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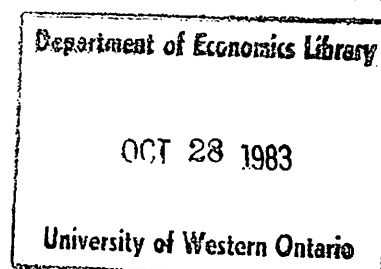
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TARIFF PREFERENCES: AN EMPIRICAL ANALYSIS

by

J. R. Melvin

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## TARIFF PREFERENCES: AN EMPIRICAL ANALYSIS\*

### I. Introduction

In recent years the question of the effect of tariff preferences has received a good deal of attention. Recent discussions concerning the possibility of the United Kingdom joining the European Economic Community with the consequent ending of the British Preference system has raised the question of what effect the preference system has had on Commonwealth trade, and whether or not the elimination of preferences would significantly affect the flow of goods among the Commonwealth countries. Tariff preferences have also received consideration as a method of aiding less developed countries. It has been suggested that if developed countries were to give preference to the manufactured and semi-manufactured goods of the less developed countries, considerable benefit could accrue to such countries, both by increasing their foreign exchange reserves, and by stimulating their manufacturing sector and thus increasing their rate of industrialization. The United Nations Conference on Trade and Development (UNCTAD) initiated discussions along these lines in 1964, and considerable attention was paid to the topic in the conference in 1968. Indeed a general agreement among developed countries to give preference to less developed countries might have been negotiated had it not been for the currency crisis which occurred at that time. While these preference proposals are currently in abeyance, they will doubtlessly reappear in the future.

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While preference proposals have been discussed as a method of promoting the rate of growth among less developed countries, all economists are not agreed on the degree to which such programs would actually accomplish this aim. Professor Grant Reuber (1968, p. 692) has suggested in reference to less developed countries, that "changes in tariff policy cannot realistically be expected to change the size of their foreign-aid requirements by very much. Tariff reductions are not a substitute for increasing foreign-aid." He has estimated that the elimination of tariffs on imports from the less developed countries would probably not increase exports from these countries by more than 2 billion dollars by 1975.<sup>1</sup>

The reasons commonly put forward in support of the position that preferences may not be of substantial aid to less developed countries include the arguments that the rates of duty on the relevant commodities are already quite low, that there exist non-tariff barriers such as quotas which are more important than tariffs in restricting exports, that cost conditions in the less developed countries would preclude a significant expansion of output, and that for political reasons the developed countries would impose constraints which would considerably limit the range of commodities over which the agreement would apply and thus severely limit its effect.<sup>2</sup> On the other hand, Johnson (1967, pp. 194-5), basing his analysis on the rates of effective protection, has argued that preferences could have a substantial effect in increasing the exports of manufactures from the less developed countries.

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<sup>1</sup>This estimate was initially made in an earlier study (Reuber, 1964, p.29). Benjamin and Jean Higgins (1970, pp. 35-6) give the same estimate. Other authors who have discussed the effects of preferences on the less developed countries include Johnson (1966, 1967 and 1969), Patterson (1965) and Wall (1968).

<sup>2</sup>For a full discussion of these and other difficulties associated with preferences see Patterson (1965) and Wall (1960).

The present study will attempt to provide some evidence on the degree of which tariff preferences have influenced Canadian import patterns. It will also provide some indication of how much the discontinuation of British Preferences would be expected to reduce the exports of Great Britain, and will provide at least some indirect evidence on the effects of preferences on less developed countries. The study combines statistics on Canadian imports by commodity by country for 1966 with Canadian nominal tariff rates as given in the Canadian Customs Tariff Manual, and through cross sectional analysis investigates the influence of tariff rates on the proportion of imports which come from British Preferential countries.

## II. Method of Analysis

The basic hypothesis to be tested is that tariffs are an important determinant of import patterns. It is obvious, of course, that there are many variables other than tariffs which would be expected to influence the volume of imports, and which ideally should be included as explanatory variables in the regressions. However, because our data were at the commodity level it was found to be impossible to obtain observations on these other influences on a comparable basis. The only apparent alternative was to select the commodity groups to be tested in such a way as to minimize the expected influence of these other factors. We will now proceed to identify these other influences and outline the procedures which were used to minimize their effect, and since in most cases we can expect to have only limited success in achieving this objective, we will also comment on whether we expect these excluded variables to bias our results, or in other words, whether we would expect there to be a relationship between these factors and the tariff rates.

One of the main concerns of international trade theory is the identification of the conditions which would result in international exchange, that is, the determinants of trade, and we will first of all consider the possible influence of these determinants. Among those things which could give rise to trade are differences in endowments, varying production functions, increasing returns to scale, differences in demand conditions, and distortions which prevent the fulfillment of the conditions necessary for the existence of a competitive equilibrium. Of these, the first three, being conditions on the production side, would give rise to differences in per unit cost, which, we suppose, would result in price differences. Such influences can be reduced to some extent by dividing the sample into a variety of commodity groups, on the premise that similar commodities tend to enjoy similar production conditions. We would expect, for example, to import capital intensive commodities, manufactures perhaps, from countries relatively better endowed with capital than Canada, and import labor intensive commodities, textiles perhaps, from countries relatively well endowed with labor. Thus we should treat these two groups separately. Similarly, with respect to production functions and returns to scale, we might expect these efficiencies in production to be shared, to some extent, by similar products.

On the demand side we would again expect imports to be influenced by relative prices abroad, and foreign prices will depend in part on relative demands for these products. Insofar as these demand differences are associated with income differences we might again hope to reduce the influence of these factors by grouping similar kinds of commodities, the hypothesis being that demand will shift towards more sophisticated products as income rises. We would expect, for example, that wealthier countries will demand proportionately more manufactures, and poorer countries proportionately more

agricultural products. With regard to distortions, our final determinant of trade, we might again expect grouping commodities to be of some assistance. The influence of factor market distortions, for example, would be expected to be related to overall endowments, and the forms of imperfect competition might have an influence on a wide range of fairly closely related commodities.

We have argued, then, that grouping commodities may reduce the influence of the various determinants of trade. A major question yet to be addressed, however, is whether we should expect the same groupings to be appropriate for all five of the determinants. That the same groupings are appropriate is probably an acceptable hypothesis as long as we do not attempt to define the groups too narrowly, for attempting a very fine classification to minimize the effect of one determinant could well amplify the effect of another.

We now turn to the possibility of biases in our analysis, resulting from our inability to completely eliminate the influence of these various determinants of trade. Differences in endowments should not affect our results unless we have reason to believe that there is a relationship between those commodities which receive preference and those commodities which, in production, use relatively large quantities of the factors which are scarce in Canada. There would seem to be no evidence to suggest that this is the case. The same argument applies to demand differences and to the possibility of varying production functions, for there seems to be no reason to believe that the British Preferential system is biased for or against those goods towards which Canadian preferences are biased, or towards those goods which Canada can produce most efficiently.<sup>3</sup> Similarly the existence of increasing

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<sup>3</sup>If a single country were setting up a preference system, then it is quite conceivable that one would observe some or all of these biases. In a multi-country agreement, however, it is unlikely that one country's preferences predominate, and it seems even less likely that the British Preferential system would be biased towards Canada.

returns to scale would not be expected to give rise to a bias in our analysis, and such a bias would, in any case, be impossible to identify. With respect to deviations from competitive equilibrium, of which monopoly and differing tax structures could be two examples, for most commodity groups there would seem to be no apparent reason for believing that the commodities which receive preferences are affected any differently than those which do not.

Quite aside from the broad influences of the determinants of trade, we have influences associated with the cross-sectional nature of our study, and the inherent differences among commodities which exist regardless of the grouping we choose. One effect in this analysis of the cross-sectional approach is that in general there will be different transportation costs associated with the different commodities. Two important variables determining such costs are the distance from which the good is imported and the method by which the transport is achieved. Other things being equal, we would expect to buy goods from the closest source of supply and from areas for which economical transport was possible. And the nature of the good itself may also be important, for we would expect trade to be biased toward goods for which the total cost of transport is a small proportion of total value. Here the weight or volume of the commodity, its perishability, its stage of manufacture, and the method by which transportation can be accomplished will be important.<sup>4</sup>

There are, then, two dimensions to the transportation question-- distance, and the characteristics of the commodity--which ideally should be taken into account. If Canada could be considered to be a single point, then

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<sup>4</sup>We would expect, for example, that commodities that can be transported in bulk, such as wheat, oil, or iron ore will have lower per pound transportation costs than items which have to be treated individually.



one might take account of distance by including as a variable the distance of the country of origin from Canada. However, from the available statistics, there is no way of telling whether the importer was in Halifax, Winnipeg or Vancouver, so that such a variable would seem to be impossible to meaningfully define. Furthermore, the nature of the transportation is also important, that is, whether the good was transported by sea or by land, and particularly with respect to ocean transport, the cost of loading and unloading make up the major portion of the transport cost. It is not clear, then, that distance itself would be the appropriate variable. To further complicate matters, rates charged by shipping companies are not determined only on the basis of the variables discussed above. It is quite possible, for example, that for the same commodity between the same two places, the transport costs will be significantly different depending on which direction you want to move the product.

Turning now to the variability in transport costs associated with the inherent differences among commodities, it can first of all be observed that such differences deserve concern only insofar as we expect trade patterns to differ among countries. Thus if Canada were assumed to import the same relative amounts of all commodities from all countries, transport differences among commodities would be a neutral influence. This does not seem like a reasonable assumption, however, and indeed traditional trade theory would predict just the opposite. Again the appropriate form of adjustment would seem to be a grouping of commodities, and the most satisfactory grouping will be the one which corresponds to the grouping found to be most satisfactory for eliminating the influences of the determinants of trade, since it is the determinants of trade which give rise to differences in trade patterns among countries.

With regard to the possibility of bias associated with our inability to entirely remove the influence of transport costs, the major source of such bias would seem to be associated with the United States, for transportation could involve going from Detroit to Windsor, or from Edmonton to Atlanta, and since from import statistics one cannot identify origin or destination, there would seem to be no way of taking account of such differences. Since it was felt that our inability to take account of such differences would introduce a substantial bias to the study, all imports from the United States were excluded from the sample. Since the transport from almost all countries other than the United States is by ocean, and in light of the grouping already discussed, it was felt that no further adjustments for transport cost differences would be appropriate.

Besides the influence on transport costs, differences among commodities has a direct influence on import patterns. First of all it is obvious that we would not expect to import the same quantity of all goods, and it is for this reason the proportions of total imports was used as the dependent variable. Even for the same commodity there will be differences among countries insofar as product differentiation exists, and for some commodities the existence of service facilities and distribution organizations will also be an important determinant of Canadian import patterns. There would seem to be no way in which such influences can be taken into account, although our grouping procedure may go some way in this direction, since the amount of product differentiation and the distribution and servicing requirements are clearly related to the degree of manufacture of the commodity.

### III. The Calculations

As was pointed out above, the basic data set was Canadian imports by

tariff item by country. The hypothesis tested was that preferential tariff treatment significantly affects import shares. This hypothesis was tested in a variety of ways. It was first of all hypothesized that the ratio of imports from countries enjoying British Preferential treatment (MBP) to total imports from British Preferential and Most Favored Nation Countries (MT = MBP + MMFN)<sup>5</sup> was a function of the difference between the Most Favored Nation tariff (TMFN) and the British Preferential tariff (TBP). The tariff ratio, and then the individual tariff rates were then considered to be the independent variables. Thus the basic equations fitted were of the form

$$(1) \quad MBP/MT = \alpha_0 + \beta_0 (TMFN - TBP)$$

$$(2) \quad MBP/MT = \alpha_1 + \beta_1 TBP/TMFN$$

$$(3) \quad MBP/MT = \alpha_2 + \beta_2 TBP + \beta_3 TMFN .$$

These equations were fitted for all countries, and then separately for developed and less developed countries. Finally, imports from all British Preferential countries was replaced with imports from Great Britain (MGB) and the three regressions were again run. In all cases the dependent variable was multiplied by 100 so that it shows the percentage share that British Preferential countries have of the Canadian market.

The tariff difference was thought to be an appropriate independent variable because of our concern with preferences, which, by definition, are tariff differences. This formulation should also give some indication of what might be expected if the preferences were removed. The tariffs themselves

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<sup>5</sup>Excluded entirely from the analysis were imports from General tariff countries, i.e., from countries who were not a party to GATT and to whom most favored nation treatment has not been extended. Imports from these countries are insignificant relative to total imports.

were used as independent variables as a test of the legitimacy of the constrained form of the equation, and to give an indication of the effect of removing either or both of the tariffs entirely. The ratio of tariffs was included as a test of whether absolute or relative differences were more important. Some non linear specifications were also considered, and these are reported in Appendix A.

In setting up the data series for the two variables it immediately became clear that there were a very large proportion of tariff items for which either or both of the variables were zero. This simply means, of course, that either no preference was given for that specific item, or that there were no imports from British Preferential countries. Since our concern was with the effect of preferences, it seemed appropriate to exclude from consideration those tariff items for which there were no preferences. Zero observations for the dependent variable indicate that the item in question tends to be an export item rather than an import, so that these observations were excluded on the basis that they also were not relevant to the hypothesis. Furthermore, because of the relatively large number of tariff items for which either or both of the variables were zero,<sup>6</sup> including these observations would have resulted in a preponderance of observations along the axes and would have effectively excluded the possibility of deriving significant results.

The observations were then divided into eleven commodity groups following the classification given in the Canadian Customs Tariff Manual. The official description of these eleven groups is given in Appendix B. An

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<sup>6</sup>The Canadian Tariff Manual lists some 2,100 tariff items. Of these, there were both imports and preferences for 749.

examination of these groups showed that groups II, III and IV contained among them only 23 observations so that these three groups were eliminated. Of the remaining eight, the largest group was VIII, Metals and Manufactures thereof, containing 270 observations, and the smallest was IX, Woods and Manufactures thereof, containing 21 observations. Equations (1), (2) and (3) were then estimated separately for these eight groups, both for all British Preferential countries, and for Great Britain alone.

#### IV. The Results

The results of the estimation of these three equations for all BP countries are given in Table I. The number of observations for each of the groups is shown in parentheses under the name of the group, and the  $t$  values are shown in parentheses in the main body of the table. The results indicate that for six of the eight groups, there exist statistically significant relationships between tariffs and the percentage share that British preferential countries have of the Canadian import market. Only for two groups, V (Pulp and Paper) and IX (Woods) are no significant relationships found, and this is true for all three equations. For the other six groups, for equation (1) the  $\beta_0$  are all significant at the 1% level except for Agriculture which is significant only at the 10% level. For equation (2) the  $\beta_1$  are all significant at the 1% level save for Drugs which is significant at the 5% level. For equation (3) the  $\beta_2$  are all significant at the 1% level, while for  $\beta_3$  only for Earthenware and Metals are the levels of significance acceptable, being  $2\frac{1}{2}\%$  and 1% respectively. The failure of groups V and IX to show significant relationships could have been predicted, for pulp and paper and wood products are two of Canada's major export classes. Whatever commodities are imported in these classes must be of a very special or unusual

Table I

MBP/MT	$= \alpha_0 + \beta_0 (\text{TMFN} - \text{TBP})$			$= \alpha_1 + \beta_1 \text{TBP/TMFN}$			$= \alpha_2 + \beta_2 \text{TBP} + \beta_3 \text{TMFN}$			$R^2$
	$\alpha_0$	$\beta_0$	$R^2$	$\alpha_1$	$\beta_1$	$R^2$	$\alpha_2$	$\beta_2$	$\beta_3$	
I Agriculture (96)	35.9 (6.33)	0.78 (1.46)	.022	51.8 (10.67)	-28.33 (-2.68)	.071	42.9 (6.53)	-1.71 (-2.44)	0.64 (1.21)	.063
V Pulp and Paper (33)	50.7 (4.61)	-.32 (-.30)	.003	50.41 (6.45)	-6.92 (-0.45)	.007	62.6 (3.66)	.16 (0.16)	-0.95 (-0.75)	.030
VI Chemicals (58)	32.0 (3.60)	2.00 (2.47)	.098	58.74 (9.94)	-22.48 (-1.84)	.057	37.9 (2.58)	-2.07 (-2.50)	1.65 (1.55)	.103
VII Earthenware (46)	19.5 (2.33)	2.45 (2.98)	.168	51.96 (8.45)	-32.40 (-2.63)	.136	33.0 (2.99)	-2.91 (-3.46)	1.78 (2.02)	.227
VIII Metals (270)	30.1 (8.66)	1.09 (3.50)	.044	45.77 (19.50)	-13.11 (-2.85)	.030	35.7 (7.85)	-1.38 (-3.93)	0.88 (2.68)	.055
IX Woods (21)	26.0 (3.17)	0.12 (0.23)	.003	30.36 (2.29)	-5.12 (-0.26)	.004	-7.8 (0.35)	0.92 (1.12)	0.97 (1.32)	.127
X Fibres (98)	28.8 (5.59)	(1.90) (3.93)	.138	70.19 (11.35)	-43.98 (-4.52)	.175	42.7 (4.85)	-2.28 (-4.42)	1.49 (2.84)	.171
XII Miscellaneous (104)	24.2 (4.45)	1.51 (3.08)	.085	61.89 (13.92)	-51.14 (-6.45)	.290	55.4 (7.07)	-2.42 (-5.10)	.33 (0.65)	.272

variety, and it is therefore not surprising that they are not significantly influenced by the tariff rates. For these two groups none of the  $t$  values are significant, and four of the eight coefficients have the wrong sign. With these two groups are also associated the two smallest samples.

The coefficients are quite consistent over the six equations for which they are significant, ranging in the tariff difference equations between 0.78 and 2.45. Because the dependent variable is defined as a percent, the coefficients indicate the increase in percentage points which would occur with a one percentage point change in the tariff difference. Thus, for example, in industry VI, Chemicals, a one percent reduction in the BP tariff rate, say from 15% to 14% (or a one percent increase in the MFN rate, say from 25% to 26%), would result in a 2% increase in the share of the Canadian import market held by BP countries (say from 51% to 53%). Although it would be difficult to say a priori what one would expect these coefficients to be, they certainly seem to be quite reasonable.

In the unconstrained equation, where both tariff rates are considered to be independent variables, the consistency of the coefficients is again observed. For the six equations for which the coefficients are significant, the values of  $\beta_2$  range from -1.38 to -2.91, while for  $\beta_3$  we have a range of 0.33 to 1.78. Again, these estimates do not seem at all unreasonable. For equation 2, the ratio form, there is less consistency in the coefficients, and in this case it is very difficult to judge what a reasonable coefficient should be.

In examining equations (1) and (3) we observe that  $\beta_2$ , the coefficient of TBP, is consistently larger in absolute value than  $\beta_0$  and  $\beta_3$  and is consistently more significant. Indeed, for the six equations for which the coefficients are significant we observe that it is always true that  $|\beta_2| > \beta_0 > \beta_3$ ,

and that  $|t_2| > t_0 > t_3$ , where  $t_i$  is the  $t$  value for  $\beta_i$ . This conforms to our expectations, and suggests that as an explanation of the BP share of Canadian imports, the BP tariff rate both has a larger influence and is more significant. In comparing equations (1) and (2) we observe that from the point of view of significance there is very little to choose between the two specifications and of course the coefficients cannot be compared.

In considering the individual groups, one is struck by how well the miscellaneous category performs. Indeed, if this is truly a Miscellaneous category, it makes one wonder about the appropriateness of the grouping procedure on which we have commented at length. A close examination of the tariff items in this group, however, indicates that a better name would have been Miscellaneous Manufactures, for it is, in general, made up of manufactured goods not included elsewhere. It includes such things as leather and leather products, rubber and rubber products, and quite a number of chemical compounds. In fact in our sample it is probably the closest example of a purely manufactured goods category, and it is this characteristic which doubtlessly explains the high significance of  $\beta_0$ ,  $\beta_1$ , and  $\beta_2$ .<sup>7</sup> It must be admitted, however, that the lack of significance of  $\beta_3$  remains something of a mystery.

One reason for specifying the equation in terms of both the tariff difference and the individual tariffs was to test whether or not the constrained form was a legitimate specification, that is, whether  $\beta_2$  and  $\beta_3$  were significantly different. The hypothesis that  $\beta_2 = \beta_3$  was tested using an F test, and these statistics are reported in the first column of Table II. The figures in brackets are the 5% confidence level for the F statistic. Only

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<sup>7</sup>This category does contain some truly miscellaneous items, two of which are old junk and broken glass. For most such items, however, the tariffs are all zero, so that they are not included in our sample.



Table II

		1. F Statistic	2. MBP/MT (TBP=TMFN)	3. $\alpha_0$	4. MBP/MT Sample Mean	5. TMFN Sample Mean	6. TBP Sample Mean	7. TMFN-TBP Sample Mean
I	Agriculture	4.12 (3.95)	30.86 (55)	35.9	42.4	13.85	5.50	8.35
V	Pulp and Paper	0.83 (4.16)	40.60 (13)	50.7	47.8	17.09	7.87	9.22
VI	Chemicals	0.25 (4.02)	33.44 (45)	32.0	51.4	15.84	6.17	9.67
VII	Earthenware	3.35 (4.06)	30.38 (22)	19.5	40.7	15.52	6.82	8.70
VIII	Metals	3.26 (3.88)	44.72 (139)	30.1	41.4	16.20	6.30	9.90
IX	Woods	2.56 (4.41)	20.28 (15)	26.0	27.3	23.60	13.21	10.39
X	Fibres	3.68 (3.95)	34.38 (24)	28.8	45.4	21.59	12.86	8.73
XI	Miscella- neous	25.87 (3.94)	35.56 (26)	24.2	38.3	18.96	9.57	9.39

for the miscellaneous category can we confidently reject the hypothesis that  $\beta_2 = \beta_3$ . For all other groups the hypothesis cannot be rejected at either the 1% or  $2\frac{1}{2}$ % significance levels, and only for agriculture do we have rejection at the 5% level. In general, then, the constraint does not seem to be an inappropriate specification.

It will be recalled that when the data set was being constructed, all those tariff items for which no preferences were given but for which there were imports from BP countries were excluded from the sample. These observations do, however, provide us with some additional information, and in column 2 of Table II the mean of these observations are reported for the eight commodity groups. The figures in brackets give the sample size of each of the groups. In column 3, for comparison purposes, we have listed the  $\alpha_0$  from Table I. These intercepts give us an estimate of what the BP share of the Canadian market would be if the preferences were removed, so that a comparison of the  $\alpha_0$  and of the share of the Canadian market enjoyed by the commodities which have no preferences (column 2) gives us information on the type of commodities which are being given preferences. For Agriculture  $\alpha_0$  is the higher of the two, for Chemicals they are almost identical, and for the remaining four groups the average market share for the commodities with no preferences is significantly higher than  $\alpha_0$ .<sup>8</sup> This suggests that while for Chemicals, the same type of commodities get preferences as those that do not, and for Agriculture, preferences tend to be given to those commodities which would do well in the Canadian market even without preferences,

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<sup>8</sup>For the remainder of our discussion we will concentrate our attention only on the six commodity groups for which significant relationships were found.

for the other four groups preferences are given to those commodities within a group which would not do well in the Canadian market without preferences. In other words, preferences are clearly being given to those commodities which need preferences. This is particularly true for Metals, Fibres, and the Miscellaneous group.

In column 4 the sample mean for MBP/MT is shown, and the comparison of these figures with the  $\alpha_0$ 's gives a clear indication of the overall effect of the preferences. Thus for fibres, for example, equation (1) indicates that if the preferences were removed, the BP share of the Canadian market would fall from 45.4% to 28.8%.<sup>9</sup> Observe that for Metals the average BP market share for commodities with preferences is lower than the average market share for those commodities which do not receive preferences (that is, 4 is less than 2). This again indicates that preference is being given to those commodities which would normally not be very competitive in the Canadian market. In columns 5, 6, and 7 we have reported the means of the two tariffs and their differences. It is of interest to observe that while both tariffs show considerable variation over the different groups, TBP ranging from 5.50% to 12.86% and TMFN from 13.85% to 21.59%, the average differences are much more consistent, ranging from 8.35% to 9.90%.

Turning now to equation (3), we observe that  $\alpha_2$  is consistently higher than  $\alpha_0$ . This is again what we would expect given the fact that  $\beta_2$  is consistently larger in absolute value than  $\beta_1$ , for while  $\alpha_0$  can be interpreted as an estimate of the BP market share if there were no preferences,  $\alpha_2$

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<sup>9</sup>It is perhaps worthwhile reminding the reader that all calculations exclude the United States, so that we are talking about the BP share of the Canadian, non-United States, import market.

indicates what the BP market share would be if there were no tariffs, that is, if  $TBP = TMFN = 0$ . Comparing  $\alpha_2$  and the MBP/MT sample means (column 4, Table II) we find that in four of the six groups  $\alpha_2$  is less than the sample mean. This suggests that complete free trade would work to the disadvantage of BP countries as far as market share is concerned. Again this is not a surprising result and simply indicates that the elimination of the higher MFN tariffs will have a larger overall effect on market shares than will the elimination of the lower BP Tariff rates, even though the coefficient for the BP rates is uniformly higher.

We next turn to a consideration of whether preferences have been more beneficial to developed or to less developed countries. We first of all estimated the three equations using only observations from developed countries, and these results are shown in Table III. Table III shows basically the same pattern as Table I where all countries were included. Again group V, pulp and paper, and group IX, woods and wood products showed no significant relationships, and some of the coefficients had the wrong sign, while for all other groups all coefficients had the proper sign and all coefficients which were significant in Table I are significant here. The coefficients for the various equations have the same order of magnitude, and in almost all cases the t values are very similar.

When the three equations were estimated using only observations from less developed countries, the results deteriorated sharply. The exclusion of all imports from developed countries substantially reduced the number of observations, and in fact only four groups, I, VIII, X and XI had enough observations remaining to permit meaningful estimation, and these four groups contained only 36, 17, 25, and 24 observations respectively. When the three

TABLE III

MBPD/MTD	$= \alpha_0 + \beta_0 (\text{TMFN} - \text{TBP})$		$= \alpha_1 + \beta_1 \text{TBP/TMFN}$		$= \alpha_2 + \beta_2 \text{TBP} + \beta_3 \text{TMFN}$			$R^2$		
	$\alpha_0$	$\beta_0$	$R^2$	$\alpha_1$	$\beta_1$	$R^2$	$\alpha_2$		$\beta_2$	$\beta_3$
I Agriculture	39.09 (6.01)	.95 (1.54)	.025	57.05 (10.18)	-30.32 (-2.49)	.062	45.98 (6.07)	-1.86 (-2.31)	.82 (1.32)	.055
V Pulp and Paper	51.56 (4.71)	-.37 (-.36)	.004	50.34 (6.46)	-5.79 (-.38)	.005	62.61 (3.67)	.23 (.21)	-.95 (-.76)	.027
VI Chemicals	33.32 (3.67)	2.27 (2.75)	.119	65.05 (10.89)	-29.88 (-2.41)	.094	45.34 (3.05)	-2.40 (-2.87)	1.56 (1.45)	.135
VII Earthenware	19.91 (2.38)	2.46 (3.00)	.170	52.23 (8.46)	-31.47 (-2.54)	.128	32.36 (2.92)	-2.89 (-3.43)	1.85 (2.09)	.221
VIII Metals	30.73 (8.65)	1.08 (3.48)	.043	45.87 (19.46)	-13.15 (-2.84)	.029	35.82 (7.83)	-1.38 (-3.91)	.88 (2.67)	.054
IX Woods	26.01 (3.23)	.099 (.19)	.002	29.81 (2.29)	-4.57 (-.24)	.003	-3.70 (-.16)	.82 (.99)	.84 (1.15)	.102
X Fibres	27.06 (4.84)	1.99 (3.79)	.130	72.49 (10.96)	-49.79 (-4.78)	.192	40.57 (4.23)	-2.37 (-4.20)	1.59 (2.78)	.157
XI Miscellaneous	21.22 (3.97)	1.70 (3.51)	.108	58.86 (12.92)	-47.17 (-5.81)	.248	47.97 (6.04)	-2.48 (-5.14)	.68 (1.35)	.246

equations were estimated for these four groups, although all variables had the proper sign, none of the coefficients were significant at the 10% level. We will return to the consideration of these results in the next section.

We now turn to the analysis of Canadian imports from Great Britain only. The three equations were again estimated, this time using the ratio of imports from Great Britain to total, non-United States, imports (MGB/MT) as the dependent variable. The results of these estimations are shown in Table IV. Comparing these results to Table I, certain basic similarities are immediately obvious. Again we find that for the two wood products groups, groups V and IX, no significant coefficients were found, and a number of the coefficients had the wrong sign. Those groups which tended to have the larger and more significant coefficients in Table I also had the larger and more significant coefficients in Table IV. The big difference between the two tables occurs in the agricultural group, for while in Table I the coefficients are reasonably high and reasonably significant, this is not true for Table IV, and indeed in Table IV none of the coefficients for agriculture are significant. This is not very surprising, of course, for Great Britain is not a major exporter of agricultural products, and certainly not as far as Canada is concerned.

In comparing the intercepts from the two tables we see that  $\alpha_0$  for Great Britain is always less than  $\alpha_0$  for all BP countries, which, of course, is as it should be since we have interpreted this intercept as an estimate of the share of the Canadian market which would be observed were there no preferences, and this should certainly be smaller for Great Britain alone than for all BP countries. Indeed the point of interest is not that the  $\alpha_0$ 's are lower in Table IV but rather that they are in some cases not much lower,

TABLE IV

MGB/MT	$= \alpha_0 + \beta_0(\text{TMFN} - \text{TBP})$		$= \alpha_1 + \beta_1 \text{TBP/TMFN}$		$= \alpha_2 + \beta_2 \text{TBP} + \beta_3 \text{TMFN}$			$R^2$		
	$\alpha_0$	$\beta_0$	$R^2$	$\alpha_1$	$\beta_1$	$R^2$	$\alpha_2$		$\beta_2$	$\beta_3$
I Agriculture (68)	20.7 (4.16)	0.07 (0.14)	.000	23.5 (5.02)	-6.46 (-0.65)	.006	20.8 (4.16)	-0.08 (-0.12)	0.07 (0.13)	.000
V Pulp and Paper (33)	49.7 (4.53)	-0.27 (-0.26)	.002	50.3 (6.47)	-8.30 (-0.54)	.009	62.5 (3.67)	0.11 (0.10)	-0.95 (-0.76)	.033
VI Chemicals (55)	31.7 (3.45)	1.62 (1.97)	.069	49.9 (8.21)	-7.07 (-0.55)	.006	23.3 (1.56)	-1.51 (-1.79)	2.12 (1.98)	.078
VII Earthenware (43)	14.6 (1.72)	2.85 (3.44)	.224	54.8 (8.98)	-42.9 (-3.53)	.233	32.4 (2.96)	-3.42 (-4.18)	1.98 (2.29)	.322
VIII Metals (266)	26.9 (7.63)	1.24 (4.02)	.058	43.0 (18.01)	-11.0 (-2.38)	.021	29.5 (6.39)	-1.38 (-3.96)	1.13 (3.44)	.060
IX Woods (21)	24.4 (2.98)	0.02 (0.03)	.000	25.9 (1.96)	-2.2 (-0.11)	.001	-5.96 (-0.26)	0.93 (1.11)	0.78 (1.05)	.102
X Fibres (94)	21.9 (4.14)	2.30 (4.62)	.188	70.0 (10.97)	-49.6 (-4.94)	.209	34.1 (3.80)	-2.64 (-4.95)	1.94 (3.63)	.213
XI Miscellaneous (103)	20.0 (3.82)	1.59 (3.37)	.101	53.2 (11.68)	-3.99 (-4.89)	.191	42.9 (5.39)	-2.23 (-4.68)	0.71 (1.40)	.208

which just emphasizes the fact that Great Britain is by far the largest BP source of supply for Canada. All these same observations can be made regarding the  $\alpha_2$ 's, the estimates of the market shares if all tariffs were removed.

Comparing the coefficients  $\beta_0$  and  $\beta_2$  and their t values for Tables I and IV, we observe that all are lower for Great Britain for Agriculture and Chemicals, but that all tend to be higher for all remaining groups, the exceptions being that  $\beta_2$  is lower for Great Britain for the Miscellaneous category and identical for Metals. This too is what we would expect, since the degree of manufacture tends to be higher in the bottom half of the table, and these are the kinds of products that Great Britain has traditionally specialized in, and they are thus likely to be quite sensitive to price changes. The size and significance of the  $\beta_3$  coefficients are also higher for Great Britain than for all BP countries, which suggests that Canadian imports from Britain tend to be relatively sensitive to the price changes in other countries.

In columns 1 and 2 of Table V we have reproduced the  $\alpha_0$  and  $\alpha_2$  from Table IV, and in column 3 have shown the mean MGB/MT for all eight groups. In columns 4 and 5 are shown the mean MFN and BP tariffs. As would be expected, columns 4, 5, and 6 of Table V are very similar to columns 4, 5 and 6 of Table II. A comparison of columns 1 and 3 gives a clear picture of the effect that preferences have had on the British share of the Canadian import market, the most significant differences being in Earthenware, where the mean market share is more than 150% higher than the intercept, and in Fibres, where the increase is 100%.

In column 6 we show an alternative estimate of what the British share of the Canadian market would be if the tariff preferences were eliminated.



TABLE V

	1.	2.	3.	4.	5.	6.	7.	8.	9.
	$\alpha_0$	$\alpha_2$	MGB/MT mean	TMFN mean	TBP mean	MGB/MT TBP=TMFN	MGB/MT TBP=0	% TBP=TMFN	% TBP=0
I Agriculture	20.7	20.8	21.24	13.48	5.79				
V Pulp and Paper	49.7	62.5	47.19	17.09	7.87				
VI Chemicals	31.7	23.3	47.66	15.79	5.96	32.9	56.8	-32.3	19.1
VII Earthenware	14.6	32.4	39.66	15.84	7.06	9.6	63.8	-69.5	60.7
VIII Metals	26.9	29.5	39.24	16.35	6.39	25.4	48.0	-33.2	22.4
IX Woods	24.4	-5.96	24.61	23.60	13.21				
X Fibres	21.9	34.1	42.04	21.74	12.96	18.9	76.3	-51.4	81.7
XI Miscellaneous	20.0	42.9	34.99	19.05	9.59	13.9	56.4	-60.3	61.1

This has been calculated by assuming in equation (3) the removal of the preference so that both tariffs would be equal to the MFN tariff. Thus for each group the difference between  $\beta_2$  and  $\beta_3$  was multiplied by the mean TMFN and added to  $\alpha_2$ . These calculations were made only for the five groups for which the coefficients were significant. The results are not markedly different from the  $\alpha_0$ 's of column 1, although, except for Earthenware, they tend to be lower, and consequently show an even greater contrast to the mean market shares of column 3. In column 7 we have considered the question of what we would expect the British share of the Canadian market to be if Canada and Britain were to form a free trade area. Thus the figures in 7 are calculated by setting TBP=0 and TMFN equal to the group mean in equation (3). Again this calculation was made only for those groups which had shown significant coefficients. Columns 8 and 9 convert the changes in market shares that we have been discussing into percentage changes in British exports to Canada. Thus column 8 shows the percentage reduction in British exports to Canada that would be expected to occur if all preferences were removed. These figures were calculated by taking the average of columns 1 and 6 as an estimate of the no-preference situation, and then taking the difference between this average and column 3 as a percentage of column 3. For the entries in column 9, the difference between columns 7 and 3 was taken as a percentage of column 3. In all cases the changes which our equations predict are quite significant.

Great Britain is presently negotiating entry to the European Economic Community and our analysis can give some indication of what effect such entry is likely to have on British Exports to Canada. Under the assumption that entry to the EEC would mean that all preferences were removed so that the MFN tariff would apply to all products from Britain, then the percentages in

column 8 give some indication of how the exports in these groups would be affected.<sup>10</sup> It must be remembered, however, that these percentage changes apply only to those commodities in each group for which preferences are presently being given, and not to all exports. Nevertheless the changes implied by column 8 would be quite significant, and in terms of 1966 data, the year for which these estimates were made, the reduction in exports would have been approximately 193.3 million dollars. This would have represented a reduction of 30 percent in British exports to Canada, which in 1966 amounted to 644.5 million dollars. And of course one could expect similar kinds of reductions for the other Commonwealth countries to which Britain exports. These estimates by themselves do not provide sufficient information to make a judgment on whether or not Britain would benefit from joining the EEC, for we have only looked at one side of the picture. Furthermore, the level of exports are certainly not the single criterion on which economic well-being should be judged. It is possible, however, that these estimates will at least provide one of the bits of information necessary to arrive at a decision on this question.

One of the alternatives to joining the EEC that has sometimes been suggested for Britain is the formation of a free trade area with North America. Although it is by no means clear that this is a viable alternative, for the present United States Congress does not seem to be particularly inclined towards free trade, it is worthwhile considering the possibility briefly. Using the figures in column 9, it has been estimated that reducing the BP tariff to zero for these items would have increased British exports to Canada by approximately 184.3 million dollars in 1966. Again, however, this estimate

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<sup>10</sup> One point that must be kept in mind is that the figures we have used are pre-Kennedy Round, so that the percentages reported will most likely tend to be overestimates of the situation that exists today.

applies only to those commodities for which preferences are given, and in this case this clearly leads to an underestimate of the overall effect. For those commodities which presently enter under the MFN tariff, the results of free trade would be much more pronounced, and we could in fact use the sum of column 9 and the absolute value of column 8 as an estimate of the effect on these other commodities. Of the commodities in these five categories that Canada imports from Britain, approximately one fifth of them are not given preferences. We might then guess that with free trade in all products, British exports could rise by at least 260 million dollars, which, in 1966, would have represented an increase of 40% in British exports to Canada.

All this, of course, ignores the fact that a North American free trade area would include the United States, and the net effect that this would have on Britain is not at all clear. While free trade with the United States would certainly increase Britain's trade with that country, it would just as certainly result in less exports to Canada, at least insofar as our "estimate" in the last paragraph is concerned, for Canadian-United States trade would doubtlessly increase, and for many products, Britain and the United States are substitute sources of supply for Canada. The analysis of this paper can certainly not give us much information on the overall effects that such a free trade area would have.

There is one final point that can be made from the information given in Tables IV and V. A 1% tariff reduction in Canada, can, from Britain's point of view, be regarded as a 1% reduction in the price that Canadians pay relative to the foreign price. The  $\beta_0$  coefficients in Table IV show the percentage point change in the British share of the Canadian market which would result from a 1% price change, and from this, and column 4 of Table V,

we can calculate the resulting percentage change in British exports. These changes are shown in Table VI. While from the Canadian point of view these changes are (or at least could be) mainly substitutions between sources of supply, and need not imply an overall increase in imports, from the British point of view these numbers represent the Canadian elasticity of demand for

TABLE VI

Industry	VI	VII	VIII	X	XI
% $\Delta$ in Imports	3.4	7.1	3.1	5.5	4.8

British products, all other things, of course, being held equal. The British have no interest in the question of whether an increase in their sales is due to an expanding market in Canada, or is accomplished through trade diversion. These figures are substantially higher than the ones usually reported. It should also be observed that these elasticities should be relevant for any price change, for Canadian importers presumably have no interest in whether a price reduction is due to a tariff reduction or to a supply price change. These figures would suggest that productivity increases, or even a slower than average rate of inflation could have substantial effects on exports.

To conclude this section we will report that to provide some evidence on the implicit hypothesis that the relation between tariffs and market shares was linear, a variety of non linear forms were estimated for the total sample. Logs, reciprocals, and squared terms were tried, and the results of these tests are shown in Appendix A, with no further comment other than the observation that none of these specifications is clearly superior to the linear form. These tables should be compared with Table I.

V. Summary and Conclusions

This paper has been concerned with a cross sectional analysis of the effects that preferences have on Canadian import patterns. And although most of our discussion has been phrased in terms of BP or British exports, it must be remembered that in international transactions the buyer is no less important than the seller. The first conclusion we must reach then, from the fact that significant relationships have been shown to exist, is that Canadian importers are sensitive to international price differences.

Turning now to the question of the role of preferences as an aid to development, our analysis has suggested that the present British Preferential tariff structure has not significantly promoted the exports of the less developed countries. This does not suggest, however, that preferences could not become a substantial aid to the less developed countries. In fact, we have shown that, in general, preferences do increase exports, and that they can increase exports substantially. Other things being equal, there would seem to be no reason why this argument should not apply equally to the less developed and developed countries. The difficulty, of course, is that other things are not equal. As was pointed out in Section I, things such as supply constraints may well work to negate the possible beneficial results of preferences, at least in the short run. Of perhaps even more importance is the question of whether preferences are being given to commodities which under-developed countries have a comparative advantage in producing, or in which they at least do not have a serious disadvantage. Perhaps our earlier conclusion that preferences were clearly being given where preferences were needed, combined with the observation that the significant results were found only for developed countries suggests that they are not. It would seem almost self-evident, in

fact, that insofar as an export potential exists, preferences in these areas would be a substantial aid. The basic question would then seem to be, are there commodities which less developed countries can produce and sell at a price within, say, 10 to 20 percent of the price charged by major suppliers. If this is the case, and if substantial increases in supply can be accomplished at constant cost, then preferences could be extremely beneficial to the less developed countries. If not, then some vehicle other than exports will have to be relied on to promote growth in the less developed regions.

In our consideration of the possible effects of Britain joining the EEC, we produced some evidence that this would result in a substantial percentage reduction in British exports to Canada, and hypothesized that a reduction of similar magnitude might apply to other developed Commonwealth countries. It is clear, however, that no conclusions can be drawn from this single piece of evidence. Some estimates of the possible increase in British exports which would occur if there were free trade between Canada and Great Britain were reported, and a substantial increase was predicted. Although the significance of such an increase can again not be judged in isolation, it does seem safe to conclude that tariff preferences are a major determinant of the pattern of trade between Canada and Great Britain.

APPENDIX A

TABLE AI

Log MBP/MT	= Log $\alpha_0 + \beta_0$ Log (TMFN - TBP)		= Log $\alpha_1 + \beta_1$ Log TBP/TMFN		= Log $\alpha_2 + \beta_2$ Log TBP + $\beta_3$ Log MFN			$R^2$		
	Log $\alpha_0$	$\beta_0$	$R^2$	Log $\alpha_1$	$\beta_1$	$R^2$	Log $\alpha_2$		$\beta_2$	$\beta_3$
I Agriculture	1.751 (3.88)	.11 (0.47)	.002	1.217 (5.51)	0.30 (2.23)	.050	1.251 (2.01)	-0.31 (-1.78)	0.02 (0.06)	.050
V Pulp and Paper	1.024 (1.59)	0.002 (0.005)	.000	0.885 (3.77)	0.09 (0.75)	.018	0.300 (0.27)	-0.02 (-0.14)	-0.25 (-0.54)	.027
VI Chemicals	0.661 (4.14)	0.71 (2.41)	.094	2.845 (3.44)	0.27 (1.95)	.064	-1.915 (-2.76)	-0.49 (-2.92)	1.24 (2.20)	.139
VII Earthenware	0.657 (5.12)	0.64 (2.56)	.130	1.131 (4.48)	0.21 (1.54)	.051	0.777 (3.11)	-0.45 (-2.46)	0.75 (1.92)	.126
VIII Metals	0.291 (9.07)	0.45 (3.97)	.056	1.113 (10.63)	0.17 (2.83)	.029	0.309 (6.15)	-0.31 (-4.28)	0.52 (3.31)	.067
IX Woods	-1.550 (-4.85)	0.77 (2.21)	.204	0.227 (2.76)	-0.06 (-0.18)	.002	-5.267 (-2.36)	0.09 (0.31)	1.60 (1.69)	.138
X Fibres	1.94 (6.16)	0.39 (2.57)	.064	2.558 (2.35)	0.28 (2.91)	.081	1.32 (1.59)	-0.35 (-2.88)	0.31 (0.95)	.090
XI Miscellaneous	0.38 (6.78)	0.48 (2.92)	.077	2.644 (3.60)	0.42 (5.05)	.200	1.23 (1.75)	-0.47 (-4.50)	0.24 (0.86)	.206



TABLE AII

MBP/MT	$= \alpha_0 + \beta_0 \text{ (TMFN - TBP)}^2$		$= \alpha_2 + \beta_2 \text{ (TBP)}^2 + \beta_3 \text{ (TMFN)}^2$			$R^2$	
	$\alpha_0$	$\beta_0$	$R^2$	$\alpha_2$	$\beta_2$		$\beta_3$
I Agriculture	41.2 (10.54)	0.001 (0.72)	.005	44.8 (10.04)	-0.06 (-1.57)	0.01 (0.48)	.030
V Pulp and Paper	49.3 (6.97)	-0.01 (-0.32)	.003	54.1 (4.95)	-0.01 (-0.17)	-0.02 (-0.39)	.018
VI Chemicals	42.4 (7.17)	0.07 (2.18)	.078	52.1 (6.25)	-0.13 (-2.26)	0.04 (1.08)	.090
VII Earthenware	29.6 (5.15)	0.11 (2.96)	.166	42.6 (5.96)	-0.16 (-3.29)	0.05 (1.73)	.221
VIII Metals	36.0 (15.32)	0.04 (3.45)	.042	41.1 (13.92)	-0.06 (-2.96)	0.02 (1.77)	.032
IX Woods	28.1 (4.21)	-0.03 (-0.30)	.005	10.3 (0.68)	0.04 (0.95)	0.01 (0.91)	.076
X Fibres	37.4 (10.32)	0.07 (3.85)	.134	48.3 (8.86)	-0.08 (-3.76)	0.03 (2.59)	.130
XI Miscellaneous	32.2 (8.50)	0.05 (2.57)	.061	53.2 (10.84)	-0.10 (-3.99)	-0.002 (-0.13)	.202

TABLE AIII

MBP/MT	$= \alpha_0 + \beta_0 / (\text{TMFN} - \text{TBP})$		$= \alpha_2 + \beta_2 (1/\text{TBP}) + \beta_3 (1/\text{TMFN})$			$R^2$	
	$\alpha_0$	$\beta_0$	$\alpha_2$	$\beta_2$	$\beta_3$		
I Agriculture	46.5 (8.61)	-20.0 (-0.98)	.010	35.5 (6.22)	13.5 (1.69)	-6.93 (-0.18)	.036
V Pulp and Paper	42.4 (3.67)	38.5 (0.53)	.009	37.1 (3.66)	-5.20 (-0.34)	178.3 (1.16)	.051
VI Chemicals	60.2 (7.71)	-60.0 (-1.37)	.032	61.7 (6.136)	28.8 (2.76)	-362.5 (-2.53)	.147
VII Earthenware	48.9 (7.71)	-43.6 (-1.87)	.073	32.9 (4.42)	31.3 (2.79)	-98.3 (-1.54)	.153
VIII Metals	45.4 (18.70)	-26.7 (-2.43)	.022	37.9 (12.40)	1.77 (4.13)	-65.2 (-2.31)	.062
IX Woods	47.3 (5.33)	-94.1 (-2.78)	.288	50.8 (3.26)	-12.3 (-0.77)	-425.1 (-1.48)	.133
X Fibres	57.6 (11.91)	-65.9 (-3.20)	.096	39.2 (6.49)	36.3 (3.78)	-44.5 (-0.41)	.153
XI Miscellaneous	52.4 (9.99)	-88.6 (-3.20)	.091	28.7 (5.83)	44.5 (6.03)	-87.1 (-1.11)	.301

APPENDIX B

Canadian Customs Tariff Manual Clarification

Group I	Animals, Agricultural Products, Fish and Provisions
Group II	Sugar, Molasses, and Manufactures thereof
Group III	Tobacco, and Manufactures thereof
Group IV	Spirits, Wines, and Other Beverages
Group V	Pulp, Paper and Books
Group VI	Chemicals, Drugs, Oils and Paints
Group VII	Earths, Earthenware and Stoneware
Group VIII	Metals, and Manufactures thereof
Group IX	Woods, and Manufactures thereof
Group X	Cotton, Flax, Hemp, Jute and other Fibres, and Silk, Wool, and Manufactures thereof
Group XI	Miscellaneous

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