APPENDIX VI

An Analysis of World Trade Flows

VI.1 AIM AND NATURE OF THE ANALYSIS

The purpose of the present analysis is to determine the normal or standard pattern of international trade that would prevail in the absence of discriminating trade impediments. We assume that this pattern coincides with the "average" pattern actually prevailing; this means that we assume the impediments to be of a stochastic nature. We will statistically determine the basic factors governing the volume of trade between any pair of countries; with this information at hand we shall be able to determine what foreign trade volume may be expected for a great number of individual countries. A comparison of the actual trade volume with the volume expected on theoretical grounds may show discrepancies indicating that a country's exports are either receiving preferential treatment in importing countries (in case of a positive deviation) or being discriminated against (in case of a negative deviation). The significance of the deviation between actual and calculated trade depends on the accuracy and reliability of the theoretical values of the trade volume as estimated with the help of econometric methods. The better the standardized pattern of international trade describes reality, the more significant are the individual exceptions or deviations from the normalized empirical trade pattern. It is precisely these deviations that we are interested in. The purpose of this econometric exercise is to find out which countries show substantial negative deviations, for these would be indicative of the existence of special barriers and obstacles to the optimum flow of international trade.

An economic model describing international trade flows can be formulated in varying degrees of detail. The present model is a very simple one, having only that aspect which is relevant to the aim of this study, i.e., the deviations from the normalized trade pattern. It consists

of only one equation in which the value of total exports from one country to another is explained by a small number of variables. The explanatory variables that play a preponderant role are:

(i) the Gross National Product (GNP) of the exporting country;
(ii) the GNP of the importing country; and
(iii) the distance between the two countries.

In several calculations other explanatory variables were introduced; however, their contribution to an explanation of the value of exports was very limited as compared to that of the three main variables. Other important characteristics of the present analysis are that:

(i) no separate demand and supply functions for exports are introduced – meaning that the equation is a turnover relation in which prices are not specified; and
(ii) only a static analysis is made – no attention is paid to the development of exports over time.

It is obvious that the model could be elaborated considerably so as to give more attention to other aspects of world trade.[1] However, for the purpose of this book a simplified model will suffice.

VI.2 THE FLOW OF TRADE BETWEEN TWO COUNTRIES

The main factors that determine the size of the trade flow between any pair of countries have been mentioned above. Their relevance is as follows:

(i) the amount of exports a country is able to supply depends on its economic size (i.e., its GNP);
(ii) the amount that can be sold to a particular country will vary with the size of that country's market (i.e., the GNP of the importing country); and
(iii) the volume of trade will depend on transportation costs (these are assumed to correspond roughly with the geographic distance between the two countries).

The factor of distance may also stand for an index of information about export markets. It will be clear that distance – in contrast to the other two factors – has a negative influence on trade flows.

1. The analysis described in this appendix forms part of a larger study of world trade flows which is presently being undertaken at the Netherlands Economic Institute. A report on this study is to be published later.

The trade flow equation can be written, in its simplest form, as follows:

$$E_{ij} = a_0 Y_i^{a_1} Y_j^{a_2} D_{ij}^{a_3} \qquad (1)$$

The meaning of the symbols used is:

E_{ij} = exports of country i to country j
Y_i = GNP of country i
Y_j = GNP of country j
D_{ij} = distance between country i and country j

The exponents a_1, a_2, and a_3 indicate that there is not necessarily direct proportionality between the explanatory variables (Y_i, Y_j, and D_{ij}) and the variable to be explained (E_{ij}). Such proportionality would exist only if the a's are all equal to 1. The factor a_0 is a constant; the numerical value of the constant depends on the units in which the variables are measured.

The equation implies that exports have a constant elasticity with respect to each of the three explanatory variables; this means that a 1 per cent increase in the GNP of country j always results in an increase of a_2 per cent in the exports of the supplying country i.

Equation 1 was used to calculate the "normal" or "standardized" flow of trade between countries. Before normal trade flows could be calculated, the numerical values of the four a's had to be estimated. This was done on the basis of actual trade flows, the underlying assumption being that the actual trade of most countries does not substantially diverge from the normal or standard pattern and volume of trade. Of course, a number of important divergencies can be expected in reality, but it is the aim of this study to trace these divergencies. It is assumed that the individual deviations from the normal pattern are relatively few in number, so that the actual trade flows follow the usual or standard pattern closely. As national trade statistics do not disclose the export and import of services on a country-by-country basis, the analysis had to be confined to commodity trade flows. In section VI.5 the total inflow or outflow of services will be introduced in the interpretation of the results.

The hypothesis that the three explanatory variables are the most relevant ones was tested first for a limited number of countries of similar economic structure. From data on the 1958 exports of 18 countries — mainly the more developed ones (see Table VI–2) — the unknown

values of the a's were estimated by least squares regression analysis. Equation (1) was rewritten for this purpose as:

$$\log E_{ij} = a_1 \log Y_i + a_2 \log Y_j + a_3 \log D_{ij} + a_0' \qquad (1')$$

in which

$$a_0' = \log a_0 \quad \text{or} \quad a_0 = 10^{a_0'}$$

Exports were expressed in $100 million, GNP in $10 billion, and distance (measured between the commercial centers of the countries involved) in 1,000 nautical miles.[2] The values of the a coefficients were fitted to 306 (18 x 17) sets of observations by the method of least squares. The results of the calculation (calculation A–1) are given in Table VI–1; the correlation coefficient was 0.82 – a figure high enough to encourage further research along these lines. The deviations of actual trade from the calculated trade volume (the "residuals," in technical terminology) are given in Table VI–2.

The figures for the export values used in calculation A–1 were taken from the export statistics of the country of origin. An alternative (and sometimes more reliable) source of information about international trade flows is the import statistics of the country of destination. In calculation A–2 export figures derived from import statistics were taken as the variable to be explained; the other variables had the same values as in the first calculation. The results of calculation A–2 turned out to be not much different from those of A–1, although the correlation coefficient was slightly lower (see Table VI–1). In all subsequent calculations trade figures were taken from export statistics.

A final exercise undertaken with the data from 18 countries was the introduction of additional explanatory variables. Apart from purely economic variables it is likely that political or semi-economic factors play a part in determining the volume of trade between countries. We considered the existence of special trade agreements as the most outstanding of these additional factors. The importance of such special ties was estimated by the introduction of a so-called dummy variable for the British Commonwealth preference. Where the trade flow analyzed concerned two members of the Commonwealth, a certain positive value was given to the dummy variable to indicate that the goods traded received preferential treatment in the importing country; where the two countries were not members of the Commonwealth, the variable had a

2. 1 nautical mile = 1,852.27 meters or 1.15 land miles.

zero value — no preferential treatment. The Benelux preference was represented by another dummy variable; this variable was given a zero value in all cases except for trade flows between Belgium (actually the Belgium-Luxembourg Economic Union) and the Netherlands.

A third variable was introduced for adjacent or neighboring countries. The results of calculations A–1 and A–2 seemed to indicate that adjacent countries have more intense trade contacts than can be explained by (short) distance alone. Again, the variable was given a positive value in the case of neighboring countries and a zero value in all other cases.[3]

With the three additional variables introduced, the trade flow equation reads:

$$E_{ij} = a_0 \, Y_i^{a_1} Y_j^{a_2} D_{ij}^{a_3} N^{a_4} P_C^{a_5} P_B^{a_6} \tag{2}$$

or

$$\log E_{ij} = a_1 \log Y_i + a_2 \log Y_j + a_3 \log D_{ij} + a_4 \log N + a_5 \log P_C + a_6 \log P_B + a'_0 \tag{2'}$$

in which:

N = dummy variable for neighboring countries

P_C = dummy variable for Commonwealth preference

P_B = dummy variable for Benelux preference

The calculation of the multiple correlation between the export values and the six explanatory variables led to the results shown in Table VI–1 (calculation A–3). Surprisingly enough, the introduction of three additional variables increased the correlation coefficient to 0.84 only. Although the algebraic signs of the regression coefficients of the three variables were all positive, as they should be, two of the three coefficients did not differ significantly from zero at the 99.7 per cent probability level. Only the dummy variable representing the Commonwealth preference made a statistically significant contribution to the explanation of the export flow. This illustrates again the dominant role played by the first three variables, exporters' and importers' GNP and distance. The coefficients of these variables were almost the same in calculations A–1 and A–3. Table VI–3 gives the deviations between actual and theoretically expected trade volume.

3. It is, in principle, irrelevant what value (other than zero) is given to a dummy variable to express the fact that a special tie or situation exists, as the choice of this value influences only the size of the coefficient (a), but not the correlation coefficient or the residuals. In all cases where the dummy variables mentioned in the text had to differ from zero, the value 1 (in logs) or 10 (in antilogs) was assigned to them.

VI.3 ANALYSIS OF INTERNATIONAL TRADE FLOWS FOR 42 COUNTRIES

The results obtained from the study of data from 18 countries encouraged further research. The number of countries included in the analysis was enlarged to 42. The mutual export trade of these 42 countries amounted to about 70 per cent of total world trade in 1959, the year to which the following calculations refer.

After the discussion in the preceding section, a brief description will be sufficient to explain the procedure followed in the 42-country analysis. First of all, the coefficients of equation (1′) were estimated from 1,722 (42 x 41) sets of observations (calculation B–1; see Table VI–4). In calculation B–2 a fourth explanatory variable was introduced, namely a dummy variable for neighboring countries (with the value, in logarithms, of either 1 or 0). In this case the trade flow equation is:

$$E_{ij} = a_0 \, Y_i^{a_1} \, Y_j^{a_2} \, D_{ij}^{a_3} \, N^{a_4} \qquad (3)$$

and the corresponding equation in logarithms is:

$$\log E_{ij} = a_1 \log Y_i + a_2 \log Y_j + a_3 \log D_{ij} + a_4 \log N + a'_0 \qquad (3')$$

The correlation coefficient was only slightly higher than in calculation A–1.

Thus far all computations were made on the basis of GNP figures converted into US dollars but calculated in national prices. As the dollar exchange rates of most countries do not adequately reflect the differences in domestic buying power between the dollar and the national currency, these GNP figures may not be the best yardstick of a country's export potential, or its import market. On the other hand, they may well be a prime indicator of a country's buying power on international markets. Although it is hard to arrive at firm conclusions as to the merits and demerits of GNP figures based on domestic prices, it seemed worth while to experiment with GNP figures corrected for differences in price level. Thus calculation B–3 was performed; this was completely similar to B–2 except that GNP figures based on US prices were used instead of nominal GNP data. Judged by the correlation coefficient that was found, B–3 was not an improvement over previous computations (see Table VI–4).

In a fourth calculation using the 42-country data another explanatory variable was added to the ones already mentioned. This fifth variable was a dummy variable, standing for all preferential trade relations. It was given a value of 2 in logarithms (or 100 in antilogarithms) for the

trade flows between the United Kingdom and a Commonwealth partner, and for trade flows between a metropolitan country and its (former) colony or colonies. It was given a value of zero for all trade flows without preferential treatment. In a number of cases the value 1 was given to the dummy variable, expressing the existence of a semi-preferential trade relation. This applied – in 1959 – to the trade of the United States with Cuba, the Philippines, or Venezuela; it also applied to trade among the EEC countries. The results of calculation B–4 are given in Table VI–4.

The same table also includes the estimates obtained in a fifth calculation, (B–5). Here GNP was measured in US prices rather than domestic prices. Also, the value given to the dummy variable representing preferential treatment of imports was different in the case of the so-called semi-preferential trade relations (the EEC countries; the US and Cuba, the Philippines, or Venezuela); in calculation B–5 the value 1.53 in logs (which corresponds to 34 in antilogs) was used. The two extreme values of the dummy variable, 2 and 0 (both in logs), were not changed.

Altogether five calculations (B–1 to B–5, inclusive) were made using the data from 42 countries; the coefficients resulting from the calculations are given in Table VI–4. For each calculation the dollar difference between the actual trade flow and the standardized trade flow – as estimated with the help of the regression equation – was computed separately for each country included in the analysis. These deviations – which may, of course, be either positive or negative – were then expressed as a percentage of the actual (1959) foreign trade figures. The absolute and the relative deviations of the export values and of the import values are shown in Tables VI–5 to VI–9. Table VI–10 compares the deviations resulting from calculation B–1 with figures on the service trade of the countries concerned. The conclusions to be drawn from Tables VI–5 to VI–10 will be discussed in section VI.5.

As a final exercise we introduced still another explanatory variable. It was thought that the trade flows of a country that specialized in exporting a small number of products might well differ in size from those of a country with a more diversified export structure. The degree of commodity concentration in exports can be measured in various ways; here the so-called Gini coefficient of concentration was used.[4] If a country exports only one commodity, the value of the Gini index is 100; the

4. See M. Michaely, "Concentration of Exports and Imports: An International Comparison," *Economic Journal,* December 1958, pp. 722 ff.

more diversified the export package is, the lower is the value of this index. Because of the requirement of comparability, the Gini coefficient could be computed only for those countries that base their export statistics on the three-digit SITC code. This procedure was possible for only 28 of the 42 countries.

From the trade data of these 28 countries – listed in Table VI–12 – the coefficients of the trade flow equation were estimated, first (calculation C–1) for the equation in its simplest form (equation 1′), and then (calculation C–2) for the equation enlarged by a fourth explanatory variable. In this case the trade flow equation is:

$$E_{ij} = a_0 \, Y_i^{a_1} Y_j^{a_2} D_{ij}^{a_3} G_i^{a_8} \qquad (4)$$

or

$$\log E_{ij} = a_1 \log Y_i + a_2 \log Y_j + a_3 \log D_{ij} + a_8 \log G_i + a_0' \qquad (4')$$

In these equations, G = the Gini coefficient of export commodity concentration.

The results of the estimation procedure – again the least squares method – are given in Table VI–11. Table VI–12 reveals the absolute and relative deviations of actual from calculated trade figures.

VI.4 A DISCUSSION OF THE RESULTS: THE COEFFICIENTS

In the present section we will discuss the statistically derived trade flow coefficients which are reproduced in Tables VI–1 (calculations A), VI–4 (calculations B), and VI–11 (calculations C). The three sets of calculations differ mainly in the number and type of countries from which the basic data were taken, that is, in the sample from which the coefficients were estimated. The same three explanatory variables – actually the most important ones – were used in all cases; for this reason it is perhaps not surprising that the correlation coefficient varied little from calculation to calculation. The average value of the correlation coefficient was not very high – around 0.81 – but certainly not unsatisfactory if we keep in mind that the actual pattern of trade is almost certain to deviate substantially from the normal (or "ideal," or "theoretical") pattern. As was pointed out earlier, it is precisely these deviations which we hope to identify in this analysis. In the next section we will discuss the pattern of deviations which emerged from the study, but first the coefficients of the export equation will be examined in some detail.

Table VI–1

FACTORS DETERMINING THE SIZE OF INTERNATIONAL TRADE FLOWS

Results of Calculations A (18 countries)

$$\log E_{ij} = \alpha_1 \log Y_i + \alpha_2 \log Y_j + \alpha_3 \log D_{ij} + \alpha_4 \log N + \alpha_5 \log P_C + \alpha_6 \log P_B + \alpha'_0$$

Calculation No.	ESTIMATED VALUE OF THE COEFFICIENTS							Correlation Coefficient
	α_1	α_2	α_3	α_4	α_5	α_6	α'_0	
A-1	0.7338 (0.0438)	0.6238 (0.0438)	–0.5981 (0.0405)	—	—	—	–0.3783	0.8248
A-2	0.7907 (0.0497)	0.6766 (0.0496)	–0.6252 (0.0460)	—	—	—	–0.4013	0.8084
A-3	0.7357 (0.0421)	0.6183 (0.0422)	–0.5570 (0.0473)	0.0191 (0.0082)	0.0496 (0.0111)	0.0406 (0.0272)	–0.4451	0.8437

E_{ij} Exports from country i to country j
Y_i GNP of exporting country
Y_j GNP of importing country
D_{ij} Distance between countries i and j
N Dummy variable for neighbor countries
P_C Dummy variable for Commonwealth preference
P_B Dummy variable for Benelux preference

In A-2 the trade amount is measured in the importing country.
Figures in brackets are standard deviations.

Table VI–2

RESULTS OF CALCULATION A-1
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
2. Brazil	–3.9557	–41.7	–5.1039	–45.9
8. Venezuela	6.2016	42.7	0.6412	4.8
14. S. Africa	–4.2625	–73.0	–1.0445	–8.6
21. Japan	–17.5284	–143.6	–17.9657	–127.6
29. Canada	13.3283	28.6	7.4520	17.2
30. USA	–62.2634	–64.1	–35.6173	–42.8
31. Austria	–2.2080	–35.4	–3.2195	–41.0
32. BLEU	6.8092	30.2	4.4003	18.7
33. Denmark	2.0741	19.5	4.8586	48.3
34. France	–24.5112	–107.6	–23.3826	–94.5
35. Germ. (F. R.)	20.6698	34.0	–1.7209	–3.8
36. Italy	–12.5307	–79.3	–10.5317	–50.5
37. Netherlands	10.7927	44.0	9.8278	36.6
38. Norway	–1.3860	–23.7	0.9802	9.1
39. Sweden	1.5372	9.4	0.2750	1.6
40. Switzerland	–0.2352	–2.1	–0.2583	–1.8
41. UK	–4.5593	–9.7	–1.9270	–3.9
42. Australia	–4.9965	–43.6	–8.2613	–68.0

Table VI–3

RESULTS OF CALCULATION A-3
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
2. Brazil	5.0224	53.0	5.6738	51.0
8. Venezuela	10.8338	74.5	7.8142	58.1
14. S. Africa	1.5811	27.1	6.6088	54.6
21. Japan	4.9034	40.2	6.1048	43.4
29. Canada	16.1715	34.7	7.0446	16.2
30. USA	18.4515	19.0	26.7411	32.1
31. Austria	–0.3717	–6.0	–0.6402	–8.2
32. BLEU	–2.1779	–9.6	–4.8247	–20.5
33. Denmark	3.8964	36.7	1.4313	14.2
34. France	–25.7047	–113.9	–21.5758	–87.2
35. Germ. (F. R.)	8.1052	13.3	–2.7045	–6.0
36. Italy	–3.2974	–21.0	0.5861	2.8
37. Netherlands	4.6532	19.0	3.6813	13.7
38. Norway	0.9463	16.2	4.3637	40.5
39. Sweden	7.2137	44.3	11.1680	63.8
40. Switzerland	–0.3338	–3.0	–0.0915	–0.6
41. UK	4.5122	9.6	9.4642	19.1
42. Australia	5.8824	51.3	5.3055	44.7

Results of Calculations B (42 countries)

$$\log E_{ij} = \alpha_1 \log Y_i + \alpha_2 \log Y_j + \alpha_3 \log D_{ij} + \alpha_4 \log N + \alpha_7 \log P + \alpha'_o$$

Calculation No.	ESTIMATED VALUE OF THE COEFFICIENTS						Correlation Coefficient
	α_1	α_2	α_3	α_4	α_7	α'_o	
B-1	1.0240 (0.0270)	0.9395 (0.0269)	−0.8919 (0.0455)	—	—	−0.6627 (0.6802)	0.8094
B-2	1.0250 (0.0269)	0.9403 (0.0269)	−0.8225 (0.0517)	0.2581 (0.0920)	—	−0.7188 (0.6789)	0.8104
B-3	1.1832 (0.0323)	1.0752 (0.0323)	−0.9325 (0.0584)	0.2217 (0.1037)	—	−1.0296 (0.7645)	0.7987
B-4	0.9965 (0.0267)	0.9116 (0.0267)	−0.7803 (0.0511)	0.2434 (0.0903)	0.4703 (0.0588)	−0.7798 (0.6668)	0.8180
B-5	1.1567 (0.0319)	1.0486 (0.0319)	−0.9165 (0.0574)	0.2367 (0.1018)	0.8926 (0.1100)	−1.0641 (0.7505)	0.8070

E_{ij} Exports from country i to country j

Y_i GNP of exporting country } Nominal in B-1, B-2 and B-4; real in B-3 and B-5.

Y_j GNP of importing country }

D_{ij} Distance between countries i and j

N Dummy variable for neighboring countries

P Dummy variable for preference

Because of difference in treatment of preferential relations, the coefficients are not comparable between B-4 and B-5.

Figures in brackets are standard deviations.

Table VI–5

RESULTS OF CALCULATION B-1
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
1. Argentina	5.0964	55.7	4.7385	49.5
2. Brazil	3.3425	29.0	1.2239	11.5
3. Chile	3.9033	80.6	2.0000	60.7
4. Cuba	3.1881	53.8	2.6871	40.4
5. Mexico	2.2217	38.0	5.6074	55.3
6. Peru	2.0595	71.9	1.4236	55.2
7. Uruguay	–0.0654	–11.1	0.5141	36.3
8. Venezuela	12.6139	80.7	9.0302	68.5
9. Belg. Congo	3.9269	87.9	1.6360	68.0
10. Ethiopia	0.0448	8.5	–0.0591	–9.5
11. Ghana	2.7051	87.1	1.8204	75.4
12. Morocco	1.5026	55.3	1.4155	45.2
13. Nigeria	3.1806	78.0	2.2665	58.1
14. S. Africa	5.3207	68.6	9.0982	74.9
15. Sudan	1.2605	79.7	0.8445	64.3
16. Fr. W. Africa	1.0269	44.8	1.1348	39.2
17. Afghanistan	0.3812	62.5	–0.0157	–4.9
18. Ceylon	2.2433	83.5	2.2386	78.4
19. India	–0.3248	–3.9	3.9851	26.1
20. Indonesia	2.1414	38.0	–1.0253	–32.9
21. Japan	9.8839	42.1	8.2853	35.2

Table VI–5 (continued)

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
22. Malaya	4.1737	81.5	1.6654	57.0
23. Pakistan	–0.0642	–2.5	0.8008	20.0
24. Philippines	3.0292	59.6	2.6830	50.6
25. Thailand	1.6002	67.4	2.0352	66.6
26. UAR (Egypt)	–0.4674	–28.9	1.0550	28.2
27. Iran	6.8885	89.9	3.3109	62.1
28. Turkey	–0.7195	–27.2	0.1299	29.9
29. Canada	4.2285	8.2	–6.2503	–12.5
30. USA	–52.3708	–39.5	–16.2260	–12.6
31. Austria	2.3735	32.2	0.9483	10.6
32. BLEU	–0.0218	–0.8	–2.9781	–9.9
33. Denmark	6.1899	51.0	5.2071	41.6
34. France	–36.8338	–102.4	–41.1475	–128.5
35. Germ. (F. R.)	–8.6616	–10.6	–26.7576	–43.6
36. Italy	–8.3864	–36.6	–6.3180	–23.4
37. Netherlands	9.2862	30.0	12.0314	30.8
38. Norway	2.7429	39.2	4.6363	46.4
39. Sweden	9.5557	51.8	8.9136	46.4
40. Switzerland	0.6489	4.6	1.6872	9.6
41. UK	–17.1995	–24.5	–13.5735	–18.7
42. Australia	11.0060	70.1	9.1865	62.2

Table VI–6

RESULTS OF CALCULATION B-2
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
1. Argentina	4.7849	52.3	4.4288	46.2
2. Brazil	3.1119	27.0	1.0369	9.7
3. Chile	3.8871	80.3	1.9837	60.2
4. Cuba	3.4298	57.8	3.0453	45.8
5. Mexico	0.8985	15.4	3.7375	36.9
6. Peru	2.0569	71.8	1.4255	55.3
7. Uruguay	–0.1599	–27.9	0.3231	22.8
8. Venezuela	12.7595	81.5	9.2475	70.2
9. Belg. Congo	3.9352	88.1	1.6533	68.7
10. Ethiopia	0.0542	10.3	–0.0474	–7.6
11. Ghana	2.7166	87.2	1.8363	76.1
12. Morocco	1.5942	58.6	1.5383	49.2
13. Nigeria	3.2057	73.6	2.2982	58.9
14. S. Africa	5.3324	68.5	5.1007	42.0
15. Sudan	1.2569	79.5	0.8509	64.8
16. Fr. W. Africa	1.0895	47.5	1.2159	42.0
17. Afghanistan	0.3754	61.5	–0.0247	–7.7
18. Ceylon	2.2016	82.0	2.1179	74.2
19. India	–0.7913	–7.7	3.7119	24.3
20. Indonesia	2.0931	37.2	–1.0506	–33.7
21. Japan	10.0539	42.8	8.1123	34.5

Table VI–6 (continued)

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
22. Malaya	4.1292	80.6	1.6822	57.6
23. Pakistan	–0.4499	–17.8	0.3945	9.9
24. Philippines	3.0501	59.9	2.7119	51.2
25. Thailand	1.6161	68.1	2.0430	66.8
26. UAR (Egypt)	–0.3745	–23.1	1.1668	31.2
27. Iran	6.8572	89.5	4.2748	80.2
28. Turkey	–0.6015	–22.7	0.3020	7.0
29. Canada	–17.1569	–33.2	–32.5137	–64.9
30. USA	–77.2627	–54.5	–36.0097	–28.0
31. Austria	0.1372	18.6	1.0980	12.3
32. BLEU	–3.1011	–10.7	–6.7707	–22.5
33. Denmark	5.8836	48.4	4.8331	38.6
34. France	–47.3966	–135.5	–51.2126	–159.9
35. Germ. (F. R.)	–21.8076	–26.8	–38.3570	–62.4
36. Italy	–11.2287	–49.0	–9.1054	–33.7
37. Netherlands	6.2773	20.3	7.8825	20.2
38. Norway	3.0422	43.5	6.1717	61.8
39. Sweden	9.9411	53.9	9.3473	48.6
40. Switzerland	–2.4002	–13.1	–1.8655	–10.6
41. UK	–5.5993	–8.0	–2.5886	–3.6
42. Australia	10.9715	69.9	9.1442	61.9

Table VI–7

RESULTS OF CALCULATION B-3
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
1. Argentina	4.3607	47.6	3.6394	38.0
2. Brazil	3.4364	29.9	0.9850	9.2
3. Chile	4.1491	185.7	2.2588	68.6
4. Cuba	4.0737	68.7	3.6697	55.2
5. Mexico	0.8602	14.7	3.4205	33.7
6. Peru	2.2182	77.4	1.5728	61.0
7. Uruguay	0.0836	14.6	0.6781	47.9
8. Venezuela	13.8315	88.5	10.4295	79.2
9. Belg. Congo	3.8902	87.1	1.5449	64.2
10. Ethiopia	0.1208	22.9	0.0099	1.6
11. Ghana	2.7872	89.4	1.9087	78.9
12. Morocco	1.7904	65.8	1.7138	54.8
13. Nigeria	3.2366	73.7	2.2533	57.7
14. S. Africa	5.5264	71.0	9.2029	75.7
15. Sudan	1.2674	80.2	0.8401	63.9
16. Fr. W. Africa	1.2441	54.3	1.3409	46.3
17. Afghanistan	0.3444	56.5	–0.0841	–25.3
18. Ceylon	2.1512	80.1	2.0778	72.8
19. India	–8.3539	–81.0	–3.6134	–23.7
20. Indonesia	2.2224	39.5	–1.0716	–34.3
21. Japan	4.6310	19.7	1.8296	7.8

ıble VI–7 (continued)

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
22. Malaya	4.1933	81.8	1.7674	60.5
23. Pakistan	1.9757	78.3	–1.5756	–39.4
24. Philippines	3.4523	67.8	3.0796	58.1
25. Thailand	1.4414	60.7	1.7655	57.8
26. UAR (Egypt)	–0.3373	–20.8	1.0880	29.1
27. Iran	6.8734	89.7	4.2387	79.5
28. Turkey	–0.5597	–21.1	0.1724	4.0
29. Canada	–11.9796	–23.2	–31.2743	–62.4
30. USA	–107.3510	–80.9	–53.3661	–41.5
31. Austria	–1.0587	–14.4	–1.8453	–20.6
32. BLEU	–12.0177	–41.6	–18.7425	–62.2
33. Denmark	5.6492	46.4	4.1175	32.9
34. France	–40.7830	–118.7	–48.8181	–152.4
35. Germ. (F. R.)	–75.0172	–92.2	–85.6230	–139.4
36. Italy	–22.0290	–96.0	–90.3563	–75.4
37. Netherlands	–8.0587	–26.0	–9.8826	–36.6
38. Norway	3.5756	51.1	6.5380	65.5
39. Sweden	11.4527	62.1	10.5792	55.0
40. Switzerland	0.2828	1.5	0.1486	0.8
41. UK	–45.2828	–64.5	–76.1651	–104.9
42. Australia	10.9524	69.8	8.8808	122.3

Table VI–8

RESULTS OF CALCULATION B-4
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
1. Argentina	5.3632	58.6	5.1265	53.5
2. Brazil	4.3373	37.7	2.4947	23.4
3. Chile	3.9733	82.1	2.1106	64.1
4. Cuba	–7.3330	–123.6	–13.5711	–204.2
5. Mexico	1.6515	28.2	4.7439	46.8
6. Peru	2.1319	74.4	1.5396	59.7
7. Uruguay	–0.0743	–13.0	0.5102	36.1
8. Venezuela	1.7217	11.0	–7.8795	–59.8
9. Belg. Congo	3.9135	87.6	1.6106	66.9
10. Ethiopia	0.0852	16.2	0.0143	2.3
11. Ghana	2.5381	81.4	1.5200	63.0
12. Morocco	0.7391	27.2	0.3989	12.7
13. Nigeria	2.6674	60.7	1.6335	41.9
14. S. Africa	4.3987	56.5	7.9967	65.8
15. Sudan	1.2783	80.9	0.8736	66.5
16. Fr. W. Africa	0.4470	19.5	0.5367	18.5
17. Afghanistan	0.3861	63.3	–0.0066	–2.0
18. Ceylon	2.0454	76.2	1.7938	62.8
19. India	–4.2768	–41.5	0.0386	0.3
20. Indonesia	2.5019	44.4	–0.5485	–17.6
21. Japan	12.3115	52.5	10.7090	45.5

Table VI–8 (continued)

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
22. Malaya	3.8835	75.6	1.4188	48.6
23. Pakistan	–1.0878	–43.1	–0.3819	–9.6
24. Philippines	–2.5083	–49.3	–5.4494	–102.9
25. Thailand	1.6747	70.5	2.2265	72.9
26. UAR (Egypt)	–0.1497	–9.2	1.3154	35.2
27. Iran	6.9233	90.4	4.3613	81.8
28. Turkey	–0.0264	–1.0	1.7279	39.8
29. Canada	–9.1852	–17.8	–22.0186	–43.9
30. USA	–72.8100	–54.9	–26.3946	–20.5
31. Austria	1.4094	19.1	1.6623	18.6
32. BLEU	–24.6476	–85.2	–30.6452	–101.7
33. Denmark	6.9251	56.9	5.9395	47.4
34. France	–93.2285	–266.5	–94.7244	–295.8
35. Germ. (F. R.)	–75.5436	–92.8	–90.3075	–147.0
36. Italy	–25.8298	–112.6	–28.5444	–105.8
37. Netherlands	–10.1536	–32.8	–10.7905	–27.6
38. Norway	3.6184	51.7	6.8922	69.0
39. Sweden	11.2796	61.1	10.9252	56.8
40. Switzerland	0.0973	0.5	2.6579	15.2
41. UK	–12.2561	–17.5	–6.9914	–9.6
42. Australia	9.9304	63.3	7.8489	53.2

Table VI–9

RESULTS OF CALCULATION B-5
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
1. Argentina	4.8111	52.6	4.3485	45.4
2. Brazil	4.4793	38.9	2.2988	21.5
3. Chile	4.2067	86.9	2.3520	71.4
4. Cuba	–3.9057	–65.9	–9.9832	–150.2
5. Mexico	1.4034	24.0	4.1646	41.1
6. Peru	2.2734	79.4	1.6643	64.6
7. Uruguay	0.1089	19.0	0.7185	50.8
8. Venezuela	6.9547	44.5	–1.0628	–8.1
9. Belg. Congo	3.8396	86.0	1.5019	62.4
10. Ethiopia	0.1462	27.7	0.0519	8.3
11. Ghana	2.4838	79.7	1.4338	59.4
12. Morocco	0.7727	28.4	0.3202	10.2
13. Nigeria	2.0685	47.1	0.6443	16.5
14. S. Africa	3.6182	46.5	6.7849	55.8
15. Sudan	1.2842	81.2	0.8673	66.0
16. Fr. W. Africa	0.6352	27.7	0.2331	8.0
17. Afghanistan	0.3575	58.6	–0.0618	–19.2
18. Ceylon	1.8312	68.2	1.5990	56.0
19. India	–22.3940	–217.1	–18.3810	–120.5
20. Indonesia	2.5937	46.0	–0.5896	–18.9
21. Japan	7.5894	32.3	5.2963	22.5

Table VI–9 (continued)

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
22. Malaya	3.7044	72.3	1.0821	37.1
23. Pakistan	–4.0108	–158.9	–4.1363	–103.5
24. Philippines	–0.4353	–8.6	–3.1177	–58.8
25. Thailand	1.5194	64.0	1.8815	61.6
26. UAR (Egypt)	–0.1475	–9.1	1.3567	36.3
27. Iran	6.8000	88.8	4.3254	81.1
28. Turkey	–0.2155	–8.1	0.6391	14.7
29. Canada	–20.7608	–40.2	–39.1819	–78.2
30. USA	–96.1700	–72.5	–40.8139	–31.7
31. Austria	–0.1662	–2.3	–0.6762	–7.5
32. BLEU	–28.0265	–96.9	–33.7112	–111.9
33. Denmark	6.3465	52.2	6.1837	49.4
34. France	–27.9418	–79.9	–38.4934	–120.2
35. Germ. (F. R.)	–50.5130	–62.1	–62.0982	–101.1
36. Italy	–15.5433	–67.8	–13.3369	–49.4
37. Netherlands	–24.1979	–78.2	–24.8702	–63.6
38. Norway	3.9350	56.3	7.3327	73.5
39. Sweden	12.2893	66.6	11.6533	60.6
40. Switzerland	1.7841	9.7	2.0509	11.7
41. UK	–76.5683	–109.1	–65.7695	–90.6
42. Australia	8.5513	54.5	6.1230	41.5

Table VI–10

RESULTS OF CALCULATION B-1
"Unexplained" Balance of Trade Compared with International Service Transactions
(in $100 million)

	Actual Balance of Trade minus Calculated Balance of Trade (1)	Balance in Service Transactions (2)	Positive (+) or Negative (–) Sum of (1) + (2) (3)
1. Argentina	0.3579	–0.023	+
2. Brazil	2.1186	–4.090	–
3. Chile	1.9033	–0.493	+
4. Cuba	0.5010	–0.780	–
5. Mexico	–3.3857	2.379	–
6. Peru	0.6357	–0.880	–
7. Uruguay	–0.5795	–0.184	–
8. Venezuela	3.5836	–8.330	–
9. Belg. Congo	2.2909	n.a.	n.a.
10. Ethiopia	0.1039	–0.153	–
11. Ghana	0.8847	–0.454	+
12. Morocco	0.0871	n.a.	n.a.
13. Nigeria	0.9141	n.a.	n.a.
14. S. Africa	–3.7780	–2.968	–
15. Sudan	0.4160	–0.115	+
16. Fr. W. Africa	–0.1079	n.a.	n.a.
17. Afghanistan	0.3969	n.a.	n.a.
18. Ceylon	0.0047	–0.023	–
19. India	–4.3099	1.199	–
20. Indonesia	3.1667	–2.100	+
21. Japan	1.5986	0.231	+

-10 (continued)

	Actual Balance of Trade minus Calculated Balance of Trade (1)	Balance in Service Transactions (2)	Positive (+) or Negative (–) Sum of (1) + (2) (3)
2. Malaya	2.5083	1.137	+
3. Pakistan	–0.8650	–2.876	–
4. Philippines	0.3462	–0.305	+
5. Thailand	–0.4350	–0.001	–
6. UAR (Egypt)	–1.5224	0.985	–
7. Iran	3.5776	–2.950	+
8. Turkey	–0.8494	–0.549	–
9. Canada	2.0218	–9.920	–
30. USA	–36.1448	–8.160	–
31. Austria	1.4252	1.866	+
32. BLEU	2.9563	1.020	+
33. Denmark	0.9828	1.222	+
34. France	4.3137	2.062	+
35. Germ. (F. R.)	18.0960	5.457	+
36. Italy	–2.0684	6.896	+
37. Netherlands	–2.7452	4.435	+
38. Norway	–1.8934	3.731	+
39. Sweden	0.6421	2.026	+
40. Switzerland	–1.0383	4.161	+
41. UK	–3.6260	3.360	–
42. Australia	1.8195	–5.286	–

: available.

Table VI–11

FACTORS DETERMINING THE SIZE OF INTERNATIONAL TRADE FLOWS

Results of Calculations C (28 Countries)

$$\log E_{ij} = \alpha_1 \log Y_i + \alpha_2 \log Y_j + \alpha_3 \log D_{ij} + \alpha_8 \log G_i + \alpha_0'$$

Calculation No.	ESTIMATED VALUE OF THE COEFFICIENTS					Correlation Coefficient
	α_1	α_2	α_3	α_8	α_0'	
C–1	1.0318 (0.0428)	0.9647 (0.0428)	−0.9228 (0.0657)	—	−0.6555	0.8039
C–2	0.8569 (0.0593)	0.9682 (0.0424)	−0.8633 (0.0664)	−0.7779 (0.1843)	+0.4927	0.8090

E_{ij} Exports from country i to country j
Y_i GNP of exporting country
Y_j GNP of importing country
D_{ij} Distance between countries i and j
G Degree of onesidedness (lack of diversification) of export products (as measured by the Gini coefficient).

Figures in brackets are standard deviations.

Table VI–12

RESULTS OF CALCULATION C-2
Total Actual Trade (1959) minus Total Calculated Trade

	EXPORT DEVIATION		IMPORT DEVIATION	
	$100 million	as per cent of actual value	$100 million	as per cent of actual value
1. Argentina	4.2879	49.0	3.8440	47.4
2. Brazil	6.9218	62.3	1.8474	19.5
5. Mexico	2.2504	39.5	5.6106	56.8
11. Ghana	2.7809	90.3	1.8790	80.5
13. Nigeria	3.2969	75.2	2.4498	63.8
14. S. Africa	4.5324	59.7	8.5226	76.4
17. Afghanistan	0.1929	38.3	0.0125	4.5
18. Ceylon	2.2721	85.8	2.0681	80.3
19. India	–0.5551	–5.8	4.9675	35.7
20. Indonesia	2.8110	51.9	0.5105	16.7
21. Japan	6.6403	32.5	7.3546	35.2
22. Malaya	4.2290	83.4	1.4607	51.2
25. Thailand	1.8075	76.8	2.1612	72.3
26. UAR (Egypt)	0.1843	13.8	1.0902	31.4
28. Turkey	–0.5692	–22.3	0.4003	9.5
29. Canada	–28.6987	–57.3	–31.7429	–65.1
30. USA	–60.2068	–54.6	–79.8669	–76.0
31. Austria	–1.2126	–18.2	1.5182	18.1
32. BLEU	–6.0168	–23.1	–7.0561	–27.1
33. Denmark	4.6445	40.0	3.3137	27.5
34. France	–53.4680	–193.5	–38.6289	–149.5
35. Germ. (F. R.)	–7.5066	–11.0	–36.9269	–67.4
36. Italy	–15.5108	–81.7	–5.7025	–24.0
37. Netherlands	–7.9116	–27.4	7.0206	19.5
38. Norway	0.9220	13.8	3.0467	31.9
39. Sweden	8.1125	46.0	9.0841	50.4
41. UK	–28.2981	–44.5	–23.6279	–36.2
42. Australia	12.2809	79.5	8.3953	59.8

A comparison of the results of series A calculations with those of series B and C shows that the absolute value of all coefficients is lower in A than in B and C. The three coefficients a_1, a_2, and a_3 all are about 0.3 greater (in absolute value) in B and C. The standard deviations of these coefficients are small, particularly in the series B calculations. The coefficients a_4 and a_5 show much greater deviations in the various calculations; and the standard errors are high. The trade-increasing effect of adjacency according to calculation A–3 is about 5 per cent of the normal trade volume; according to calculations B–2 to B–5 it is something like 75 per cent. Similarly, the trade-stimulating effect of preferential treatment is estimated to be 10 to 12 per cent of the standardized trade flow in calculation A–3, whereas in B–4 and B–5 full preferences appear to give rise to no less than 10 times the usual trade volume, while semi-preferential trade relations bring about a fivefold increase. However high a "colonial or ex-colonial trade multiplier" of 10 may seem to be, a verification ex-post from trade statistics confirms this order of magnitude.

The difference between the coefficients derived from the calculations of series A and those derived from series B and C is due to the different coverage of the samples. The list of countries included in series B (42 in number), and also, but to a lesser extent, in series C (28 countries), differs from that in series A in three respects:

(i) whereas series A consists predominantly of developed countries, series B and C include a number of developing nations, which means that GNP indicates mainly geographic size in series A and both geographic and economic size in series B and C;

(ii) the countries added in series B and C generally have a low GNP in comparison to those included in series A, so that the range of values that the first two explanatory variables may take is enlarged (in one direction) in B and C;

(iii) the countries added in series B and C are in general the more remote countries, and so the role of the distance factor can be estimated more accurately here than in the geographically less balanced sample used in A.

As these three changes occurred simultaneously when the data were enlarged, their individual consequences cannot be estimated from the change in the coefficients. It is obvious, however, that in the present context the calculations with the broader coverages — i.e., those of series B and C — are more meaningful than the ones based on the trade pattern of industrialized countries only.

Confining ourselves to the results of calculations B and C, we find that the values of a_1 and a_2 are always close to 1. This means that the export flow is almost proportional to the GNP of the exporting and the importing country. It also implies that the analysis could have been based on an *a priori* value of 1 for both a_1 and a_2 without much loss of information. Still, the values of a_1 and a_2 deviate from 1 in most calculations, even though the difference often is barely significant statistically. This is especially true of a_2, which tends to be smaller than 1; this may indicate that with increasing GNP, imports decline relatively because of more varied domestic production.

An interesting aspect of the results obtained for a_1 and a_2 is that in all calculations – except in C–3, which will be discussed below – the value of a_1 was about 0.1 higher than the value of a_2. This means that export volume depends somewhat more on the GNP of the exporting country than on the GNP of the importing country; it also implies that there is no equilibrium in the balance of trade between two countries with different levels of GNP. From the difference between the two coefficients a_1 and a_2 it follows that large countries (in terms of GNP) always export more to small countries than they import from them; this leads to a positive balance of trade for the bigger countries and a negative trade balance for the smaller ones. According to the present estimates, the United States should have a surplus on its trade accounts of something like 25 per cent; countries with an "average" GNP (the larger industrialized countries, mostly) should find that their trade flows were in approximate equilibrium; and countries at the lower end of the GNP scale (most underdeveloped countries and the smallest industrial countries) should experience a deficit amounting to some 30 per cent of their imports.

The coefficients a_1 and a_2 of the trade flow equation as fitted to the various sets of data can hardly be considered indicative of the desired pattern of trade; they merely describe reality. It will be necessary, in interpreting the deviations between actual and calculated trade, to keep in mind the preceding considerations. If we assume that, by and large, trade balances should be in equilibrium, it may be stated that the trade flow equation resulting from our calculations overestimates the normal exports of the bigger countries (in terms of GNP) and underestimates the exports of the smaller countries (i.e., underestimates the imports of bigger countries). A deviation of about 25 per cent between actual and calculated exports (in the sense that the latter exceed the former) for the United States could be due to this effect. Similarly, a positive devia-

tion of up to about 30 per cent in the export volume of countries with a low GNP (most developing countries and the small industrial nations) could well be caused by this factor alone. The figures for the larger industrialized countries like the United Kingdom, France, and Germany will not be much influenced by this consideration; the deviations recorded will not be appreciably biased in either direction.

Finally, a word may be said about the coefficients found in calculation C–2. This is the only case in which the value of a_1 is lower than that of a_2. The value of a_1 is not too reliable, however, because of intercorrelation between the GNP of the exporting country and the fourth explanatory variable, the concentration coefficient of exports. The intercorrelation was not very high (–0.54), but it was sufficiently significant to cast doubt upon the estimates of a_1 and a_8.[5] It should be noted that the foregoing discussion of the consequences of the difference between a_1 and a_2 applies to the results obtained in calculation C–2 as well, but in exactly the opposite sense. In spite of the fact that the value of a_1 in calculation C–2 is itself somewhat unreliable, it provides a useful check on our analysis of the impact of the values of a_1 and a_2 on the deviations between actual and calculated trade.

As to the effect of specialization in the export sector, it follows from the negative sign of a_8 that an increase in commodity concentration leads to a smaller flow of exports. In other words, the more diversified the export package, the greater the export volume. This tendency is counteracted by the fact that in this calculation the export-increasing effect of a higher GNP is less strong than in other calculations (a higher GNP generally means a more diversified export line). More research will be needed before a clear economic interpretation can be made of the effects of the degree of commodity concentration on the size of a country's export flow.

VI.5 A DISCUSSION OF THE RESULTS: THE DEVIATIONS

For most of the calculations, the deviations of actual trade from standardized or theoretical trade were computed. This was done first for

5. There was only one other case of a significant intercorrelation between explanatory variables, and that occurred in calculation A-3. In the latter calculation the variable distance and the dummy variable for neighboring countries showed an intercorrelation of –0.54 also. All other coefficients of intercorrelation were, in absolute value, less than 0.5.

each trade flow individually; subsequently these deviations were totaled for each exporting country and each importing country. Along these lines figures for total export deviations and total import deviations were derived. They are given in Tables VI–2, VI–3, VI–5 to VI–9, and VI–12. In these tables the sum total of the deviations is also expressed as a percentage of the actual value of the economic magnitude concerned.

The relative deviations are quite considerable. This is not surprising in view of the correlation coefficient of 0.8, which leaves 36 per cent of the variance of the variable concerned "unexplained." Substantial deviations were to be expected because of the existence of many types of trade impediments (or occasionally trade stimuli) with varying degrees of effectiveness. It is also true that the present analysis is a fairly crude one which clearly needs to be supplemented by further research. The results reported here must be used with a good deal of care; only provisional and qualified conclusions are possible.

As the purpose of the investigation was to find out which countries are hurt most by discriminatory trade restrictions, we are particularly interested in the negative deviations; a negative deviation implies that actual trade — export or import, or both — is lower than what could be expected based on the experience of other countries. Since the ultimate target of all foreign trade is to make available necessary capital and consumption goods with the least possible sacrifice, the level of imports would seem to have the greatest claim to our attention. In this context exports are important only as a means of paying for imports. Thus we will analyze the import deviations first.

Deviations of actual from calculated imports may be due to several causes:

(i) a positive deviation may be due to a positive deviation on the export side (e.g., preferential treatment of the exports of the country concerned), to the running down of previously accumulated stocks of foreign exchange, to a positive service balance, or to a net inflow of new capital, or amortizations;

(ii) a negative deviation may be due to a negative deviation on the export side (most likely to be caused by discriminatory treatment of the exports of the country concerned), to import restrictions imposed by the importing country itself (e.g., in order to build up foreign exchange reserves, or to obtain foreign exchange for debt repayment), to a negative service balance, or to a net outflow of new capital or amortizations.

Confining ourselves to negative import deviations — which are sum-

marized also in Table 3–2 of Chapter 3 – we may note first that these deviations cannot be explained by service balances. The latter are given in Table VI–10; it appears that, in general, neither their magnitude nor their algebraic sign is sufficiently correlated with the import deviations to contribute much to an explanation of them.

The role of capital flows is of greater importance than that of service exchanges. In the year under consideration, there was a substantial flow of capital from the developed countries to the newly developing parts of the world. This apparently enabled the developing countries to import more than they could have imported on the basis of export proceeds alone. Positive deviations could be expected, therefore, in the developing countries on the import side and in the developed countries on the export side. To be sure, the deviations caused by this factor might be compensated for or reinforced by other factors.

It is difficult to quantify the effects of service balances and capital flows on the volume of imports without going into a large amount of detailed work. The implications partly offset each other as these factors work in opposite directions in most cases. For all developing countries together, the net effect seems to be such as to allow a deficit on the commodity trade balance, i.e., a higher level of imports than would follow from the export level. Insofar as this is true for all developing countries, it would not invalidate the present analysis of the import deviations as possible indicators of discriminatory trade impediments, because the coefficients of the trade flow equation essentially describe the "average" or "normal" trade flows for developed as well as developing countries. As the newly developing countries (i.e., the countries having higher imports than exports) are all among the countries with low GNP, the fact of an import surplus in developing countries would probably be brought out by the GNP coefficients resulting from the correlation. In this way systematic divergencies are incorporated in the standard pattern of trade, so that random deviations will be indicative of discriminatory or preferential treatment of trade flows. The discussion in the preceding section regarding the values of the coefficients points in this direction, and seems to confirm the hypothesis that the net effect of service balances and the capital flows is incorporated in the standardized trade pattern as described by the trade flow equation.

Thus, in spite of some ambiguities and uncertainties, the negative deviations of actual from calculated imports can be considered as indicative of the existence of discriminatory trade impediments. Cases of subnormal imports fall into two distinct categories. In the first instance

an importing country has deliberately and voluntarily erected import barriers. In the second instance an importing country has been forced to reduce its purchases from abroad because its exports have suffered from discriminatory treatment. It is obvious that in the latter case not only imports but also exports will be lower than the normal values as calculated from the trade flow equation.

In Chapter 3 the negative deviations, on both sides of the trade flow, are summarized in one table (Table 3–2) and discussed along the lines of the above distinction. For the main conclusions, the reader is referred to that chapter. Only one technical remark need be inserted here. The results of the calculation show that, with respect to the special trade relations of the United States with Cuba, the Philippines, and Venezuela, the preferential treatment is less important than it was assumed to be (in relation to the Commonwealth imperial preference and the preference within the French Community). Particularly in the cases of Cuba and the Philippines, the trade flow equation overestimates the trade-increasing effect of the special economic links so that these countries show substantial negative deviations both for exports and imports. This being so, these negative deviations (or at least their magnitude) cannot serve as the basis for further analysis.

Finally, it must be stressed once more that the present analysis is only a first step in what the authors consider to be an interesting and promising approach to the study of world trade flows. As was pointed out earlier, the analysis is so crude that only tentative conclusions are possible. Further research is being undertaken which might lead to a more accurate model of world trade flows and to firmer conclusions about the "location" and impact of trade impediments.

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APPENDIX VII

Tariff Reductions and Their Consequences

VII.1 THE PROPOSED REDUCTIONS AND THEIR TIMING

In Chapter 8 suggestions are made for reducing the EEC outer tariff. Specific proposals for a number of commodities are given in Table 8–1 and in section 8.7. The percentage reductions advocated for these particular products are as follows:

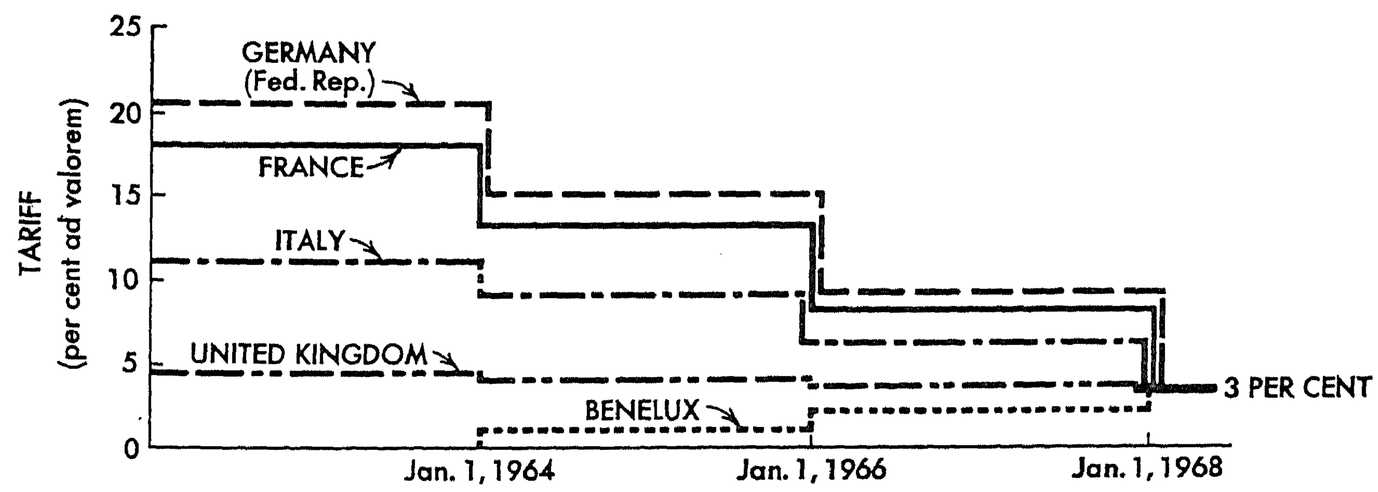
	Per Cent
Coffee	80
Bananas	80
Sugar	70
Tea	70
Cocoa beans	60
Dried fruits	60
Cotton fabrics	50

These reductions should be made gradually; in the section referred to above we propose that they should be fully in force by the end of 1967. In the accompanying graphs (Figs. VII–1 to VII–7) are plotted the possible time paths of the movements to a common outer tariff for the EEC countries and the United Kingdom on the basis of the new outer tariff implied by the proposed reductions of the actual outer tariff.

The main purpose of the graphs is to illustrate the changes in customs tariffs necessitated by the specific proposals made in section 8.7 of Chapter 8. The number of steps in which the new outer tariff is to be reached and the time interval of two years between each successive step represent a somewhat arbitrary choice out of an unlimited number of possibilities. Nevertheless, they are considered to be sufficiently realistic to serve as a starting point for discussions.

As it is difficult to obtain reliable and current information about im-

FIG. VII–1 *Proposed Lowering of EEC Outer Tariff on Coffee*



port duties (both specific and ad valorem) and internal fiscal charges — and more particularly about their incidence on import prices — all figures given here should be considered estimates rather than hard facts. For this reason, the incidence of the charges (expressed as a percentage of the import price) is always mentioned explicitly in the calculations of this appendix, so as to show clearly on what figures the proposals or computations are based.

FIG. VII–2 *Proposed Lowering of EEC Outer Tariff on Bananas*

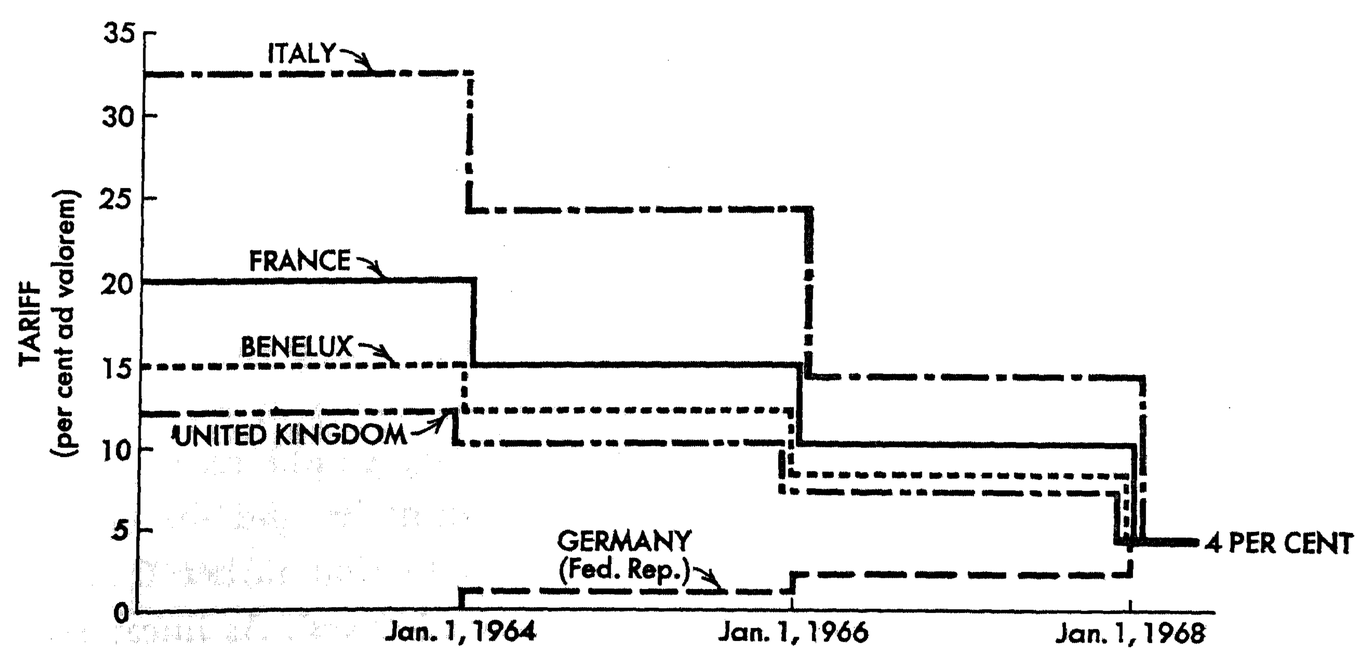
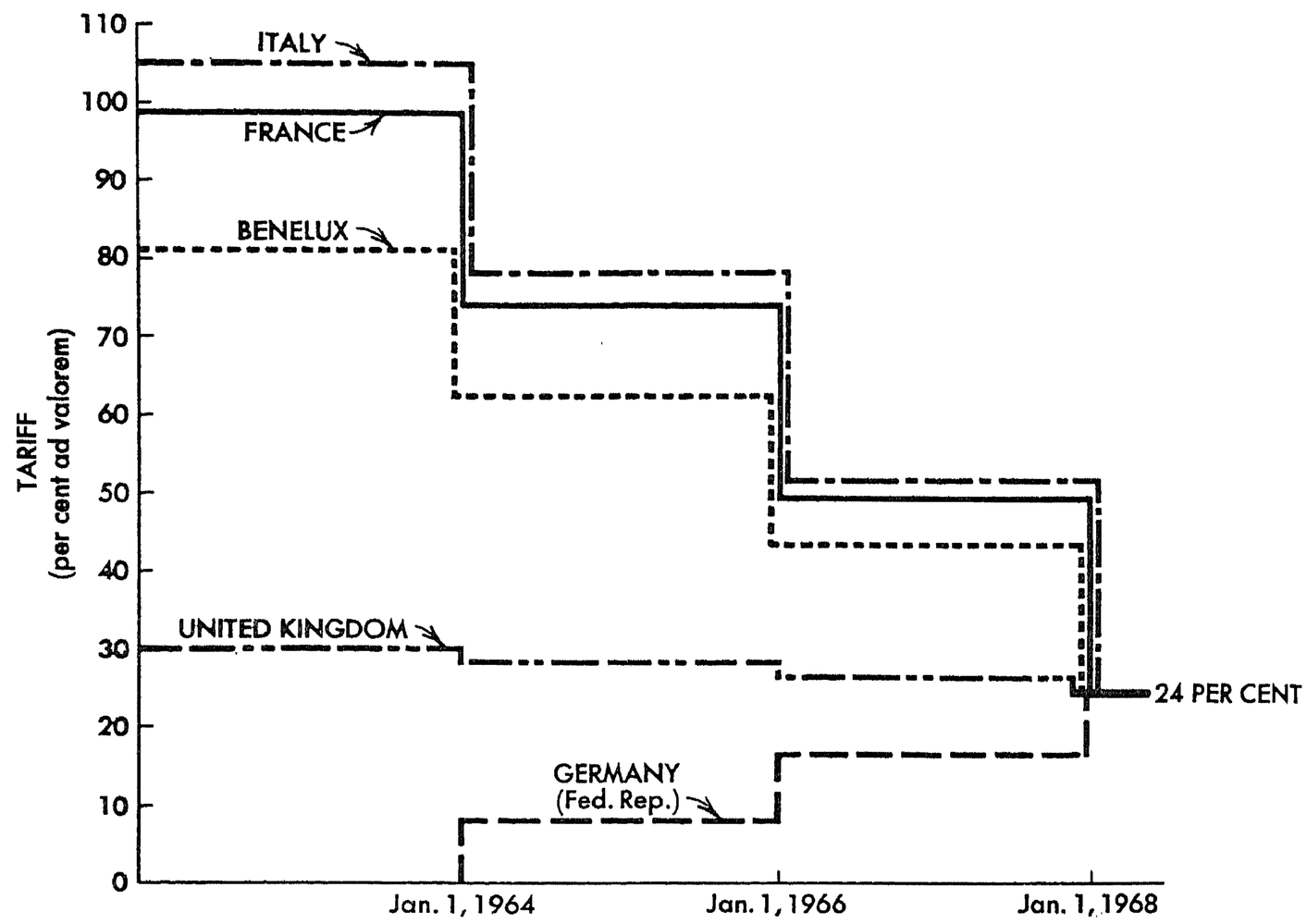


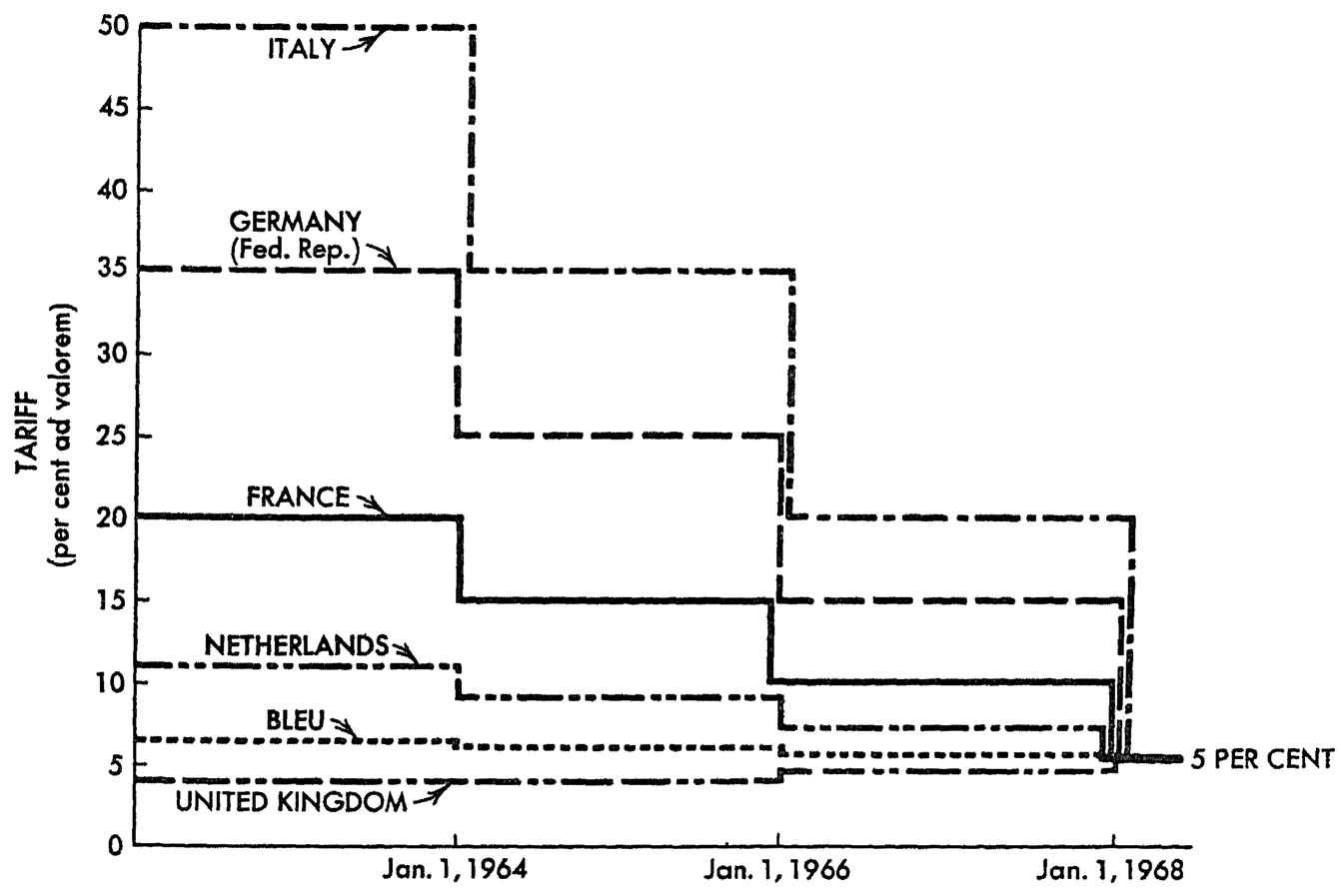
FIG. VII-3 *Proposed Lowering of EEC Outer Tariff on Sugar*



VII.2 CONSEQUENCES OF TARIFF REDUCTION OR ABOLITION

To gain some insight into the sacrifices which a reduction or abolition of tariffs and internal duties would require on the part of the developed countries, an attempt was made to calculate — for a few products and for a varying list of developed countries — the impact of a complete removal of trade barriers on the balance of payments, the employment situation, and government revenue. The results are presented and discussed in Chapter 8; they are reproduced in the tables of this appendix. The findings suggest the order of magnitude of the effects; they do not pretend to be refined estimates of great reliability. Also, it must be clear from the outset that the effects as indicated in these tables are much greater than those which would result if our proposals concerning the tariff of the EEC countries and the United Kingdom were accepted (they related to a reduction rather than an abolition of duties and do not apply to internal taxes). As linear rela-

FIG. VII–4 *Proposed Lowering of EEC Outer Tariff on Tea*



tionships between the economic variables concerned were assumed, the effect of a tariff reduction can be calculated as a simple fraction — equal to that part of the tariff which is to be abolished — of the maximum impact as shown.

It was assumed in the calculations of this appendix that import duties and consumption taxes are the only impediments to imports of the

FIG. VII–5 *Proposed Lowering of EEC Outer Tariff on Cocoa Beans*

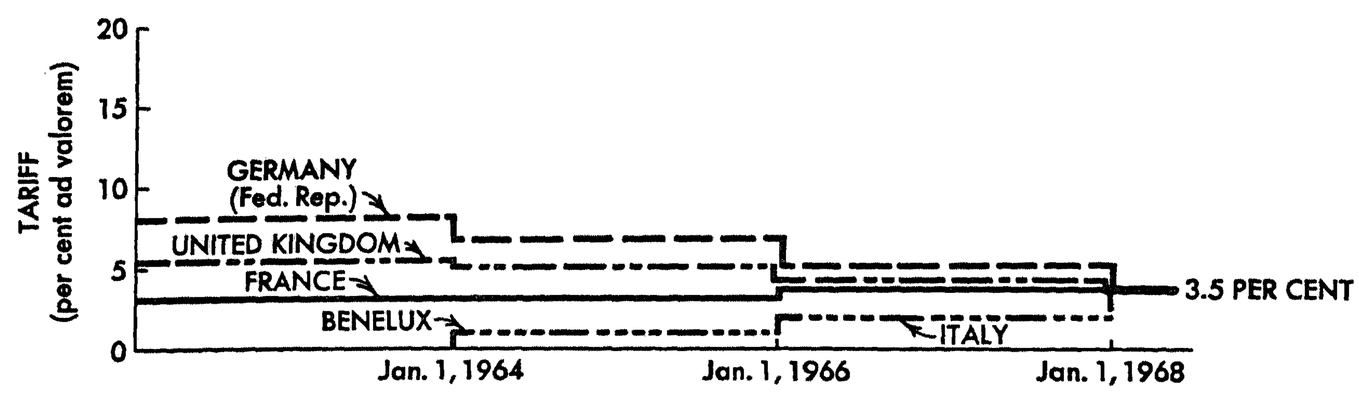
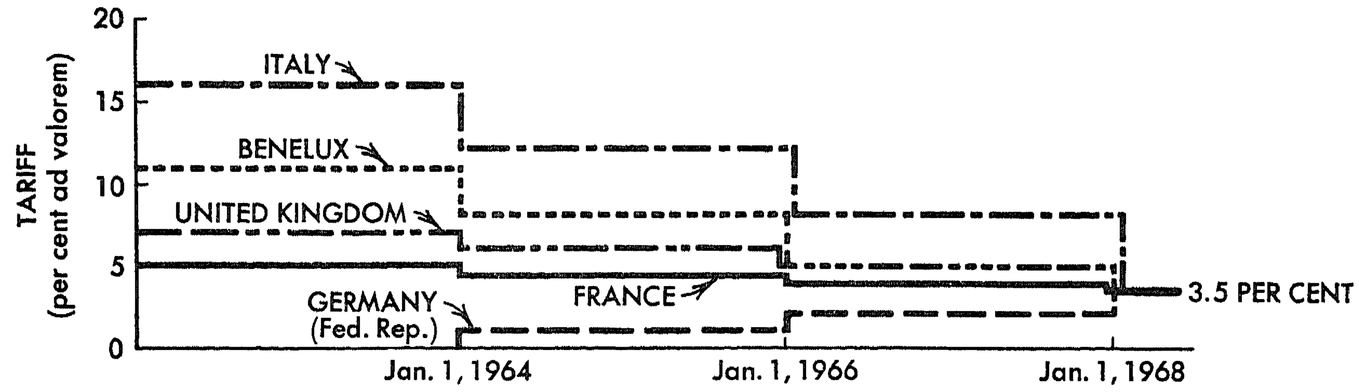
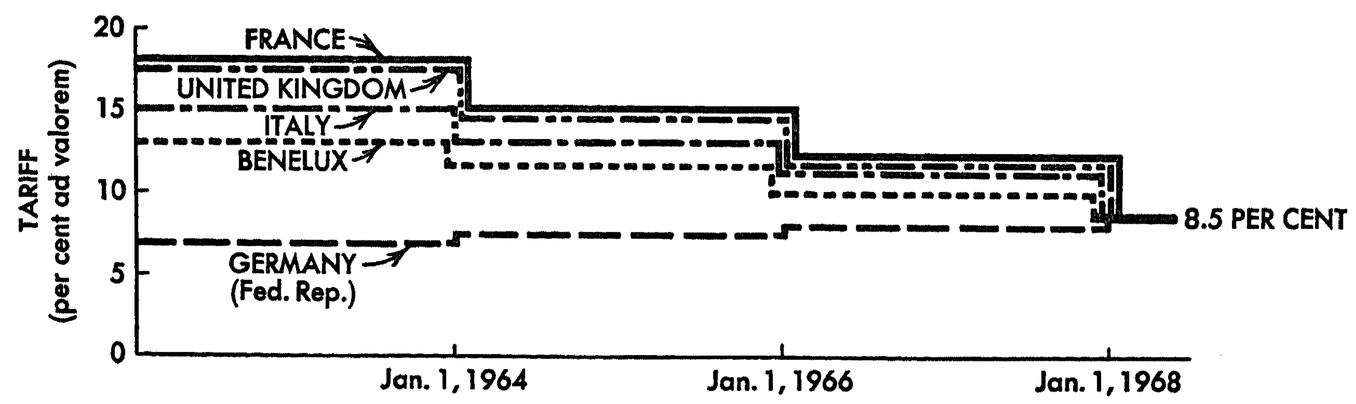


FIG. VII-6 *Proposed Lowering of EEC Outer Tariff on Raisins*



particular commodity; in other words, that quantitative import restrictions are either absent or not active because of a low level of imports. In cases where this assumption would not be justified by the facts, the results of the calculations have to be interpreted in a somewhat different way. If a certain country uses quantitative restrictions to hold down imports of a commodity, the abolition of import duties and internal charges will have the consequences discussed in this appendix only if it is accompanied by a corresponding (partial) "liberalization" of the quantitative restrictions. The increase in imports calculated below should in such a case be regarded as the result of a sufficient relaxation of the quantitative restrictions rather than as the result of the operation of the market mechanism. Apparently, if the quantitative restrictions were reduced still further (so as to make them ineffective), the effects would be larger than those estimated in this appendix. As information

FIG. VII-7 *Proposed Lowering of EEC Outer Tariff on Cotton Grey Goods*



on the existence and effectiveness of quantitative restrictions is hard to obtain, the analysis could not be pursued further. It is clear that this adds another element of uncertainty to the interpretation of our results.

VII.3 THE RESULTS OF FREE IMPORTING: NONCOMPETING AGRICULTURAL PRODUCTS

The effect on imports of an abolition of all duties and taxes was estimated first for three agricultural commodities not produced in the importing (temperate) countries: bananas, coffee, and tea. The results are given in Table VII–1. The consequences for government revenue of the abolition of charges on these same products are shown in Table VII–2.

The estimates were arrived at in the following way. The basic data all refer to the year 1959, and comprise:

(i) actual imports (preferential and nonpreferential);
(ii) import duties;
(iii) internal charges;
(iv) retail prices (in relation to import prices); and
(v) price elasticities of demand.

It was assumed that retail prices would be lowered by an absolute amount equal to the sum of the abolished import duties and internal charges. With the help of price elasticities, this decrease in consumer price is translated into an increase in quantity demanded, and hence into additional imports. In order to judge its relative importance, the import increase was related to the actual volume of these commodities imported and to the total imports of the country concerned.

The impact on the government budget was found very simply by multiplying the value of actual imports by the rate of total charges. The resulting loss in revenue was compared with total government income from indirect taxes. As the products concerned are not produced in temperate climates, there is no direct effect on domestic production and employment.

The results of the calculations are necessarily subject to some uncertainty since insufficient information was available about some of the variables involved. Imports were known, of course, for all countries. The relation between retail prices and import prices had to be estimated for some countries; this was done on the basis of the ratio observed in other countries. Elasticities of demand were also unknown for many

Table VII–1

ESTIMATED EFFECT ON IMPORTS OF THE ABOLITION OF TOTAL CHARGES ON COFFEE, TEA, AND BANANAS (1959 data)

	Increase in Imports in Millions of Dollars				Increase in Imports as Per Cent of Total Imports of the Three Commodities	Increase in Imports as Per Cent of Total Imports
	Coffee	Tea	Bananas	Total Three Commodities		
Total 17 countries	54.3	1.5	8.2	64.0	2.3	0.08
BLEU	—	—	0.3	0.3	0.5	0.01
France	8.3	—	2.4	10.7	4.2	0.21
Germany (F. R.)	20.7	0.7	0.6	22.0	8.5	0.26
Italy	13.2	0.1	0.9	14.2	15.3	0.43
Netherlands	—	0.3	0.4	0.7	1.2	0.02
Austria	0.4	—	0.1	0.5	4.4	0.04
Denmark	1.3	—	—	1.3	3.5	0.08
Finland	6.7	0.1	—	6.8	23.9	0.08
Norway	—	—	0.1	0.1	0.4	0.01
Sweden	1.8	—	0.3	2.1	2.8	0.09
Switzerland	0.7	—	0.4	1.1	3.4	0.06
UK	0.1	0.1	1.5	1.7	0.4	0.02
Canada	0.4	—	0.9	1.3	1.2	0.02
USA	—	—	—	—	—	—
Australia	0.1	0.1	—	0.2	0.5	0.01
New Zealand	—	—	—	—	—	—
Japan	0.6	0.1	0.3	1.0	6.6	0.03

— negligible or nil.

Sources: See end of appendix for sources used in constructing this and all other tables.

Table VII–2

ESTIMATED EFFECT ON GOVERNMENT REVENUE OF THE ABOLITION OF TOTAL CHARGES ON COFFEE, TEA, AND BANANAS (1959 Data)

	Loss of Government Revenue in Millions of Dollars				Loss of Govt. Revenue as Per Cent of Total Indirect Taxes
	Coffee	Tea	Bananas	Total Three Commodities	
Total 17 countries	392.1	19.3	32.0	443.4	0.5
BLEU	—	0.1	1.6	1.7	0.2
France	55.5	0.6	9.2	65.3	0.7
Germany (F. R.)	183.8	10.8	2.1	196.7	2.5
Italy	78.8	1.2	4.7	84.7	2.1
Netherlands	—	1.2	1.4	2.6	0.3
Austria	2.5	0.3	0.3	3.1	0.4
Denmark	9.3	0.5	—	9.8	1.5
Finland	41.9	0.6	—	42.5	7.3
Norway	—	0.1	0.7	0.8	0.1
Sweden	9.0	0.2	1.5	10.7	0.9
Switzerland	3.4	0.2	1.7	5.3	1.4
UK	1.5	0.7	5.9	8.1	0.9
Canada	2.5	0.1	1.7	4.3	0.1
USA	—	—	—	—	—
Australia	0.6	1.8	—	2.4	0.1
New Zealand	—	—	0.1	0.1	0.3
Japan	3.3	0.9	1.1	5.3	1.6

— negligible or nil.

Table VII–3

ASSUMED PRICE ELASTICITIES OF DEMAND FOR COFFEE, TEA, AND BANANAS

	Coffee	Tea	Bananas
BLEU	–0.4	–0.2	–0.7
France	–0.4	–0.2	–0.7
Germany (F. R.)	–0.4	–0.3	–0.7
Italy	–0.6	–0.3	–0.7
Netherlands	–0.4	–0.4	–0.7
Austria	–0.5	–0.3	–0.7
Denmark	–0.4	–0.3	–0.7
Finland	–0.6	–0.3	–0.7
Norway	–0.4	–0.3	–0.7
Sweden	–0.4	–0.3	–0.7
Switzerland	–0.4	–0.3	–0.7
UK	–0.3	–0.2	–0.7
Canada	–0.3	–0.2	–0.7
USA	–0.3	–0.2	–0.7
Australia	–0.3	–0.2	–0.7
New Zealand	–0.3	–0.2	–0.7
Japan	–0.5	–0.2	–0.7

countries, and the same estimating procedure was followed. The assumed values of the elasticities are given in Table VII–3. Table VII–4 gives the figures for total charges on which our estimates were based.

VII.4 THE RESULTS OF FREE IMPORTING: COMPETING AGRICULTURAL PRODUCTS–SUGAR

The consequences of a tariff abolition are less easy to estimate in the case of imports which compete with domestic production than in the case of noncompeting imports. It is not difficult to calculate the loss of government revenue, but the increase in imports will depend upon two factors:

(i) the increase in total consumption; and
(ii) the changes in domestic production and supply.

Table VII–4

TOTAL CHARGES ON COFFEE, TEA, AND BANANAS
AS PER CENT OF IMPORT PRICE

	COFFEE		TEA		BANANAS	
	Non-preferential	Preferential	Non-preferential	Preferential	Non-preferential	Preferential
BLEU	—	—	19	17	27	12
France	51	33	20–30	16–24	20	15
Germany (F. R.)	94		105		4	
Italy	101		62	52	39	36
Netherlands	—		11	9	20	5
Austria	26		39		36	
Denmark	30		24		1	
Finland	160		80		1	
Norway	—		11		18	
Sweden	15		7		19	
Switzerland	14		13		27	
UK	5	2	4	—	12	—
Canada	4	—	14	—	7	
USA	—		—		—	
Australia	8	8	6	6	21	5
New Zealand	3	—	2	—	12	3
Japan	43		48		20	

— negligible or nil.

The employment effect also has to be considered. The most important agricultural commodity which is both imported and produced locally in the developed countries is sugar. The results of our calculations with regard to this product are shown in Table VII–5.

The basic information required is the same as that described in the preceding section under items (i) to (v); in addition it is necessary to ascertain (vi) domestic production, (vii) employment per unit of production, (viii) exports, and (ix) price elasticities of domestic supply. It is obvious that the last mentioned item in particular presents a serious problem for statistical investigation. Unpublished studies by one

Table VII–5

ESTIMATED EFFECT ON GOVERNMENT REVENUE, ON IMPORTS, AND ON EMPLOYMENT OF THE ABOLITION OF TOTAL CHARGES ON SUGAR (1959 data)

	Loss of Govt. Revenue as Per Cent of Total Indirect Taxes	Increase in Demand in 1,000 Tons	Decrease in Domestic Supply in 1,000 Tons		Increase in Imports in Millions of Dollars		Average Increase in Imports as Per Cent of Total Imports	Percentage Decrease in Production and Employment		Average Decrease in Employment in Sugar Refining in Thousands
			Ass. 1	Ass. 2	Ass. 1	Ass. 2		Ass. 1	Ass. 2	
BLEU	1.2	13	167	231	11.3	15.4	0.4	72	100	n.a.
France	0.9	132	692	870	105.5	121.5	2.3	80	100	28.3
Germ. (F. R.)	0.5	40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Italy	3.5	114	1,021	1,247	96.5	115.7	3.2	82	100	18.3
Neth.	6.4	47	365	503	26.0	34.7	0.8	72	100	9.2
Austria	1.8	24	189	282	23.0	33.0	2.5	66	100	n.a.
Denmark	—	7	117	176	8.2	12.1	0.6	40	60	1.4
Finland	3.8	19	41	43	5.9	6.1	0.1	96	100	n.a.
Norway	0.3	2	no production		0.2	0.2	—	—	—	—
Sweden	1.5	12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Switz.	2.3	10	13	22	2.3	3.2	0.1	47	70	0.3
UK	2.3	147	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	0.5	19	55	83	6.3	8.7	0.1	37	55	1.4
USA	0.3	162	380	566	64.5	86.6	0.5	15	22	5.6
N. Zeal.	1.0	3	no production		0.2	0.2	—	—	—	—
Japan	5.4	98	102	146	17.0	20.7	0.5	70	100	n.a.

— negligible or nil.
n.a.: not available, or impossible to estimate.

Assumption 1: Price elasticity of domestic supply 1.6.
Assumption 2: Price elasticity of domestic supply 2.4.

of the authors, J. Tinbergen, reveal the existence of great regularity in the shape of the frequency distribution of production costs of industries in the agricultural sector and in the manufacturing sector.[1] Assuming that the market price is equal to the cost of producing the last unit of output, the price elasticity of supply would tend to be around 2 in many branches of production. In the case of the production of sugar from sugar beet, the price elasticity of supply was assumed to be 1.6, and, alternatively, 2.4.

With the help of these supply elasticities, the impact of an abolition of import duties on domestic production was calculated; it was assumed that the price received by domestic producers would fall by the same amount as the import duties. Several countries in our group relied predominantly or exclusively on import quotas as a means of protecting their domestic sugar industry. Obviously, the above procedure, which postulates a tariff reduction, could not be followed for these countries. For this reason the effect on domestic production of an abolition of import duties could not be estimated for Germany and Sweden. The United Kingdom was excluded because of her particular position in world sugar trade and in the Commonwealth Sugar Agreement. The estimates of the impact on production in the remaining countries are liable to substantial errors. They suggest, nevertheless, that an abolition of import duties would mean the end of most, if not all, sugar production in Europe and Japan. Complete abolition might therefore be considered too drastic a measure; it should be remembered that in Chapter 8 only a reduction of import duties is proposed.

The effect on employment was supposed to be proportional to the impact on production. It should be noted that the employment effect could be calculated in absolute terms for sugar refineries only. An element of uncertainty in this respect is introduced by the fact that sugar can be imported either raw or refined. Here the maximum impact was estimated, i.e., we assumed that only refined sugar would be imported in the future. It is not accurately known how many people in the agricultural sector are dependent on beet sugar production; however,

1. This regularity can be indicated by stating that the cost of production at the ninth decile of the cumulative frequency distribution of production costs (i.e., the cost of producing the 90th unit out of total production of 100) is 50 to 100 per cent higher than the cost of production at the first decile (i.e., the cost of producing the 10th unit). The empirical evidence comes from industries with relatively many independent production units.

Table VII–6

IMPORT DUTIES, INTERNAL TAXES, AND ASSUMED PRICE ELASTICITIES OF DEMAND FOR SUGAR (duties and taxes as per cent of import price)

	IMPORT DUTIES[a]			
	Non-preferential	Preferential	INTERNAL TAXES	PRICE ELASTICITY OF DEMAND
BLEU	81	67	31	0.3
France	99	88	12	0.4
Germany (Fed. Rep.)	0		36	0.4
Italy	105	88	122	0.6
Netherlands	81		107	0.4
Austria	71		2	0.4
Denmark	33		0	0.2
Finland	151		0	0.5
Norway	0		11	0.3
Sweden	0		60	0.3
Switzerland	41		0	0.3
United Kingdom	30		55	0.3
Canada	30	17	11	0.3
United States	10		11	0.3
New Zealand	41		0	0.3
Japan	78		86	0.6

a. Weighted averages for raw and refined sugar.

as sugar production is usually not the sole activity of farmers in the developed countries, it may be supposed that the agricultural population — even in the case of a complete elimination of beet sugar production — could shift gradually to the cultivation of other products, albeit with some difficulty.

The import duties, internal charges, and price elasticities of demand which underlie the present estimates are given in Table VII–6.

VII.5 THE RESULTS OF FREE IMPORTING: COMPETING MANUFACTURED PRODUCTS— COTTON GREY GOODS

The estimation of the effects of a tariff and revenue abolition in the case of a manufactured item proceeds in principle along the same lines

as in the case of an agricultural commodity. The procedure described earlier was applied to one of the typical products of the manufacturing industry of several developing countries, i.e., to cotton grey goods. However, there were a number of complications, mainly stemming from the fact that cotton grey goods are an intermediate product rather than a good for final consumption.

The direct impact (through substitution) on imports and on domestic production – of the improved competitive position (lower price) of imported cotton grey goods – is fairly easy to estimate; there is a complete identity with the case of the preceding section. Only the indirect effect of the greater consumption of the commodity cannot be measured directly. It was assumed that the price of cotton grey goods (as an intermediate product) was equal to 0.3 of the price of the final product (cotton fabrics), so that lowering the price of cotton grey goods by a certain percentage would mean lowering the price of cotton fabrics by only 0.3 of that percentage (the reference is to prices at the wholesale level). Price elasticity of demand for cotton fabrics was put at –0.8 (again wholesale prices); this corresponds with an empirically derived elasticity of about –1.0 at the retail level.

Another problem was the fact that few if any figures were available for production and employment in the cotton grey goods industry. It is known, however, that there is very little weight loss in processing. Therefore the production of cotton grey goods (measured in tons) was assumed to be equal to the domestic production of cotton fabrics, taking into account the import and export of the former but neglecting inventories. Production was valued, where necessary, at an average (import) price of cotton grey goods of $1.5 per kilogram. In calculating the employment effect, it was assumed that labor inputs are the same per dollar of production value in the cotton grey goods industry as in the cotton industry as a whole.

As in the case of sugar, alternative assumptions were introduced with respect to the price elasticity of supply. Calculations were carried through based on an elasticity of 1.5, and, again, based on an elasticity of 2.0. The results of both computations are given in Table VII–7 (import effect) and Table VII–8 (employment effect). Because of insufficient information, some countries had to be dropped from the list.

As Table VII–7 shows, the import-increasing effect of an abolition of the duties on cotton grey goods is rather substantial, although the percentage increase in imports would not be greater than 1 per cent, except

Table VII–7

ESTIMATED EFFECT ON IMPORTS OF THE ABOLITION OF TOTAL CHARGES ON COTTON GREY GOODS (1959 data)

	Production of Cotton Grey in 1,000 Tons	Import Duty as Per Cent of Import Price	Decrease in Production in 1,000 Tons		Total Charges on Cotton Grey in Per Cent Ad Valorem	Increase in Consumption in 1,000 Tons	Increase in Imports in 1,000 Tons		Increase in Imports in Millions of Dollars		Average Increase as Per Cent of Total Imports
			Ass. 1	Ass. 2			Ass. 1	Ass. 2	Ass. 1	Ass. 2	
BLEU	64	13	11.0	14.7	13	1.3	12.3	16.0	18.5	24.0	0.6
France	183	18	41.9	55.9	51	11.1	53.0	67.0	79.5	100.5	1.8
Germ. (F. R.)	270	7	26.4	35.3	13	7.4	33.8	42.7	50.7	64.1	0.7
Italy	n.a.	15	n.a.	n.a.	15	3.6	n.a.	n.a.	n.a.	n.a.	n.a.
Neth.	54	13	9.3	12.4	13	1.5	10.8	13.9	16.2	20.9	0.5
Austria	14	26	4.7	6.3	28	1.0	5.7	7.3	8.6	11.0	0.9
Denmark	3	10	0.4	0.5	24	0.7	1.1	1.2	1.7	1.8	0.1
Norway	3	15	0.6	0.8	15	0.3	0.9	1.1	1.4	1.7	0.1
Sweden	18	13	3.1	4.0	13	0.9	4.0	4.9	6.0	7.4	0.3
Switz.	18	11	2.6	3.5	18	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
UK	143	18	32.7	43.6	18	8.6	41.3	52.2	62.0	78.3	0.6

n.a.: not available, or impossible to estimate.
Assumption 1: Price elasticity of domestic supply 1.5.
Assumption 2: Price elasticity of domestic supply 2.0.

Table VII–8

ESTIMATED EFFECT ON EMPLOYMENT OF THE ABOLITION OF TOTAL CHARGES ON COTTON GREY GOODS (1959 data)

	Est. Value of Production in Cotton Textile Industry in Millions of Dollars	Decrease in Cotton Grey Production in Millions of Dollars		Percentage Decrease in Prod. and Employ. in Cotton Textile Industry		Employees in Cotton Textile Industry in Thousands	Decrease in Employment in Thousands	
		Ass. 1	Ass. 2	Ass. 1	Ass. 2		Ass. 1	Ass. 2
BLEU	204	16.5	22.1	8.1	10.8	17[a]	1.3[a]	1.8[a]
France	580	62.9	83.9	10.8	14.5	118	12.7	17.1
Germ. (F. R.)	900	39.6	53.0	4.4	5.9	185	7.9	10.9
Italy	400	n.a.	n.a.	n.a.	n.a.	166	n.a.	n.a.
Neth.	212	14.0	18.6	6.6	8.8	50	3.3	4.4
Austria	55	7.1	9.5	12.9	17.3	24	3.0	4.1
Denmark	17	0.6	0.8	3.5	4.7	n.a.	n.a.	n.a.
Norway	15	0.9	1.2	6.0	8.0	4	0.2	0.3
Sweden	75	4.6	6.0	6.1	8.0	n.a.	n.a.	n.a.
Switz.	60	3.9	5.3	6.5	8.8	22	1.4	1.9
UK	670	49.1	65.4	7.3	9.8	210	15.4	20.6

a. Unreliable. n.a.: not available, or impossible to estimate.
Assumption 1: Price elasticity of domestic supply 1.5.
Assumption 2: Price elasticity of domestic supply 2.0.

for France. The figures of Table VII–8 are more interesting. They reveal that, on the average, employment in the cotton textile industry would go down by some 10 per cent; for some countries (France, Austria) the percentage is around 15. It goes without saying that these figures are not more than tentative estimates.

VII.6 SOME CONCLUDING REMARKS

The estimates presented here regarding the impact of a complete abolition of tariffs and duties on imports, government revenue, and employment must be considered very rough and tentative. A more refined analysis would certainly be worth while, particularly with respect to the employment effect. This would require, however, the full support and collaboration of the industries involved — in the present case, the sugar industry and the cotton textile industry — in both the importing and the exporting countries. A major ground for uncertainty is the limited information available about quantitative restrictions and their trade-reducing effect. It is believed, nevertheless, that the significance of the estimates surpasses that of simple illustration; the figures — however approximate they may be — give an impression of the order of magnitude of the various consequences of a removal of trade impediments.

As was noted in section VII–2, the present estimates indicate the maximum impact of free-market forces in that they are based on the most ambitious of targets: the complete removal of tariffs and internal duties. In a sense this aim is overambitious, as there is no need to abolish a general turnover tax which does not discriminate against the products of developing countries. Actually, the abolition of import duties and discriminating internal taxes will take place only very gradually, so that the impact on the economy will manifest itself in a piecemeal way over a number of years.

Studying the results of our calculations with these considerations in mind, it is apparent that the effects of a very substantial lowering or even a full abolition of import duties and discriminating internal taxes are not of such a magnitude as to present a serious problem to the developed countries of the West. On the contrary, under the present conditions of full employment and rapid economic expansion, it would not be difficult for the developed countries to adapt their economies to the changes that would occur in the event of a major move in the direction of trade liberalization. In the case of the sugar industry, and also,

but to a lesser extent, the cotton textile industry, some factors of production would have to adapt to the change by moving to other occupations or other specialties within the same branch. However, the small losses and inconveniences which would be involved are far outweighed by the gain to the nation as a whole (particularly to the consumers).

The analysis of this appendix has deliberately been confined to an evaluation of the sacrifices to be made or the changes to be effected in the developed economies. It should be kept in mind that the benefits of less restricted trade accrue not only to the developing countries but to the developed countries as well. These benefits take the form of lower consumer prices and, ultimately, an improved allocation of productive forces.

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