

THE INCIDENCE OF TRANSPORT COSTS ON EXPORTS FROM THE UNITED KINGDOM

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In a recent issue of this Journal, the authors examined the incidence of international transport and insurance charges on Australian exports to the United States [2]. On average, *ad valorem* freight rates were found to pose a trade barrier two to three times that of most-favoured-nation (MFN) tariffs, but for some individual products their importance was considerably greater. Within the framework of the effective protection model the incidence of transport costs was found to be even more imposing. This led to some conclusions concerning policies designed to influence the types of goods exported, or to strengthen the bargaining position of shippers vis-à-vis the liner conferences.

The purpose of this note is to determine whether the conclusions concerning the relative importance of international transport costs hold for an industrial country which is more favourably located in relation to its major export markets, and which exports a broader range of semi-finished and manufactured goods. To carry out this test, we have chosen to estimate the transport cost profile of the United Kingdom. The import market is again the United States, which is by far the U.K.'s largest export market, accounting for about 4 billion dollars, or 11 per cent of total exports, in 1974.

As in our previous study, data for the estimation of shipping costs are drawn from a United States Department of Commerce publication [3]. This tabulates imports, by product by country, on a joint "free-alongside-ship" (f.a.s.) and "cost-insurance-freight" basis. The ratio of the c.i.f. to the f.a.s. import value thus provides a measure of the *ad valorem* incidence of international transport and insurance charges.¹

Table 1 presents estimated nominal transport and insurance costs for each of the United Kingdom's principal two-digit Standard International Trade Classification (SITC) group exports. Altogether, these 55 product groups have a combined value

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¹The formula used to estimate the *ad valorem* transport rate (R) was

$$(1) \quad R = (V_{cif}/V_{fas}) - 1$$

The f.a.s. value of imports is placed in the denominator to make the nominal freight rates comparable to U.S. tariffs, which are levied on an f.o.b. basis.

of approximately 3.9 billion dollars, or 99 per cent of total United Kingdom exports to the United States.² To indicate the dispersion of the component seven-digit items, the weighted absolute deviations from the two-digit group means are shown.³ Finally, Table 1 gives nominal tariffs for each two-digit SITC group as well as total (trade weighted and unweighted) nominal tariff and transport rates.

Examination of Table 1 shows that the conclusions reached in our Australian study concerning the relative importance of transport costs and tariffs also hold for the United Kingdom. On an overall basis, the average (weighted) transport rate for these 55 products (6.6 per cent) is more than 2 percentage points higher than the average tariff rate. However, the weighted averages probably understate the true importance of shipping costs, since the spread between the unweighted figures rises to almost 5 percentage points.⁴ Also, an examination of individual product data shows that transport costs have a considerably greater range than tariffs. For example, animal oils and fats (SITC 41) have the highest recorded freight rate, with transport and insurance charges accounting for approximately 40 per cent of product value. Freight factors of over 20 per cent are also observed for rubber manufactures, coal, gas and paper pulp. Conversely, only in one instance, clothing (SITC 84), is a tariff rate as high as 20 per cent registered. These comparisons, plus the fact that nominal transport charges are higher than tariffs for 35 of the 55 product groups, strongly suggest that shipping costs generally pose a more important barrier to United Kingdom penetration of the United States market.

As indicated in our previous study, analysis of the effective protection from transport costs and tariffs offers useful insights into the way the *structure* of these charges influences the protection of value added in a production process.⁵ Protection of value added is the main concern of domestic producers, since this determines the extent to which they can operate with direct cost (value added) higher than that obtainable with tariff and transport charges set at lower levels. The effective rate of

²Miscellaneous transactions (SITC 9) such as returned goods, reimported articles, and articles for exhibition are excluded from the table.

³Specifically, the average deviation (D_j) for each product group was estimated using

$$(2) \quad D_j = \sum \frac{V_{ij}}{V_j} |C_{ij} - \bar{C}_j|$$

where \bar{C}_j and V_j are the average freight factor and U.K. export value for the j th two-digit group, while V_{ij} and C_{ij} represent value and transport rate figures for each seven-digit component product.

⁴This reflects a problem inherent in the use of a country's own trade weights for computation of tariff or transport averages. High tariffs or shipping costs on some commodities reduce the flow of imports of these items. The low volume of imports thus causes the high tariff or transport cost items to enter the calculation of an overall average with weights that may understate the importance of these charges.

⁵The effective rate of protection from transport costs and tariffs is defined by

$$(3) \quad E_j = \frac{(t_j + r_j) - \sum m_i(t_i + r_i)}{V_j}$$

where r_j and r_i are nominal transport rates for the final product j and its material inputs, t_j and t_i give corresponding tariff rates, while V_j is the free trade value added coefficient. For an application see [1]. However, when equation (3) is used to estimate effective protection against United Kingdom products, the r_j represent *ad valorem* transport costs for these items, while the r_i give average rates for U.S. imports of material inputs from all sources.

TABLE I

Comparison of the ad valorem Incidence of International Transport and Insurance Charges on the United Kingdom's Exports to the United States with Current Most-Favoured Nation Tariffs; Selected Product Groups.

SITC	Description	Ad Valorem Rate on U.K. Exports			1974 F.A.S. Value of Exports (\$000)	
		Transport Cost		Nominal Tariffs		
		Group Average	Mean Deviation			
71	Nonelectrical machinery	5.7	5.4	4.8	10.5	842,093.6
73	Transport equipment	4.7	3.6	6.4	11.1	471,864.6
11	Beverages	9.2	2.1	5.8	15.0	402,409.2
89	Miscellaneous manufacturing	5.5	10.2	9.0	14.5	350,458.9
66	Nonmetallic mineral manufactures	3.9	3.7	10.1	14.0	296,734.0
68	Nonferrous metals	1.4	1.3	4.7	6.1	295,877.6
67	Iron and steel	14.1	13.3	5.6	19.7	184,098.7
51	Chemical elements and compounds	8.9	8.4	6.3	15.2	153,008.1
72	Electrical machinery	6.5	6.1	7.7	14.2	127,467.6
69	Metal manufacture, nes	8.0	7.6	7.7	15.7	83,837.3
65	Textile yarns and fabrics	9.4	9.0	14.7	24.1	72,550.9
86	Professional instruments	5.4	5.3	11.2	16.6	70,421.9
84	Clothing	6.6	6.4	20.0	26.6	42,210.0
28	Metalliferous ores	2.2	1.9	1.0	3.2	40,900.4
33	Petroleum products	10.4	8.3	3.6	14.0	39,006.0
59	Chemical products, nes	6.0	4.3	11.5	17.5	36,181.4
58	Plastics	8.3	6.7	8.2	16.5	32,664.8
54	Medicinal products	5.1	3.2	3.9	9.0	32,122.0
07	Coffee, tea, cocoa and spices	7.6	5.5	0.7	8.3	31,459.2
61	Leather and products	3.9	3.6	5.1	9.0	24,100.2
62	Rubber manufactures, nes	21.0	14.6	6.4	27.4	21,214.6
26	Textile fibres	7.3	6.2	7.6	14.9	19,922.4
06	Sugar and honey	12.1	0.2	6.6	18.7	17,217.5
82	Furniture	17.5	8.5	7.5	25.0	16,955.7
53	Dyeing and tanning materials	5.5	3.9	4.3	9.7	16,064.8
32	Coke, coal and briquettes	29.4	7.7	0.0	29.4	15,828.4
03	Fish and preparations	8.7	7.7	1.3	10.0	15,725.8
64	Paper manufactures	12.9	11.6	4.0	16.9	14,252.6
85	Footwear	6.5	5.2	16.7	23.2	13,757.7
27	Crude fertilisers and materials	9.9	9.3	1.6	11.5	13,391.4
02	Dairy products	7.9	5.2	10.7	18.6	13,256.0
04	Cereals and preparations	15.8	6.9	5.8	21.6	12,728.7
55	Essential oils	9.7	7.2	4.0	13.7	7,489.5
00	Live animals	8.7	6.2	3.7	12.4	6,295.0
12	Tobacco and manufactures	10.9	3.6	18.3	29.2	4,356.0
63	Wood manufactures	14.8	12.4	6.7	21.5	3,926.5
56	Manufactured fertilisers	17.6	9.6	0.0	17.6	3,535.9
29	Crude materials, nes	7.4	6.8	2.1	9.5	3,426.7
83	Travel goods	11.0	8.9	15.3	25.3	3,212.2
05	Fruits and vegetables	17.0	14.2	9.5	26.5	2,383.2
52	Mineral tars, etc.	8.9	0.9	0.0	8.9	2,252.0
43	Animal and vegetable oils	7.3	3.8	6.4	13.7	1,937.3

TRANSPORT COSTS ON U.K. EXPORTS

Gary P. Sampson and Alexander J. Yeats

SITC	Description	Ad Valorem Rate on U.K. Exports			1974 F.A.S. Value of Exports (\$000)	
		Transport Cost		Nominal Tariffs		
		Group Average	Mean Deviation			
24	Wood, lumber and cork	11.5	7.0	6.5	18.0	1,578.0
01	Meat and preparations	9.5	1.5	5.4	14.9	1,507.1
09	Miscellaneous food preparations	16.0	12.2	12.5	28.5	1,363.2
23	Crude rubber	17.8	8.3	0.6	18.4	1,330.1
81	Sanitary fixtures	9.8	7.3	13.9	23.7	1,224.3
21	Hides and skins	4.0	3.3	0.1	4.1	1,207.2
34	Natural gas	28.2	0.4	0.0	28.2	1,206.8
57	Explosives	8.6	6.7	12.4	21.0	822.2
08	Feeding stuff for animals	14.2	7.6	0.8	15.0	604.6
22	Oil seeds and nuts	17.5	0.0	11.3	28.8	372.2
42	Fixed vegetable oils	5.1	2.4	7.3	12.4	230.8
41	Animal fats and oils	38.7	26.9	6.5	45.2	156.2
25	Pulp and waste paper	22.4	9.3	0.0	22.4	109.8
<i>Average Ad Valorem Rate</i>						
	Trade weighted	6.6		4.5	11.1	
	Unweighted	11.0		6.4	17.4	
<i>Standard deviation</i>		7.0		4.9		

protection in the market for exported goods is also a major concern of United Kingdom producers, since this indicates the extent to which they must operate with direct costs lower than those of their counterparts in the United States.

To investigate how the structure of tariff and transport charges influences effective protection for industries of export interest to the U.K., *ad valorem* rates for these charges were incorporated in equation (3) along with production coefficients employed in our Australian study.⁶ Table 2 summarises the results obtained for 35 products or product groups exported to the United States. Also shown are the MFN tariffs applied to these items and their *ad valorem* transport rates. Finally, to assist in comparing transport costs facing United Kingdom producers with those incurred by their competitors, the average freight factor (on imports from all sources) is given for each product.⁷

⁶Coefficients for several additional industries, whose products are not exported by Australia, are taken from [1].

⁷Since the items shown in Table 2 may be composed of a number of different lower level products, we have calculated the average transport cost factor (\bar{T}_j) for component *j* using U.K. trade weights. Specifically,

$$(4) \quad \bar{T}_j = \sum_i \left(\frac{v_{ij}}{v_j} \right) t_i$$

where v_{ij} are U.K. shipments of each of the *n* components of aggregate product *j*, v_j is the total value of shipments of the two-digit product, and t_i is the average transport rate experienced by non-U.K. exporters to the U.S. Estimation of the over-all transport factor by this procedure permits direct comparison of freight costs facing U.K. and other exporters, since it holds the component product mix constant between groups.

Nominal and Effective Rates of Protection by Transport and Insurance Costs and Tariffs against United Kingdom and Other Exporters to the United States

Commodity Group	Nominal Protection			Effective Protection		
	Tariffs	Transport Costs		From Tariffs	From Transport Costs Plus Tariffs	
		Other Countries	United Kingdom		Other Countries	United Kingdom
	%	%	%	%	%	%
<i>Processed Foods</i>						
Meat products	6	7	9	10	26	36
Preserved sea foods	6	8	9	16	18	24
Frozen fruits and vegetables	15	12	19	37	61	87
Dehydrated foods	8	8	21	33	37	102
Pickles and dressings	9	14	15	-27	27	34
Soft drinks	1	38	38	-10	73	73
<i>Dairy Products</i>						
Cheese	12	10	7	35	62	42
Butter	10	21	7	47	198	58
Condensed milk	11	8	9	30	39	45
<i>Animal and Vegetable Oils</i>						
Vegetable oils	23	6	6	253	188	188
Animal and marine oils	4	8	8	6	12	12
<i>Grain Products</i>						
Cereal preparations	11	9	11	35	44	55
Bakery products	6	9	4	7	18	24
Macaroni and spaghetti	3	9	19	0	4	33
<i>Textile Products</i>						
Wool yarn	31	20	25	62	116	134
Wool fabrics	47	5	5	91	92	92
Wool clothing	27	6	6	7	10	10
Cotton yarn	8	29	7	12	105	27
Cotton fabrics	16	6	8	31	34	40
Cotton clothing	20	7	8	34	40	42
<i>Leather and Products</i>						
Leather	6	5	3	19	24	19
Leather goods excl. shoes	4	9	6	4	18	11
Shoes	11	7	7	15	24	24
<i>Lumber and Paper Products</i>						
Plywood	13	13	25	28	49	75
Wood manufactures	7	7	14	8	0	10
Paper and articles	5	7	15	13	7	27
<i>Nonferrous Metal Products</i>						
Nonmetallic mineral products	6	14	19	10	19	28
Glass and products	13	11	13	20	26	30
Nonferrous metals	6	2	2	14	0	0

Commodity Group	Nominal Protection			Effective Protection		
	Tariffs	Transport Costs		From Tariffs	From Transport Costs Plus Tariffs	
		Other Countries	United Kingdom		Other Countries	United Kingdom
	%	%	%	%	%	%
<i>Iron and Steel Products</i>						
Pig iron	1	15	15	6	30	30
Steel ingots	6	15	14	51	77	66
Metal manufactures	8	7	7	13	19	19
<i>Machinery</i>						
Nonelectric	7	3	3	9	8	8
Electric	6	5	7	7	13	16
Agricultural	1	8	8	3	8	8

Note: Effective protection from transport costs can be derived by subtracting effective tariff protection from the figures shown in the two last columns.

As with our Australian results, Table 2 shows that estimates of the level of protection facing United Kingdom exporters would be seriously understated by sole use of the effective tariff rates. For 31 of the 35 product groups shipping costs raise, often very considerably, the effective protection estimates. Since these findings are consistent with those for Australia, a number of important theoretical and policy implications follow. Specifically, economists have frequently been perplexed by the fact that calculated effective (tariff) rates fail to show the direction of domestic resource flows as postulated by economic theory. Since our findings demonstrate that total effective protection (tariffs plus transport) may differ so markedly from effective tariff protection, failure to include the influence of transport costs in the calculations may have seriously biased the results presented in earlier empirical studies. Also the fact that negative effective tariff rates for Australia and the U.K. are positive when freight costs are included may be of importance. Negative effective tariffs are a phenomenon which has stimulated considerable discussion in the professional literature. Our results suggest that they may be due to the influence of freight costs which more than offset the influence of tariffs. Finally, the fact that trade barriers posed by transport costs have been found to exceed those due to tariffs for both Australia and the United Kingdom accents the role freight costs have in limiting international trade flows. The findings also indicate the potential importance of measures to save transport costs as a stimulus to trade.

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