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Christopher Bliss

Centre for Economic Policy Research

6 Duke of York Street, London SW1Y 6LA

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Centre for Economic Policy Research
6 Duke of York Street
London SW1Y 6LA
Tel: (44 1) 930 2963

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agricultural producers, more like other countries outside the union than those already inside. In the simplest three country case, where the joining country is identical to the rest of the world and different from the existing union, there is a real danger of trade diversion. In order to get the neutral outcome it will be necessary to cut the CET on goods which would otherwise be subject to diversion away from suppliers in the non-member towards those in the new enlarged union. This suggests that the CET should be cut in response to enlargement, except that treaties of association may already be serving to mitigate trade diversion anyway.

In many simple trade models the optimal tariff is always zero, making the question of its adjustment to enlargement trivial. Even in the traditional literature, however, various cases are recognized where a positive CET is optimal. This can happen when no intra-union policies can be designed to compensate regions or interest groups for losses associated with union membership, so that an external tariff is the only available mechanism; when the customs union has a 'chauvinistic' welfare function, preferring intra-union to extra-union trade, or pursues non-economic objectives; when an optimal tariff can be designed that exploits variability in the terms of trade with non-members; and when assumptions depart from competitive market structure.

The problem of income distribution has always been present in trade theory, which would sometimes like to ignore it for the sake of powerful results but which cannot help but show why and how it matters. The neutral case owes a lot to the implicit assumption that income can be redistributed within the union so as to guarantee that all members benefit from trade creation. In general, however, it is perfectly possible that there are no changes in prices that do not entail welfare losses for some region or interest group. Although the EC embraces mechanisms to compensate losers, it must be doubted how effective they can be. In cases where the ideal compensating transfers of pure theory cannot be applied, there will be a tendency to maintain the incomes of losing factors or interest groups by raising the CET on some factors or goods.

Many people believe that importing things is harmful to their nation and that it is better to buy domestically produced goods. The meaning of chauvinism – or, equivalently, non-economic objectives concerning trade as such – differs in an EC context according to whether it takes the form of national or Community chauvinism. This in turn makes a large difference to how enlargement affects the CET, as is illustrated by the case of agriculture. Bringing in low-cost agricultural producers enables the Community-chauvinistic desire for agricultural self-sufficiency to be realized more cheaply. With nation-chauvinism within the EC, however, high-cost farmers may press for an increased tariff to compensate for reduced agricultural prices.

The optimal tariff, chosen to take into account the effect of a country's or a bloc's trade on its terms of trade, raises intricate problems of modelling and specification. Three cases are discussed. In the first, each union member prior to enlargement has its own optimal tariff which, following enlargement, are adjusted to a CET. Coordination has an important effect here: union members considering their joint tariff take into account the effects of their own trade on the terms of trade of their partners. In the second case, the joining country had no optimal tariff prior to enlargement. If the existing customs union decides at what level to set the CET after the enlargement, it will only, but perhaps importantly, adjust its external tariff as a result of changes in trade flows with its new partner. In a final case the joining units are of medium size compared with the existing union, which acts as leader in the tariff-setting game.

Finally, the implications for customs union formation of non-neo-classical assumptions have been largely unexplored. All the above discussion has employed competitive assumptions regarding the structure of production and the passiveness of the rest of the world. But imperfect competition and increasing returns to scale are active areas of trade theory. The possibility of rent-seeking tariffs in oligopolistic markets suggests a trade-off between the benefits to domestic profits and the costs of a tariff in distorting resource allocation. Increasing returns to scale can provide a justification for protecting a firm's domestic market, but enlarging the market has ambiguous implications for the CET depending on the initial size of the industry in question.

In addition, interest in questions of bargaining strategy between trading blocs has never been higher. Some of the most interesting questions concern the negotiation of customs union enlargement with existing members and with other countries. Simplifying the US-EC quarrel over US exports to Spain, the United States wanted a neutral enlargement while the policy proposed was harmful to it. Each side threatened and took steps towards a trade war even though simple models of bargaining provide no rationale for such threats to be credible.

The question of how the CET is affected by customs union enlargement is very complicated. Numerous effects operate and may well offset each other even when, as is not always the case, each effect alone has an unambiguous direction. Some points may be singled out. First, the reasons for pre-enlargement tariffs make an important difference. Second, with a neutral enlargement the choice of the CET is virtually determined by the need to avoid trade diversion. The direction of the change in the CET in this case will depend on the structures of the existing union, the joining countries and the outside world. Third, enlargement guarantees that coordination of tariff-setting policy will be possible, and this may even be its most important consequence for the CET. Finally, enlargement can tend to imply either a higher or a lower CET, depending on the case chosen.

1. Introduction

The aim of this paper is to investigate the implications of the enlargement of a customs union (CU) for its common external tariff (CET). As far as I know this question has not been directly addressed by trade theorists, although most customs union theory impinges on it, and some existing work is directly applicable to this particular issue. For an overview of received customs union theory, see Corden (1984), pp. 122-4. There is, to quote Corden, "a vast literature" and no attempt will be made to review it here. Fortunately much of that vastness is not relevant to our present concerns. In particular, as Corden makes clear, most writers have glossed over the problem of the choice of the CET.

Beside the huge literature on customs unions there is a substantial literature devoted specifically to European union[1], the problem which more than any other application gave rise to the pioneering work by Viner, Lipsey, Meade, and Scitovsky. There has been little theoretical work on enlargement as such, partly because CU formation and CU enlargement raise almost the same issues. However there has been some important empirical work strictly on enlargement. Aktan (1985), models the second enlargement of the EEC (Greece, Portugal, Spain and Turkey), while Miller and Spencer (1977) concern themselves with the retrospective analysis of Britain's entry. This last field is surveyed by Winters (1987). These studies naturally take the structure of tariffs and of the CET as datum and do not consider questions of optimality.

It is important to consider the question of the level of the CET at any time. However as the EEC is augmented by the addition of new

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[1] On this topic see Balassa (1975).

countries the CET should in principle be reconsidered. Hence. although the questions discussed here are as old as customs unions, they are given a new urgency by the enlargement of the EEC, both by the recent addition of Greece, Spain and Portugal, and by any future addition of e.g. Turkey. Despite my confident assertion that this is an important question, I am of course aware that there is no indication that the Commission is inclined to consider it. However it may be forced to review the present CET in future negotiations within or outside the GATT.

If one had a workable theory of the optimal external tariff that theory would clearly be applicable to the issues raised by enlargement. In fact there is little work that can be applied immediately to the question of the height and structure of the CET, and for this fact there are good reasons. A not inconsiderable problem is to know how to formulate the question and how to model the problem. That seemingly trivial aspect will take up most of this paper. At the moment I am reconnoitring the territory rather than presenting a finished map. Hence the arguments which follow should be seen as suggestions for discussion rather than claims to the final answer.

Suppose that one had a theory of the optimal external tariff. Then assessing the effect of a change in the composition of a customs union would be a comparative statics exercise. However it can be a very complicated exercise. Alsc as a starting point one needs to ask why the CU will have an external tariff at all. In many of the models treated in the literature the unilateral adoption of free trade would be optimal for a single country, and hence for a CU in which side (or transfer)-payments could take place. This point is obscured by the Viner approach

to CU formation, which concentrates on world efficiency. Then, in a second-best context, if one country has tariff barriers, it may not be optimal from the point of view of world efficiency for other countries to adopt free trade. However a selfish CU need not concern itself with that issue.

Despite the above point, a common external tariff may be appropriate for any or all of the following reasons:

(a) a "chauvinistic" welfare function for the union which attaches either a negative weight to extra-union trade, or a positive weight to intra-union trade; or

(b) limitations on transfer instruments within the union; or

(c) non-economic objectives; or

(d) the standard optimal tariff argument; or

(e) non-neoclassical assumptions and bargaining.

Each of these considerations can define a model and there is plainly a taxonomy which would investigate how the size and structure of a CET is affected when combinations of these considerations interact. Rather than aiming for completeness we show below how each consideration will affect the CET when it operates alone.

In Section 2 some broad features of European Community tariff policy are reviewed to provide a background for theoretical investigations. Section 3 investigates a CU formed (whether from scratch or by enlargement) in such a way that it is neutral with regard to trade with the rest of the world. The following 5 sections discuss the consequences for the CET of, respectively, limitations on the extent to which income distribution may be directly influenced e.g. by transfers (Section 4), a "chauvinistic" welfare function or non-economic

objectives (Section 5), optimal tariff considerations when each partner previously set its own optimal tariff (Section 6), optimal tariff considerations when the country that joins was previously a passive constituent of the rest of the world (Section 7), and non-neoclassical assumptions and bargaining aspects (Section 8). Section 9 considers the application of the approach to two particular questions: the mobility of labour, and the unified market. Section 10 concludes and points out some avenues for future research. The mathematics of optimal tariffs is treated in the Appendix.

2. The Tariff Policy of The European Economic Community

As the European Economic Community (the EEC) established a customs union and not merely a free trade area, it necessarily involved the establishment of a common external tariff. Unfortunately the principles underlying that CET and the objectives which it was designed to achieve were not made explicit in the Treaty of Rome, or indeed elsewhere. Nevertheless certain points emerge from a study of the articles of the Treaty and of the negotiations which eventually resulted in concrete tariff levels.

Economists like to work with objective functions maximized subject to constraints. Hence an ideal approach to assessing EEC external tariffs would be to examine the relevant objective function and the constraints that it must respect, and to see how well the CET serves that objective subject to those constraints. Not surprisingly there are difficulties with deriving from the articles of the Treaty of Rome the kind of objective function that an economist would ideally like. Much of the Treaty is inward looking in its orientation. It requires the abolition of tariff (and quota) barriers between member countries, and

it specifically lays down that the member countries should implement a common external policy with regard to the outside world[2]. However neither does it say on what principles that policy should be founded, nor does it adjudicate between high and low external tariffs[3].

We might reasonably infer that the promotion of trade within the community is seen as a good in itself. Or we might conclude that gains are expected from trade creation and that trade diversion is not seen as a serious problem. A closer examination of the history of the EEC however provides useful information on its objectives.

First, the CET for most goods (but with agricultural goods forming an important exception) was set at the arithmetical average of the 1957 external tariff rates of the original member countries (Article 19). Something like this could be seen as a necessary requirement of avoiding conflict with the GATT, or even a trade war with the USA. It might also be interpreted as a wish to promote inter-European trade without hurting the outside world. In theory a CET at the average level of previous tariffs may be associated with serious problems of trade diversion, so the policy was by not obviously neutral with regard to the outside world.

Secondly, the EEC by engaging in tariff cutting exercises, particularly in the Kennedy Round, showed that it regarded general trade promotion as a valid objective. However this should be seen as a mutual

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[2] For a concise introduction to the institutions and regulations of the European Community, see El-Agraa (1980), particularly Chapters 2 and 3.

[3] The level of external tariffs was laid down in the Treaty, see below, without however explaining whether the formula proposed, which was based on existing tariff levels, would have remained applicable had existing tariff levels been lower or higher.

exchange of trade concessions rather than an acceptance of the benefits of unilateral freer trade. Perhaps the EEC viewed cuts in its own tariffs as a price worth paying for greater access particularly to US markets. Allowing easier access to outside imports was a price to be paid, a negative component in an overall favourable balance. A reduction in CET rates was not apparently seen as beneficial in itself.

Thirdly, the policy towards agriculture, the Common Agricultural Policy (CAP), was distinctive and avowedly protectionist in intent. As the agricultural policies of the original members of the Community were complicated and diverse, a simple tariff averaging rule was not applicable. However even if applicable it would not have satisfied the architects of the Treaty. The policy that resulted was a reflection of a non-economic objective, to promote and protect the agricultural sector. One might interpret it as Stolper-Samuelson protection to help a factor, or rather factors - in this case specific factors employed in agriculture.

Lastly the EEC showed itself willing to negotiate Treaties of Association to provide for access to its market for goods originating in countries, ex-colonies and geographically proximate non-European countries. Sometimes these countries had a special relationship with one of its members. Access was given to all member countries, and reciprocal arrangements were to apply to all member countries. As usual this policy does not uniquely reveal an objective. It could be seen as a response to political necessity, as certain signatories were bound to insist on some kind of arrangement, it was best to have a tidy system. This policy sometimes avoided severe trade diversion (e.g. from North African or Israeli vegetable and fruit production to French). On the other hand it

created other trade diversion, from the produce of non-associated countries to that of associated countries.

In general it is difficult to infer an objective function unambiguously from the history and actions of the EEC. In the case of agriculture, however, the policy appears to be the combination of a non-economic objective, the promotion and preservation of agricultural activity and the incomes of factors engaged in it, and a preference for price support over direct subsidy. In the latter case, although the major consideration may not be an objective as such - but rather a pessimistic assessment of the costs of alternative taxation instruments which could in principle achieve the same end - it is difficult to credit the view that the lump sum burden of (e.g.) a VAT would exceed the lump sum burden of severe agricultural price inflation.

When the first enlargement of the EEC , which brought in Britain, Denmark and the Republic of Ireland, took place, the principle of tariff averaging was not applied. Rather the joining countries adjusted their external tariffs to accord with the existing CET. The same principle will be applied with the second enlargement, which is now under way. As the relationship between the CET and the tariffs of the joining members is entirely different in the two cases, it is difficult to see that any principle is being applied beyond the time honoured principle of administrative simplicity.

3. A neutral customs union

The idea of a customs union that would mainly benefit its members by virtue of its trade creation and would not harm the rest of the world fits naturally into traditional CU theory. That theory tended to identify this case with a non-trade diverting union with given external

tariffs. See e.g. Balassa (1967) and Cooper and Massell (1965). However Ohyama (1972) introduced the idea of a tariff compensating customs union, which 'sets its common external tariffs so as to preserve the same volume and composition of net trade with the rest of the world as occurred before it was formed'. The elementary proposition of Kemp and Wan (1976) embodies the same idea. These authors showed that a customs union can always be world Pareto improving if the external tariff is adjusted so as to leave trade with the rest of the world unaffected by enlargement[4]. Such a neutral customs union will benefit its members provided only that there are gains from trade to be reaped by the joining countries even when trade with the rest of the world is held constant.

Definition 3.1 A customs union will be said to be Ohyama/Kemp/Wan neutral, or neutral for short, if after its formation, including the setting of the CET, its total net trade with the outside world is the same as it was prior to the formation of the union.

The countries of a neutral CU enjoy gains from increased trade and trade diversion is avoided. However a customs union enlarging itself may not wish to avoid welfare losses to the rest of the world, still less to freeze trade flows, which is what the a neutral CU entails. This is partly a question of objectives - i.e. how self regarding is the CU? - and partly a question of constraints. The CU may wish to avoid provoking retaliation from the outside world. Nevertheless, a neutral union can usefully be considered as one step in a multi-step implementation of enlargement. Specifically:

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[4] See also Dixit and Norman (1980), pp. 191-4, and Woodland (1982).

(1) The CU first enlarges in the neutral manner; and

(2) The external tariff is then adjusted to the optimum subject to the constraint that the welfare of the outside world[5] - but not necessarily net trade flows - is not to be worsened; and finally

(3) The external tariff is adjusted to the selfish optimum from the point of view of the union. At this stage the outside world may be harmed.

It turns out that it is sometimes possible to show what the implications for the CET are of each of these steps, but less often possible to be certain what the sum of the three steps will be. In any case even the individual steps sometimes require a taxonomy. However, as is often the case in economics, when a complex step can be broken down into simple components, this approach is helpful in throwing light on the implications of a CU for the eventual CET.

The Kemp/Wan argument goes as follows. A general equilibrium of the union countries has net trade with the rest of the world as an initial endowment. Associated with that endowment will be a vector of shadow prices, which will be different in general from the prices at which the goods are traded with the rest of the world. The difference between the two sets of prices define the CET of the union.

What can be said about the formation of a neutral customs union? If we look for example at the rate of tariff on a particular good, under

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[5] In general the constraint may require that no single country in the outside world should be harmed, or it may require that some aggregate measure of outside world welfare be not compromised. As we always aggregate the outside world into a single country this distinction never arises in the present paper.

what conditions will it rise or fall under the formation of a neutral union? It is useful to set the scene by looking at two very simple special cases. Consider a world of three countries, A,B and C. At the start all countries have external tariffs, possibly for the reasons detailed in Section 2. Then A and B unite and abolish all tariffs on trade between them.

Example 1: A and B are identical.

This is not a very plausible case for an economic union but may be more plausible if political considerations dictate the formation of CUs. In any case this example is simple to analyse. Note first that, neglecting scale effects, which we do at this point, the abolition of internal tariffs has no effect, as A and B cannot gainfully trade with each other. Hence no adjustment to the external tariffs gives the neutral outcome at once.

Example 2: B and C are identical.

This is another extremely simple case, but an important one to consider as it represents an aspect of real CU formation. Sometimes, to some extent, the joining country(ies) is from the economic point of view just a part of the outside world. When CUs are formed in this way there is a real danger of trade diversion. In order to get the neutral outcome it will be necessary to cut the external tariff on goods the trade in which would be diverted when the union is enlarged. However it will not be cut to zero. The opening up of more trade between A and B will be an addition to the trade which will still take place between A and C (which used also to take place between A and B).

Can one derive from the neutral customs union case a theoretical argument in favour of the averaging procedure of the Treaty of Rome? The

strict answer is obvious, nothing is likely to justify an arithmetic average of tariff rates. However might a weighted average of some kind be indicated? Fortunately the theory of the neutral CU is rather easy to develop, so we can usefully attack this question.

Consider an individual country. We assume that income can be costlessly transferred between its citizens without affecting economic decisions. Hence national welfare is a utility function of net national consumption $\underline{x}$.[6] This is equivalent to assuming community indifference curves and is not a good assumption for well-known reasons. However we weaken this requirement in Section 6 below. The vector of net national production will be $\underline{y}$, and the country will have given net imports from the rest of the world denoted by $\underline{m}$. Tariffs are not represented directly but emerge from the maximization of national welfare as differences between shadow prices on net import levels and world prices, assumed constant for the time being. The production function is $f(\underline{y})$. The maximum level of national welfare may now be depicted as the solution to:

$$\begin{aligned} &\text{Max} && U(\underline{x}) && ; \\ &\text{subject to:} && \underline{y} \geq \underline{x} - \underline{m} && ; \qquad (3.1) \\ & && f(\underline{y}) \geq 0 && . \end{aligned}$$

In solving (3.1) $\underline{m}$ is treated as a constant. Clearly the level of welfare attainable depends on $\underline{m}$ and may be written:

$$V(\underline{m}) \quad , \qquad (3.2)$$

where $V(.)$ is a concave function the partial derivatives of which give the shadow prices of imports and hence the structure of tariffs.

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[6] Throughout the rest of the paper we denote vectors by underlined Roman letters and scalars by plain Roman letters.

Now consider two countries A and B forming a CU. They start with indirect welfare functions $V^A(\underline{m}^A)$ and $V^B(\underline{m}^B)$ and net import vectors $\underline{m}^A$ and $\underline{m}^B$. For a neutral CU they pool their import vectors but must hold the total constant. This depends upon assuming that there can be intra-union transfers of income as required. Let the V(.) functions be so chosen that the union wishes to maximize their sum. There is no loss of generality here, as the orderings entailed in the functions could have any representation. Then the union solves the problem:

$$\text{Max} \qquad V^A(\underline{m}^A) + V^B(\underline{m}^B) \quad ;$$

$$\text{subject to:} \qquad \underline{m}^A + \underline{m}^B \geq \underline{m}^A{}_0 + \underline{m}^B{}_0 \quad ; \qquad (3.3)$$

where $\underline{m}^A{}_0$ and $\underline{m}^B{}_0$ are the original pre-union net import levels of A and B respectively.

This is rather a familiar type of problem. The V(.) functions are very like ordinary functions and the $\underline{m}$ vectors are very like consumption baskets (only note that consumptions can be negative). When the functions and the consumptions are pooled we desire to maximize total utility. Naturally consumptions are reallocated so as to equalize marginal utilities, then the common marginal utilities are shadow prices of goods, the same for both units. In the CU case we end up with a CET.

The increase in total community welfare as a result of the union can now be written:

$$V^A(\underline{m}^A) + V^B(\underline{m}^B) - V^A(\underline{m}^A{}_0) - V^B(\underline{m}^B{}_0), \qquad (3.4)$$

where $\underline{m}^A$ and $\underline{m}^B$ are the net imports from the rest of the world of the two countries after the CU is formed and $\underline{m}^A{}_0$ and $\underline{m}^B{}_0$ are the equivalent values before the CU is formed. By the mean value theorem (3.3) can be written:

$$\underline{v}^A{}_m(\underline{m}^A - \underline{m}^A{}_0) + \underline{v}^B{}_m(\underline{m}^B - \underline{m}^B{}_0), \qquad (3.5)$$

where $\underline{v}^A{}_m$ and $\underline{v}^B{}_m$ are vectors of partial derivatives of respectively the V^A and the V^B functions with respect to components of $\underline{m}$, evaluated at points chosen to satisfy the property asserted by the mean value theorem[7]. In other words, the vectors $\underline{v}^A{}_m$ and $\underline{v}^B{}_m$ are shadow price vectors but not the shadow prices of either the equilibrium prior to the formation of the CU, or of the equilibrium after the formation of the CU.

Notice that:

$$(\underline{m}^A - \underline{m}^A{}_0) - (\underline{m}^B - \underline{m}^B{}_0) = 0 \quad . \qquad (3.6)$$

Thus the present approach confirms the claim advanced above, that there was no gain from the creation of a neutral CU in Example 1. As the vectors $\underline{v}_m$ are the same for A and B, (3.6) implies a zero gain. In general there is more gain the further apart are the shadow prices $\underline{v}_m$, which is to say the further apart are original trading patterns if the countries are otherwise identical. Hence a sharp difference in shadow prices indicates that the countries can gain considerably even if the union is required to be neutral.

Consider now the case of two traded goods. In this case we can justify a natural intuition based on the analogy to a utility function of consumptions, that would run as follows. If two consuming units are combined and consumptions are reallocated they will be taken from the unit with a low marginal utility and given to the unit with a higher marginal utility. Hence marginal utilities will be equalized and their eventual values will lies between the values that they previously took in the two units. Translating back to the CU case, this conclusion says

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[7] Notice that a point at which the mean value theorem condition is satisfied lies somewhere on the line joining $(\underline{m}^A{}_0, \underline{m}^B{}_0)$ and $(\underline{m}^A, \underline{m}^B)$.

that final tariffs for a neutral union will be an average of pre-CU tariff levels. Of course this average is not derived from any particular formula and is certainly not an arithmetic average. However we have derived some justification for the view that a CU should average out its external tariff levels.

Unfortunately this result does not generalize. Indeed it is a well known feature of price theory that the simple properties of the two-good case do not all generalize even to 3 goods[8]. The reason is that the off-diagonal terms of the Jacobian matrix of a concave utility function can only be negative when that matrix is 2 by 2. However in higher dimensions there are richer possibilities.

A silly but clear example will explain the point that the formation of a CU may raise the shadow price of a net import above the level that ruled in either country before the union, in which case the CET may have to rise sharply to avoid a growth of imports, as required by the neutrality assumption. Suppose that neither country can produce any good in the category motor vehicles and accessories. Both countries import some cars, A also imports tyres but no fan-belts, while B imports fan-belts but no tyres. Prior to the union cars are of little use as they soon wear out their tyres or their fan-belts. When A and B pool their net imports the marginal utility of the import of a car rises greatly in both countries and hence in the union.

It seems then that the case of a neutral CU is a useful reference case. However except in simple or special cases it is hard to say exactly what the effects of a even a neutral CU will be. There is some

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[8] See Hicks (1939).

support for the view that neutrality is related to pre-union tariff averaging but this is certainly not always the case.

Following the formation of a neutral CU there will typically be gains to be had from adjusting the CET. The elegant simplicity of the Kemp/Wan method is that the issue of price, or terms of trade, changes is avoided. Since a net trade vector m is held constant and since that vector by definition was consistent with the balance of trade constraint of the union, price changes do not arise. However a new m could now be chosen by the union from a set of balance of trade feasible net trades. Alternatively, if the CU is large and there are large units in the outside world, a bargaining game may follow in which the CU and the outside world (or part of it) bargain over what the eventual net trades will be.

How does the argument concerning the neutral CU that has been rehearsed above apply to the enlargement of the EEC, particularly to the second enlargement, i.e. the addition of Greece, Spain, and Portugal already - and more to come supposedly. First notice that the EEC by negotiating treaties of association (e.g. with Israel and Turkey) already takes steps to mitigate trade diversion, which is a potentially serious cause of harm to the rest of the world. Broadly speaking the joining countries will be high cost manufacturers and low cost agricultural producers, more like the outside than the already inside, to put it simply. Hence the B and C are identical case is the nearest gross simplification. However the joining countries already had the benefits of treaties of association. The conclusion will then be that with enlargement the external tariff should be cut, except that treaties of association may be achieving this end already.

4. Income distribution

One of the problems to which this section is devoted is well explained by Corden:

> "One other aspect of the CET must be mentioned, namely the disposition of the tariff revenue. This is an important matter as all observers of the European Economic Community know, but there has not been much theory about it. The models all assume that the revenue is redistributed to the partners in proportion to their absorption of C's imports. But, of course, in the absence of such full automatic redistribution, the welfare effects on the partners separately cannot be analysed without adding the effects that follow from formulae for the use and distribution of the tariff revenue." (Corden, op. cit. p.119)

One might add that this is only one example of the problems for enlargement theory which arise when income cannot be, or will not be, redistributed to compensate losers.

A parallel problem arises when factors or groups inside a country will lose from enlargement and no compensation will be forthcoming. Indeed the beautiful simplicity of the neutral enlargement of Section 3 owed a lot to the implicit assumption that income could be redistributed between groups within partners, and between the partners themselves, to guarantee a Pareto improvement. In fact the EEC embraces mechanisms to compensate particular losers. It must be doubted however how generally effective these mechanisms can be, particularly in the future with a seemingly unending budgetary crisis.

Consider a newly enlarged union. In the initial state two groups of producers and consumers belonging to different nations will be

trading at different prices, because they have only just become partners in the enlarged CU. We might rule out lump-sum transfers between countries or individuals entirely, as is done by Diamond and Mirrlees (1971) in their well-known model of optimum indirect taxation. With no transfers permitted the welfare of individuals and groups depends upon their indirect utility functions, that is upon the prices that they face. Then it is perfectly possible that there will be no changes in prices which will not entail welfare losses for some group, even for a whole nation. In the Ohyama/Kemp/Wan analysis this problem was taken care of by transfers, so that we only needed the possibility of the Pareto improvement, which certainly exists if initially different agents do not trade at the same prices, to ensure that we could get to an overall improvement.

Of course, to assume that the CU, or its enlargement, cannot overcome these problems, and that they are too serious to be ignored, is to make nonsense of the idea of economic benefits from trade creation within the CU. So let us assume that they can be overcome at the neutral enlargement stage. Even given this assumption, however, a parallel problem may well arise at the later stage of CET adjustment. In most of this paper the CU is treated as a unit so that, for example, the tariff that is optimal for one is optimal for all. For this to be strictly the case we shall require intra-union transfers again. Otherwise the import tariff on steel that is good for the union is general may be bad for steel-using exporters struggling to compete.

The most famous tariff based on the impossibility of transfers is the Stolper-Samuelson factor price boosting tariff. We can take a not unrealistic example of his type of effect if we imagine that the CAP is

partly designed to boost the incomes of "farm" factors. The effect of enlargement on such a tariff depends on the structure of the original country, the joining country and the rest of the world.

To be specific, assume that Europa enlarges by admitting Iberia to its CU. Europa is not well-endowed with agricultural factors and has protected its agriculture, so agricultural prices are relatively high. Iberia is well-endowed with agricultural factors and its agricultural prices are low. At the neutral enlargement stage agricultural prices must become equal throughout the union and trade with the rest of the world will remain the same. In the absence of compensating transfers, agricultural factors in Europa must lose. The CET for agricultural produce will probably need to fall to preserve trade with the rest of the world. However in any case European farmers will have lost from the fall in the internal prices of agricultural goods. When the stage for the reconsideration of the CET arrives there will be pressure to compensate European agricultural factors for their losses from the enlargement by raising the CET against outside agricultural imports to inflate agricultural prices in the enlarged CU. The tariff required to compensate European farmers will be higher than the pre-enlargement tariff. The above example is just an example but it illustrates the point that where income effects cannot be neutralized by transfers they will inevitably affect the CET.

5. Chauvinism and non-economic objectives

Many people believe that importing things is harmful to their nation and that it would be better to buy domestic goods, and sometimes governments seem to share this view. It is not clear however how such considerations should be incorporated into a formal model. Probably the

chief influence at work here is the opinion that imports take jobs from workers in the home country - i.e. cause unemployment. To strictly include unemployment we would have to construct a fix-price model or something equivalent. However perhaps there is no need to do so. A wish not to harm workers by causing them to become unemployed and a wish not to force them to take a lower wage rate to compete with imports come to much the same thing, and the latter leads to the Stolper-Samuelson protection already discussed in Section 4 above.

We have shifted the argument from generally held views of individuals to government intervention. Why, if individuals recognize that importing Japanese goods takes work from their countrymen, is protection necessary? One possibility is that individuals feel that their own purchasing decisions make no material difference, but would like their government to enforce collective compliance. A similar situation arises when someone deposits litter because his own contribution to the stinking mound makes no measurable difference, while the same person would strongly favour savagely deterrent fines on throwing litter being applied to all.

If chauvinism is to be admitted as an effect independent of income distribution problems, it will have to be a rather unattractive position. Nevertheless, as it is not difficult to analyse, we may as well look at it. In Section 3 above, where we studied neutral enlargement, we have already developed a framework which can be extended to pure chauvinism - a simple dislike of imports. There we worked with the indirect welfare function defined over imports V(m). We saw imports as a good which the constraints of the problem did not allow to be indefinitely expanded. We must keep imports as an indirect good, but we

may note that many undoubted goods, such as garlic, have their bad side-effects. The utility function, direct or indirect, measures the balance of good and bad effects. Hence our functions V(m) as they stand may already incorporate chauvinism.

How is the argument concerning a neutral enlargement affected by this extended interpretation? Plainly we cannot merely rehearse the same argument noting that the V(m) functions include the effects of chauvinism on tastes. After enlargement people, presumably, and in any case governments, are meant to exclude chauvinistic feelings towards their new partners. To treat this we would need to establish a more complicated objective function as:

$$V(\underline{m}^F, \underline{m}^S) \quad ; \qquad (5.1)$$

where $\underline{m}^F$ and $\underline{m}^S$ stand for respectively imports from friends and imports from strangers. Before enlargement, to keep things simple, $\underline{m}^F$ might be zero for both partners. When they have joined each other the union solves a problem of the form:

$$\text{Max} \quad V^A(\underline{m}^I, \underline{m}^A) + V^B(-\underline{m}^I, \underline{m}^B) \quad ;$$

subject to: (5.2)

$$\underline{m}^A + \underline{m}^B \geq \underline{m}^A{}_0 + \underline{m}^B{}_0 \quad ;$$

where $\underline{m}^I$ represents intra union trade flows measured as imports into A[9]. At the neutral enlargement stage this makes little difference, as the constraint in (5.2) keeps total imports into the union constant. However the price system that results now includes an additional tariff element. Because now $\underline{m}^A$ and $\underline{m}^I$ (or $\underline{m}^B$ and $-\underline{m}^I$) are no longer perfect substitutes, they will have different shadow prices. After the

[9] On this interpretation of the problem the two countries can cleanse goods of their foreignness by importing them from the rest of the world and reexporting them inside the union.

constraint is relaxed and the union can reconsider its trade, it goes without saying that chauvinism will discourage trade, which we may interpret as a higher CET.

Non-economic objectives (NEOs) are a reason for tariffs only when other instruments such as subsidies are ruled out. On this see Corden, op. cit., 6.6. An exception to this proposition is encountered when the non-economic objective concerns trade as such (e.g. a self-sufficiency objective), however in practice this is indistinguishable from the chauvinism already discussed. In the context of EEC enlargement it is important to look at NEOs because the Common Agricultural Policy is a striking example of the importance and power of this case. We shall concentrate our discussion of NEOs on the CAP which will serve as the typical case. In fact most examples of NEOs share similar features.

We may take it therefore that the CAP reflects the NEO of promoting agricultural activity, seen as an activity generating non-economic but vital external economies. In a detailed examination of the CAP as such it would be necessary to refine this assumption considerably. Confusion concerning various and distinct objectives has bedevilled the CAP from its birth. Is it output that generates the external economy; or cultivated area; or profits in farming; or employment of factors; or, finally, is it family farming? For our present purposes, which are only illustrative, we may assume that the size of the domestic agricultural sector measured by output is what matters. This is what the CAP mainly promoted, much more than family farming, for example.

We must accept that a direct subsidy of agricultural production with consumers enjoying low prices is infeasible, for otherwise we can

make no sense of the CAP as a policy response to a NEO. Then tariff and quota protection is a possible policy, albeit a second-best response, to achieve this NEO. How is this case affected by enlargement?

To answer this question we need to refine the assumptions somewhat. Compare two different cases. In the first citizens of the EEC countries (or their governments) like to feel that there is farming going on somewhere in the EEC. They would hate it, for example, if too much of their food came from the USA, and they would not like it even if it came from European countries outside the EEC. In the second case, each constituent country has an independent NEO in favour of agriculture. Germany, for example, sees agriculture as an important part of its own national life and culture.

According to which of the above two cases applies we reach different conclusions. Suppose, for the sake of illustration, that Spain were mainly an agricultural producer[10]. Then enlarging the union by the addition of Spain achieves the NEO of having a large domestic agricultural sector at a lower cost than protecting Northern agriculture. Indeed part of the protection prior to enlargement had the effect of keeping out Spanish produce. This was true to some extent even though Spain had a treaty of association with the EEC before it became a member. After an enlargement which brings in Spain, less protection, a lower CET, will probably be necessary to achieve the same NEO.

Unfortunately this first case does not look very realistic. The telling example of Germany's objectives was intended to suggest that individual countries do indeed have their individual NEOs. In this case we reach a conclusion parallel to the income distribution effect

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[10] In fact this is far from being the case.

discussed in Section 4 above. When German farmers have to compete with Spanish farmers they will want, and a super-national objective function which includes national NEOs will respect this wish, to have additional protection from imports from outside the CU to keep German farmers in business. In this case enlargement might well lead to a higher CET on agricultural imports.

6. The optimal tariff: each partner has its own OT

By the optimal tariff (OT) will be intended the tariff which exploits the variability of the terms of trade with the rest of the world of a trading country or block. The OT provides another reason why the countries that merge to form the CU (or to enlarge an existing CU) may have had tariffs in place beforehand. In the present and following sections we examine the consequences of enlargement for the size and structure of an OT. Enlargement may be treated either as the union of two previously independent units, each one setting its own OT, or as the detachment of part of the outside world to augment the union. We shall consider each of these cases, the former in the present section, the latter in the next section.

The first type of enlargement that we consider takes place in a world which consists of 3 countries or groups of countries, denoted A, B and C. For convenience they will be called countries. The CU is formed, or enlarged, by the merging of A and B, so C is the rest of the world. It is not immediately obvious how to model the behaviour of A and B prior to the formation of the union. Unless one is assumed to be small, they must assume something about the other when they set optimal tariffs.

Where a single country A sets an optimal tariff, the formula derived in the Appendix applies. The optimal tariffs are:

$(z^A - \underline{x}^A).[M_p{}^C]\text{-}1$; (6.1)

where z is production and x consumption of goods 2 to N in country A, and $[M_p{}^C]\text{-}1$ is the inverse of the Jacobian matrix of demand to price responses for C.

Where two countries, A and B, set OTs, we distinguish two cases. In the first case A is a leader, who sets tariffs to which B responds by setting his own tariffs. B is a follower, who reacts to whatever tariffs A has set. Then A takes B's reaction, which may be calculated, into account when deciding what tariffs to choose. A is the Stackelberg leader and B is the follower. In the second case both countries assume that the other will hold to certain tariffs and each then selects optimal tariffs. We examine the Nash equilibrium in which the countries would each choose the tariffs assumed by the other.

Both cases need careful treatment to take into account technical problems that can arise in this type of game. Details are therefore relegated to where they properly belong, the appendix of this paper. To summarize the findings, the Stackelberg case is better behaved, in the sense that an equilibrium always exists, while for the symmetrical Nash case even existence is problematic. However, if we assume for the sake of discussion that a unique solution exists to both problems, then a common conclusion applies to them both. This is that the outcome will be inefficient in the sense that a coordinated setting of tariffs by A and B, jointly exploiting C, could benefit them both.

The reason is that when they act in an uncoordinated manner the countries A and B do not fully take into account the effects on the

prices paid by the other consequent upon their own purchases or sales. This is obvious in the Nash case. Equally, in the Stackelberg case, although A, the leader, will take into account the effect of his tariff setting on B's choice of tariffs, he does not take into account the effect on B's welfare of price changes induced by his - A's - actions. In the simple case in which both countries both export one good to purchase another single good[11], the countries "trade too much", because part of the cost of the deterioration in the terms of trade falls on the other country. When the two countries coordinate their policies, they improve, as usual, upon the Nash equilibrium, or upon the Stackelberg equilibrium as the case may be. With cooperation in a CU, the two countries will trade more efficiently. In the simple case of two goods, this corresponds to setting a higher CET.

7. The optimal tariff: the joining country was passive

Now consider a different case with a different conclusion. Suppose that initially there are two countries: A, which is an active optimal tariff setter, as above, and C, which is passive, again as above. Now assume that a certain fraction of C breaks away and forms a CU with A. To be specific, we may suppose that C previously consisted of many identical countries. A fraction s of C which will be denoted B (but note that B is a fraction of C and identical to the rest of C) now joins an enlarged CU consisting of A and s of C. The eventual consequences of

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[11] Consider the two countries as choosing tariff vectors $\underline{t}^A$ and $\underline{t}^B$. Suppose that the coordinated welfare maximizing vectors would be $\underline{t}^{A*}$ and $\underline{t}^{B*}$. In general all these vectors may have negative components, and in any case comparisons of them raise the usual index number problem. The inefficiency of an uncoordinated equilibrium follows from the fact that uncoordinated maximization will not support the optimum.

this change for the OT are quite complex, and we shall again analyse the change in stages.

In the first stage B simply adheres to A without a rearrangement of trade and exchange. Hence the same exchange occurs with A as occurred before when B was outside the CU. Neither A nor B, nor at this stage the remainder of C, suffers any loss, but equally they do not gain. Now A reconsiders its CET with the remainder of C. Before B joined the CU, A was solving a problem of the type[12]:

$$\text{Max} \quad V^A(\underline{p}^A, y^A) \qquad ; \qquad (7.1)$$

$$\underline{p}^A, y^A, \underline{p}$$

subject to:

$$z^A(\underline{p}^A) - x^A(\underline{p}^A, y^A) + p.[z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A)] \geq 0 \; ; \quad (7.2)$$

$$z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A) - \underline{m}^C(\underline{p}) \geq 0 \quad ; \quad (7.3)$$

Notice that $\underline{p}$ may be perturbed at will provided that an adjustment to p^A and y^A accompanies it to ensure that (7.2) and (7.3) are satisfied. Furthermore at a maximum there must exist feasible perturbations of this type such that in the limit, as the scale of the perturbation becomes arbitrarily small, the value of the programme is unaffected. Indeed a maximum is defined by the property that for all feasible perturbations the rate of change of the objective function shall be non-positive.

Now consider a perturbation with the property that the objective function is unaffected in the limit, denoted $D\underline{p}$ and Dy; where Dp refers to the perturbation to Dp^A, and Dy refers to the perturbation to Dy^A. Clearly the perturbation $(1-s)D\underline{p}$ and (1-s)Dy will now be feasible for the enlarged CU which now includes a fraction s of what was previously

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[12] See the appendix.

C. This is because C has now been scaled down to (1-s) what it was before. However so long as B remains a non-participating member of the CU, in the sense that it exchanges with A just as it did when it was outside, the conditions for optimal p and y from A's point of view are unaffected. Hence a mere enlargement of the CU in this case has no effect on the optimal CET.

In case this result seems surprising, it may be checked by examining the first order conditions for a maximum. We leave this for the interested reader.

Of course we cannot allow that B's role in the CU will be that of an inactive member of a club. There would be no economic point in its joining and being allowed to join were that to be so. And even if the motivation for the enlargement was originally political, a situation has now been created in which A and B will have possibilities for gainful trade between themselves which could not be exploited when B was outside and had to treated exactly as the rest of C. So let A and B now exploit their gains from trade and now A reconsiders the CET again. We saw previously that when B simply came in and went on trading as if it were still outside, that the effect of the change was to make C smaller but to leave the same set of feasible perturbations in place. That remains the case after A and B have traded more with each other. However two additional effects are now in operation.

First A's marginal utilities for imports from C will tend to decline because it will have enjoyed the advantages of additional trade in the same products with B. Because a fraction of C is identical to C there must be a tendency to trade diversion. This will lead to trade discouraging changes in p and q, which is equivalent to a higher

external tariff[13]. The reason why trade is discouraged is that with lower marginal utilities of imports, the terms of trade changes at the margin become relatively more important.

Secondly, there is an income effect, as A's welfare, and B's too presumably, are increased as they gain from trade with each other. This effect mitigates the negative effect on trade detailed above but cannot dominate it. Even if the import from C is a very superior good, A and B by trading with each other cannot become so hungry for imports from C that their marginal utilities for these imports increase.

The net conclusion then is that a CU enlargement in which an undifferentiated fraction of the rest of the world is detached and joined to the original union, will result in an increase in the optimal CET chosen on terms of trade grounds.

8. Non-neoclassical assumptions and bargaining

This final substantive section of our paper will consider what is, at least in the context of CUs, mainly unexplored territory. As there is quite a lot of relevant analysis and not a few issues that may be introduced, the treatment must inevitably be cursory. However it is important to note the existence of this matter, for without noting that it exists the argument would be seriously biased.

All the above analysis has been "competitive" in two separate respects. First, the underlying production model has been competitive. We have, it is true, employed general production constraints. However

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[13] Our way of investigating the problem through choice of prices and quantities subject to constraints means that tariffs are not directly chosen. Also as no distinction exists between tariffs and export subsidies, it makes sense to look at the effect on the extent of trade and to identify a decrease in the extent of trade with a higher CET.

shadow prices for production have been identified with internal prices. Secondly, the rest of the world, Country C as it was usually named, has been like a collection of uncoordinated atomistic units. The CU has had to calculate how C will react to what it, the CU, does, but has not been involved in bargaining with C.

The trends in current economic theory run against all this. Imperfect competition and increasing returns are active areas in trade theory - see for example Brander and Spencer (1984) and Krugman (1984) - and interest in bargaining and questions of strategy has never been higher. The eventual implications of these trends for customs union theory mostly remain to be explored. Here we consider only some obvious points.

First, in connection with CU enlargement, some of the most interesting questions concern the negotiation of the enlargement of the CU with prospective members and with the outside world. Most of these questions lie outside our analysis, which has followed much of the literature[14] in taking the composition of the CU as given and the outside world as passive. This seems reasonable. One could imagine a United States less in favour of European union than was the actual administration at the time trying to kill the EEC at birth by initiating a trade war, but it is much more likely that such a threat would apply if at all to the trade policy of the CU rather than to its existence in any form.

In this connection the quarrel between the US and the EEC over US exports to Spain following enlargement is interesting. To put the US position simply, one might say that the it wanted the enlargement to be

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[14] For an exception see Johnson (1965).

neutral, at least with regard to itself, whereas the policy proposed was harmful to it. What then ensued is instructive. Both sides threatened and took steps towards a mutually harmful trade restricting war. Simple bargaining theory would say that such threats can never be credible. According to that reasoning a country will never do something that harms itself, such as the tariff on edible oils proposed by the EEC, simply to avenge a harm done by another. However simple bargaining theory may well be too optimistic here.

It is indeed a striking feature of tariff reductions - which can stand here for any reductions in constraints on trade - that they are typically negotiated in conferences, such as the GATT[15]. This underlines the recurrent problem in CU theory that it does not explain why the countries involved do not adopt unilateral free trade. The optimal tariff models would help here - see Wonnacot and Wonnacot (1981) - as they provide a reason why coordinated reduction in tariffs may be gainful where unilateral reduction would not be. However it is difficult to believe that negotiation of tariff reduction is necessary only because of terms of trade effects. The ideology of "fair trade", according to which we should adopt free trade only if others play fair too, is too influential to be ignored.

One possibility to consider is that for various reasons the tariffs that countries and blocks levy are optimal for them given their objectives and in the second-best circumstances in which they find themselves, and assuming the tariffs of others to be immovable. This leads to a familiar inefficiency outcome due to lack of coordination. Each country is optimizing taking the other's policy as given. Together

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[15] This point has been emphasized by Brander and Spencer (1984).

they can improve by jointly reducing tariffs. We have seen this type of result in operation in Section 6 above.

To see how imperfect competition and increasing returns to scale affect the results for CU enlargement we consider two particular models by way of illustration. Imperfect competition is most easily modelled as oligopoly. The essential point of the model of Brander and Spencer (1984) is neatly summarized by its authors:

> "Protection can shift some profit from foreign to domestic firms, and in addition, tariffs can transfer foreign rents to the domestic treasury in the form of tariff revenue. There is some cost in that markets are further distorted, but it is clear that, from a purely domestic point of view, protection is likely to be an attractive policy. A non-cooperative international equilibrium will involve such tariffs." (Ibid. p.194)

An important point for CU theory emerges again from this clear summary of an argument that is complex in its detail. The enlargement of a CU guarantees the establishment of a cooperative equilibrium which might in principle come about by negotiation, but may in fact be hard to achieve by the latter route. What are the implications for the CET of Brander-Spencer rent-shifting tariffs? The formal structure is very similar to the optimal (terms of trade) tariff setting of Section 6. In each case there is trade-off between national benefit consequent upon a tariff and a cost in terms of distortion imposed by the tariff. Again, the nature of the initial equilibrium is not immediately clear and some assumptions have to be chosen to obtain a definite result.

With the OT the amalgamating countries traded too much with the outside world prior to enlargement because they did not take into account the effect of their policies on the other's terms of trade. After enlargement the CET therefore tended to be larger. The external effects involved in the rent-shifting case are similar. If A taxes imports from a monopolist located in C in order to shift rent, B tends to gain. The monopolist will sell less to A, and will consequently have a lower marginal cost of production from which B will benefit. Hence A and B acting non-cooperatively levy lower rent shifting tariffs than they would do if they acted jointly in a CU.

Next consider increasing returns to scale. Krugman (1984) has shown how with increasing returns to scale it may be rational to protect the domestic market for a good, because this allows domestic production to benefit from economies of scale and even promotes exports. As usual this benefit may be offset by the costs of distortion as domestic consumers may pay a higher price for the protected good[16]. With enlargement the domestic market is increased in size and economies of scale are larger with a given CET. This argument was often employed when the debate for and against UK entry to the EEC was being rehearsed. It was much favoured by politicians and tended to be dismissed by economists - at least by those who were not card-carrying advocates of UK entry.

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[16] Domestic consumers must pay a higher price if the protection is required as a permanent device to achieve the desired result. The same would not be true of the effect of the protection is to tip the world equilibrium towards a scale-based comparative advantage in favour of the home country for the good concerned.

The neutral enlargement of a CU will automatically increase the size of the domestic market. It does not follow that this will mitigate against export promoting protection. For any particular industry it could go either way. The motor vehicle industry may enjoy such a large domestic market in an enlarged CU that it is no longer necessary or worthwhile to protect it to the same extent. However the aircraft industry, which was too small before enlargement to qualify for export promoting protection, may now begin to qualify on account of it greater size.

We emphasize again that this brief review of non-neoclassical models and their implications for CU enlargement and the CET has been very cursory. There are numerous models and each has to be evaluated for its implications for the CU enlargement question. Here we have considered just two models chosen for their illustrative power[17]. Nevertheless some clear principles do emerge. In particular, we see that the point that CU enlargement creates the conditions for a cooperative equilibrium emerges as an important conclusion in this context.

9. Applications: labour mobility and the unified market

As our basic framework is rather general, we may apply some of our findings to particular questions. In the present section we briefly consider two such questions, both of which arise more generally from an examination of the development over time, including the enlargement, of the EEC.

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[17] Also we have only looked at the basic model in each case and have ignored interesting developments.

At an abstract level, labour mobility[18] is similar to the export or import of a good. The detail is different, of course. For instance, labour may migrate for a long time and spend a large fraction of its income in the host country. However the similarities are more notable than the differences. The fundamental concepts of trade creation and trade diversion still apply, and the notion of a neutral enlargement is valid for this case as for standard goods trade. We may translate the tariffs that have been employed in our argument above to quotas or regulations that apply to e.g. the entry of Turkish labour (assuming Turkey still outside) to work in the community.

In so far as the joining countries of the second enlargement are going to provide labour services that will be exported to the rest of the community, there is a serious problem of trade diversion. This would lead to the conclusion that for a neutral enlargement the barriers on entry of non-EEC labour should come down as the community enlarges. However the community is unlikely to want to enlarge in a neutral manner where this case is concerned. The case of chauvinism becomes horribly realistic and serious in this case and one should note the negative consequences for in-migration of non-EEC labour. As far as optimal terms of trade discrimination is concerned, the case of Section 7 is perhaps most directly applicable. Barriers to the inflow of labour to the enlarged EEC should probably rise, although until more exchange takes place within the enlarged EEC, no adjustment is required.

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[18] The mobility of other factors, including capital, raises similar issues. However we concentrate on the case of labour, leaving the reader to examine generalizations, and problems with generalizations, to other factors.

The unified market is planned for January 1993 and, even if incomplete at that date, will involve a number of far-reaching changes to taxation, and the removal of various inhibitions to factor and goods mobility within the community, such as differential safety and standards regulations. It is not entirely clear how these changes should best be modelled. At the simplest level one might argue that the unified market will be no more than an extension of the removal of tariff and quota restrictions that automatically accompanies the accession of a member to the community.

It could even be maintained that the community will become "enlarged" by virtue of establishing a single market and that the implications for the CET will be similar to those rehearsed above. Even if true, this conclusion is too vague. One needs to know which of the various cases and effects examined will be of particular relevance to the consequences of the unified market. A plausible answer would maintain that in connection with the unified market it is scale effects that will prove to be of greatest importance. Indeed gaining the full benefit of the huge scale of the combined markets - as we must at present call them - of the member countries of the community is the chief objective of the commission in its attempt to create a unified market.

As has been remarked above, in Section 8, it is difficult to derive unambiguous findings regarding the CET from models with increasing returns to scale. This was true for an argument that neglected questions of conflict between the interests of various community member countries, or groups within those countries, and would be even more true were such conflicts to be taken into account. We must

fall back here on the generalities that economics teaches us to respect. Where there is inefficiency the state of affairs can often, but not invariably, be improved upon by allowing free or low cost trade. However even where this favourable outcome results, it will very likely be necessary to compensate groups who lose as a consequence of the overall changes if the gains are to be enjoyed by all.

10. Concluding remarks

For most interesting questions in economics the answer is the same - it all depends. Such is certainly the case where the question is the effect on the CET of a CU when that union is enlarged. There are numerous effects in operation and they may well offset each other even when, as is not always the case, the direction of each effect taken alone is unambiguous. From a sometimes tangled argument certain points may be singled out as crucial:

(i) the reasons why the pre-enlargement tariffs were in place makes an important difference; and

(ii) with a neutral enlargement the choice of the CET is virtually determined by the need to avoid trade diversion, and which way this goes will depend upon the structure of the existing CU, the joining countries and the outside world; and

(iii) enlargement guarantees that the coordination of tariff setting policy will be possible and this may even be its most important consequence for the CET; and finally

(iv) according to the case chosen, enlargement may tend to imply either a higher CET or a lower.

As this paper only attempts to lay out a field, there is almost no limit to the further research that it might reasonably propose. However

two broad types of research are suggested by our investigations. First, the theory needs to be taken further, especially in the area of non-neoclassical models. Here useful contributions could be made by people with a less extreme distaste for taxonomy than that possessed by the present author, ideally without taking the argument to the opposite extreme.

Secondly the empirical approach needs to be married to the optimizing approach, as typically it has not been. Theory can only suggest conclusions concerning the optimal CET, it needs to be calculated. To this proposition the empirical investigators are likely to reply that they cannot do very much while the theorists have only vague and contradictory ideas concerning the motivation for the protection of the internal markets of CUs, or while the thinking of theorists is in irreconcilable conflict with that of politicians and administrators.

Perhaps the first step will be to initiate a debate in which ideally people of varied backgrounds and views can participate. The breakdown of the CAP in its original form has induced a climate in which a questioning of the presumptions of the EEC and other trading blocks is not so easily drowned out by overbearing common sense. At the same time economists are becoming more open minded and less prone to think that people who advocate protection only need a simple lecture to correct their errors. The enlargement of the EEC is a wonderful occasion to look at fundamental questions afresh.

Appendix

In this Appendix the mathematics of the optimal tariff with large countries and many goods is developed. Before examining the effect of enlargement on the optimal tariff, we first derive the optimal tariff for a single unit, called Country A. The rest of the world is denoted Country C - Country B may join in later when enlargement takes place. C is assumed to be passive, in the sense that it accepts whatever prices world equilibrium throws up and generates at those prices a net trade vector. One could suppose that C is the sum of many relatively small countries.

Let there be N tradeable goods. The prices at which international exchange takes place are expressed in terms of good 1. A variable not underlined, to denote a scalar, will refer to that value for good 1. Vector values will refer to good the remaining N-1 goods. Thus for example $\underline{p}$ are prices of goods 2 to N in terms of good 1, so that p=1 by definition. The reason for expressing prices this way is that it is convenient to have demand functions that are not homogeneous of degree zero in prices. As we shall take domestic and international prices as distinct, the vector of tariffs is implicit, it is the difference between the two. However, it is assumed that there is no direct protection of good 1.

$V^I(\underline{p}^I,y^I)$ will be the indirect utility function of country I, depending on the prices that its residents face $\underline{p}^I$ and on income in terms of domestic prices, which must be adjusted to ensure balance of trade equality, y^I. Production will be denoted by $\underline{z}$ and z, and consumption by $\underline{x}$ and x. Net demand, $\underline{x}-\underline{z}$, or x-z, will be denoted $\underline{d}$ or d respectively. In the problem of setting optimal tariffs A may choose its

domestic prices $\underline{p}^A$, and the prices at which trade will take place, $\underline{p}$. However A must ensure that there is a balance of trade and world supply and demand equality for each good. Thus A solves the following programme:

$$\text{Max} \quad V^A(\underline{p}^A, y^A) \quad ; \quad (A.1)$$

$$\underline{p}^A, y^A, \underline{p}$$

subject to:

$$z^A(\underline{p}^A) - x^A(\underline{p}^A, y^A) + p.[z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A)] \geq 0 \quad ; \quad (A.2)$$

$$z^A(\underline{p}^A) - x^A(\underline{p}^A, y^A) - m^C(\underline{p}) \geq 0 \quad ; \quad (A.2')$$

$$z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A) - \underline{m}^C(\underline{p}) \geq 0 \quad ; \quad (A.3)$$

Where (A.2) states that A is in balance of trade equilibrium at prices $\underline{p}$, and (A.2′) and (A.3) rule out an excess demand for any good, including good 1. Here the constraints are written out in full. However as they are not independent[19], they may be reduced to:

$$z^A(\underline{p}^A) - x^A(\underline{p}^A, y^A) + p.[z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A)] \geq 0 \quad ; \quad (A.2)$$

$$z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A) - \underline{m}^C(\underline{p}) \geq 0 \quad ; \quad (A.3)$$

which is the form that we shall use.

Let the shadow prices on constraints (A.2) and (A.3) be respectively a and $\underline{q}$. Then from necessary conditions for a maximum with respect to $\underline{p}^A$, y^A and $\underline{p}$ we obtain:

$$\underline{p}^A: \quad -V^A_y.\underline{x}^A - a\{dp^A - \underline{p}.[D\underline{p}^A]\} + \underline{q}.[D\underline{p}^A] = 0 \quad ; \quad (A.4)$$

$$y^A: \quad V^A_y - a\{x_y + \underline{p}.x_y\} - q.d^A_y = 0 \quad . \quad (A.5)$$

$$\underline{p}: \quad \underline{a}(\underline{z}^A - \underline{x}^A) - \underline{q}.[M_p{}^C] = 0 \quad ; \quad (A.6)$$

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[19] As $-m^C(\underline{p}) - \underline{p}.\underline{m}^C(\underline{p}) = 0$ (Walras' Law), and as (7.2) and (7.3) are satisfied with equality, we have $-m^A - \underline{p}.\underline{m}^A = 0$, and $-\underline{m}^A - \underline{m}^C(\underline{p}) = 0$. Hence multiplying by $\underline{p}$ and rearranging, we obtain: $-m^A - \underline{p}.\underline{m}^A = 0$, and $-\underline{p}.\underline{m}^A - \underline{p}.\underline{m}^C(\underline{p}) = 0$, and hence $-m^A = \underline{p}.\underline{m}^A = -\underline{p}.\underline{m}^C(\underline{p}) = m^C(\underline{p})$.

where subscripts denote partial derivatives and the arguments of functions have been suppressed. Now dp^A and $[Dp^A]$, are respectively the vector of responses of d^A to components of $\underline{p}^A$, and the matrix of partial derivatives of d^A with respect to components of $\underline{p}^A$. Similarly, $m_p{}^C$ is the vector of responses of m^C to components of $\underline{p}$, and $[M_p{}^C]$ is the matrix of partial derivatives of $\underline{m}^C(p)$ to components of $\underline{p}$. As $[D_p{}^A]$ and $[M_p{}^C]$ measure responses of demands for goods 2 to N to prices of goods 2 to N relative to good 1, they are square non-singular matrices.

We obtain a formula for optimal tariffs directly from (A.6) which may be rearranged to yield[20]:

$$\underline{q}/a = (\underline{z}^A - \underline{x}^A).[M_p{}^C]^{-1} \quad . \qquad (A.7)$$

As it stands this condition is not easy to interpret[21], for the matrix $[M_p{}^C]^{-1}$ has no immediate economic interpretation.

To see how this formula can work out, consider a very simple example. Suppose that Country C has a given production of good 1[22], which we may take to consist of one unit, and a linear logarithmic (or Cobb-Douglas) utility function. Then a notable simplification of the formula follows. Now C's income is 1 and expenditure shares on goods 2 to N are independent of prices. Let the share of expenditure on good i (i=1,..,N) be t^i. Then demand for good i is:

$$m^{Ci} = t^i/p^i \quad ; \qquad (A.8)$$

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[20] This assumes that tariffs are $\underline{q}/a$. That this is so is most easily shown by expressing the problem in its direct form, with quantities being chosen instead of prices. We leave it to the reader to confirm this claim.

[21] The complexity of the general multi-good optimal tariff formula deters most trade textbooks from treating it. However see Pearce (1970), Book I, Section 7.11.

[22] The essence of this assumption is that C exports only one good. This may be taken without loss of generality to be good 1.

and the matrix $[M_p^C]^{-1}$ is diagonal with typical element:

$$-t^i/(p^i)^2 \quad . \qquad (A.9)$$

Then (A.9) becomes:

$$q_i/a = t^i m^{Ai}/(p^i)^2 \qquad (i=2,\ldots,N) \quad . \qquad (A.10)$$

A is exporting goods 2 to N so that the m^{Ai} values are negative and A imposes export taxes proportional to volumes and inversely proportional to prices.

We now turn to the consideration of three countries with two of them setting OTs. First let Country A be a tariff leader. Then when A has set pA, B will choose pB. Thus B solves a problem of the form:

$$\text{Max} \quad V^B(\underline{p}^B, y^B) \qquad ; \qquad (A.11)$$

$$\underline{p}^B, y^B, \underline{p}$$

subject to:

$$z^B(\underline{p}^B) - x^B(\underline{p}^B, y^B) + p.[z^B(\underline{p}^B) - \underline{x}^B(\underline{p}^B, y^B)] \geq 0 \; ; \qquad (A.12)$$

$$z^B(\underline{p}^B) - \underline{x}^B(\underline{p}^B) - m^A(p, p^A) - m^C(\underline{p}) \geq 0 \quad . \qquad (A.13)$$

In this formulation $m^A(p,p^A)$ is the net import vector that A will demand when it has set domestic prices p^A and then adjusted y^A so as to maintain balance of trade equality.

Now A can pursue a leader strategy knowing that B will follow by solving a problem of the form (A.11) to (A.13). In effect it is B that sets p. A chooses p^A, knowing that B will choose p (and p^B as well - but only the choice of p concerns A) according to a calculable reaction function:

$$p = p^{RB}(p^A) \qquad ; \qquad (A.14)$$

where the superscript RB indicates that this is a reaction function of B.

Then Country A solves:

$$\text{Max} \quad V^A(\underline{p}^A, y^A) \quad ; \qquad \text{(A.15)}$$

$$\underline{p}^A, y^A, \underline{p}$$

subject to:

$$z^A(\underline{p}^A) - x^A(\underline{p}^A, y^A) + p^{RB}(p^A).[z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A, y^A)] \geq 0 \; ; \qquad \text{(A.16)}$$

$$z^A(\underline{p}^A) - \underline{x}^A(\underline{p}^A) - m^{RB}(p^A) - m^C(\underline{p}) \geq 0 \quad . \qquad \text{(A.17)}$$

where in (A.17) B's net imports have been expressed in reaction function form as depending on A's choice of domestic prices, hence implicitly of tariffs.

It goes without saying that the above problem is horribly complicated. In particular, as demand functions are included in constraints, the constraint sets may not be convex, and there may be discontinuities and other awkward outcomes. However the existence of a solution is not a considerable problem. Given any choice by A, B has a set[23] of maximizing choices. This follows from the closedness and boundedness of B's choice set and the continuity of his objective. Then A's problem is almost everywhere well-defined and a solution exists for the same reason.

If we consider the symmetrical game in which A and B are both quite large, and both try to set optimal tariffs against C and against each other, we have a still more difficult problem, and even the existence of a solution is in question. The standard approach to this type of problem is to look for the Nash solution. Each player assumes the other's action to be given and maximizes under that assumption. This idea is not applicable to the present case without amendment or

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[23] If B has more than one distinct maximizing choice we might allow A to choose which option will be selected.

reinterpretation, because a country cannot be strictly passive while the other changes strategy. The reason is that world prices $\underline{p}$ will change and a country has to react to maintain balance of trade equality[24]. We assume that each country supposes that the other will maintain domestic prices and adjust income to maintain balance of trade equality. This is simpler than assuming that tariffs are maintained but the issues are parallel in either case.

Consider a possible pair of domestic prices $(\underline{p}^A,\underline{p}^B)$. Let the two parts of any such pair be assumed by the converse players. Then they each solve a problem of the form:

$$\text{Max} \quad V^I(\underline{p}^I,y^I) \quad ; \quad \text{(A.18)}$$

$$\underline{p}^I,y^I,\underline{p}$$

subject to:

$$z^I(\underline{p}^I)-x^I(\underline{p}^I,y^I)+\underline{p}.[\underline{z}^I(\underline{p}^I)-\underline{x}^I(\underline{p}^I,y^I)] \geq 0 \; ; \quad \text{(A.19)}$$

$$z^I(\underline{p}^I)-\underline{x}^I(\underline{p}^I)-m^{RJ}(p)-m^C(\underline{p}) \geq 0 \quad . \quad \text{(A.20)}$$

Note that the action of J, being the other country, has been expressed as net imports depending only on world prices $\underline{p}$, that is $\underline{m}^{RJ}(\underline{p})$. Thus an actual choice of $(\underline{p}^A,\underline{p}^B)$ results from an assumed value of $(\underline{p}^A,\underline{p}^B)$. Now suppose an equilibrium in which the players each choose the $\underline{p}$ value that the other players was assuming[25]. In their choices both countries

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[24] Purists may argue that Nash equilibrium does not depend upon dynamic stories involving players changing actions. This issue cannot be pursued here. However we may briefly note that a player, say Player A, cannot decide whether a choice maximizes given the action of B unless he can evaluate at least a perturbation of his own action. If such a perturbation involves a violation of B's budget constraint unless B reacts, then the manner in which that violation would be repaired is important to A's choice.

[25] This is to suppose the existence of a fixed point for the mapping of $(\underline{m}^A,\underline{m}^B)$ values onto itself. Unhappily there is no fixed point theorem for this model. We might reasonably assume the space of

satisfy the constraint (A.20). Hence at such a point both parties arrive at the same net trade vector for C, that is $\underline{m}^C(\underline{p})$. It is possible that they could do that and yet assume different values for $\underline{p}$, because the function $\underline{m}^C(\underline{p})$ may not be invertible.

Notice however that if the function $\underline{m}^C(\underline{p})$ is not invertible, and A and B are assuming different values of $\underline{p}$, they are most unlikely to arrive at the same values for $(\underline{p}^A,\underline{p}^B)$ and $\underline{m}^C(\underline{p})$. Hence an identity of assumed values with outcome $\underline{p}$ values very probably entails a Nash equilibrium in which both countries think that they are setting their own tariffs (strictly domestic prices) and choosing world prices taking the other's domestic prices as given, and the outcome does not disabuse them of this view. In order to proceed we ignore the existence problem noted in footnote 25 and assume that a unique Nash equilibrium always exists. We may then compare that outcome with the result of the formation of a CU.

Following the formation of the CU the optimal CET is set to solve:

$$\text{Max} \quad V^A(\underline{p}^A,y^A) + V^B(\underline{p}^B,y^B) \quad ; \qquad \text{(A.21)}$$

subject to:

$$z^A(\underline{p}^A)-x^A(\underline{p}^A,y^A)+\underline{p}.[z^A(\underline{p}^A)-\underline{x}^A(\underline{p}^A,y^A)] \geq 0 \quad ; \qquad \text{(A.22)}$$

$$z^B(\underline{p}^B)-x^B(\underline{p}^B,y^B)+\underline{p}.[z^B(\underline{p}^B)-\underline{x}^B(\underline{p}^B,y^B)] \geq 0 \quad ; \qquad \text{(A.23)}$$

$$z^A(\underline{p}^A)-\underline{x}^A(\underline{p}^A)+z^B(\underline{p}^B)-\underline{x}^B(\underline{p}^B)-m^C(\underline{p}) \geq 0 \quad ; \qquad \text{(A.24)}$$

where it is assumed that each country must satisfy the same balance of trade constraint as applied when they acted alone.

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admissible $(\underline{m}^A,\underline{m}^B)$ values bounded above and below, so that it may be mapped onto a simplex. However the mapping from assumed $(\underline{m}^A,\underline{m}^B)$ values to outcome $(\underline{m}^A,\underline{m}^B)$ values is not in general continuous. This is because the constraint sets are not typically convex, a familiar problem when constraints are defined by demand functions.

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