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TARIFFS AND THE CANADIAN RAPESEED INDUSTRY

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ABSTRACT

Rapeseed, in terms of farm value, is the second most important crop grown in Canada. The existence of tariffs on rapeseed oil, in the major import markets of the EC and Japan, have led many to believe that the elimination of these tariffs would result in substantial benefits for Canada. This paper presents empirical evidence on the impacts of removing the EC and Japanese tariffs on rapeseed and soybean oil, both separately and jointly. In general, Canada gains from rapeseed oil tariff reductions and loses from soybean oil tariff cuts. Canada also gains if the tariff is removed on both commodities in Japan but loses if both tariffs are reduced in the EC.

INTRODUCTION

Rapeseed is by far the most important oilseed crop grown in Canada, ranking second only to wheat in farm value of all crops grown (OMAF 1980). Exports of rapeseed oil, and the oil equivalent in seed, comprise the majority of all Canadian exports of fats and oils (especially edible fats and oils) and greatly exceeds the volume of all Canadian imports of fats and oils (Agriculture Canada 1977). Canada dominates world trade in rapeseed and its products, and rapeseed's position in world oilseed trade is significant and expanding (FAO 1980). For example, Canada's market share of all exports of rapeseed and rapeseed oil averaged over 50 percent during the 1970's. Rapeseed also forms a significant component of international trade in oilseeds and oilseed products. Rapeseed is estimated to account for nine percent of trade in edible vegetable and palm oils, while its position in oilcake and meal trade was an estimated four percent in 1979 (USDA 1980).

Numerous studies on the situation and outlook for the Canadian rapeseed industry agree that continued growth in rapeseed supply is reasonably certain. These increases will lead to gradual import substitution for imported soybeans, soybean meal and various vegetable and palm oils, and greater export market penetration (Rapeseed Association of Canada 1973; Al-Zand 1974; Perkins 1976; Rigaux 1976; Agriculture Canada 1977; Furtan *et al.* 1978, 1979). Concurrently, however many argue that there exist several major factors constraining the achievement of an expanded rapeseed production, crushing and manufacturing complex.

One of the principal constraints is believed to be the tariff faced by rapeseed oil entering the major import markets of Japan and the European Community (EC). The import tariff on most crude vegetable oils, including rapeseed and soybean oil, entering Japan is a fixed rate of 17,000 yen per metric ton, while the EC has an ad valorem tariff of ten percent on crude rapeseed and soybean oil [1].

The theoretical impact of a tariff on market prices and quantities is well known. In a static, single commodity, partial equilibrium analysis the effect of an import tariff is to raise the importer's domestic price, and reduce the world market price from its free trade level. This serves to decrease imports, and lower export revenue in the exporting region, while reducing social welfare. The actual effects can be derived analytically with knowledge of some basic parameter values (Kindleberger 1973).

The proponents of tariff reductions for rapeseed oil (Rapeseed Association of Canada 1973; Sabotini 1975; Perkins 1976; Agriculture Canada (1977) use these partial equilibrium results to argue that the existence of rapeseed oil tariffs have led to under-utilization of Canadian crushing capacity, the loss of value added revenue to the economy, and smaller foreign exchange earnings.

In reality, however, the conditions necessary for the simple theoretical results to hold may not be fulfilled. For example, it seems

unlikely that the tariff for rapeseed oil alone would be singled out for reduction. It is far more likely that tariff reductions for rapeseed oil would occur at the same time as the tariffs for other competitive vegetable oils are being lowered [2]. Even in the case of a single product tariff change Paarlberg and Thompson (1980) have shown that in a two-or-more product, partial equilibrium model, an import tariff may raise, lower, or leave unchanged the price in either country examined.

Consequently it is important that the impacts of tariff cuts for rapeseed and competing oils, in the major import markets, be evaluated so that the effects of such changes can be traced through to the Canadian rapeseed sector. Furtan *et al.* (1978, 1979) have examined the effects of reducing the Japanese rapeseed oil tariff on the Canadian rapeseed industry, but in terms of a single period, fixed supply model. They suggest the need for further studies which take a more detailed and longer term view of such policy alternatives. In particular, they discuss the need to examine the effects of tariff changes in import markets for substitute oils, such as soybean oil, on the Canadian rapeseed sector.

OBJECTIVES

The objective of this study is to determine the likely long-run impacts on the Canadian rapeseed market of a reduction in tariff levels for rapeseed oil, and its principal competitor soybean oil; in the two major rapeseed oil import markets, Japan and the EC. The specific tariff cuts evaluated are: (a) the complete removal of the Japanese rapeseed and soybean oil tariffs, both separately and jointly; (b) the complete removal of the EC rapeseed and soybean oil tariffs, both separately and jointly; and, (c) the complete removal of both the Japanese and EC rapeseed and soybean oil tariffs.

The information from these evaluations can be used to better develop a negotiating position in future multilateral and/or bilateral trade talks. Policy makers will also have a more comprehensive understanding of the impacts of such cuts, and hence the measures needed to take maximum advantage of benefits and/or to curtail or alleviate any adverse consequences.

THE MODEL

The policy alternatives are evaluated by performing simulation experiments with an econometric model of the world markets for rapeseed, soybeans and their products. The model was constructed with the aim of analyzing a range of domestic and trade policies pertaining to these markets, and is fully documented in Griffith and Meilke (1982a). Some features of the model are that it contains 141 behavioral equations, market-clearing conditions and technical identities, representing six commodity markets (rapeseed, rapeseed oil, rapeseed meal, soybeans, soybean oil, soybean meal) in six regions (Canada,

Japan, EC, U.S., Brazil and an aggregate Rest of the World). The model is therefore fairly detailed in its coverage of products and regions and as such provides a more realistic representation of actual behavior in these markets than previously available (Thompson 1981; Williams 1982).

The model specification used includes a number of modifications and extensions to econometric commodity models, in general; and oilseed sector models in particular, that have been suggested in recent years. These extensions include a detailed multi-region, multi-product specification (Thompson 1981); policy response functions that explain the links between government support and market-determined producer prices, and the links between domestic wholesale prices and world equilibrium prices (Meilke and Griffith 1982); and, market share functions to better account for substitutability in vegetable oil demand (Meilke and Griffith 1981).

The way in which the tariff variables are included in the model is fully described in Griffith and Meilke (1982a). Briefly, world equilibrium prices for rapeseed and soybean oil - taken to be European Community CIF import prices - are determined by equating world excess supply and world excess demand. Domestic Japanese prices are specified as price linkage functions dependent on world prices, tariffs and other variables, while domestic EC prices are specified as identities given world prices and tariffs. The world prices also determine domestic rapeseed and soybean oil prices in other regions in the model, and all these domestic oil prices are embedded in total vegetable oil demand functions, market share functions for rapeseed and soybean oil, and crush demand equations for rapeseed and soybeans. Consequently, changing the relationship between the world oil prices and the domestic oil prices in Japan and the EC (by changing the exogenous tariff), can have implications not only for the domestic vegetable oil markets, but for the entire oilseed and product complex in all regions.

SIMULATION AND EVALUATION PROCEDURES

The impacts of changing tariffs, in Japan and the EC, are analyzed retrospectively by historical, dynamic, deterministic simulations of the econometric model. The tariff changes are assumed to be implemented in 1968/69 and maintained at that level through 1976/77. In Labys (1973) notation, these are "sustained" rather than "impulse" policy changes. Note that since the tariff cuts are complete and immediate, and since the model contains no terms of trade effects, the effects of the tariff removal are the maximum possible [3].

The dynamic validation of the model is used as the base against which to compare the impacts of the tariff cuts. The exogenous Japan and the EC tariff variables are altered to their appropriate values, the model is simulated and the results compared to the base simulation in which tariffs are at their actual values. Differences in generated prices, demands, supplies, and trade flows can be directly attributed to the tariff changes, since the "noise" due to validation error is filtered

out of the policy evaluations. Since the policy analyses are retrospective, the relevant question is not what will happen, but what would have happened if these tariffs had been different between 1968/69 and 1976/77.

The impacts of a trade policy change, such as the abolition of tariffs, are often evaluated using the concepts of economic surplus to derive estimates of efficiency gains and welfare transfers [4]. However, in the present study, our major interest is not in estimating the net welfare changes from varying tariffs, because these are likely to be small; but in analyzing the changes in the value of trade in rapeseed, soybeans and their products, since these are the politically observable variables and of most importance to the Canadian oilseed industry. In addition, policy changes which result in small net welfare changes often result in large changes in trade flows, both in direction and volume. Measures of domestic supply and demand quantities are also important in gauging the impact of a policy on domestic value added, regional employment of resources and farm incomes. For these reasons export revenues, import expenditures, and domestic supply and demand quantities are used as the major indicators of the impacts of the tariff cuts. Consumer surplus changes, resulting from the tariff cuts, are calculated from the total vegetable oil demand functions. Since the demand for rapeseed and soybean oil is calculated using market share equations it is impossible to calculate consumer's surplus for the individual oils.

EMPIRICAL RESULTS

In this section the impacts of the various tariff cut combinations on the Canadian rapeseed industry are emphasized, but reference is also made to important effects in other regions. In the tables, the variables of interest are listed vertically, and for each policy simulation the unit change and percentage change in the variable is listed horizontally. All references to changes in variables refer to the change in the mean value of the variable over the nine year period of the policy simulation. Thus the changes may be regarded as the average annual impacts.

Impact of Eliminating the Japanese Rapeseed Oil Tariff

The impacts on the Canadian rapeseed industry of a 100 percent cut in various Japanese tariff combinations are presented in table 1. The effects on Canada of abolishing the Japanese rapeseed oil tariff alone, are minimal. The Canadian rapeseed oil price rises \$6.20/mt annually, which causes a 1.7 percent reduction in domestic demand and an increase of 1,900 mt in exports. Rapeseed oil export revenues increase by \$0.9 million but this increase is partially offset by a \$0.2 million increase in soybean oil imports. Rapeseed export revenues are up \$0.8 million leading to a net gain of \$1.7 million in the value of rapeseed and products trade. There are no changes greater than 1.3 percent outside the vegetable oil sector.

Table 1: Impacts on Canada of 100 Percent Cuts in Japanese Tariffs, 1968/69 - 1976/77

Variables	Units	Value in Base Simulation \bar{a}	Impacts of Eliminating Tariff on					
			Rapeoil Only		Soyoil Only		Rapeoil and Soyoil	
			Unit Δ	% Δ	Unit Δ	% Δ	Unit Δ	% Δ
Rapeseed supply	1,000 mt	1260.1	3.2	0.3	-1.9	-0.2	0.9	0.0
Soybean supply	1,000 mt	298.1	-0.1	-0.0	0.1	0.0	0.0	0.0
Rapeseed crush	1,000 mt	291.6	0.7	0.2	-0.2	-0.1	0.6	0.2
Soybean crush	1,000 mt	635.9	0.0	0.0	0.1	0.0	0.1	0.0
Rapeseed trade	1,000 mt	836.0	2.8	0.3	-1.9	-0.2	0.5	0.1
Rapeseed price	C\$/mt	194.1	0.1	0.1	-0.1	-0.1	0.1	0.1
Soybean price	C\$/mt	180.6	0.0	0.0	0.0	0.0	0.0	0.0
Value of rapeseed trade	Mil. C\$	170.1	0.8	0.5	-0.7	-0.4	0.1	0.1
Value of soybean trade	Mil. C\$	-95.9	0.0	0.0	0.0	0.0	0.0	0.0
Veg. oil consumer surplus	1,000 C\$	3554.0	-9.2	-0.3	2.6	0.1	-6.4	-0.2
Rapeoil demand	1,000 mt	96.5	-1.6	-1.7	0.5	0.5	-1.1	-1.1
Soyoil demand	1,000 mt	113.0	0.5	0.4	-0.2	-0.2	0.3	0.3
Rapeoil trade	1,000 mt	18.1	1.9	10.5	-0.6	-3.3	1.3	7.2
Rapeoil price	C\$/mt	469.2	6.2	1.3	-2.1	-0.4	3.9	0.8
Soyoil price	C\$/mt	451.2	0.7	0.2	0.1	0.0	0.8	0.2

Table 1 continued

Variables	Units	Value in Base Simulation	Impacts of Eliminating Tariff on					
			Rapeoil Only		Soyoil Only		Rapeoil and Soyoil	
			Unit Δ	% Δ	Unit Δ	% Δ	Unit Δ	% Δ
Value of rapeoil trade	Mil. C\$	14.1	0.9	6.4	-0.4	-2.8	0.5	3.5
Value of soyoil trade	Mil. C\$	-5.2	-0.2	-3.8	0.1	0.7	-0.1	-0.7
Rapeseed demand	1,000 mt	152.0	0.6	0.4	-0.3	-0.2	0.2	0.1
Soymeal demand	1,000 mt	636.7	-1.2	-0.2	0.5	0.0	-0.4	-0.0
Rapemeal trade	1,000 mt	15.9	-0.2	-1.3	0.2	1.3	0.1	0.6
Rapemeal price	C\$/mt	105.8	-0.6	-0.6	0.3	0.3	-0.3	-0.3
Soymeal price	C\$/mt	204.2	-0.2	-0.1	0.1	0.0	-0.2	-0.1
Value of rapemeal trade	Mil. C\$	25.2	-0.0	-0.7	0.0	1.4	0.0	1.0
Value of soymeal trade	Mil. C\$	-29.6	0.2	0.7	-0.1	-0.3	0.1	0.3
Value of rapeseed and productstrade	Mil. C\$	186.7	1.7	0.9	-1.0	-0.5	0.7	0.4
Value of soybean and productstrade	Mil. C\$	-95.9	0.1	0.1	0.0	0.0	0.0	0.0
Value of rapeseed, soybean and productstrade	Mil. C\$	90.8	1.8	2.0	-1.0	-1.1	0.7	0.8

a/ Negative values for trade quantities and trade values indicate imports and import expenditures respectively.

In Japan, the abolition of the rapeseed oil tariff reduces the domestic rapeseed oil price by 21,100 y/mt, or more than the full extent of the tariff (table 2). Japanese demand for rapeseed oil rises by 7.0 percent, and with reduced rapeseed crush (-7.5 percent), rapeseed oil imports increase substantially. Rapeseed oil import expenditure rises by 3.1 billion yen (including foregone export revenue). Rapeseed import expenditures decline by 2.3 billion yen, since crush falls, but this is partially offset by an increase in rapeseed meal requirements worth an extra 0.9 billion yen. The net revenue effect on the Japanese rapeseed sector is an increased import expenditure of 1.7 billion yen. There are also some interesting cross effects in the soybean oil sector. The soybean oil price is essentially unchanged, so the decline in the rapeseed oil price leads to a reduction in soybean oil demand of 3.2 percent. With no changes in soybean crush, soybean oil is available for export and import expenditure is therefore reduced by some 2.6 billion yen. The net revenue effect on the soybean sector is reduced import expenditures of 2.9 billion yen [5].

Impact of Eliminating the Japanese Soybean Oil Tariff

Abolishing the Japanese soybean oil tariff alone, has even smaller effects on Canada than eliminating the rapeseed oil tariff. There is a decline in Japanese import requirements for rapeseed oil, so Canadian rapeseed oil export revenue falls by \$0.4 million. This is compounded by losses on rapeseed revenues of \$0.7 million, and with no change in rapeseed meal revenue, the net revenue effect is a reduction of \$1.0 million in foreign exchange earnings. In Japan, the abolition of the soybean oil tariff generates less impact than the rapeseed oil tariff cut. The domestic soybean oil price falls by 23,900 y/mt, again more than the tariff. Domestic soybean oil demand rises some 2.7 percent and with a reduced crush of 20,300 mt, soybean oil imports expand. Import expenditures on soybean oil more than double to 2.8 billion yen. Soybean meal imports also rise (22.0 percent) so even with the reduced soybean demand, net soybean sector import expenditures are up 2.8 billion yen. In the rapeseed sector there is increased rapeseed crush (1.4 percent) and import spending (1.3 percent), but this is more than offset by a 28.6 percent reduction in rapeseed meal import expenditure and an increase of 1.4 billion yen in rapeseed oil export revenue. Net rapeseed sector expenditures are thereby down by 1.1 billion yen.

Impact of the Joint Elimination of the Japanese Rapeseed and Soybean Oil Tariffs

The impacts on the Canadian rapeseed industry of the simultaneous abolition of the Japanese rapeseed and soybean oil tariffs are extremely small (table 1). There are some very minor impacts in the rapeseed oil market (price rises 0.8 percent and export revenue rises 3.5 percent), but the net revenue effect is an increase of only \$0.5 million annually.

As shown in table 2, the impacts on Japan generally fall between those found for the tariff reductions on the two oils individually. Domestic rapeseed oil and soybean oil prices fall 21,600 y/mt (14.9 percent) and 23,600 y/mt (11.2 percent) respectively. Demand for

Table 2: Impacts on Japan of 100 Percent Cuts in Japanese Tariffs, 1968/69 - 1976/77

Variables	Units	Value in Base/ Simulation ^a	Impacts of Eliminating Tariff on						
			Rapeoil Only		Soyoil Only		Rapeoil and Soyoil		
			Unit Δ	%Δ	Unit Δ	%Δ	Unit Δ	%Δ	
Rapeseed crush	1,000 mt	596.7	-44.5	-7.5	8.6	1.4	-36.1	-6.0	
Soybean crush	1,000 mt	2677.9	0.0	0.0	-20.3	-0.8	-20.3	-0.8	
Rapeseed trade	1,000 mt	-573.0	44.9	7.8	-8.7	-1.5	36.4	6.3	
Value of rapeseed trade	Bil. yen	-39.2	2.3	5.9	-0.5	-1.3	1.8	4.6	
Value of soybean trade	Bil. yen	-197.4	0.1	0.0	1.2	6.1	1.2	6.1	
∞									
Veg. oil consumer surplus	Bil. yen	20507.0	112.5	0.5	308.2	1.5	422.4	2.1	
Rapeoil demand	1,000 mt	245.9	17.3	7.0	-6.8	-2.8	10.3	4.2	
Soyoil demand	1,000 mt	458.3	-14.6	-3.2	12.5	2.7	-2.8	-0.6	
Rapeoil trade	1,000 mt	-1.3	-35.6	-2738.5	10.3	792.3	-25.1	-1930.7	
Rapeoil price	1,000 yen/mt	145.2	-21.1	-14.5	-0.5	-0.3	-21.6	-14.9	
Soyoil price	1,000 yen/mt	211.4	0.3	0.1	-23.9	-11.3	-23.6	-11.2	
Value of rapeoil trade	Bil. yen	+0.3	-3.1	-1033.3	1.4	466.7	-1.9	-633.3	
Value of soyoil trade	Bil. yen	-1.1	2.6	236.4	-2.8	-254.5	-0.4	-36.4	
Rapemeal trade	1,000 mt	-11.2	-26.2	-233.9	5.2	46.4	-21.1	-188.4	

Table 2 continued

Variables	Units	Value in Base Simulation	Impacts of Eliminating Tariff on					
			Rapeoil Only		Soyoil Only		Rapeoil and Soyoil	
			Unit Δ	%Δ	Unit Δ	%Δ	Unit Δ	%Δ
Value of rapemeal trade	Bil. yen	-0.7	-0.9	-128.6	0.2	28.6	-0.7	-100.0
Value of soymeal trade	Bil. yen	-8.3	0.3	3.6	-1.2	-14.5	-1.0	-12.0
Value of rapeseed and products trade	Bil. yen	-39.7	-1.7	-4.3	1.1	2.8	-0.8	-2.0
Value of soybean and products trade	Bil. yen	-206.8	2.9	1.4	-2.8	-1.3	-0.2	-0.1
Value of rapeseed, soybean and products trade	Bil. yen	-246.5	1.1	0.4	-1.7	-0.7	-1.0	-0.4

a/ Negative values for trade quantities and trade values indicate imports and import expenditures respectively.

rapeseed oil expands (4.2 percent), import requirements increase, and import expenditures rise by 1.9 billion yen (including the foregone export revenue). Soybean oil demand declines slightly (0.6 percent) and there is a gain in consumer surplus in the total vegetable oil sector of 2.1 percent. Crush demand, and hence import demand, for both rapeseed and soybeans contracts, and import expenditures on these inputs fall by 1.8 and 1.2 billion yen respectively. These shifts in crush of course exacerbate the domestic vegetable oil shortfall and further increase the need for imports of both oils and meals. Import expenditures on rapeseed meal and soybean meal increase by 0.7 and 1.0 billion yen respectively. The increased spending on oil and meal more than offsets the decline in rapeseed and soybean expenditure, to the extent of 0.8 and 0.2 billion yen respectively.

The effects of this tariff policy change on the world market, is, virtually non existent (table 5). There are small changes in the world prices for rapeseed oil and soybean oil, but the only impact these have is to cause an expansion in U.S. and Brazil soybean oil exports. United States soybean oil export revenue rises some \$3.4 million and Brazil soybean oil export revenue rises by 2.9 million cr.

Impacts of Eliminating the EC Rapeseed Oil Tariff

It is plain from tables 1 and 3 that abolishing the EC rapeseed oil tariff has considerably greater impacts on Canada than the equivalent Japanese tariff cut. The Canadian rapeseed oil price rises \$51.60/mt, or about 11 percent above the base solution value with the tariff cut. This causes a 10.4 percent decline in rapeseed oil demand and an increase in exports. Rapeseed oil export revenues rise \$8.2 million, but this increase is partially offset by rising soybean oil imports worth \$1.3 million. The rapeseed meal price increases slightly (1.8 percent) and domestic demand is reduced slightly (1.5 percent), resulting in higher exports. The demand for soybean meal increases (0.5 percent) and the cost of additional soybean meal imports exceeds the value of increased rapeseed meal exports by \$0.2 million. Finally, in the seed market, the rapeseed price is essentially unchanged, but the substantial increase in product prices induces greater domestic rapeseed crushing and fewer exports. Rapeseed export revenues fall \$4.7 million, so the net effect is an increase of \$4.1 million in rapeseed and products trade. This gain is offset, however, by increased import expenditures of \$2.2 million in the soybean and products markets.

In the EC, the abolition of the rapeseed oil tariff reduces the domestic price by \$6.8/mt or 1.5 percent (table 4). Even so there are some significant oil market effects because of the highly elastic demand for individual vegetable oils (Meilke and Griffith, 1981). Rapeseed oil demand expands by 20,200 mt or 5.7 percent, rapeseed oil net exports are reduced, and export revenues fall by \$19.2 million or 24.8 percent. Conversely, soybean oil demand is curtailed, export availabilities increase, and export revenue rises by \$16.4 million or 14.5 percent. These shifts in export availabilities are compounded by changes in crush - EC rapeseed crush declines by 42,100 mt as oil imports become cheaper, and soybean crush expands by 68,200 mt to take advantage of

greater export revenues for soybean oil. Import expenditures on seed, beans and meal reflect these shifts in crush location. Expenditures on rapeseed fall 16.7 percent or \$10.0 million while expenditure on soybeans rise 16.4 million or 1.1 percent; rapeseed meal expenditures rise \$2.4 million or over 24 percent; and soybean meal expenditures increase \$9.6 million. The net expenditure effects are a 161.1 percent or \$11.6 million increase for the rapeseed sector, and a \$9.6 million increase for the soybean sector.

Impact of Eliminating the EC Soybean Oil Tariff

In the case of abolishing the EC soybean oil tariff the effects on Canada are generally negative. The Canadian rapeseed oil price falls 5.9 percent and this causes a 8.8 percent increase in domestic demand and a reduction in export availability. Rapeseed oil export revenue falls by 32.6 percent or \$4.6 million. The meal effects are similar to the rapeseed oil tariff case, but there are considerably larger impacts in the seed market. The price of seed falls \$1.20/mt but with oil price down as well, crush is reduced by 0.7 percent. Rapeseed supply is decreased by 3.0 percent or 38,100 mt, hence exports contract and rapeseed export revenue falls by \$7.8 million. The net revenue effect is a reduction of \$11.7 million or 6.3 percent in the rapeseed sector.

In the EC, the abolition of the soybean oil tariff again has greater effects than elimination of the rapeseed oil tariff. The domestic soybean oil price falls \$38.2/mt or by 7.8 percent and domestic demand is stimulated. EC exports of soybean oil fall by 76.7 percent and export revenues fall by over \$104 million. The EC domestic rapeseed oil price only falls by 4.0 percent compared to 7.8 percent for soybean oil, consequently demand is curtailed. Export availabilities increase and export revenue rises some \$8.3 million or 10.7 percent. The increased requirements for soybean oil are compounded by a 10.6 percent decline in soybean crush and hence soybean oil production; import expenditures on soybeans are reduced by \$169.9 million or 11.3 percent. The reduced demand for rapeseed oil is offset to some extent by a 2.2 percent fall in rapeseed crush and thus rapeseed oil production; rapeseed import expenditures are decreased by \$7.0 million or 11.6 percent. Both soybean meal and rapeseed meal imports expand to fill the gap caused by decreased domestic production and import expenditures rise \$165.1 million (35.5 percent) and 2.1 million (21.1 percent) respectively. The net revenue effects in the EC are an increase in soybean sector expenditure of \$99.9 million, and an increase in rapeseed sector revenues of \$13.2 million.

Impact of Eliminating the EC Rapeseed and Soybean Oil Tariffs

The impacts on the Canadian rapeseed industry of the joint abolition of the EC rapeseed oil and soybean oil tariffs are shown in table 3. The domestic rapeseed oil price increases some 4.4 percent, and with a demand contraction and greater oil production, export availabilities rise. Rapeseed oil export revenues rise \$3.1 million or 22.0 percent. A similar situation occurs in the rapeseed meal market, with export revenues rising \$1.4 million or 5.5 percent. However the combined

Table 3: Impacts on Canada of 100 Percent Cuts in European Community Tariffs, 1968/69-1976/77

Variables	Units	Value in Base/ Simulation ^a	Impacts of Eliminating Tariff on					
			Rapeoil Only		Soyoil Only		Rapeoil and Soyoil	
			Unit Δ	%Δ	Unit Δ	%Δ	Unit Δ	%Δ
Rapeseed supply	1,000 mt	1260.1	-14.6	-1.2	-38.1	-3.0	-52.6	-4.2
Soybean supply	1,000 mt	298.1	0.7	0.2	-1.8	0.6	-1.0	-0.3
Rapeseed crush	1,000 mt	291.6	6.5	2.2	-2.0	-0.7	4.5	1.5
Soybean crush	1,000 mt	635.9	-0.1	0.0	15.5	2.4	15.3	2.4
Rapeseed trade	1,000 mt	836.0	-21.1	-2.5	-33.5	-4.0	-54.5	-6.5
Rapeseed price	C\$/mt	194.1	0.1	0.0	-1.2	-0.6	-1.3	-0.7
Soybean price	C\$/mt	180.6	0.5	0.3	-1.2	-0.7	-0.7	-0.4
Value of rapeseed trade	Mil. C\$	170.1	-4.7	-2.8	-7.8	-4.6	-13.0	-7.6
Value of soybean trade	Mil. C\$	-95.9	0.0	0.0	-2.9	-3.0	-2.9	-3.0
Veg. oil consumer surplus	1,000 C\$	3554.0	-68.2	-1.9	27.3	0.8	-36.7	-1.0
Rapeoil demand	1,000 mt	96.5	-10.0	-10.4	8.5	8.8	-2.5	-2.6
Soyoil demand	1,000 mt	113.0	3.0	2.7	-2.7	-2.4	0.3	0.3
Rapeoil trade	1,000 mt	18.1	12.6	69.6	-9.3	-51.4	4.3	23.7
Rapeoil price	C\$/mt	469.2	51.6	11.0	-27.5	-5.9	20.8	4.4
Soyoil price	C\$/mt	451.2	1.7	3.8	6.6	1.5	8.3	1.8

Table 3 continued

Variables	Units	Value in Base Simulation	Impacts of Eliminating Tariff on					
			Rapeoil Only		Soyoil Only		Rapeoil and Soyoil	
			Unit Δ	% Δ	Unit Δ	% Δ	Unit Δ	% Δ
Value of rapeoil trade	Mil. C\$	14.1	8.2	58.1	-4.6	-32.6	3.1	22.0
Value of soyoil trade	Mil. C\$	-5.2	-1.3	25.0	2.4	46.2	1.1	21.1
Rapemeal demand	1,000 mt	152.0	-2.3	-1.5	-5.4	-3.6	-7.7	-5.1
Soymeal demand	1,000 mt	636.7	3.4	0.5	7.9	1.2	11.3	1.8
Rapemeal trade	1,000 mt	15.9	6.1	38.4	4.3	27.0	10.4	65.4
Rapemeal price	C\$/mt	105.8	1.9	1.8	7.0	6.6	9.0	8.5
Soymeal price	C\$/mt	204.2	0.4	0.2	4.9	2.4	5.4	2.6
Value of rapemeal trade	Mil. C\$	25.2	0.6	2.4	0.7	2.8	1.4	5.5
Value of soymeal trade	Mil. C\$	-29.6	-0.8	-2.7	0.1	0.3	-0.8	-2.7
Value of rapeseed and product trade	Mil. C\$	186.7	4.1	2.2	-11.7	-6.3	-8.5	-4.6
Value of soybean and product trade	Mil. C\$	-95.9	-2.2	-2.3	-0.4	-0.4	-2.6	-2.7
Value of rapeseed, soybean and products trade	Mil. C\$	90.8	1.9	2.1	-12.1	-13.3	-11.1	-12.2

a/ Negative values for trade quantities and trade values indicate imports and import expenditures respectively.

effect of increased crush and a contraction in rapeseed supply reduces seed export supply, and export revenue falls some \$13.0 million or 7.6 percent. Thus the net export revenue effect is a decline of \$8.5 million or 4.6 percent in rapeseed and products trade plus increased import expenditures of 2.6 million for soybeans and products.

As shown in table 4, the impacts of this policy change in the EC are substantial. Domestic rapeseed oil and soybean oil prices fall \$26.30/mt (5.6 percent) and \$36.60/mt (7.4 percent) respectively, again much less than the extent of the tariff. These relative price changes cause rapeseed oil demand to fall, but with a substantially reduced rapeseed crush, rapeseed oil export supplies contract and export revenue falls some \$10.4 million or 13.4 percent. Soybean oil demand however expands and soybean oil export revenues decline 78.8 percent or \$89.0 million. With the greatly reduced crush demand for rapeseeds and soybeans, imports of these products decline, and expenditure falls by \$17.4 million and \$153.5 million respectively. The meal market however, needs more imports to offset reduced domestic supplies, and rapeseed meal and soybean meal expenditures rise by \$4.9 and \$175.6 million respectively. The net revenue effects are an increase of \$2.1 million in export revenues in the rapeseed sector and an increase of \$111.1 million in import expenditures for the soybean sector.

The effects of this policy on the world market are considerably greater than for the equivalent Japanese tariff changes (table 5). There are substantial rises in world oil and meal prices and marginal falls in world seed and bean prices. To meet the expanded EC import demand for oil and meal, soybean crush in both the U.S. and Brazil increase and greater quantities of oil and meal are shipped to the EC. United States export revenue for oil and meal rises by about 27 percent while for Brazil it's about 5 percent. The combined effect of increased crush demand and reduced supply results in less soybean exports from both these regions, so soybean export revenues are down, but this is not enough to offset the gains in oil and meal trade. The net revenue effects are increases of \$103.6 million for the U.S. and 190.2 million cr. for Brazil.

Impact of Eliminating the Japanese and EC Tariffs on Rapeseed and Soybean Oil

In general the impacts of eliminating all four tariffs are similar to the impacts of eliminating the EC tariffs alone. Table 6 shows that eliminating all four tariffs reduces the value of Canada's rapeseed and products trade by \$7.7 million and increases the cost of Canada's soybean and product imports by \$2.5 million. Clearly, tariff liberalization has a sizeable negative impact on the value of Canada's trade in oilseeds.

The total impacts on Japan tend to be small: a 1.7 percent increase in consumer surplus; a 1.8 percent increase in import expenditures for soybeans and products; and, a 0.2 percent increase in import expenditures for rapeseed and products.

Table 4: Impacts on the European Community of 100 Percent Cuts in European Community Tariffs, 1968/69-1976/77

Variables	Units	Value in Base/ Simulation	Impact of Eliminating Tariff on					
			Rapeoil Only Unit Δ	%Δ	Soyoil Only Unit Δ	%Δ	Rapeoil and Soyoil Unit Δ	%Δ
Rapeseed crush	1,000 mt	1248.4	-42.1	-3.3	-27.0	-2.2	-67.9	-5.4
Soybean crush	1,000 mt	7553.6	68.2	0.9	-801.1	-10.6	-738.6	-9.8
Rapeseed trade	1,000 mt	-297.1	42.1	14.2	27.0	9.1	68.0	22.9
Value of rapeseed trade	Mil. US\$	-60.2	10.0	16.7	7.0	11.6	17.4	28.9
Value of soybean trade	Mil. US\$	-1500.5	-16.4	-1.1	169.9	11.3	153.5	10.2
Veg. oil consumer surplus	Mil. US\$	6597.3	-1.1	0.0	147.2	2.2	147.3	2.2
Rapeoil demand	1,000 mt	353.5	20.2	5.7	-35.1	-9.9	-14.7	-4.2
Soyoil demand	1,000 mt	1085.2	-18.6	-0.1	51.2	4.7	30.2	2.8
Rapeoil trade	1,000 mt	144.7	-37.0	-25.6	24.3	16.8	-12.4	-8.6
Rapeoil price	US\$/mt	465.7	-6.8	-1.5	-18.9	-4.0	-26.3	-5.6
Soyoil price	US\$/mt	491.2	1.7	0.3	-38.2	-7.8	-36.6	-7.4
Value of rapeoil trade	Mil. US\$	77.4	-19.2	-24.8	8.3	10.7	-10.4	-13.4
Value of soyoil trade	Mil. US\$	112.9	16.4	14.5	-104.7	-92.7	-89.0	-78.8
Rapemeal trade	1,000 mt	-87.8	-20.8	-23.7	-8.7	-9.9	-28.9	-32.9

Table 4 continued

Variables	Impact of Eliminating Tariff on							
	Value in Base Simulation		Rapeoil Only		Soyoil Only		Rapeoil and Soyoil	
	Units	Value in Base Simulation	Unit Δ	% Δ	Unit Δ	% Δ	Unit Δ	% Δ
Value of rapemeal trade	Mil. US\$	-9.9	-2.4	-24.2	-2.1	-21.2	-4.9	-49.5
Value of soymeal trade	Mil. US\$	-465.4	-9.6	-2.1	-165.1	-35.5	-175.6	-37.7
Value of rapeseed and products trade	Mil. US\$	+7.2	-11.6	-161.1	13.2	183.3	2.1	29.2
Value of soybean and products trade	Mil. US\$	-1852.9	-9.6	-0.5	-99.9	-5.4	-111.1	-6.0
Value of rapeseed, soybean and products trade	Mil. US\$	-1845.7	-21.2	-1.1	-86.6	-4.7	-109.0	-5.9

a/ Negative values for trade quantities and trade values indicate imports and import expenditures respectively.

Table 5: Impacts on Rest of World of Eliminating Selected Tariffs, 1968/69-1976/77

Variables	Units	Value in Base Simulation ^a	Impact of Eliminating Tariff on			
			Japan Rapeoil and Soyoil Unit Δ	Japan Rapeoil and Soyoil %Δ	EC Rapeoil and Soyoil Unit Δ	EC Rapeoil and Soyoil %Δ
World price of:						
Rapeseed	US\$/mt	226.9	0.1	0.0	-1.2	-0.5
Soybeans	US\$/mt	194.9	0.0	0.0	-0.6	-0.3
Rapeoil	US\$/mt	425.4	2.4	0.6	14.0	3.3
Soyoil	US\$/mt	446.6	0.8	0.2	8.0	1.8
Rapemeal	US\$/mt	105.5	-0.3	-0.3	12.1	11.5
Soymeal	US\$/mt	159.7	-0.2	-0.1	5.3	3.3
United States:						
Soybean supply	1,000 mt	34509.8	10.0	0.0	-80.0	-0.2
Soybean crush	1,000 mt	20135.6	4.1	0.0	622.7	3.1
Value of soybean trade	Mil. US\$	2277.2	0.2	0.0	-134.5	-5.9
Value of soyoil trade	Mil. US\$	287.1	3.4	1.2	78.8	27.4
Value of soymeal trade	Mil. US\$	584.7	-0.8	-0.1	156.7	26.8
Value of soybean and products trade	Mil. US\$	3149.1	2.8	0.1	101.0	3.2
					103.6	3.3

Table 5 continued

Variables	Units	Value in Base Simulation	Impact of Eliminating Tariff on					
			Japan Rapeoil and Soyoil Unit Δ	EC Rapeoil and Soyoil Unit Δ	Japan and EC Rapeoil & Soyoil Unit Δ	%Δ		
Brazil:								
Soybean supply	1,000 mt	5984.6	-0.3	0.0	-9.3	-0.1	-9.7	-0.2
Soybean crush	1,000 mt	3414.1	0.1	0.0	16.9	0.5	17.1	0.5
Value of soybean trade	Mil. Cr.	3153.4	-0.6	0.0	-39.8	-1.3	-40.4	-1.3
Value of soyoil trade	Mil. Cr.	1113.9	2.9	0.3	49.8	4.5	52.4	4.7
Value of soymeal trade	Mil. Cr.	3580.0	0.7	0.0	177.4	5.0	178.1	5.0
Value of soybean and products trade	Mil. Cr.	7847.3	3.0	0.0	187.4	2.4	190.2	2.4

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a/ Negative values for trade quantities and trade values indicate imports and import expenditures respectively.

Table 6: Impacts on Canada, Japan and the European Community of Eliminating Import Tariffs on Rapeseed and Soybean Oil, 1968/69-1976/77

	Units	Value in Base Simulation	Impact of Eliminating Tariffs Unit Δ	%Δ
Canada:				
Veg. oil consumer surplus	1,000 C\$	3554.0	-43.0	-1.2
Value of rapeseed trade	Mil. C\$	170.1	-12.8	-7.5
Value of soybean trade	Mil. C\$	-61.0	-2.9	-4.8
Value of rapeseed trade	Mil. C\$	14.1	3.6	25.5
Value of soybean trade	Mil. C\$	-5.2	1.0	19.2
Value of rapeseed trade	Mil. C\$	2.5	1.4	56.0
Value of soybean trade	Mil. C\$	-29.6	-0.6	-2.2
Value of rapeseed and products trade	Mil. C\$	186.7	-7.7	-4.1
Value of soybean and products trade	Mil. C\$	-95.9	-2.5	-2.6
Value of rapeseed, soybean and products trade	Mil. C\$	90.8	-10.3	-11.3
Japan:				
Veg. oil consumer surplus	Bil. Yen	20507.0	355.3	1.7
Value of rapeseed trade	Bil. Yen	-39.2	+1.0	2.6

Table 6 continued

	Units	Value in Base Simulation	Impact of Eliminating Tariffs Unit Δ	%Δ
Value of soybean trade	Bil. Yen	-197.4	0.9	0.5
Value of rapeoil trade	Bil. Yen	0.3	-0.8	-266.7
Value of soyoil trade	Bil. Yen	-1.1	-0.1	-9.1
Value of rapemeal trade	Bil. Yen	-0.7	-0.3	-42.9
Value of soymeal trade	Bil. Yen	-8.3	-4.4	-53.0
Value of rapeseed and products trade	Bil. Yen	-39.6	-0.1	-0.2
Value of soybean and products trade	Bil. Yen	-206.8	-3.7	-1.8
Value of rapeseed, soybean and products trade	Bil. Yen	-246.5	-3.8	-1.5
European Community:				
Veg. oil consumer surplus	Mil. US\$	6597.3	141.3	2.1
Value of rapeseed trade	Mil. US\$	-60.2	11.7	19.4
Value of soybean trade	Mil. US\$	-1500.5	150.7	10.0
Value of rapeoil trade	Mil. US\$	77.4	-3.8	-4.9
Value of soyoil trade	Mil. US\$	113.0	-89.2	-78.9
Value of rapemeal trade	Mil. US\$	-9.9	-3.0	-30.3

Table 6 continued

	Units	Value in Base Simulation	Impact of Eliminating Tariffs Unit Δ	%Δ
Value of soymeal trade	Mil. US\$	-465.4	-172.6	-37.1
Value of rapeseed and products trade	Mil. US\$	7.2	5.0	69.4
Value of soybean and products trade	Mil. US\$	-1852.9	-111.1	-6.0
Value of rapeseed, soybean and products trade	Mil. US\$	-1845.7	-106.1	-5.7

a/ Negative values for trade quantities and trade values indicate imports and import expenditures respectively.

Impacts in the EC are much larger than in Japan. Vegetable oil consumer surplus is up 2.1 percent but import expenditures on rapeseed, soybeans and products are up by 5.7 percent.

CONCLUSIONS AND IMPLICATIONS

The empirical results of the single product tariff simulations accord well with the predictions of partial equilibrium theory. In the context of rapeseed oil tariff cuts, abolishing the rapeseed oil tariff in one importing region (Japan or the EC) reduces the price in the importing region, and stimulates domestic and import demand. In the exporting region (Canada) the rapeseed oil price rises, demand contracts and exports expand. Import expenditure and export revenue for rapeseed oil increase, so there is a positive benefit to Canadian crushers. The impacts of the rapeseed oil tariff cuts are, however, quite different in the two major importing regions. In Japan, abolishing the rapeseed oil tariff results in a decrease in the domestic price of 21,100 y/mt, considerably more than the value of the tariff. In the EC, the rapeseed oil tariff cut also results in a decrease in the domestic price but by only 1.5 percent, considerably less than the 10 percent tariff.

The implementation of rapeseed oil tariff cuts has only small impacts in the soybean sector, but the effects on the rapeseed sector of soybean oil tariff changes are much larger. Consequently, the impacts of joint rapeseed and soybean oil tariff cuts tend to be closer to the soybean oil tariff impacts than the rapeseed oil impacts.

When all four tariffs are simultaneously abolished the impacts in the EC, Canada and the Rest of the World markets are very similar to those of abolishing the two EC tariffs only. Conversely, the impacts in Japan are similar to those of abolishing the two Japanese tariffs only, although the magnitude of the impacts are dampened.

The analysis has several implications for the Canadian rapeseed industry. Abolishing the rapeseed oil tariff in Japan, or the EC, raises Canadian export revenue for rapeseed oil. Total export revenue for rapeseed and products also increases. However, if both the rapeseed and soybean oil tariffs are removed Canada gains marginally (\$0.7 million) if the cuts are in Japan but loses (\$8.5 million on rapeseed and products and \$2.6 million on soybeans and products) if the cuts are in the EC. Joint removal of all four tariffs also reduces Canada's export revenue by \$10.3 million in the rapeseed, soybean and products markets.

Contrary to the results reported by Furtan *et al.* (1978, 1979), the overall impacts on the Canadian industry of abolishing Japanese rapeseed and soybean oil tariffs are minimal. The impacts of abolishing the EC tariffs are more pronounced, and the policy of abolishing the rapeseed tariff alone yields the largest positive net benefit to the Canadian rapeseed industry. However, much of this gain is offset by the increased cost of imported soybeans and products.

One of the more important changes caused by the oil tariff cuts is the shift in the location of crushing. Thus when the Japanese rapeseed and soybean oil tariff is removed, rapeseed and soybean crushing contracts in Japan and expands in Canada, and Brazil and the United States, respectively. The same type of adjustment occurs when EC tariffs are abolished.

Based on our results, Canada's position in future trade negotiations should be (a) to emphasize single commodity negotiations, since removal of rapeseed oil tariffs in Japan and the EC have positive net trade benefits; (b) to attempt to block pressure by the U.S. and Brazil to lower soybean oil tariffs, since these cuts have almost uniformly negative impacts on Canada; and, (c) to recognize that gains in the rapeseed sector from rapeseed oil tariff reductions may be partially offset by losses in the soybean sector.

However, the impacts of the tariffs cuts on Canada are not large, a maximum net benefit of \$1.9 million annually for removal of the EC rapeseed oil tariff and a maximum loss of \$13.3 million for removal of the EC soybean oil tariff. In this situation it may be better for the Canadian oilseed industry to focus on market development and promotion assistance; and, solving domestic infrastructure problems, such as the Crows Nest Pass freight rate (Furtan et al. 1978, 1979) than on pushing for tariff reductions.

FOOTNOTES

1. The fixed tariff ranged between 8 and 15 percent of the world market price over the 1963-1977 period. Readers wishing more details on the policy and institutional features of the world oilseed market are referred to Griffith and Meilke (1980).
2. Magee (1979) has shown that in these situations it is possible for the general equilibrium effects of a tariff to be opposite to the partial equilibrium effect.
3. An offsetting effect may be the fact that the model does not explicitly include a tariff equivalent for the import quotas effective in Japan over part of the sample period. However a dummy variable is included for the period when the quotas were in force.
4. The impact of the tariff reductions on rapeseed and soybean production are essentially zero for all regions except Canada. In Canada rapeseed and soybean production is a function of lagged market price. In this case producer surplus is equal to total revenue, thus estimates of producer surplus are not reported.
5. For detailed comparison of the results from this simulation to Furtan et. al.'s (1979, p. 247) see Griffith and Meilke (1982b).

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