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of the Impact of Internal Market Barriers
in the European Community


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# Contents

## Introduction

This paper attempts to quantify the economic costs of the existing barriers to intra-EC trade and commerce, or conversely, the potential benefits from what has come to be known as "internal market completion".[1] Current barriers are many and various, some sectoral, others horizontal, some applying specifically to trade others to production or provision of goods and services in general.

The reduction or removal of barriers can be expected to lead to a number of important effects. Differences between prices in different regions will be reduced with the concurrent static[2] benefits of improved allocative efficiency and lower consumer prices. In addition greater market integration and increased competition will be fostered, with the associated dynamic[2] benefits of reduced X-inefficiency (increased technical efficiency), erosion of oligopoly profits and improved consumer choice. Furthermore, it is generally accepted that innovation would be encouraged, both in terms of technical progress and the development of new products and services. This latter feature can be thought of as a genuinely dynamic effect and one which is consequently the most difficult to quantify.

Few attempts have been made by economists to estimate the dynamic effects of trade barriers, see for example Balassa (1974). Such a task is even more difficult in the present case because the widespread changes envisaged are likely to entail substantial reorganisation and specialisation right across the Community economy and over a lengthy period. Detailed estimates of the potential benefits of both barrier removal and market integration effects are given in 'The Economics of 1992' report (1988) but the integration effects are obtained by estimating the economies of scale effects from restructuring and by extending the potential benefits obtained in this paper using the results of Smith and Venables (1987). For a full exposition of the calculation of these market integration effects, the interested reader is referred both to the relevant sections of the report, to the paper cited and to chapter 9 of this volume.

This paper, therefore, concentrates on the static or barrier removal effects, and is ordered as follows. Section 1 examines the most significant barriers to current intra-EC trade and considers the relative

merits of possible approaches to quantifying them, in particular partial and general equilibrium analysis. The second section presents the details of the partial equilibrium approach which is adopted and examines closely the potential biases or omissions. The third section covers the rather extensive data requirements whilst the fourth presents and examines the results. A fifth section concludes.

## Section 1: Internal Market Barriers

The barriers to intra-EC trade which are mentioned in the White Paper may be classified as either cost increasing barriers or restrictions on market entry, and this is the focus of the paper. But it is important to recognise that the present internal market is characterised by a number of other market imperfections. Examples include quantitative restrictions or quotas in certain sectors (this has applied both to Community production eg steel and to country-specific imports eg automobiles), price support mechanisms in agriculture and a range of subsidy measures at both Community and national level, albeit with varying degrees of economic justification.

One of the most observable cost increasing barriers in the Community is that due to customs procedures[3]. These formalities, which involve actual delays and various kinds of administrative procedure, impose a cost on the movement of all goods between member countries, a cost which varies according to the goods and countries concerned.

A further cost is imposed by norms and technical standards which vary between countries. These require producers to manufacture or package goods in forms which are different for other EC markets than those for their own domestic market.

Both of these elements can be thought of as cost-increasing non-tariff barriers which create a wedge between the cost of domestic goods and delivered exports, considerably greater than the transport cost involved. In some cases, however, regulations or standards impose extra costs on local production as well as on imports. One example is the processed food industry where national regulations on inputs, testing and packaging not only restrict trade but increase production costs, often unnecessarily.

Another important barrier is the restriction of market entry which ultimately imposes a cost on the consumer by limiting choice, inhibiting competition among sellers or curtailing the exploitation of economies of scale. In some instances the barrier is total, in that trade does not exist at all. This is often the case with public procurement restrictions.

Moreover, the cost here is not simply that governments or public authorities are prevented from purchasing goods or services from cheaper or the cheapest sources. Market segmentation allows relatively inefficient enterprises to survive, in some cases with considerable local market power, and prevents the move towards more efficient market structures which would be the consequence of an increase in competition. It, therefore, follows that such rationalisation effects are likely to be of considerable importance in sectors where trade and European-wide competition have been prohibited to date. Noteable examples are telecommunications equipment, power generating equipment and railway rolling stock.

In many other sectors market access is not total but limited, either by quotas, regulations, restrictions on establishment, or by capital controls. This is particularly true for a number of service sectors eg banking, insurance and business services, and air and freight transport.

One possible approach, therefore, to quantifying the potential benefits of internal market completion is to estimate separately the cost of each of the barriers observed. The major drawback here is the extent to which the barriers mentioned overlap and interact, making it difficult to avoid double-counting and at the same time account for all the potential effects.

A much more satisfactory approach would be to use a general equilibrium model that was rich enough, not only to encompass spillover effects between sectors (substitution and income effects) and between countries (trade effects conditioned by some kind of trade balance restriction) but to consider the benefits of increased integration and competition in markets which are characterised by imperfections. Unfortunately, no such tool is available.

The solution adopted, therefore has been to employ partial equilibrium techniques, where the price or cost effects are treated in a consistent fashion but on a sector by sector basis. Partial equilibrium methods have typically been used[4] to examine the static effects of tariff barriers both on importing and exporting countries. The great advantage is their simplicity of application and the fact that, when markets can be

characterised by perfect competition and price effects are relatively small, they approximate the general equilibrium calculations.

What they miss in comparison to general equilibrium calculations are the interactive effects between sectors which occur as relative prices and relative factor payments change. However, these biases are not expected to be particularly large for what are relatively small cost changes spread across many sectors.

The main drawback of the traditional partial equilibrium analysis[5] in the context of the present problem is shared by the traditional general equilibrium approach. These disadvantages derive from the relatively restrictive assumptions behind the analysis, namely those associated with perfectly competitive markets. This makes traditional partial equilibrium methods rather unsatisfactory for dealing with potential gains from increased competition in markets characterised by imperfections, unless such market structure is specifically modelled. Reductions in X-inefficiency can be represented by the rightward or downward shift of sectoral supply curves but large economies of scale effects are not easily incorporated into a conceptual approach which essentially assumes them away.

Furthermore, benefits and losses in the partial equilibrium framework are expressed in terms of welfare changes for consumers, producers and governments. There is, therefore, no immediate provision for examining adjustment costs as factors move from shrinking to expanding sectors, although these could be incorporated by subtracting the present value of the welfare costs of adjustment (occurring once and probably spread over the first few years) from the present value of the total welfare benefits of permanent market integration.

Despite these drawbacks, the use of partial equilibrium methods can be defended for reasons of transparency and simplicity. It is also important to note that the static welfare gains from internal market liberalisation are of a much greater order of magnitude than would be the case for tariff removal or customs union formation, even though the notion of trade diversion can not be ignored. This is because the benefits derived from the lower cost of imports are not offset by a loss of tariff revenue. It

is the welfare gain of the relevant rectangles which is more important than that of the traditional triangles (see section 2 for further details).

Two implications can therefore be drawn. A first order of magnitude of the static economic gains can be derived on a sectoral basis by multiplying cost reductions by the existing level of imports (for a trade barrier) or by the existing level of output (for a regulation which imposes costs on production). This means that total welfare benefits are much less subject to assumptions on supply and demand elasticities than would normally be the case.

For a number of reasons which are detailed in the following sections, it is suggested that the estimates produced in this paper do not have any obvious net bias. Nevertheless, a margin of error should be attached to the figures and this is emphasised by the presentation of a range of results.

Section 2: Method

The removal of the trade and regulatory barriers mentioned in section 1 and the consequent cost reductions of traded goods and production leads to a number of effects.

In the first case the usual trade creation and trade diversion effects occur. Cheaper imports from other Community countries will to varying degrees be substituted for locally produced goods. Consumption and trade within the EC will rise and allocative efficiency will improve. At the same time there will be a tendency for imports from countries outside the Community to be reduced, except to the extent that external exporters can also take advantage of standardised norms or cheaper distribution within the EC.

In the second case reduced regulatory activity may lower production costs directly and, indirectly, by inducing greater market integration and competition. An example in the financial services sector will serve. Alleviating the restrictions governing establishment or exchange controls will in general lower costs of banking and insurance services and, to the extent that there is competition, prices will fall thereby increasing consumer surplus without eroding producer surplus. But greater market access will encourage further competition at a European level. The consequent reorganisation, exploitation of economies of scale, specialisation and improved technical efficiency will lead to additional cost and price reductions. However to the extent that prices are pushed nearer to costs, there will be a redistribution of welfare from producers to consumers. This reduction of producer surplus has to be subtracted from gains in consumer welfare.

At the same time, any cost reductions achieved within the Community will improve its trading position with the rest of the world.

The methods used to encompass these various effects are treated in the rest of this section. Stage one treats the effects produced by lower trade barriers within the Community. It confines itself to final demand, including investment goods. Stage two concentrates on the effects due to

lower production cost. In order to treat both intermediate and final goods the partial equilibrium calculations are performed in conjunction with Community input-output tables. Any other cost effects on intermediate goods (either trade or economies of scale effects) are also treated here. Finally stage three treats scale effects on final goods only, although the results of scale effects on intermediate goods are also reported as part of stage three. In the essentially static treatment in this paper, scale effects encompass no more than those which derive from spreading greater output over existing plant.

The three stages should be seen, therefore, more as practical accounting steps rather than clear conceptual divisions, and the remainder of the section indicates more clearly exactly what is included and where.

## 2.1 Stage 1, Trade Barriers

The first stage operates in the usual three country framework with a single Community country importing both from the rest of the Community and from the rest of the world. To illustrate the salient features, the simpler two-country case is first considered.

Figure 1
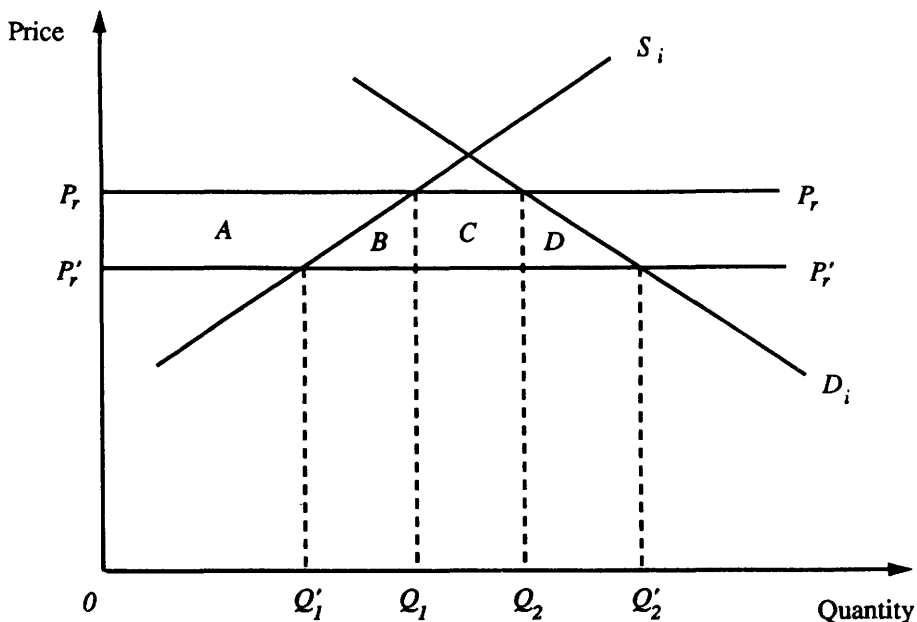
Figure 1 is drawn for a single good, with $D_i$ and $S_i$ respectively representing the domestic or home country demand and supply schedules. The world price is $P_r'$ and $P_r$ represents the import supply schedule if the importing country I imposes a tariff equal to $t = (P_r-P_r')/P_r'$. Alternatively, the difference may represent an equivalent non-tariff barrier where t represents a mark-up which consumers or importers in the home country face due to the extra costs imposed by the barriers. Under free trade the country would import $Q_1'Q_2'$ and produce $OQ_1'$ domestically. In the presence of the barrier, trade is lower at $Q_1Q_2$ and consumption declines to $OQ_2$.

The barrier therefore has a trade effect, a production effect and a consumption effect. In the case of a tariff, it also has a revenue effect in that amount C (equals t times $Q_1Q_2$) accrues to the government in country I in the form of tariff receipts. The relative size of these effects for a given barrier depends on the elasticity of demand for imports which in turn depends on the elasticities of supply and demand for output. Thus the adverse effects of the barrier are less for inelastic goods than for more elastic goods because the distortion of quantities is smaller.

When the non-tariff barrier is lifted, consumer surplus increases by area (A+B+C+D) while there is a loss in producer surplus of A. The net welfare gain, therefore, is represented by area (B+C+D). For the elimination of an equivalent tariff barrier, the net welfare gain would only be area (B+D) due to the loss of tariff revenue.

The approach used in this paper elaborates on this model in two important ways. Firstly it assumes that the importing country faces a supply curve which is not perfectly elastic so that an increased demand for imports increases their price. Secondly, it assumes that goods (or services) may be imported both from other Community countries and from the rest of the world. Figure 2 represents this situation.

It is assumed in figure 2 that non-tariff barriers between I and C disappear while the tariff (inclusive of any non-tariff barrier effects) against the rest of the world (in effect the Common External Tariff or CET) remains constant.

## Figure 2
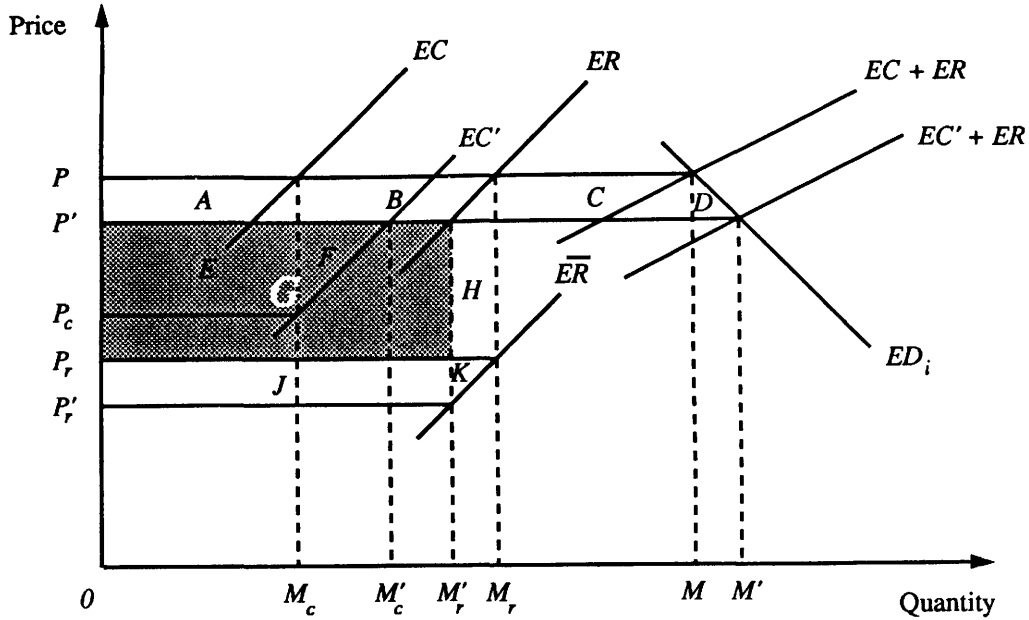


Note : $OM_c + OM_r = OM$
$OM'_c + OM'_r = OM'$

$ED_i$ represents the excess demand schedule for the good in country I. EC and EC' are the excess supply schedules of C before and after non-tariff barriers are removed. ER and $\overline{ER}$ represent the excess supply schedules of R, inclusive and net of the CET respectively, ie I faces an import supply schedule from R of ER while producers in R receive revenue according to $\overline{ER}$. The import supply schedule faced by I shifts from (EC+ER) to (EC'+ER) when internal barriers are removed. These schedules intersect $ED_i$ at prices P and P' respectively, so that the elimination of barriers leads to a reduction in price in country I. The amount of the price fall depends on the cost equivalent of the barrier (downward shift of EC), the excess demand elasticity in country I and the excess supply elasticities of C and R. The price received by exporters in C, net of costs associated with the barriers rises from $P_c$ to P' while the price net of tariffs received by exporters in R falls from $P_r$ to $P_r'$.

When internal barriers are removed, I's total imports rise from M to M', with imports from C rising from $M_c$ to $M_c'$ and from R falling from $M_r$ to $M_r'$. The reduction in imports from the rest of the world, by analogy with customs union theory may be called trade diversion since it represents a shift from a lower cost producer outside the Community to a higher cost producer within.

The static welfare effects on country I are: a consumer surplus gain (net of producer surplus loss) of (A+B+C+D); a loss of tariff revenue of (A+B+G+H) - (G+J). The net gain to I is given by areas (C+D-H+J). These areas may be interpreted as gains or losses from terms of trade changes. Area C equals the terms of trade gain on existing imports from C, while D gives the gain on additional imports from C. Area H represents the terms of trade loss on imports diverted from the lower cost producer R to C, while area J is the terms of trade gain from the reduced price paid on remaining imports from R.

The welfare effect on the rest of the Community C consists of the producer surplus gain (net of consumer surplus loss) of areas (E+F). E equals the terms of trade gain on existing exports to I while F is the producer surplus gain on additional exports.

The rest of the world is characterised by a loss of producer surplus equal to (J+K).

Given estimates of the supply and demand elasticities, the reduction in the non-tariff barrier and the existing trade shares, all these welfare changes can be calculated as proportions of total existing imports.

Where the barriers being removed are technical norms specific to the importer, it may be expected that exporters in the rest of the world will also benefit from market integration in that their costs of producing varying specifications for different Community countries will be reduced. This feature may also be incorporated by shifting downwards the excess supply curve of the rest of the world by an amount reflecting this cost saving. It is this model that is actually used for the calculations, see annex C.

The result will be that the diversion of imports R to C is less than in the simpler case illustrated above and the price reduction in country I will be greater. In terms of welfare changes, the gains for I will be greater, those for C less and the losses for R reduced. In fact if the reduction in R's unit costs is sufficient, the rest of the world may also experience net gains.

All the algebraic details of the welfare calculations are given in annex C. Both the welfare areas and the price changes can be written in terms of the exogenous parameters: the trade shares, the elasticities, the cost reductions and the external tariff.

## 2.2 Stage 1, Public Procurement

Goods and services subject to public procurement restrictions warrant special attention. First of all, trade is often non-existent, and, secondly, the liberalising of these markets could be expected to lead to substantial long-term restructuring.

The immediate trade effect is considered as a distinct part of stage one. The consultancy report for public procurement (Atkins, 1987), has estimated potential cost savings from buying existing quantities of publicly procured goods more cheaply in other Community countries, taking account of the fact that costs do not necessarily remain the same under increased demand. Eighty per cent of these estimated cost savings (assuming that twenty per cent of publicly procured goods can only be tendered for locally) are added in to stage one results on a sector by sector basis, see Table 3, annex A. Any welfare effects due to lower border and trade costs are automatically considered in the stage one calculations.

## 2.3 Stage 2, Barriers affecting production cost

The discussion in section one also emphasised the potential reduction of regulatory activity across the Community leading to cost savings in the production of goods and services. Furthermore, the removal of internal trade barriers is expected to stimulate competition, greater technical efficiency and specialisation, adding to these cost savings. This process

is treated in stage two as a downward shift in the supply curve for the Community, on a sector by sector basis. First the case of an autarkic Community is treated, followed by the situation in which the Community trades with the rest of the world.

Figure 3
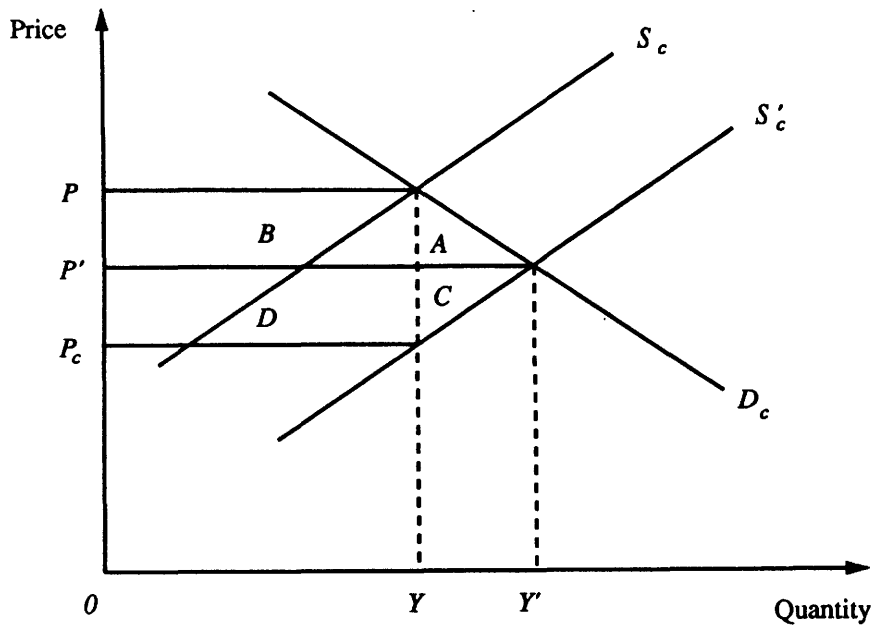


In Figure 3 the supply and demand curves for the Community are used, rather than excess supply and excess demand curves. Community output, before and after cost reduction effects shift the supply curve down from S to S', are given respectively by Y and Y'. The pre- and post-shift Community prices are given respectively by P and P', where the actual cost reduction is from P to Pc.

The welfare effects consist of a consumer surplus gain of A + B and a producer surplus gain of C + D.

Figure 4 illustrates the non-autarkic case. The excess supply curve of the rest of the world, ER, is added to the supply curve of the Community S to give (S + ER). Community production is initially OY, with imports OM and consumption OC (equals OY + OM). Initial tariff revenues are (A+B+G+H) and the tariff rate t equals $(P-P_r)/P_r$.

## Figure 4
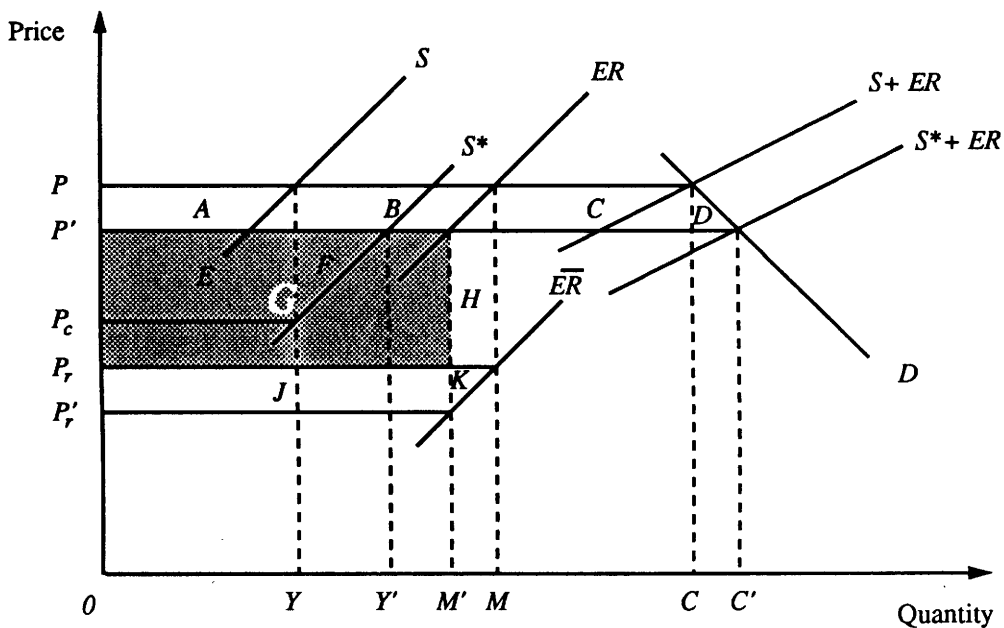


Note : OY + OM = OC
OY' + OM' = OC'

Following the fall in the Community supply curve to S', Community output becomes OY', imports OM' and consumption OC'.

The welfare effects for the Community are: a consumer surplus gain of (A+B+C+D); a producer surplus gain of (E+F); a tariff loss of (A+B+G+H) - (G+J). The net gain to the Community is (C+D+E+F+J-H), while the rest of the world suffers a producer surplus loss of (J+K).

## 2.4 Methodological problems

A number of methodological problems arise in this second stage. These include additional trade effects within the Community, the distinction between final and intermediate goods, the question of intra-industry trade and the distinction between cost and price.

The treatment of the Community as a block means that second order trade effects between regions or countries, following the reduction in production cost, are ignored. Only the trade changes with the rest of the world are included. This omission can only be rectified by explicitly modelling the interaction between the national producers in the Community. Two remarks may be made about this omission. One is that these trade effects will be small relative to the welfare effects arising from lower production costs, although clearly they will be more important as the variance in the fall in production cost between different countries is larger. Furthermore, such effects will be more crucial to the way in which welfare increases are distributed between countries than to the aggregate gain in welfare itself.

A second problem is that production cost reductions and concomitant welfare gains occur at various stages of the production cycle and these should all be counted. There is also a significant interaction between branches of the economies as the output of one sector which can now be produced more cheaply is used as an input to other sectors. To cater for these two aspects, identified cost reductions by sector have been fed through the Community input-output matrix[6] to produce a resultant effect on a vector of final output. These resultant cost effects are the ones which have been used in the partial equilibrium calculations.

One of the difficulties of using the input-output matrix to trace through potential cost reductions concerns the interaction with the rest of the world. If as in figure 5, intermediate inputs are imported from the rest of the world at price P, then this will be unaffected by the downward shift in Community costs from $S_c$ to $S_c'$. Total derived demand in the Community ($DD_c$) remains the same at Q while the quantity produced within the Community rises from $Q_c$ to $Q_c'$, all at a constant price P. The implicit assumption in the approach used, therefore, is that intermediate inputs

are produced within the Community. For the inputs which produce the most significant cost effects, financial services, business services, telecommunications services, freight and air transport, this is indeed the case.

There are other small influences on the cost of goods and services produced as intermediate inputs. One is the economies of scale in the production of intermediate inputs. Because this effect requires the same input-output treatment, it is incorporated into stage two. However, the results are reported separately with those for economies of scale on final goods in stage three. A second small influence is the effect on production cost of intermediate inputs traded within the Community, which are now cheaper

Figure 5
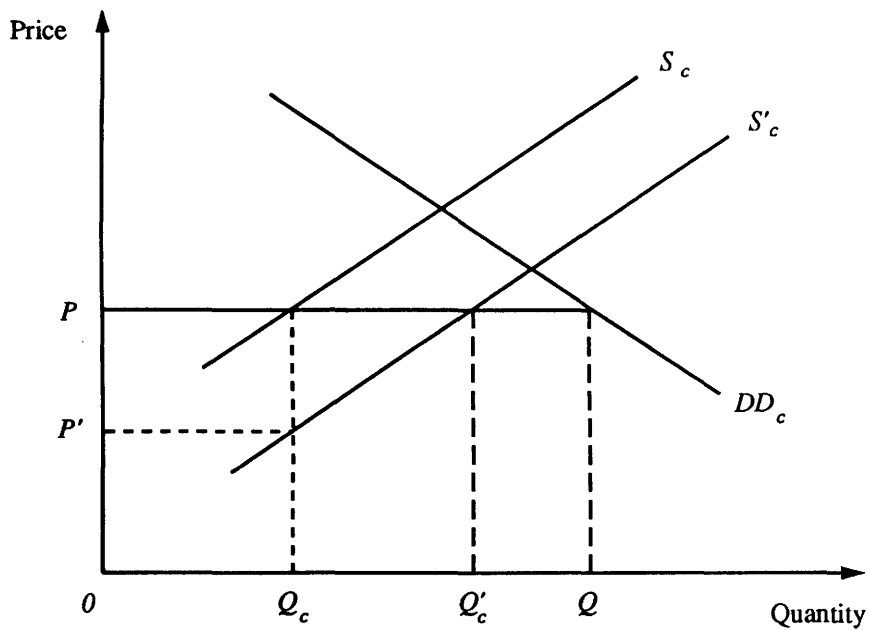
because of lower trade barriers. This aspect has also been incorporated into the stage two calculations although, like the scale effects, it is rather insignificant compared to the specific sectoral cost effects which account for the major part of the stage two results.

The third problem concerns the existence of intra-industry trade. The simple Heckscher-Ohlin trade model, which is based on comparative advantage predicts that the same good will not be both imported and exported. In principle all that is needed is a sufficiently disaggregated level of trade elasticities to discover this phenomenon. But although intra-industry trade indices, (Grubel and Lloyd, 1975) decline at these lower levels, two-way trade is still observable.

This can be explained in two ways. Firstly, intra-industry trade in functionally homogeneous products can take place for a number of reasons, for example, where there exist transportation and storage costs. Secondly and more importantly, it arises because of economies of scale in the production of differentiated goods. Free trade allows both lower unit costs due to the scale effects of producing for larger markets and increased variety via two-way trade in differentiated goods.

In practice, in almost all products, intra-industry trade takes place. While the removal of barriers implies a rise in imports, when unit production costs are reduced, it is also likely that exports to the rest of the world will increase. This gives rise to additional producer surplus gains which are not quantified in the stage two methodology. The under-estimation of the welfare gains from ignoring these effects on exports will to some extent offset any loss in producer surplus which derives from producers outside the Community exploiting the removal of barriers, and in particular the adoption of Community standards, to increase their exports to the Community. Of course it cannot be assumed that the offset is exact but there is no reason to believe that the bias operates in one or other direction.

Finally, the important distinction between cost and price arises. The parameters for the trade and regulatory cost reductions are drawn in the main from a number of case studies (annex D) which predominantly focus on

potential cost reductions. However, in a number of sectors characterised by significant market imperfections, prices are expected to fall further than cost, reflecting the compression of excess profits in addition to improved technical efficiency and other genuine cost savings. To the extent that these goods or services are used as intermediate inputs to other sectors or finally consumed these price changes will be the ones that that are passed on. However, the compression of excess profits means that the consequent transfer of welfare from producers to intermediate or final consumers has to be set against consumer gains to arrive at total welfare gains.

Such a cost/price distribution arises for several sectors e.g. financial services, agriculture and coal. The way in which net welfare changes are calculated is detailed in section 3.

## 2.5 Stage three, Economies of scale, existing plant

This stage quantifies the most immediate or static effect of economies of scale. The survey report on economies of scale, (Pratten, 1987) gives estimates of unit cost gradients at given proportions of minimum efficient scale for existing European plant in a number of sectors. If some simplifying assumptions are made concerning plant cost functions then it is possible to convert this information into a parameter or elasticity that links changes in unit cost to changes in production (Annex C).

The output increases in the Community from stages 1 and 2 following reduced trade and regulatory barriers give rise, therefore, to additional cost effects as increased production is spread across existing plant. In stage three the welfare gains arising from these unit cost reductions on final goods are considered (Annex C). The unit cost reductions from scale effects on intermediate goods have been included within the stage two calculations so that the input-output effects can be taken into account. The calculations are iterated in order that the unit cost reductions on intermediate goods from increased output can be incorporated into the overall calculation. Despite the inclusion of intermediate goods scale effects in stage two, all welfare gains due to economies of scale (both final and intermediate) are reported together in Table A6.

## Section 3: Data Requirements

The data required to undertake the calculations detailed in section 2 are summarised in Table 3.1. Coverage is limited to Germany, France, Italy, UK, and the Benelux countries, comprising about 88% of Community value-added in the year considered, 1985. Aggregate results are reported both for this group of countries, EUR7 in 1985 prices and also for EUR12 at 1988 prices, by scaling up proportionately using GDP.

In essence stages two and three and the adding-up stage operate at the R-44 level of sectoral disaggregation. This facilitates the use of the Community input-output table which corresponds to this level and which is essential for the workings of stage two. In contrast stage one operates at a rather more disaggregated level, Nace 3-digit.

As Table 3.1 indicates, the data needs are substantial and comprise trade and production data, elasticity estimates, the common external tariff and economies of scale parameters as well as estimates of the potential sectoral cost reductions following the removal of trade and regulatory barriers. This section concentrates on the cost reduction estimates. All other data aspects are discussed in Annex B.

### 3.1 Stage One

The calculations in this first stage cover the 65 predominantly final goods sectors which have been selected from the NACE 3-digit classification of 166 agricultural and manufacturing sectors. For two rather important sectors, agriculture and energy, a proportion of trade for the sector has been taken to correspond to the fraction of final output in total output. The sectors treated in stage one correspond to about 220 billion ECU of intra-EC imports or about 60% of intra-EC trade for the countries considered. It should be stressed that the stage one calculations have been undertaken using each of the Community countries in turn as an importing country. The results in Tables A2 and A3 report total welfare gains for EUR7. The average cost and price changes are weighted by sector and country importance.

Table 3.1 :        Data requirements

| Parameters | Stage 1[1] | Stage 2[2] | Stage 3 |
|---|---|---|---|
| Trade shares | $s_c$= share of imports from rest of EC<br>$s_r$= share of imports from rest of world | | |
| Consumption shares | | $s_y$= share of AC provided by EC production<br>$s_m$= share of AC provided by extra imports | |
| Elasticities | n= elasticity of import demand<br>$e_c$= elasticity of excess supply from rest of EC<br>$e_r$= elasticity of excess supply from ROW | $e_{cd}$= elasticity of demand in EC<br>$e_{cs}$= elasticity of supply in EC<br>$e_r$= elasticity of excess supply from ROW | |
| Common External Tariff | t by sector | t by sector | - |
| Price or cost Reduction | b= effect of lower trade barrier | w= cost reduction in EC | dependent on sectoral output increase |
| Economies of Scale | - | EOS parameter intermediate goods | EOS parameter final goods |
| Data for calculation of welfare amounts | Total imports by EC country per sector, M | Apparent Consumption of EC per sector, AC | EC Production per sector, Y |

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[1] On a country by country basis except for the CET.
[2] Apparent consumption, (AC) = Production (Y) + extra EC imports - extra EC exports.

Two principal sources of information have been used to generate the cost reductions which would ensue from the elimination of Community trade barriers. One is an industrial survey of firms' estimates of the cost of these barriers (Nerb, 1987). The other is a study specifically directed at the cost of border formalities, administrative costs and delays, (Ernst & Whinney, 1987). Two matrices of cost reduction estimates (by sector and country) have been constructed, based principally on these two sources; (Tables B1 and B2). However, the sectoral estimates have been checked for consistency with information from specific consultants' studies (Annex D) where this exists.

The first set of inputs (Table B1 and column (i) Table A3) are derived from the Ernst & Whinney study. The cost of border formalities comprises the administrative costs of both exporters and importers, agents' fees and border delays. The study provides estimates of these costs both by consignment and in relation to intra-Community trade value for exporters and importers within thirteen sectors, based on surveys of firms in Belgium, France, Germany, Italy, the Netherlands and the UK. These estimates have been converted (using an import share matrix) into an average cost figure (as a percentage of intra-EC imports) for each Member State and sector.

No adjustment has been made to these figures for the additional costs associated with satisfying national product norms or regulations. In general, therefore, these percentages can be considered to be a low estimate of the costs of barriers affecting intra-Community trade.

The other set of cost reduction estimates is based on the survey undertaken to assess the extent of trade barriers within the Community (Nerb, 1987). This survey indicated that the main barriers, in order of importance, are standards and regulations, administrative barriers, frontier delays followed by a number of other barriers such as sales tax differences, transport regulations and the differential implementation of Community law.

In addition enterprises were invited to indicate the expected unit cost savings from eliminated barriers. Sectoral responses for five countries, Germany, UK, Netherlands, Spain and Ireland are available, and for all

countries the reasons for the expected cost reductions have been given. First in importance is lower distribution costs, then reduced costs of imported materials and cheaper production process and lastly lower banking, marketing and insurance costs.

However, for the calculations of stage one, it is the direct costs associated with delays, administrative procedures and producing for standards imposed in other Community countries which should be taken into account. The second set of estimates (Table B2 and column (ii) of Table A3) is derived by first transforming the survey data (using an import share matrix) to produce a cost reduction figure for each sector and each Member State as an importing country. On the basis of input-output coefficients, these figures have been adjusted downwards to account for the fact that the survey results include the indirect effects of the anticipated price reductions of intermediate goods and services. They have then been adjusted upwards to take account of the cost of border formalities borne by importers; this information is derived from the Ernst and Whinney study. In general this second set of cost reduction estimates is slightly greater than the first set. The range of the average cost saving is from 1.6 to 1.9 percent.

## 3.2 Stage two

The stage two calculations are based on aggregated Community data. They include the same seven countries as in the first stage and cover the 44 sectors of the NACE-CLIO R44 classification which is used for the Community input-output tables. Again, two sets of input data are used (see columns (i) and (ii) of Table A5), constituting lower and upper estimates of potential cost reductions of total final output.

This input data essentially includes three sources of cost reduction. By far the most important are the specific sectoral cost reductions due to de-regulation, but in addition there is the reduced cost of intermediate inputs imported from other Member States (and not covered in stage one) plus the effect of scale economies on intermediate goods.

For traded intermediate goods, cost reductions are taken from the sectoral estimates used in stage one and scaled down by the share of intra-Community

trade in Community output. The effects of economies of scale in intermediate goods are incorporated using the parameters derived for stage three and the output increases which emerge from iterative calculations.

The cost reductions for financial and business services and telecommunications are based on the commissioned studies for these sectors (Price Waterhouse, 1987; Peat Marwick McLintock, 1987; Müller, 1987). Estimates for air and road transport and energy have been added for the sake of completeness. These sectors form the basis of column (i) of Table A5. For column (ii) price reductions for agriculture and steel are also incorporated.

In the case of the financial services sector, agriculture and also coal, potential price reductions are used in stage two, rather than potential cost reductions. However, such price reductions will, in the first two cases, derive to some extent from decreases in excess profits and, therefore, involve a transfer of welfare from producers to consumers. These full price reductions are used in conjunction with input-output tables to assess the effect on other sectors, but thereafter the welfare transferred is estimated and subtracted to derive the net gain. The fraction of price reduction due to the compression of rent is assumed to be three fifths in the case of agriculture (Thomson 1985). For financial services it has been assumed that one third of the increase in welfare should be deducted as it represents a transfer from producers to consumers.

In the case of the energy sector, de-regulation in the production of refined petroleum products and in the distribution of electricity should lead to genuine cost reductions for these sectors. For coal, the effects are of price rather than cost. The reduction of internal subsidies allows the import of coal at world prices. For this sector welfare changes were modelled in a slightly different way. It was assumed that internal subsidies on coal and restrictions on importing coal would be removed, leading to lower price and higher imports.

## Section 4: Results

The principal estimates of the potential welfare changes from eliminating internal market barriers are set out in Tables A2 to A6 with the results of the three stages summarised in Table A7. The cost of the barriers affecting trade only (final goods) including the static effects of public procurement restrictions is estimated at between 8 and 9 billion ECU (EUR7 at 1985 prices). The cost of barriers affecting all production is calculated at between 58 and 72 billion ECU, or 2.0-2.4% of GDP. Therefore, total potential benefits from barrier removal for these two stages are estimated at between 66 and 81 billion ECU or 2.2-2.7% of GDP. If these figures are scaled up to represent the same GDP share of EUR12 at 1988 prices the figures become 90-110 billion ECU. In addition there are the small benefits from scale economies on existing plant, 4-5 billion ECU for EUR 7 at 1985 prices.

These estimates should be viewed as potential gains in economic welfare if the full internal market programme is implemented. No attempt has been made to systematically estimate the likely outcome if certain barriers or market restrictions are not removed. Furthermore even these static benefits can be expected to take several years to materialise. The dynamic benefits or those due to market integration, which have been estimated as an an additional 62 to 107 billion ECU for EUR 7 at 1985 prices, are likely to take longer, possibly between five and ten years.

It is probably useful at this stage to examine the possible bias in the figures given. First of all, the detailed calculations apply to seven Member States since most of the quantitative information from consultants' studies and surveys relates to these countries. A simple linear scaling-up of the results for EUR7 can be expected to underestimate the total for EUR12 since qualitative information from the business survey (on potential reductions in production costs and increase in sales) indicates that internal market barriers are more significant for the other five countries.

A second source of bias derives from the use of partial techniques. Where the price effects are small, the bias is likely to be small even if the trade effects are large. Where the price effects are larger, as, for example, with financial services or some of the other service sectors, the

omission of general equilibrium effects will entail greater bias. However, it is not obvious in which direction the bias will lie.

A third source of bias concerns the existence of monopoly or oligopoly power. To the extent that markets are characterised by market imperfections, the increase in output and therefore welfare is overestimated. However, this bias is relatively small because the significant welfare gains are on existing output. It also means that price reductions will have been overestimated, but, for a given cost reduction, the net gain will not be affected; there will simply be more producer gain and less consumer gain. Clearly where barrier removal implies an erosion of monopoly power it is important to exclude the reduction of excess profits where welfare is simply transferred from producers to consumers. For sectors where this information was available (e.g. agriculture, financial services), this adjustment has been made.

One of the aims of the internal market programme is to encourage market entry and competition. To the extent that the opening of markets could lead to greater market power at a European level by reducing and concentrating the firms in an industry, then a more active competition policy would be required. This question is addressed in some detail in Part D of "The Economics of 1992".

Fourthly, the use of unweighted averages for common external tariffs may produce a bias. Where the share of goods facing high tariffs would normally be large, in the absence of tariffs, relative to goods facing low tariffs, the unweighted average will be biased downwards. This leads to an underestimate of tariff loss and an overestimate of welfare gains. The bias is reversed for the converse situation. These sectoral biases are probably largely off-setting.

From the above discussion it is, therefore, not clear that there is any systematic bias in the estimates that have been produced. This does not exclude the fact that they may be subject to a considerable margin of error. The range of estimates given reflects uncertainty over the size of cost reduction effects following barrier removal.

## Section 5: Conclusions.

The modified partial equilibrium approach used in this paper has enabled a large amount of microeconomic data on the likely effects of market integration in the Community to be combined together in a systematic and transparent fashion. The resultant potential benefits in terms of economic welfare are sizeable, chiefly because non-tariff (as opposed to tariff) barriers are being removed and because of the significant effect on production cost in the Community.

The principal drawbacks of the methodology lie with its limitations. It fails to deal with certain major impacts of integration. One of the most important is the effect of increased competition and the consequent restructuring of the production structure. Such market integration effects have been estimated for the cost of non-Europe exercise calculating economies of scale effects (see chapter 9) and by generalising a number of representative sectoral calculations, Smith and Venables (1987). This latter estimate has been achieved by deriving multiplier coefficients with which to scale up the economic welfare gains developed here.

However, even these substantial integration effects do not exhaust the potential gains from internal market completion. There is evidence that there will be additional positive impacts on innovation (Geroski 1988) which will reinforce the gains from increased competition and may lead to an increase in the potential rate of economic growth.

Finally, by its nature, the partial equilibrium approach fails to take into account the indirect macroeconomic effects of cost reductions. The effects of increased output on investment and of increased factor incomes on savings are disregarded. The analysis leaves open the question of whether the potential gains associated with cost reductions are taken in the form of reduced prices (or possibly lower inflation) or higher output. This balance will to some extent be determined by the reactions of consumers and producers to market integration, but may also be influenced through the choice of monetary and fiscal policies. These issues are properly examined using macroeconomic models and are treated in Catinat, Donni and Italianer (1988).

## Footnotes

[1] See 'Completing the Internal Market', White Paper from the Commission to the European Council, 1985.

[2] The traditional terms 'static' and 'dynamic' of the trade literature are dropped in 'The Economics of 1992' report in favour of the more specific 'barrier removal' and 'integration' effects. The 'static' welfare calculations in this paper, therefore, correspond to barrier removal effects.

[3] Customs procedures, involving frontier stops either at internal Community borders or inland, and related administrative costs borne inland by companies and the public authorities, are at present maintained within the Community for the following reasons:
- differences in value added tax rates and excise duties, which are currently applied in accordance with the "destination principle", and thus necessitate border tax adjustments in the Member State of destination;
- application of monetary compensatory amounts to trade in certain agricultural products in accordance with the Common Agricultural Policy;
- differences in national public health standards involve veterinary and plant health checks;
- checks to control road transport licenses, and the compliance of vehicles with national regulations including safety rules for the transport of dangerous products;
- formalities carried out for statistical purposes;
- the enforcement of certain bilateral trade quota regimes that Member States maintain with third countries, for example textile quotas under the multi-fibre agreement of the GATT and other miscellaneous national measures authorised under Article 115 of the Treaty of Rome.

[4] See for example Cline et al (1978), Baldwin and Murray (1977).

[5] It is of course possible to modify these traditional approaches to take account of non-competitive market structure, see for example Smith and Venables (1987) or Cox and Harris (1985).

[6] Using the Leontieff inverse $(I-A)^{-1}$.

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Table A1 : Initial Values, Trade and Output  EUR 7 (1985)

| | Stage 1 | | | Stage 2 | | | | |
|---|---|---|---|---|---|---|---|---|
| | Initial intra-EC imports (ECU bn) | Initial extra-EC imports (ECU bn) | | Production (ECU bn) | Extra-EC Imports (ECU bn) | Extra-EC Exports (ECU bn) | Apparent Consumption (ECU bn) | Final Produc. (ECU bn) |
| Agriculture | 11.15 | 6.81 | Agriculture | 173.28 | 101.33 | 17.54 | 257.07 | 35.77 |
| | | | | | | | | |
| Oil, Natural Gas | 5.12 | 6.59 | Solid fuels | 30.44 | 5.23 | .21 | 35.46 | 3.85 |
| Mineral Oil Refining | 9.47 | 5.66 | Coke | 4.09 | .18 | .44 | 3.82 | .92 |
| | | | Oil, gas, petrol | 238.73 | 95.34 | 16.38 | 317.69 | 69.64 |
| Pharmaceuticals | 3.57 | 5.73 | Electr.,gas,water | 170.64 | .58 | .51 | 170.71 | 55.78 |
| Soap, Detergents | 1.94 | 2.24 | Nuclear fuels | 3.47 | 1.67 | 1.35 | 3.79 | 1.86 |
| Household Chemicals | 4.01 | 6.53 | | | | | | |
| Metal Products | 1.32 | 1.63 | Ores, metals | 158.30 | 29.30 | 24.90 | 162.70 | 16.16 |
| Boilermaking | .67 | .81 | Non-met. minerals | 79.20 | 4.44 | 7.52 | 75.99 | 14.55 |
| Tools, metal Goods | 5.35 | 7.90 | Chemicals | 235.08 | 17.51 | 42.61 | 215.77 | 69.69 |
| | | | Metal articles | 134.81 | 19.47 | 13.11 | 126.14 | 48.71 |
| Agric. Machinery | 2.45 | 2.98 | Mechanical engineering | 158.52 | 17.51 | 54.59 | 121.44 | 103.05 |
| Machine Tools | 2.75 | 5.12 | Office machinery | 48.49 | 19.47 | 14.97 | 52.98 | 31.60 |
| Textile Machinery | 1.24 | 2.23 | Electrical goods | 154.85 | 26.81 | 32.46 | 149.20 | 85.00 |
| Food, Chemical Mach. | 3.44 | 5.02 | Motor vehicles | 146.19 | 14.09 | 36.73 | 123.55 | 107.06 |
| Mining Equipment etc. | 4.40 | 6.55 | Other transport | 45.61 | 6.50 | 10.70 | 41.41 | 25.94 |
| Transmission Equip. | 2.19 | 3.56 | | | | | | |
| Other Mach. Industry | 2.17 | 3.39 | Meats, preserves | 48.32 | 3.78 | 1.88 | 50.22 | 38.91 |
| Other Mach. Equip. | 10.44 | 17.72 | Dairy products | 58.67 | .67 | 3.08 | 56.27 | 43.80 |
| | | | Other food products | 158.94 | 8.60 | 7.55 | 159.99 | 89.57 |
| Office Machinery | 13.51 | 26.70 | Beverages | 54.93 | .69 | 4.14 | 51.48 | 27.85 |
| | | | Tobacco products | 39.62 | .10 | .66 | 39.06 | 33.96 |
| Electrical Machinery | 4.48 | 7.99 | | | | | | |
| Telecom. Equipment | 9.42 | 20.09 | Textiles, clothing | 126.01 | 20.44 | 17.21 | 129.24 | 75.73 |
| Radio Television | 6.18 | 13.87 | Leather | 25.48 | 4.98 | 5.45 | 25.02 | 18.88 |
| Dom. Electrical Equip. | 3.19 | 4.49 | Timber, furniture | 68.82 | 7.96 | 3.99 | 72.79 | 32.07 |
| Vehicles, Engines | 27.83 | 39.90 | Paper and products | 131.11 | 12.73 | 6.98 | 136.86 | 28.13 |
| Vehicle Bodies | .57 | .67 | Rubber, plastics | 69.06 | 4.15 | 8.38 | 64.82 | 13.60 |
| Shipbuilding | .42 | 1.20 | Other manufacturing | 18.95 | 12.13 | 15.77 | 15.30 | 13.84 |
| Rail Rolling Stock | .18 | .29 | Building, civil engin. | 327.26 | .00 | .00 | 327.26 | 261.27 |
| Cycles, Motorcycles | .61 | 1.34 | | | | | | |
| Aerospace | 9.07 | 13.94 | Wholesale, retail trade | 481.01 | 4.90 | 19.58 | 466.34 | 342.05 |
| | | | Lodging, catering | 129.83 | 1.65 | 1.16 | 130.32 | 103.34 |
| Optical Photographic | 2.41 | 5.43 | Inland transport | 99.38 | 2.13 | 3.31 | 98.20 | 34.38 |
| Clocks, Watches | .40 | 1.73 | Sea, air transport | 50.46 | 9.96 | 31.09 | 29.32 | 34.27 |
| | | | Auxiliary transport | 44.90 | 5.65 | 5.51 | 45.04 | 6.29 |
| Vegetable, Animal Oils | 2.87 | 7.83 | Communications | 77.97 | 1.03 | .95 | 78.05 | 28.64 |
| Meat Preparation | 10.27 | 14.05 | Credit and insurance | 425.30 | 11.81 | 21.19 | 415.92 | 90.56 |
| Dairy Products | 6.90 | 7.57 | Rent | 256.69 | .77 | .46 | 257.00 | 220.27 |
| Fruit, Veg. Processing | 3.28 | 6.12 | Other market services | 213.65 | 5.22 | 5.10 | 213.77 | 155.28 |
| Fish Processing | .93 | 2.30 | Non-market services | 627.51 | .00 | .00 | 627.51 | 627.27 |
| Grain Milling | .79 | 1.28 | | | | | | |
| Pasta | .22 | .25 | Total | 5315.59 | 469.39 | 437.47 | 5347.51 | 2989.55 |
| Starch Products | .62 | 1.14 | | | | | | |
| Bread, Flour | .90 | .99 | | | | | | |
| Sugar Refining | .58 | 1.54 | | | | | | |
| Cocoa, Choco., Sugar | 2.34 | 2.96 | | | | | | |
| Animal Food | 1.25 | 1.66 | | | | | | |
| Other Food Products | 2.05 | 3.34 | | | | | | |
| Ethyl, Distilling | 1.00 | 1.17 | | | | | | |
| Wine | .53 | .90 | | | | | | |
| Cider, Perry, Mead | .01 | .02 | | | | | | |
| Brewing | .70 | .82 | | | | | | |
| Soft Drinks, Water | .32 | .34 | | | | | | |
| Tobacco Products | 2.01 | 2.11 | | | | | | |
| | | | | | | | | |
| Manufact. of Leather | .69 | 1.69 | | | | | | |
| Footwear | 3.69 | 6.09 | | | | | | |
| Clothing | 5.82 | 13.19 | | | | | | |
| Household Textiles | .72 | 1.64 | | | | | | |
| Fur Goods | .44 | .89 | | | | | | |
| Wooden Furniture | 3.01 | 4.21 | | | | | | |
| | | | | | | | | |
| Printing | 1.24 | 1.82 | | | | | | |
| Publishing | 1.24 | .22 | | | | | | |
| Rubber Products | .79 | .01 | | | | | | |
| Retread, Repair Tyres | .02 | .42 | | | | | | |
| Processed Plastics | 1.61 | .42 | | | | | | |
| | | | | | | | | |
| Jewellery | 3.60 | 9.24 | | | | | | |
| Musical Instruments | .17 | .54 | | | | | | |
| Photo.Processing | .12 | .20 | | | | | | |
| Toys, Sports Goods | 1.23 | 2.88 | | | | | | |
| Miscellaneous | 7.49 | 11.87 | | | | | | |
| | | | | | | | | |
| Total | 219.39 | 341.24 | | | | | | |

Source: Sectoral and VISA database, Commission, Apparent Consumption = Production + Imports − Exports, Final Production from Input-Output tables

Note: The import figures for stage 1 only cover goods comprising final consumption, including investment goods. The trade figures for stage 2 cover both final and intermediate goods, together with services.

Source: VISA database, Commission

Table A.2: Results of Static Calculations, Stage 1

| | Change in intra-EC imports (%) | | Change in extra-EC imports (%) | | Static Welfare gains (ECU bn) | | Public Procurement (ECU bn) | Total gains (ECU bn) | |
|---|---|---|---|---|---|---|---|---|---|
| | A (i) | B (ii) | A (iii) | B (iv) | A (v) | B (vi) | (vii) | A (viii) | B (ix) |
| Agriculture | 6.4 | 5.0 | -1.8 | -1.4 | .4 | .3 | .0 | .4 | .3 |
| Oil, Natural Gas | 2.7 | 8.3 | -.5 | -1.6 | .1 | .2 | .0 | .1 | .2 |
| Mineral Oil Refining | 1.7 | 5.4 | -1.0 | -2.9 | .1 | .3 | .0 | .1 | .3 |
| Pharmaceuticals | 1.8 | 2.6 | -1.7 | -2.3 | .0 | .0 | .9 | 1.0 | 1.0 |
| Soap, Detergents | 1.1 | 1.6 | -2.2 | -3.1 | .0 | .0 | .0 | .0 | .0 |
| Household Chemicals | 1.8 | 2.5 | -1.5 | -2.1 | .0 | .1 | .0 | .0 | .1 |
| Metal Products | 2.0 | 2.5 | -3.3 | -3.9 | .0 | .0 | .0 | .0 | .0 |
| Boilermaking | 1.9 | 2.3 | -3.4 | -3.9 | .0 | .0 | .0 | .0 | .0 |
| Tools, metal Goods | 2.6 | 3.2 | -2.7 | -3.4 | .0 | .1 | .0 | .1 | .1 |
| Agric. Machinery | 5.7 | 5.1 | -8.4 | -7.8 | .1 | .1 | .0 | .1 | .1 |
| Machine Tools | 7.6 | 7.3 | -4.6 | -4.5 | .1 | .1 | .0 | .1 | .1 |
| Textile Machinery | 7.6 | 7.1 | -5.1 | -4.8 | .0 | .0 | .0 | .0 | .0 |
| Food, Chemical Mach. | 6.3 | 6.0 | -6.2 | -6.0 | .1 | .1 | .0 | .1 | .1 |
| Mining Equipment etc. | 6.4 | 6.2 | -6.2 | -6.0 | .1 | .1 | .0 | .1 | .1 |
| Transmission Equip. | 7.0 | 6.7 | -5.5 | -5.4 | .1 | .1 | .0 | .1 | .1 |
| Other Mach. Industry | 6.8 | 6.5 | -5.8 | -5.6 | .1 | .1 | .0 | .1 | .1 |
| Other Mach. Equip. | 7.3 | 7.0 | -5.5 | -5.3 | .3 | .3 | .1 | .4 | .4 |
| Office Machinery | 4.4 | 2.9 | -3.1 | -2.1 | .3 | .2 | .2 | .5 | .4 |
| Electrical Machinery | 4.3 | 6.1 | -3.0 | -4.1 | .1 | .1 | .0 | .1 | .1 |
| Telecom. Equipment | 4.9 | 6.9 | -2.5 | -3.5 | .2 | .2 | .4 | .5 | .6 |
| Radio Television | 4.9 | 6.9 | -2.3 | -3.2 | .1 | .2 | .0 | .1 | .2 |
| Dom. Electrical Equip. | 3.6 | 5.0 | -4.0 | -5.6 | .1 | .1 | .0 | .1 | .1 |
| Vehicles, Engines | 1.1 | 3.4 | -1.1 | -3.6 | .2 | .5 | .1 | .2 | .6 |
| Vehicle Bodies | .8 | 2.5 | -1.2 | -4.1 | .0 | .0 | .0 | .0 | .0 |
| Shipbuilding | 1.9 | 5.0 | -.4 | -1.1 | .0 | .0 | .0 | .0 | .0 |
| Rail Rolling Stock | 1.4 | 3.3 | -.6 | -1.6 | .0 | .0 | 1.1 | 1.1 | 1.1 |
| Cycles, Motorcycles | 1.7 | 4.6 | -.6 | -1.5 | .0 | .0 | .0 | .0 | .0 |
| Aerospace | 1.5 | 4.0 | -.8 | -2.0 | .1 | .2 | .0 | .1 | .2 |
| Optical Photographic | 6.3 | 4.0 | -3.1 | -2.0 | .1 | .0 | .0 | .1 | .0 |
| Clocks, Watches | 8.0 | 5.3 | -1.5 | -1.0 | .0 | .0 | .0 | .0 | .0 |
| Vegetable, Animal Oils | 1.0 | 2.4 | .0 | .0 | .0 | .1 | .0 | .0 | .1 |
| Meat Preparation | .7 | 1.7 | .0 | .0 | .1 | .3 | .0 | .1 | .3 |
| Dairy Products | .7 | 1.6 | .0 | .0 | .1 | .2 | .0 | .1 | .2 |
| Fruit, Veg. Processing | .9 | 2.0 | .0 | .0 | .0 | .1 | .0 | .0 | .1 |
| Fish Processing | 1.0 | 2.3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Grain Milling | .8 | 1.8 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Pasta | .6 | 1.4 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Starch Products | .8 | 1.9 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Bread, Flour | .6 | 1.4 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Sugar Refining | 1.0 | 2.2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Cocoa, Choco., Sugar | .7 | 1.6 | .0 | .0 | .0 | .1 | .0 | .0 | .1 |
| Animal Food | .8 | 1.8 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Other Food Products | .8 | 1.8 | .0 | .0 | .0 | .1 | .0 | .0 | .1 |
| Ethyl, Distilling | 1.3 | 2.9 | -3.0 | -7.2 | .0 | .0 | .0 | .0 | .0 |
| Wine | 2.1 | 4.9 | -1.8 | -4.3 | .0 | .0 | .0 | .0 | .0 |
| Cider, Perry, Mead | 1.8 | 4.2 | -2.3 | -5.5 | .0 | .0 | .0 | .0 | .0 |
| Brewing | 1.2 | 2.9 | -2.9 | -7.2 | .0 | .0 | .0 | .0 | .0 |
| Soft Drinks, Water | 1.1 | 2.4 | -3.5 | -7.2 | .0 | .0 | .0 | .0 | .0 |
| Tobacco Products | .8 | 2.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Manufact. of Leather | 6.8 | 3.3 | -3.1 | -1.5 | .0 | .0 | .0 | .0 | .0 |
| Footwear | 6.1 | 2.9 | -3.9 | -1.9 | .1 | .0 | .0 | .1 | .0 |
| Clothing | 6.9 | 3.4 | -2.5 | -1.3 | .1 | .1 | .1 | .3 | .2 |
| Household Textiles | 6.8 | 3.4 | -2.6 | -1.3 | .0 | .0 | .0 | .0 | .0 |
| Fur Goods | 6.2 | 2.5 | -2.4 | -1.0 | .0 | .0 | .0 | .0 | .0 |
| Wooden Furniture | 6.2 | 4.4 | -6.4 | -4.6 | .1 | .1 | .0 | .1 | .1 |
| Printing | 3.2 | 2.8 | -3.2 | -2.8 | .0 | .0 | .0 | .0 | .0 |
| Publishing | 3.2 | 2.8 | -3.2 | -2.8 | .0 | .0 | .0 | .0 | .0 |
| Rubber Products | 3.6 | 4.5 | -3.8 | -4.8 | .0 | .0 | .0 | .0 | .0 |
| Retread, Repair Tyres | 3.0 | 3.6 | -4.0 | -5.2 | .0 | .0 | .0 | .0 | .0 |
| Processed Plastics | 3.2 | 4.0 | -4.0 | -5.1 | .0 | .0 | .0 | .0 | .0 |
| Jewellery | 3.5 | 3.9 | -1.2 | -1.3 | .1 | .1 | .0 | .1 | .1 |
| Musical Instruments | 5.5 | 6.0 | -1.6 | -1.7 | .0 | .0 | .0 | .0 | .0 |
| Photo.Processing | 4.1 | 4.4 | -3.0 | -3.3 | .0 | .0 | .0 | .0 | .0 |
| Toys, Sports Goods | 4.8 | 5.2 | -2.1 | -2.3 | .0 | .0 | .0 | .0 | .0 |
| Miscellaneous | 3.6 | 3.8 | -2.7 | -2.9 | .1 | .2 | .0 | .2 | .2 |
| Total | 3.7 | 4.5 | -2.2 | -2.6 | 3.8 | 5.1 | 3.9 | 7.7 | 9.0 |

Table A3: Results of static calculations, stage 1

| | Cost Reduction stage 1 (%) | | Change in Price (%) | | Change in Imports (%) | |
|---|---|---|---|---|---|---|
| | A (i) | B (ii) | A (iii) | B (iv) | A (v) | B (vi) |
| Agriculture | 2.0 | 1.5 | -.7 | -.5 | 3.3 | 2.6 |
| Oil, Natural Gas | .8 | 2.2 | -.2 | -.6 | .9 | 2.7 |
| Mineral Oil Refining | .8 | 2.3 | -.3 | -1.1 | .7 | 2.3 |
| Pharmaceuticals | .8 | 1.1 | -.4 | -.5 | -.3 | -.4 |
| Soap, Detergents | .8 | 1.1 | -.6 | -.7 | -.7 | -.9 |
| Household Chemicals | .8 | 1.1 | -.4 | -.5 | -.3 | -.4 |
| Metal Products | 1.2 | 1.5 | -.8 | -.8 | -.9 | -1.0 |
| Boilermaking | 1.2 | 1.5 | -.8 | -.9 | -1.0 | -1.1 |
| Tools, metal Goods | 1.2 | 1.5 | -.7 | -.7 | -.6 | -.7 |
| Agric. Machinery | 2.7 | 2.5 | -1.7 | -1.5 | -2.0 | -2.0 |
| Machine Tools | 2.4 | 2.3 | -1.1 | -1.0 | -.4 | -.4 |
| Textile Machinery | 2.4 | 2.3 | -1.2 | -1.0 | -.6 | -.5 |
| Food, Chemical Mach. | 2.4 | 2.3 | -1.4 | -1.2 | -1.1 | -1.1 |
| Mining Equipment etc. | 2.4 | 2.3 | -1.3 | -1.2 | -1.1 | -1.1 |
| Transmission Equip. | 2.4 | 2.3 | -1.2 | -1.1 | -.8 | -.8 |
| Other Mach. Industry | 2.4 | 2.3 | -1.3 | -1.2 | -.9 | -.9 |
| Other Mach. Equip. | 2.4 | 2.3 | -1.2 | -1.1 | -.8 | -.7 |
| Office Machinery | 1.4 | .9 | -.7 | -.4 | -.6 | -.4 |
| Electrical Machinery | 1.4 | 2.0 | -.7 | -.9 | -.3 | -.5 |
| Telecom. Equipment | 1.4 | 2.0 | -.6 | -.8 | -.1 | -.2 |
| Radio Television | 1.4 | 2.0 | -.6 | -.8 | -.1 | -.1 |
| Dom. Electrical Equip. | 1.4 | 2.0 | -.8 | -1.1 | -.8 | -1.2 |
| Vehicles, Engines | .5 | 1.6 | -.3 | -.9 | -.2 | -.7 |
| Vehicle Bodies | .5 | 1.6 | -.3 | -1.0 | -.3 | -1.1 |
| Shipbuilding | .5 | 1.4 | -.1 | -.2 | .2 | .5 |
| Rail Rolling Stock | .5 | 1.3 | -.2 | -.2 | .1 | .3 |
| Cycles, Motorcycles | .5 | 1.4 | -.2 | -.2 | .2 | .4 |
| Aerospace | .5 | 1.5 | -.2 | -.5 | .1 | .4 |
| Optical Photographic | 2.1 | 1.3 | -.9 | -.5 | -.2 | -.1 |
| Clocks, Watches | 2.1 | 1.3 | -.5 | -.3 | .3 | .2 |
| Vegetable, Animal Oils | 1.0 | 2.3 | -.4 | 1.0 | .3 | .6 |
| Meat Preparation | 1.0 | 2.3 | -.6 | -1.3 | .3 | .7 |
| Dairy Products | 1.1 | 2.4 | -.7 | -1.4 | .3 | .8 |
| Fruit, Veg. Processing | 1.0 | 2.3 | -.6 | -1.3 | .3 | .7 |
| Fish Processing | .9 | 2.2 | -.5 | -1.0 | .3 | .7 |
| Grain Milling | 1.0 | 2.4 | -.5 | -1.2 | .2 | .7 |
| Pasta | 1.0 | 2.3 | -.7 | -1.5 | .3 | .7 |
| Starch Products | 1.0 | 2.3 | -.5 | -1.2 | .3 | .7 |
| Bread, Flour | 1.0 | 2.3 | -.7 | -1.5 | .3 | .7 |
| Sugar Refining | .9 | 2.2 | -.4 | -.8 | .3 | .6 |
| Cocoa, Choco., Sugar | 1.0 | 2.3 | -.6 | -1.4 | .3 | .7 |
| Animal Food | 1.1 | 2.4 | -.7 | -1.3 | .4 | .8 |
| Other Food Products | .9 | 2.3 | -.5 | -1.2 | .3 | .7 |
| Ethyl, Distilling | 1.0 | 2.3 | -.7 | -1.6 | -1.0 | -2.5 |
| Wine | 1.0 | 2.3 | -.5 | -1.2 | -.4 | -.9 |
| Cider, Perry, Mead | 1.0 | 2.3 | -.6 | -1.4 | -.6 | -1.5 |
| Brewing | 1.0 | 2.3 | -.7 | -1.6 | -1.0 | -2.6 |
| Soft Drinks, Water | 1.1 | 2.4 | -.9 | -.8 | .4 | -2.6 |
| Tobacco Products | 1.0 | 2.3 | -.8 | -1.7 | -.3 | 1.0 |
| Manufact. of Leather | 2.3 | 1.1 | -.9 | -.4 | -.1 | -.1 |
| Footwear | 2.3 | 1.1 | -1.1 | -.4 | .4 | -.1 |
| Clothing | 2.3 | 1.1 | -.8 | -.4 | .3 | .2 |
| Household Textiles | 2.3 | 1.1 | -.8 | -.4 | .4 | .1 |
| Fur Goods | 2.0 | .9 | -.8 | -.4 | -1.2 | .1 |
| Wooden Furniture | 3.1 | 2.2 | -1.9 | -1.3 | -.6 | -.8 |
| Printing | 1.6 | 1.4 | -.9 | -.7 | -.6 | -.6 |
| Publishing | 1.6 | 1.4 | -.9 | -.7 | 1.9 | -.5 |
| Rubber Products | 1.6 | 2.1 | -.9 | -1.1 | 1.5 | 2.4 |
| Retread, Repair Tyres | 1.6 | 2.0 | -1.0 | -1.2 | 1.7 | 1.7 |
| Processed Plastics | 1.6 | 2.0 | -1.0 | -1.2 | 1.7 | 2.1 |
| Jewellery | 1.4 | 1.6 | -.5 | .-.6 | .2 | .2 |
| Musical Instruments | 1.7 | 1.8 | -.5 | -.5 | .1 | .1 |
| Photo.Processing | 1.6 | 1.8 | -.8 | -.8 | -.4 | -.4 |
| Toys, Sports Goods | 1.6 | 1.8 | -.6 | -.6 | -.0 | -.1 |
| Miscellaneous | 1.6 | 1.7 | -.8 | -.4 | -.3 | -.3 |
| Total | 1.6 | 1.9 | -.7 | -.8 | .1 | .2 |

Table A.4:   Results of Static Calculations, Stage 2

| | Change in output (%) | | Change in extra-EC imports (%) | | Static Welfare gains (ECU bn) | | |
|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | | B |
| | (i) | (ii) | (iii) | (iv) | (v) | (vi) | |
| Agriculture | .4 | 2.9 | .0 | .0 | .4 | 2.8 | |
| Solid fuels | .0 | .0 | 2.4 | 2.9 | .0 | .1 | |
| Coke | .0 | .0 | 3.9 | 4.4 | .0 | .0 | |
| Oil, gas, petrol | 2.7 | 2.7 | -4.3 | -4.4 | 1.1 | 1.1 | |
| Electr.,gas,water | 2.7 | 2.8 | -31.5 | -32.0 | 3.3 | 3.3 | |
| Nuclear fuels | .0 | .0 | .0 | .0 | .0 | .0 | |
| Ores, metals | 2.3 | 8.4 | -8.6 | -31.0 | .5 | 1.7 | |
| Non-met. minerals | 1.1 | 1.2 | -8.3 | -9.1 | .3 | .3 | |
| Chemicals | 1.7 | 1.8 | -9.5 | -10.4 | 1.7 | 1.9 | |
| Metal articles | .8 | 1.4 | -7.1 | -12.4 | .7 | 1.2 | |
| Mechanical engineering | 1.4 | 2.0 | -6.0 | -8.4 | 1.6 | 2.3 | |
| Office machinery | 3.4 | 3.9 | -5.8 | -6.7 | 1.1 | 1.3 | |
| Electrical goods | 1.9 | 2.6 | -5.8 | -7.7 | 1.8 | 2.3 | |
| Motor vehicles | 1.4 | 2.0 | -5.4 | -7.4 | 1.8 | 2.5 | |
| Other transport | 1.7 | 2.2 | -5.2 | -6.7 | .5 | .6 | |
| Meats, preserves | .4 | 1.5 | .0 | .0 | .4 | 1.5 | |
| Dairy products | .4 | 1.5 | .0 | .0 | .5 | 1.8 | |
| Other food products | .4 | 1.0 | .0 | .0 | 1.0 | 2.2 | |
| Beverages | .5 | .6 | -1.9 | -2.5 | .3 | .5 | |
| Tobacco products | .2 | .3 | -2.2 | -3.2 | .2 | .2 | |
| Textiles, clothing | 1.7 | 1.8 | -5.3 | -5.8 | 1.5 | 1.7 | |
| Leather | 1.8 | 2.2 | -5.2 | -6.4 | .4 | .5 | |
| Timber, furniture | 1.6 | 2.2 | -5.4 | -7.4 | .6 | .8 | |
| Paper and products | 1.7 | 1.8 | -6.2 | -6.7 | .5 | .6 | |
| Rubber, plastics | 1.6 | 1.8 | -7.3 | -8.1 | .3 | .3 | |
| Other manufacturing | 3.4 | 4.6 | -4.4 | -6.0 | .5 | .6 | |
| Building, civil engin. | 1.0 | 1.2 | -2.0 | -2.4 | 4.2 | 4.9 | |
| Wholesale, retail trade | .9 | .9 | .0 | .0 | 3.5 | 3.8 | |
| Lodging, catering | .9 | 1.4 | .0 | .0 | 1.1 | 1.8 | |
| Inland transport | 2.8 | 2.8 | -7.6 | -7.7 | 1.5 | 1.5 | |
| Sea, air transport | 3.5 | 3.6 | -10.3 | -10.4 | 1.4 | 1.4 | |
| Auxiliary transport | 1.1 | 1.2 | -5.3 | -5.6 | .1 | .1 | |
| Communications | 3.0 | 3.0 | -30.7 | -30.9 | 1.7 | 1.7 | |
| Credit and insurance | 6.7 | 6.7 | -60.9 | -61.3 | 10.5 | 10.6 | |
| Rent | .4 | .4 | -3.5 | -3.7 | 1.5 | 1.6 | |
| Other market services | .7 | .7 | .0 | .0 | 5.9 | 6.0 | |
| Non-market services | .6 | .7 | .0 | .0 | 5.8 | 6.4 | |
| Total | 1.3 | 1.5 | -5.7 | -7.7 | 58.0 | 71.8 | |

Table A5: Results of static calculations, stage 2

| | Cost Reduction Stage 2 (%) | | Change in Price (%) | | Change in total output (%) | |
|---|---|---|---|---|---|---|
| | A (i) | B (ii) | A (iii) | B (iv) | A (v) | B (vi) |
| Agriculture | 0.8 | 5.9 | -.5 | -3.9 | .4 | 2.9 |
| Solid fuels | 1.1 | 1.3 | -6.4 | -1.3 | .8 | 1.0 |
| Coke | 1.4 | 1.6 | -4.9 | -1.4 | 1.0 | 1.1 |
| Oil, gas, petrol | 1.3 | 1.3 | -.8 | -.7 | 2.7 | 2.7 |
| Electr.,gas,water | 5.8 | 5.9 | -5.3 | -5.3 | 2.7 | 2.8 |
| Nuclear fuels | 1.6 | 1.7 | -.1 | .0 | .0 | .0 |
| Ores, metals | 1.9 | 6.9 | -1.5 | -5.2 | 2.3 | 8.4 |
| Non-met. minerals | 1.6 | 1.8 | -1.4 | -1.5 | 1.1 | 1.2 |
| Chemicals | 1.9 | 2.1 | -1.6 | -1.7 | 1.7 | 1.8 |
| Metal articles | 1.4 | 2.4 | -1.2 | -2.1 | .8 | 1.4 |
| Mechanical engineering | 1.4 | 1.9 | -1.0 | -1.4 | 1.4 | 2.0 |
| Office machinery | 1.7 | 2.0 | -1.0 | -1.1 | 3.4 | 3.9 |
| Electrical goods | 1.4 | 1.8 | -1.0 | -1.3 | 1.9 | 2.6 |
| Motor vehicles | 1.5 | 2.1 | -1.1 | -1.5 | 1.4 | 2.0 |
| Other transport | 1.5 | 1.9 | -.7 | -1.3 | 1.7 | 2.2 |
| Meats, preserves | 0.9 | 4.0 | -.8 | -2.9 | .4 | 1.5 |
| Dairy products | 1.1 | 4.3 | -.8 | -3.2 | .4 | 1.5 |
| Other food products | 1.1 | 2.6 | -.9 | -1.9 | .4 | 1.0 |
| Beverages | 1.3 | 1.7 | -.9 | -1.3 | .5 | .6 |
| Tobacco products | 0.5 | 0.7 | -.4 | -.5 | .2 | .3 |
| Textiles, clothing | 1.3 | 1.5 | -.9 | -1.0 | 1.7 | 1.8 |
| Leather | 1.4 | 1.7 | -.9 | -1.1 | 1.8 | 2.2 |
| Timber, furniture | 1.3 | 1.8 | -.9 | -1.2 | 1.6 | 2.2 |
| Paper and products | 1.5 | 1.6 | -1.1 | -1.1 | 1.7 | 1.8 |
| Rubber, plastics | 1.6 | 1.8 | -1.2 | -1.4 | 1.6 | 1.8 |
| Other manufacturing | 1.5 | 2.1 | -.8 | -1.0 | 3.4 | 4.6 |
| Building, civil engin. | .13 | 1.5 | -1.0 | -1.2 | 1.0 | 1.2 |
| Wholesale, retail trade | 1.1 | 1.1 | -.9 | -.9 | .9 | .9 |
| Lodging, catering | 1.1 | 1.7 | -.9 | -1.4 | .9 | 1.4 |
| Inland transport | 4.4 | 4.4 | -3.8 | -3.9 | 2.8 | 2.8 |
| Sea, air transport | 6.2 | 6.3 | -5.2 | -5.2 | 3.5 | 3.6 |
| Auxiliary transport | 1.1 | 1.2 | -.9 | -.9 | 1.1 | 1.2 |
| Communications | 5.7 | 5.8 | -5.1 | -5.1 | 3.0 | 3.0 |
| Credit and insurance | 11.5 | 11.6 | -10.2 | -10.2 | 6.7 | 6.7 |
| Rent | 0.7 | 0.7 | -.6 | -.6 | .4 | .4 |
| Other market services | 3.8 | 3.9 | -3.6 | -3.7 | .7 | .7 |
| Non-market services | 0.9 | 1.0 | -.8 | -.9 | .6 | .7 |
| Average | 2.4 | 3.0 | -1.5 | -1.8 | 1.3 | 1.5 |

Table A6: Economies of scale and total static welfare effects

| | EOS[1] Parameter | EOS Welfare Gains[2] Intermediate goods | | EOS Welfare Gains[2] Final Goods | | Total static Welfare Gains[2] | |
| | | A | B | A | B | A | B |
| | (i) | (ii) | (iii) | (iv) | (v) | (vi) | (vii) |
|---|---|---|---|---|---|---|---|
| Agriculture | 0 | .0 | .0 | .0 | .0 | .0 | .0 |
| | | | | | | | |
| Solid fuels | 0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Coke | 0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Oil, gas, petrol | 0.12 | .0 | .0 | .3 | .6 | .4 | .6 |
| Electr.,gas,water | 0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Nuclear fuels | 0 | .0 | .0 | .0 | .0 | .0 | .0 |
| | | | | | | | |
| Ores, metals | 0.11 | .1 | .2 | .0 | .2 | .1 | .4 |
| Non-met. minerals | 0.05 | .0 | .0 | .0 | .0 | .0 | .0 |
| Chemicals | 0.12 | .2 | .2 | .2 | .2 | .3 | .4 |
| Metal articles | 0.06 | .1 | .1 | .0 | .1 | .1 | .2 |
| Mechanical engineering | 0.1 | .1 | .2 | .5 | .5 | .6 | .7 |
| Office machinery | 0.11 | .1 | .1 | .3 | .3 | .4 | .4 |
| Electrical goods | 0.08 | .2 | .2 | .3 | .4 | .5 | .6 |
| Motor vehicles | 0.14 | .2 | .2 | .3 | .5 | .4 | .7 |
| Other transport | 0.12 | .0 | .0 | .1 | .2 | .1 | .2 |
| | | | | | | | |
| Meats, preserves | 0.04 | .0 | .0 | .0 | .0 | .0 | .0 |
| Dairy products | 0.04 | .0 | .0 | .0 | .0 | .0 | .0 |
| Other food products | 0.04 | .0 | .0 | .0 | .1 | .1 | .1 |
| Beverages | 0.04 | .0 | .0 | .0 | .0 | .0 | .0 |
| Tobacco products | 0.03 | .0 | .0 | .0 | .0 | .0 | .0 |
| | | | | | | | |
| Textiles, clothing | 0.03 | .0 | .0 | .1 | .0 | .1 | .1 |
| Leather | 0.03 | .0 | .0 | .0 | .0 | .1 | .0 |
| Timber, furniture | 0.04 | .0 | .0 | .0 | .0 | .1 | .1 |
| Paper and products | 0.07 | .0 | .0 | .0 | .0 | .1 | .1 |
| Rubber, plastics | 0.04 | .0 | .0 | .0 | .0 | .0 | .0 |
| Other manufacturing | 0.04 | .0 | .0 | .1 | .1 | .1 | .1 |
| Building, civil engin. | 0 | .1 | .1 | .0 | .0 | .1 | .1 |
| | | | | | | | |
| Wholesale, retail trade | | .1 | .1 | .0 | .0 | .1 | .1 |
| Lodging, catering | | .0 | .0 | .0 | .0 | .0 | .0 |
| Inland transport | | .0 | .0 | .0 | .0 | .0 | .0 |
| Sea, air transport | | .0 | .0 | .0 | .0 | .0 | .0 |
| Auxiliary transport | | .0 | .0 | .0 | .0 | .0 | .0 |
| Communications | | .0 | .0 | .0 | .0 | .0 | .0 |
| Credit and insurance | | .0 | .0 | .0 | .0 | .0 | .0 |
| Rent | | .0 | .0 | .0 | .0 | .0 | .0 |
| Other market services | | .0 | .0 | .0 | .0 | .0 | .0 |
| Non-market services | | .1 | .1 | .0 | .0 | .1 | .1 |
| | | | | | | | |
| Total | | 1.5 | 1.8 | 2.4 | 3.3 | 3.9 | 5.1 |

[1] Percentage reduction in average cost for a one per cent increase in output (see Annex C3).
[2] Billion ECU.

Table A7: Total static welfare effects (bn ECU)

| | (I)<br>Trade PP | | (II)<br>Production Cost | | (III)<br>Economies of<br>Scale | | Total | |
|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B |
| Agriculture | .4 | .3 | .4 | 2.8 | .0 | .0 | .8 | 3.1 |
| Solid fuels | .0 | .0 | .0 | .1 | .0 | .0 | .1 | .1 |
| Coke | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Oil, gas, petrol | .2 | .5 | 1.1 | 1.1 | .4 | .6 | 1.6 | 2.3 |
| Electr.,gas,water | .0 | .0 | 3.3 | 3.3 | .0 | .0 | 3.3 | 3.3 |
| Nuclear fuels | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| Ores, metals | .0 | .0 | .5 | 1.7 | .1 | .4 | .6 | 2.1 |
| Non-met. minerals | .0 | .0 | .3 | .3 | .0 | .0 | .3 | .3 |
| Chemicals | 1.0 | 1.0 | 1.7 | 1.9 | .3 | .4 | 3.1 | 3.3 |
| Metal articles | .1 | .1 | .7 | 1.2 | .1 | .2 | .9 | 1.5 |
| Mechanical engineering | 1.0 | .9 | 1.6 | 2.3 | .6 | .7 | 3.2 | 3.9 |
| Office machinery | .6 | .4 | 1.1 | 1.3 | .4 | .4 | 2.0 | 2.1 |
| Electrical goods | .8 | 1.0 | 1.8 | 2.3 | .5 | .6 | 3.0 | 1.8 |
| Motor vehicles | .2 | .6 | 1.8 | 2.5 | .4 | .7 | 2.5 | 2.0 |
| Other transport | 1.2 | 1.3 | .5 | .6 | .1 | .2 | 1.8 | 2.8 |
| Meats, preserves | .1 | .3 | .4 | 1.5 | .0 | .0 | .5 | .5 |
| Dairy products | .1 | .2 | .5 | 1.8 | .0 | .0 | .6 | .3 |
| Other food products | .2 | .5 | 1.0 | 2.2 | .1 | .1 | 1.2 | 1.8 |
| Beverages | .0 | .1 | .3 | .5 | .0 | .0 | .4 | .7 |
| Tobacco products | .0 | .0 | .2 | .2 | .0 | .0 | .2 | .9 |
| Textiles, clothing | .1 | .1 | 1.5 | 1.7 | .1 | .1 | 1.7 | .7 |
| Leather | .3 | .2 | .4 | .5 | .1 | .0 | .7 | .4 |
| Timber, furniture | .1 | .1 | .6 | .8 | .1 | .1 | .7 | 1.0 |
| Paper and products | .1 | .1 | .5 | .6 | .1 | .1 | .7 | 5.9 |
| Rubber, plastics | .0 | .1 | .3 | .3 | .0 | .0 | .3 | 3.8 |
| Other manufacturing | .3 | .3 | .5 | .6 | .1 | .1 | .8 | 1.8 |
| Building, civil engin. | .9 | .9 | 4.2 | 4.9 | .1 | .1 | 5.3 | 5.9 |
| Wholesale, retail trade | .0 | .0 | 3.5 | 3.8 | .1 | .1 | 3.6 | 3.8 |
| Lodging, catering | .0 | .0 | 1.1 | 1.8 | .0 | .0 | 1.1 | 1.8 |
| Inland transport | .0 | .0 | 1.5 | 1.5 | .0 | .0 | 1.5 | 1.5 |
| Sea, air transport | .0 | .0 | 1.4 | 1.4 | .0 | .0 | 1.4 | 1.4 |
| Auxiliary transport | .0 | .0 | .1 | .1 | .0 | .0 | .1 | .1 |
| Communications | .0 | .0 | 1.7 | 1.7 | .0 | .0 | 1.7 | 1.7 |
| Credit and insurance | .0 | .0 | 10.5 | 10.6 | .0 | .0 | 10.5 | 10.6 |
| Rent | .0 | .0 | 1.5 | 1.6 | .0 | .0 | .15 | 1.6 |
| Other market services | .0 | .0 | 5.9 | 6.0 | .0 | .0 | 5.9 | 6.0 |
| Non-market services | .0 | .0 | 5.8 | 6.4 | .1 | .1 | 5.9 | 6.5 |
| Total | 7.7 | 9.0 | 58.0 | 71.8 | 3.9 | 5.1 | 69.6 | 85.8 |

## Annex B

### Data Requirements

In addition to estimates of non-tariff barrier cost reductions stages one and two also require trade and output data, the relevant price elasticities and the common external tariff (CET). For the calculations of the static trade effects in stage one, price elasticities of import demand in each EC country are required plus export elasticities for both the rest of the Community and the rest of the world. Assuming perfectly substitutablegoods these elasticities can be derived from industry supply and demand curves. In practise the industry supply curves may be difficult to define because of oligopoly power.

### Trade and output

Trade data for stage one which considers only trade in final manufactured and agricultural goods are drawn from the VISA databank for the EC, in this case at Nace 3-digit level and distinguishing intra-EC and extra-EC imports. For stage two which considers the whole economy but at an aggregate Community (the above seven countries) level, both production data and data for trade in services are required. The production or output data are drawn from the Commission's sectoral database which operates at the R-25 level. Where necessary these sectoral data are disaggregated using country-specific input-output tables to the R-44 level. The correspondance between R-44 and R-25 is given in Table B8. Data on extra-EC exports and extra-EC imports for the individual countries is taken from the VISA databank for manufactured and agricultural goods. For services the trade data from the most recent country input-output tables are taken and scaled up by the appropriate increase in output to produce 1985 figures. The data on output and extra-EC trade are then aggregated for the seven countries and transformed to give a data series for apparent consumption.

### Elasticities

For the seven EC countries and for each sector import demand elasticities have been selected on the basis of a literature search, the main sources

being Stern, Francis and Schumacher (1976) and the studies undertaken within the Cambridge Growth Project. The latter constitute the most comprehensive set of disaggregated import price elasticities that are available. For countries other than the UK, elasticities have been selected (i) by taking account of Stern et alia's best point estimates which are generally at a higher level of aggregation, (ii) by analogy with those for the UK and (iii) by taking into account the fact that high import consumption sectors usually imply low price elasticities of demand and that elasticities are typically greater for manufactured goods than for non-manufactured goods; furthermore that among the latter, elasticities are typically higher for raw materials than for food and beverages.

Econometric estimates of export supply elasticities for either the Community or the rest of the world are less evident. The parameters used here are based on surveys (Goldstein and Khan (1985), Davenport, (1986)) and on the expectation that these estimates are inversely correlated with the degree of export openness and positively correlated with real GNP (Gylfason 1978). It has been assumed that each Community country faces the same rest-of-the-Community supply elasticity.

Most processed foodstuffs entering the Community from outside face a tariff and some are subject to a variable levy. This levy is determined by the prevailing price of products for which there is a Common Agricultural Policy regime and effectively excludes a supply reaction from the rest of the world to changes in internal Community prices. Therefore the export elasticity of the rest of the world was artificially set equal to zero for meat products, dairy products, cereals and sugar.

For stage two where the impact of Community-wide cost reductions, both on goods produced for dometic consumption and on those destined for export, is calculated, demand and supply elasticities by sector for the Community are required. The uncompensated demand elasticities are based on the Hermes model results (Italianer 1986) for the various national estimates of the Rotterdam specification developed by Barten (1969). These estimates are supplemented with more recent studies using the same or similar specifications (Lluch et alia 1977).

A survey of econometric models having some sectoral breakdown of the determination of capital formation demonstrates the extreme sensitivity of the estimate of the price elasticity of demand for investment goods to model specification. These elasticities were, in effect, set at unity. A complete list of the elasticities used is given in Tables B3–B5.

## Common External Tariff

Tables B6 and B7 detail the values that have been used for the common external tariff (CET). The CET is actually levied on about six thousand goods according to their Nimexe classification. The main source of the values used here (which are unweighted averages for sectoral classifications) is material produced by the GATT Committee on Trade and Development.

## Economies of scale

Finally, it is necessary to have economies of scale parameters for use in stage three where scale effects on final goods are treated and for scale effects on intermediate goods in stage two. From the information on the cost gradient at a given percentage of minimum efficient scale (see Pratten 1987) it is possible to derive a sectoral relationship between increases in production or output and reductions in unit cost provided some assumption is made regarding the form of the cost function and that it is assumed that extra production gets spread in an even fashion across average-sized plants which are producing below minimum efficient scale. This has been done at Nace 2-digit level to produce what is essentially a rather static measure of economies of scale, i.e. assuming extra output is spread across existing plant without any restructuring of capacity. The parameters are given in Table A6.

Table B1: Cost Reductions by sector and country for stage 1A

| | D | F | I | NL | B | UK |
|---|---|---|---|---|---|---|
| Agriculture | 2.9 | 1.8 | 1.6 | 1.5 | 1.4 | 1.5 |
| Oil, Natural Gas | .7 | .8 | .8 | 1.0 | .8 | .7 |
| Mineral Oil Refining | .7 | .8 | .8 | 1.0 | .8 | .7 |
| Pharmaceuticals | .4 | .7 | 1.6 | 1.0 | .5 | .7 |
| Soap, Detergents | .4 | .7 | 1.6 | 1.0 | .5 | .7 |
| Household Chemicals | .4 | .7 | 1.6 | 1.0 | .5 | .7 |
| Metal Products | 1.5 | .8 | 1.8 | .5 | .5 | .7 |
| Boilermaking | 1.5 | .8 | 1.8 | .5 | .5 | .7 |
| Tools, metal Goods | 1.5 | .8 | 1.8 | .5 | .5 | .7 |
| Agric. Machinery | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Machine Tools | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Textile Machinery | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Food, Chemical Mach. | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Mining Equipment etc. | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Transmission Equip. | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Other Mach. Industry | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Other Mach. Equip. | 1.9 | 4.0 | 2.5 | 1.6 | 1.6 | 2.1 |
| Office Machinery | 1.1 | 1.4 | 1.9 | 1.2 | 1.5 | 1.6 |
| Electrical Machinery | 1.1 | 1.4 | 1.9 | 1.2 | 1.5 | 1.6 |
| Telecom. Equipment | 1.1 | 1.4 | 1.9 | 1.2 | 1.5 | 1.6 |
| Radio Television | 1.1 | 1.4 | 1.9 | 1.2 | 1.5 | 1.6 |
| Dom. Electrical Equip. | 1.1 | 1.4 | 1.9 | 1.2 | 1.5 | 1.6 |
| Vehicles, Engines | .5 | .4 | .7 | .5 | .3 | .5 |
| Vehicle Bodies | .5 | .4 | .7 | .5 | .3 | .5 |
| Shipbuilding | .5 | .4 | .7 | .5 | .3 | .5 |
| Rail Rolling Stock | .5 | .4 | .7 | .5 | .3 | .5 |
| Cycles, Motorcycles | .5 | .4 | .7 | .5 | .3 | .5 |
| Aerospace | .5 | .4 | .7 | .5 | .3 | .5 |
| Optical Photographic | 1.5 | 2.3 | 2.5 | 3.3 | 1.8 | 1.9 |
| Clocks, Watches | 1.5 | 2.3 | 2.5 | 3.3 | 1.8 | 1.9 |
| Vegetable, Animal Oils | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Meat Preparation | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Dairy Products | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Fruit, Veg. Processing | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Fish Processing | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Grain Milling | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Pasta | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Starch Products | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Bread, Flour | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Sugar Refining | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Cocoa, Choco., Sugar | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Animal Food | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Other Food Products | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Ethyl, Distilling | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Wine | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Cider, Perry, Mead | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Brewing | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Soft Drinks, Water | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Tobacco Products | 1.4 | .7 | 1.1 | .7 | 1.8 | .5 |
| Manufact. of Leather | 2.3 | 2.5 | 1.4 | 2.2 | 2.6 | 2.2 |
| Footwear | 2.3 | 2.5 | 1.4 | 2.2 | 2.6 | 2.2 |
| Clothing | 2.3 | 2.5 | 1.4 | 2.2 | 2.6 | 2.2 |
| Household Textiles | 2.3 | 2.5 | 1.4 | 2.2 | 2.6 | 2.2 |
| Fur Goods | 2.3 | 2.5 | 1.4 | 2.2 | 2.6 | 2.2 |
| Wooden Furniture | 1.8 | 5.1 | 5.6 | 3.2 | 2.2 | 2.3 |
| Printing | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Publishing | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Rubber Products | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Retread, Repair Tyres | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Processed Plastics | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Jewellery | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Musical Instruments | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Photo.Processing | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Toys, Sports Goods | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Miscellaneous | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |
| Total | 1.6 | 1.8 | 1.9 | 1.5 | 1.2 | 1.5 |

Table B2: Cost reductions by sector and country for stage 1B

| | D | F | I | NL | B | UK |
|---|---|---|---|---|---|---|
| Agriculture | 2.2 | 1.4 | 1.3 | 1.2 | 1.1 | 1.2 |
| Oil, Natural Gas | 3.1 | 2.3 | 1.9 | 2.0 | 2.1 | 1.3 |
| Mineral Oil Refining | 3.1 | 2.3 | 1.9 | 2.0 | 2.1 | 1.3 |
| Pharmaceuticals | 1.1 | .9 | 1.5 | 1.3 | .9 | .9 |
| Soap, Detergents | 1.1 | .9 | 1.5 | 1.3 | .9 | .9 |
| Household Chemicals | 1.1 | .9 | 1.5 | 1.3 | .9 | .9 |
| Metal Products | 1.8 | 1.3 | 1.6 | 1.2 | 1.7 | 1.6 |
| Boilermaking | 1.8 | 1.3 | 1.6 | 1.2 | 1.7 | 1.6 |
| Tools, metal Goods | 1.8 | 1.3 | 1.6 | 1.2 | 1.7 | 1.6 |
| Agric. Machinery | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Machine Tools | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Textile Machinery | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Food, Chemical Mach. | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Mining Equipment etc. | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Transmission Equip. | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Other Mach. Industry | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Other Mach. Equip. | 2.3 | 3.1 | 2.2 | 1.5 | 1.7 | 2.3 |
| Office Machinery | .7 | 1.0 | 1.3 | .9 | .9 | 1.0 |
| Electrical Machinery | 1.8 | 1.9 | 2.3 | 1.8 | 2.2 | 2.2 |
| Telecom. Equipment | 1.8 | 1.9 | 2.3 | 1.8 | 2.2 | 2.2 |
| Radio Television | 1.8 | 1.9 | 2.3 | 1.8 | 2.2 | 2.2 |
| Dom. Electrical Equip. | 1.8 | 1.9 | 2.3 | 1.8 | 2.2 | 2.2 |
| Vehicles, Engines | 1.8 | 1.9 | 2.3 | 1.8 | 2.2 | 2.2 |
| Vehicle Bodies | 1.8 | 1.9 | 2.3 | 1.8 | 2.2 | 2.2 |
| Shipbuilding | 1.7 | 1.2 | 1.1 | 1.0 | 1.3 | 1.5 |
| Rail Rolling Stock | 1.7 | 1.2 | 1.1 | 1.0 | 1.3 | 1.5 |
| Cycles, Motorcycles | 1.7 | 1.2 | 1.1 | 1.0 | 1.3 | 1.5 |
| Aerospace | 1.7 | 1.2 | 1.1 | 1.0 | 1.3 | 1.5 |
| Optical Photographic | .5 | 1.4 | 1.8 | 2.2 | 1.2 | 1.6 |
| Clocks, Watches | .5 | 1.4 | 1.8 | 2.2 | 1.2 | 1.6 |
| Vegetable, Animal Oils | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Meat Preparation | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Dairy Products | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Fruit, Veg. Processing | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Fish Processing | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Grain Milling | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Pasta | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Starch Products | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Bread, Flour | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Sugar Refining | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Cocoa, Choco., Sugar | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Animal Food | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Other Food Products | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Ethyl, Distilling | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Wine | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Cider, Perry, Mead | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Brewing | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Soft Drinks, Water | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Tobacco Products | 2.6 | 2.0 | 2.4 | 2.1 | 3.0 | 2.0 |
| Manufact. of Leather | .8 | 1.3 | 1.2 | 1.6 | 1.4 | 1.1 |
| Footwear | .8 | 1.3 | 1.2 | 1.6 | 1.4 | 1.1 |
| Clothing | .8 | 1.3 | 1.2 | 1.6 | 1.4 | 1.1 |
| Household Textiles | .8 | .9 | 1.2 | 1.6 | 1.4 | 1.1 |
| Fur Goods | .8 | .1 | 1.2 | 1.6 | 1.4 | 1.1 |
| Wooden Furniture | 1.3 | 3.8 | 3.9 | 2.2 | 1.3 | 1.5 |
| Printing | 1.4 | 1.5 | 1.5 | 1.3 | 1.2 | 1.4 |
| Publishing | 1.4 | 1.5 | 1.5 | 1.3 | 1.2 | 1.4 |
| Rubber Products | 2.4 | 1.9 | 1.9 | 1.6 | 2.1 | 2.1 |
| Retread, Repair Tyres | 2.4 | 1.9 | 1.9 | 1.6 | 2.1 | 2.1 |
| Processed Plastics | 2.4 | 1.9 | 1.9 | 1.6 | 2.1 | 2.1 |
| Jewellery | 1.7 | 1.9 | 2.0 | 1.8 | 1.5 | 1.7 |
| Musical Instruments | 1.7 | 1.9 | 2.0 | 1.8 | 1.5 | 1.7 |
| Photo.Processing | 1.7 | 1.9 | 2.0 | 1.8 | 1.5 | 1.7 |
| Toys, Sports Goods | 1.7 | 1.9 | 2.0 | 1.8 | 1.5 | 1.7 |
| Miscellaneous | 1.7 | 1.9 | 2.0 | 1.8 | 1.5 | 1.7 |
| Total | 2.2 | 2.0 | 2.0 | 1.7 | 1.7 | 1.8 |

Table B3: **Excess Demand Elasticities by sector and country, stage 1**

|  | D | F | I | UK | NL | B/L |
|---|---|---|---|---|---|---|
| Agriculture | -1.8 | -1.8 | -1.2 | -1.4 | -1.1 | -1.3 |
| | | | | | | |
| Oil, Natural Gas | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| Mineral Oil Refining | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| | | | | | | |
| Pharmaceuticals | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| Soap, Detergents | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| Household Chemicals | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| Metal Products | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| Boilermaking | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| Tools, metal Goods | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| | | | | | | |
| Agric. Machinery | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Machine Tools | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Textile Machinery | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Food, Chemical Mach. | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Mining Equipment etc. | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Transmission Equip. | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Other Mach. Industry | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| Other Mach. Equip. | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.6 |
| | | | | | | |
| Office Machinery | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| | | | | | | |
| Electrical Machinery | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.5 |
| Telecom. Equipment | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.5 |
| Radio Television | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.5 |
| Dom. Electrical Equip. | -2.0 | -2.0 | -1.4 | -1.6 | -1.3 | -1.5 |
| Vehicles, Engines | -1.8 | -1.8 | -1.2 | -1;4 | -1.1 | -1.3 |
| Vehicle Bodies | -1.8 | -1.8 | -1.2 | -1.4 | -1.1 | -1.3 |
| Shipbuilding | -3.2 | -3.0 | -2.6 | -2.8 | -2.5 | -2.7 |
| Rail Rolling Stock | -3.2 | -3.0 | -2.6 | -2.8 | -2.5 | -2.7 |
| Cycles, Motorcycles | -3.2 | -3.0 | -2.6 | -2.8 | -2.5 | -2.7 |
| Aerospace | -3.2 | -3.0 | -2.6 | -2.8 | -2.5 | -2.7 |
| | | | | | | |
| Optical Photographic | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| Clocks, Watches | -1.7 | -1.6 | -1.0 | -1.2 | -.9 | -1.1 |
| | | | | | | |
| Vegetable, Animal Oils | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Meat Preparation | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Dairy Products | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Fruit, Veg. Processing | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Fish Processing | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Grain Milling | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Pasta | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Starch Products | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Bread, Flour | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Sugar Refining | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Cocoa, Choco., Sugar | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Animal Food | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Other Food Products | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Ethyl, Distilling | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Wine | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Cider, Perry, Mead | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Brewing | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Soft Drinks, Water | -.8 | -.6 | -1.0 | -.9 | -.8 | -1.1 |
| Tobacco Products | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| | | | | | | |
| Manufact. of Leather | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| Footwear | -3.2 | -1.7 | -1.4 | -1.0 | -1.6 | -1.9 |
| Clothing | -3.2 | -1.7 | -1.4 | -1.0 | -1.6 | -1.9 |
| Household Textiles | -3.2 | -1.7 | -1.4 | -1.0 | -1.6 | -1.9 |
| Fur Goods | -3.2 | -1.7 | -1.4 | -1.0 | -1.6 | -1.9 |
| Wooden Furniture | -2.6 | -1.3 | -1.0 | -1.0 | -1.1 | -1.4 |
| | | | | | | |
| Printing | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |
| Publishing | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |
| Rubber Products | -1.5 | -2.0 | -1.5 | -1.0 | -1.5 | -1.5 |
| Retread, Repair Tyres | -1.5 | -2.0 | -1.5 | -1.0 | -1.5 | -1.5 |
| Processed Plastics | -1.5 | -2.0 | -1.5 | -1.0 | -1.5 | -1.5 |
| | | | | | | |
| Jewellery | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |
| Musical Instruments | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |
| Photo.Processing | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |
| Toys, Sports Goods | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |
| Miscellaneous | -2.5 | -1.2 | -1.0 | -1.0 | -.9 | -1.3 |

Source: see text

Table B4: **Excess Supply Elasticities, Community and rest of the world, stage 1**

|  | $e_c$ | $e_r$ |
|---|---|---|
| Agriculture | 5.0 | 5.0 |
| Oil, Natural Gas | 5.0 | 5.0 |
| Mineral Oil Refining | 5.0 | 5.0 |
| Pharmaceuticals | 5.0 | 5.0 |
| Soap, Detergents | 5.0 | 5.0 |
| Household Chemicals | 5.0 | 5.0 |
| Metal Products | 5.0 | 5.0 |
| Boilermaking | 5.0 | 5.0 |
| Tools, metal Goods | 5.0 | 5.0 |
| Agric. Machinery | 6.0 | 6.0 |
| Machine Tools | 6.0 | 6.0 |
| Textile Machinery | 6.0 | 6.0 |
| Food, Chemical Mach. | 6.0 | 6.0 |
| Mining Equipment etc. | 6.0 | 6.0 |
| Transmission Equip. | 6.0 | 6.0 |
| Other Mach. Industry | 6.0 | 6.0 |
| Other Mach. Equip. | 6.0 | 6.0 |
| Office Machinery | 6.0 | 6.0 |
| Electrical Machinery | 6.0 | 6.0 |
| Telecom. Equipment | 6.0 | 6.0 |
| Radio Television | 6.0 | 6.0 |
| Dom. Electrical Equip. | 6.0 | 6.0 |
| Vehicles, Engines | 5.0 | 5.0 |
| Vehicle Bodies | 5.0 | 5.0 |
| Shipbuilding | 5.0 | 5.0 |
| Rail Rolling Stock | 5.0 | 5.0 |
| Cycles, Motorcycles | 5.0 | 5.0 |
| Aerospace | 5.0 | 5.0 |
| Optical Photographic | 5.0 | 5.0 |
| Clocks, Watches | 5.0 | 5.0 |
| Vegetable, Animal Oils | 2.0 | .0 |
| Meat Preparation | 2.0 | .0 |
| Dairy Products | 2.0 | .0 |
| Fruit, Veg. Processing | 2.0 | .0 |
| Fish Processing | 2.0 | .0 |
| Grain Milling | 2.0 | .0 |
| Pasta | 2.0 | .0 |
| Starch Products | 2.0 | .0 |
| Bread, Flour | 2.0 | .0 |
| Sugar Refining | 2.0 | .0 |
| Cocoa, Choco., Sugar | 2.0 | .0 |
| Animal Food | 2.0 | .0 |
| Other Food Products | 2.0 | .0 |
| Ethyl, Distilling | 5.0 | 5.0 |
| Wine | 5.0 | 5.0 |
| Cider, Perry, Mead | 5.0 | 5.0 |
| Brewing | 5.0 | 5.0 |
| Soft Drinks, Water | 5.0 | 5.0 |
| Tobacco Products | 5.0 | .0 |
| Manufact. of Leather | 5.0 | 5.0 |
| Footwear | 5.0 | 5.0 |
| Clothing | 5.0 | 5.0 |
| Household Textiles | 5.0 | 5.0 |
| Fur Goods | 5.0 | 5.0 |
| Wooden Furniture | 5.0 | 5.0 |
| Printing | 5.0 | 5.0 |
| Publishing | 5.0 | 5.0 |
| Rubber Products | 5.0 | 5.0 |
| Retread, Repair Tyres | 5.0 | 5.0 |
| Processed Plastics | 5.0 | 5.0 |
| Jewellery | 5.0 | 5.0 |
| Musical Instruments | 5.0 | 5.0 |
| Photo.Processing | 5.0 | 5.0 |
| Toys, Sports Goods | 5.0 | 5.0 |
| Miscellaneous | 5.0 | 5.0 |

Source: see text

## Table B5: Demand and supply elasticities, stage 2

| | $e_{cd}$ | $e_{cs}$ | $e_r$ |
|---|---|---|---|
| Agriculture | -.5 | 1.5 | .0 |
| Solid fuels | -1.0 | 5.0 | 6.0 |
| Coke | -1.0 | 5.0 | 6.0 |
| Oil, gas, petrol | -1.0 | 5.0 | 6.0 |
| Electr.,gas,water | -.5 | 5.0 | 6.0 |
| Nuclear fuels | -.5 | .0 | 6.0 |
| Ores, metals | -.5 | 5.0 | 6.0 |
| Non-met. minerals | -.5 | 5.0 | 6.0 |
| Chemicals | -.5 | 5.0 | 6.0 |
| Metal articles | -.5 | 5.0 | 6.0 |
| Mechanical engineering | -1.0 | 5.0 | 6.0 |
| Office machinery | -1.0 | 5.0 | 6.0 |
| Electrical goods | -1.0 | 5.0 | 6.0 |
| Motor vehicles | -1.0 | 5.0 | 6.0 |
| Other transport | -1.0 | 5.0 | 6.0 |
| Meats, preserves | -.5 | 1.5 | .0 |
| Dairy products | -.5 | 1.5 | .0 |
| Other food products | -.5 | 1.5 | .0 |
| Beverages | -.5 | 1.5 | .0 |
| Tobacco products | -.5 | 1.5 | .0 |
| Textiles, clothing | -.9 | 4.0 | 6.0 |
| Leather | -.9 | 4.0 | 6.0 |
| Timber, furniture | -1.0 | 4.0 | 6.0 |
| Paper and products | -1.0 | 4.0 | 6.0 |
| Rubber, plastics | -1.0 | 4.0 | 6.0 |
| Other manufacturing | -1.0 | 4.0 | 6.0 |
| Building, civil engin. | -1.0 | 4.0 | 6.0 |
| Wholesale, retail trade | -1.0 | 4.0 | 6.0 |
| Lodging, catering | -1.0 | 4.0 | 6.0 |
| Inland transport | -.7 | 5.0 | 2.0 |
| Sea, air transport | -.5 | 5.0 | 2.0 |
| Auxiliary transport | -.5 | 5.0 | 6.0 |
| Communications | -.5 | 5.0 | 6.0 |
| Credit and insurance | -.5 | 5.0 | 6.0 |
| Rent | -.7 | 5.0 | 6.0 |
| Other market services | -.2 | 5.0 | .0 |
| Non-market services | -.8 | 5.0 | .0 |

Source: see text

Table B6: Common External Tariff by sector, stage 1

| | CET (%) |
|---|---|
| Agriculture | .0 |
| Oil, Natural Gas | .0 |
| Mineral Oil Refining | .0 |
| Pharmaceuticals | 6.5 |
| Soap, Detergents | 6.4 |
| Household Chemicals | 6.7 |
| Metal Products | 5.6 |
| Boilermaking | 5.7 |
| Tools, metal Goods | 5.2 |
| | 4.1 |
| Agric. Machinery | 4.1 |
| Machine Tools | 4.1 |
| Textile Machinery | 4.1 |
| Food, Chemical Mach. | 4.1 |
| Mining Equipment etc. | 4.1 |
| Transmission Equip. | 4.1 |
| Other Mach. Industry | 4.1 |
| Other Mach. Equip. | 4.1 |
| Office Machinery | 4.8 |
| Electrical Machinery | 5.5 |
| Telecom. Equipment | 5.5 |
| Radio Television | 5.5 |
| Dom. Electrical Equip. | 5.5 |
| Vehicles, Engines | 6.5 |
| Vehicle Bodies | 6.5 |
| Shipbuilding | 6.5 |
| Rail Rolling Stock | 6.5 |
| Cycles, Motorcycles | 6.5 |
| Aerospace | 6.5 |
| Optical Photographic | 5.6 |
| Clocks, Watches | 5.6 |
| Vegetable, Animal Oils | 15.0 |
| Meat Preparation | 20.0 |
| Dairy Products | 20.0 |
| Fruit, Veg. Processing | 7.0 |
| Fish Processing | 13.0 |
| Grain Milling | .0 |
| Pasta | 15.0 |
| Starch Products | 15.0 |
| Bread, Flour | 20.0 |
| Sugar Refining | 80.0 |
| Cocoa, Choco., Sugar | 10.0 |
| Animal Food | .0 |
| Other Food Products | 10.0 |
| Ethyl, Distilling | 15.0 |
| Wine | 10.0 |
| Cider, Perry, Mead | .0 |
| Brewing | 24.0 |
| Soft Drinks, Water | 10.0 |
| Tobacco Products | 30.0 |
| Manufact. of Leather | 7.6 |
| Footwear | 10.0 |
| Clothing | 12.5 |
| Household Textiles | 10.2 |
| Fur Goods | 5.6 |
| Wooden Furniture | 5.2 |
| Printing | 2.7 |
| Publishing | 2.7 |
| Rubber Products | 6.3 |
| Retread, Repair Tyres | 4.0 |
| Processed Plastics | 8.0 |
| Jewellery | 4.0 |
| Musical Instruments | 5.4 |
| Photo.Processing | 5.6 |
| Toys, Sports Goods | 6.1 |
| Miscellaneous | 5.5 |

Source: see text.

Table B7: Common External Tariff by sector, stage 2

| | CET (%) |
|---|---|
| Agriculture | .0 |
| Solid fuels | .0 |
| Coke | .0 |
| Oil, gas, petrol | .0 |
| Electr.,gas,water | .0 |
| Nuclear fuels | .0 |
| Ores, metals | 3.0 |
| Non-met. minerals | 5.0 |
| Chemicals | 6.5 |
| Metal articles | 5.3 |
| Mechanical engineering | 4.1 |
| Office machinery | 5.0 |
| Electrical goods | 5.5 |
| Motor vehicles | 6.5 |
| Other transport | 6.5 |
| Meats, preserves | 20.0 |
| Dairy products | 20.0 |
| Other food products | 16.5 |
| Beverages | 30.0 |
| Tobacco products | 30.0 |
| Textiles, clothing | 10.0 |
| Leather | 7.5 |
| Timber, furniture | 4.8 |
| Paper and products | 5.5 |
| Rubber, plastics | 6.1 |
| Other manufacturing | 5.3 |
| Building, civil engin. | .0 |
| Wholesale, retail trade | .0 |
| Lodging, catering | .0 |
| Inland transport | .0 |
| Sea, air transport | .0 |
| Auxiliary transport | .0 |
| Communications | .0 |
| Credit and insurance | .0 |
| Rent | .0 |
| Other market services | .0 |
| Non-market services | .0 |

Source: see text.

Annex C


## Algebraic details of Method


### C1 Stage 1


Figure C1 summarises the model for the stage 1 calculations. It is identical to figure 2 in Section 2 except that the excess supply curve of the rest of the world, ER, has shifted down by a fraction, d, of the downward shift in the rest of the Community excess supply curve EC. This reflects the extent to which non-Community suppliers can also take advantage of harmonised or mutually recognised standards. Note that R would enjoy producer surplus gains if the displacement from ER to ER' was large enough for ER' to cut the new price line P' to the right of $M_r$.


Net welfare gain to country I equals C + D - H + J and net welfare gain to C equals E + F. Therefore, the total Community welfare gain equals C + D + E + F - H + J. Welfare loss in rest of the world equals N + K.


Using the following definitions:


p    =    proportionate change in I's import price, $(P'-P)/P$; (this will be negative).


$P_r$    =    proportionate change in ROW's export price, $(P_r'-P_r)/P_r$; (this will be negative).


$P_c$    =    proportionate change in C's export price, net of NTB costs, $(P'-P_c)/P_c$ (will be positive).


$s_r$    =    initial share of ROW in I's imports, $M_r/M$.


$s_c$    =    initial share of C in I's imports, $M_c/M$.

**Figure C1**
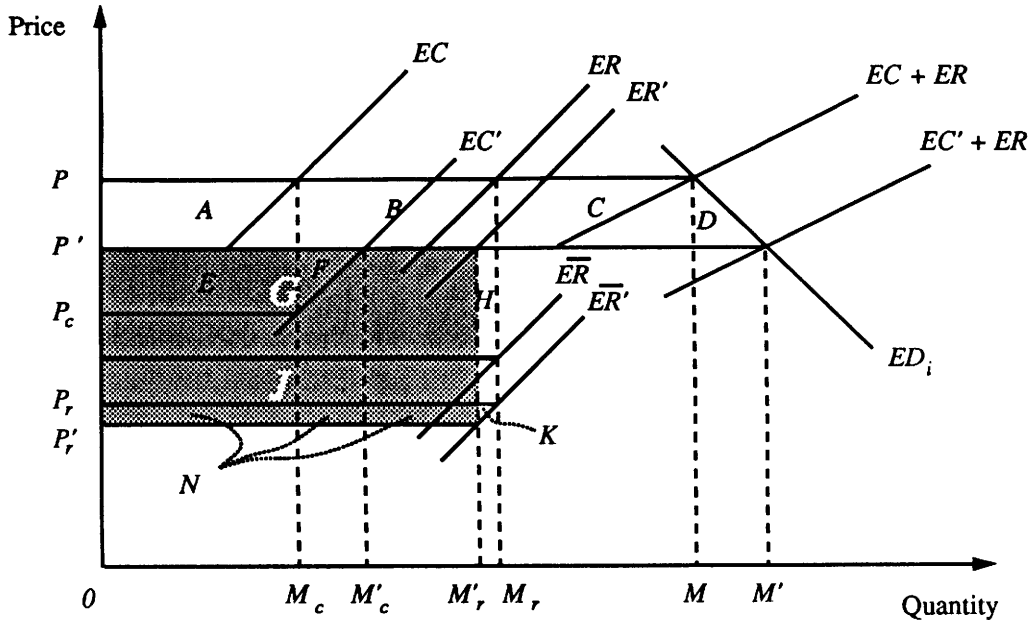


m = proportionate change in I's imports, (M'-M)/M.

$m_r$ = proportionate change in I's imports from ROW, (MR'-MR)/MR (negative).

$m_c$ = proportionate change in I's imports from C, (MC'-MC)/MC (positive).

b = the proportionate change (reduction) in costs in the Community due to the removal of NTBs, $(P-P_c)/P$ (will be positive). This change corresponds to the potential cost reductions which are given by the internal market studies. It is defined as above in order that $P/P_c = 1/(1-b)$.

t = the proportionate tariff rate (positive) on imports from ROW, $(P-P_r)/P_r$ or $(P'-P_r')/P_r'$.

$m_d$ = $m_r \cdot s_r$ which is a measure of trade diversion, note that

$m = m_r \cdot s_r + m_c \cdot s_c$.

n = import elasticity of demand in the home country.

$e_r$ = export supply elasticity for ROW.

$e_c$ = export supply elasticity for the Community.

Then C = $-p \cdot s_c$

D = $-(p \cdot m)/2$

E = $p_c \cdot s_c (1-b)$

F = $p_c(1-b)m_c \cdot s_c/2$

H = $m_d (t/(1+t) + p)$

J = $-p(s_r + m_d)/(1+t)$

K = $-p_r \cdot m_d/2(1+t)$

N = $-p_r(s_r + m_d)/(1+t)$.

All effects are expressed as proportions of the total value of initial imports, M.P.

To calculate C, D, E, F, J, K, H, N it is necessary to have expressions for p, $p_r$, $p_c$, m, $m_r$, $m_c$ in terms of known quantities $s_r$, $s_c$, t, b, n, $e_r$, $e_c$ where n, $e_r$ and $e_c$ are the elasticities defined above.

By definition    m = n·p

$m_r = e_r \cdot p_r$

$m_c = e_c \cdot p_c$

$m = m_c s_c + m_r s_r$

Now,    $p_c = p + b$, approximately.

and, $\qquad p_r = p + db \qquad (-p = db - p_r)$

producing $\qquad p = \dfrac{-b(e_c s_c + d e_r s_r)}{e_c s_c + e_r s_r - n}$ (less than or equal to zero)

and $\qquad p_c = \dfrac{b((1-d)e_r s_r - n)}{e_c s_c + e_r s_r - n}$ (greater than or equal to zero)

If $d = 0$, the expressions for $p$ and $p_c$ reduce to $\dfrac{-b(e_c s_c)}{e_c s_c + e_r s_r - n}$

and $\qquad \dfrac{b(e_r s_r - n)}{e_c s_c + e_r s_r - n}$, respectively

Note that $\qquad p_r = \dfrac{b(e_c s_c (d-1) - nd)}{e_c s_c + e_r s_r - n}$ (is greater than zero if $nd$ is less than $e_c s_c (d-1)$)

Then the fall in price P to P' (measured by p) will be greater the larger is b, the proportionate reduction in costs in the Community, $e_c s_c$ and the smaller is $e_r s_r$ and n. The maximum value n can take (assuming a non-inferior good) is zero, in this case $m_c s_c = -m_r s_r$.

Re-writing the expressions for A to N in terms of known parameters,

$C \quad = - p \cdot s_c.$

$D \quad = -(n \cdot p^2)/2$

$E \quad = p_c \cdot s_c \, (1-b)$

$F \quad = p_c^2 \, (1-b) \cdot e_c \cdot s_c / 2$

$H \quad = s_r \cdot e_r \cdot p_r (t/(1+t) + p)$

$J \quad = - p \cdot s_r \, (1 + e_r \cdot p_r)/(1+t)$

$K \quad = - p_r^2 \cdot e_r \cdot s_r / 2 \, (1+t)$

$N \quad = - p_r s_r (1 + e_r \cdot p_r)/(1+t)$

## C.2 Stage 2

The model for stage 2 is summarised in Figure C2.

Net welfare gain to the Community equals C + D + E + F - H + J. Welfare loss in the rest of the world equals J + K.

Using the following definitions:

$c$ $= (C'-C)/C$, proportionate change in apparent consumption

$m$ $= (M'-M)/M$, proportionate change in extra-EC imports

$y$ $= (Y'-Y)/Y$ proportionate change in apparent production

$p$ $= (P'-P)/P$, proportionate change in price of EC consumption, negative

$p_c$ $= (P'-P_c)/Pc$ proportionate change in EC export or supply price, positive

$p_r$ $= (P_r'-P_r)/P_r$ proportionate change in rest of world export price

$w$ $= (P-P_c)/P$, proportionate cost reduction in EC

$s_y$ $= Y/C$, share of EC production in apparent consumption

$s_m$ $= M/C$, share of imports in apparent consumption

$e_r$ $=$ export supply elasticity for rest of world

$e_{cs}$ $=$ supply elasticity for Community

$e_{cd}$ $=$ demand elasticity for Community

By definition,

$c$ $= e_{cd} \cdot p$

$m$ $= e_r \cdot p_r$

$y$ $= e_{cs} \cdot p_c$

Now $p_c = p + w$, approximately and $p_r = p$

Therefore, $p = \dfrac{-w\,(s_y \cdot e_{cs})}{s_y \cdot e_{cs} + s_m \cdot e_r - e_{cd}}$

and $p_c = \dfrac{w(s_m \cdot e_r - e_{cd}}{s_y \cdot e_{cs} + s_m \cdot e_r - e_{cd}}$

$p_r = p$

## Figure C2
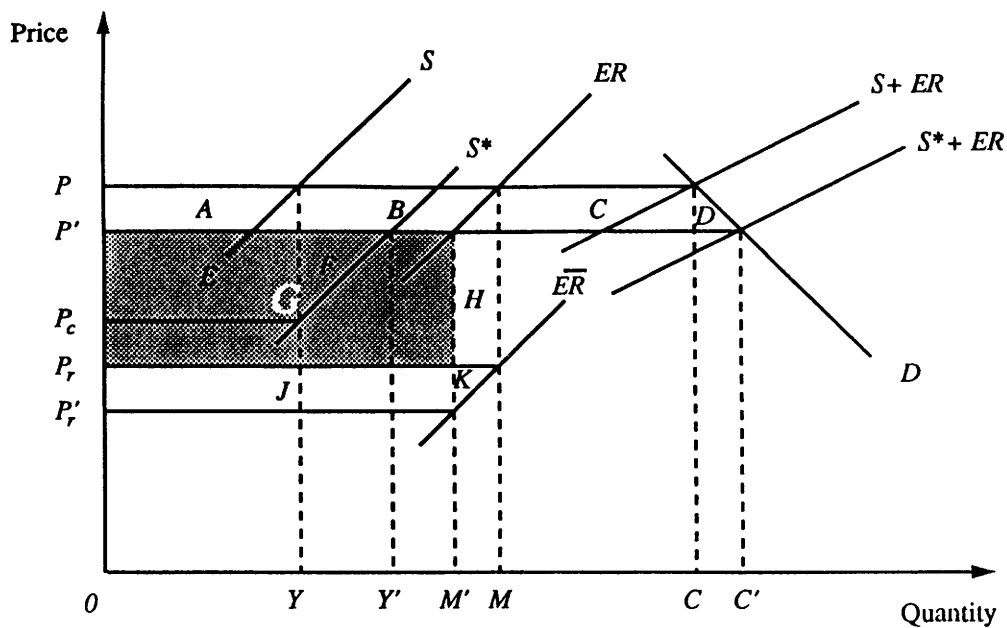


Note : OY + OM = OC
OY' + OM' = OC'

The areas are defined as follows:

C $= - p(1 - s_m)$

D $= - e_{cd} \cdot p^2/2$

E $= p_c \cdot s_y(1-w)$

F $= p_c^2 \cdot (1-w) \, e_{cs} \cdot s_y/2$

H $= s_m \cdot e_r \cdot p_r((t/1+t) + p)$

J $= - p \cdot s_m(1+e_r \cdot p_r)/(1+t)$

K $= s_m \cdot e_r \cdot p^2/2(1+t)$, where $p_r = p$.

All welfare changes are expressed as a proportion of the initial level of apparent consumption.

## C.3 Stage 3

The model for stage 3 is summarised in figure C3.

An increase in output is associated with a decrease in unit cost. This parameter on a sector by sector basis is derived from Pratten (1987) in the fashion described below.

The welfare gain from the unit cost decrease is given by areas A and B.

$= (P'-P)/P \cdot (Q + (Q' - Q)/2)/Q$ as a proportion of initial production.

$= p \cdot (1 + q/2)$

where p = proportionate change in unit cost

q = proportionate change in output.

For a cost function of the following form

$$\log C = a + b \log Y$$

average cost $= a\ Y^b$, marginal cost $= (1 + b)\ aY^b$

The ratio of unit cost at half of minimum efficient scale (MES) relative to unit cost at MES is, therefore, given by

$$AC \text{ (half of MES)}/AC(MES) = \frac{(Y_{MES}/2)^b}{Y_{MES}{}^b}$$

It is therefore possible to calculate the parameter, b, which links changes in unit cost and changes in output. These parameters are given in Table A6.

One problem associated with stage 3 is that it assumes that extra output is spread evenly across existing Community plants. There is no consideration, therefore, of the trade effects either within the Community or with the rest of the world.

## Figure C3
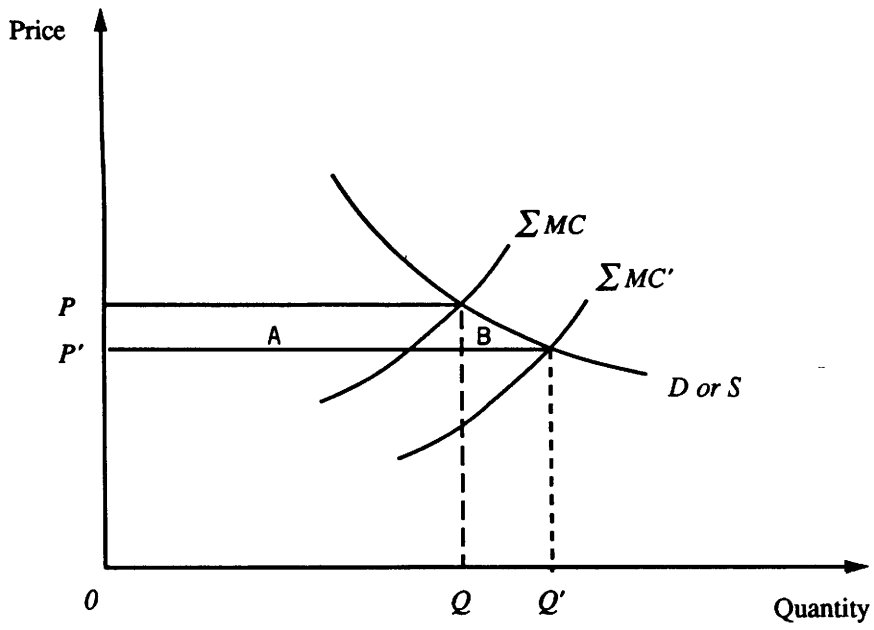


$\Sigma$ MC is a quasi-supply schedule.
Essentially industry moves from P, Q to P', Q'.

## Annex D

### List of Studies

#### Studies concerning specific types of barrier

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