U.S. Durum and Semolina Exports Under Alternative Trade Policies

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World trade in durum has increased from an average of 1.75 million metric tons (mmt) in the 1960s to 5.51 mmt in 1989/90 (Foreign Agricultural Service). The United States, Canada, and the European Community (EC) account for nearly all durum exports. Canada was the major durum exporter throughout the 1980s, followed by the United States and the EC, mainly France. These three exporting countries compete in a few highly concentrated import markets, such as Italy, Algeria, Tunisia, the former USSR, and Venezuela.

Export promotion policies that exporting countries use are the Export Enhancement Program (EEP) in the United States, the Export Refund Program (ERP) in the EC, and rail subsidies under the Western Grain Transportation Act (WGTA) in Canada. They also use tariffs and non-tariff barriers to protect their domestic durum production. The EC's variable levy is a typical example of border protection. In addition, the U.S./Canadian Free Trade Agreement (FTA) will alter trade flows of durum between the two countries and also with third party countries.

The primary objective of this study is to evaluate the impacts of changing trade promotion and restricting programs on competitiveness of durum and semolina production under the given production conditions. Special attention is given to trade flows of durum and semolina under the U.S. and Canadian FTA.

MODEL DEVELOPMENT

A computer model was developed to evaluate the competitiveness of durum and semolina in the world market. The objective of the model is to minimize production costs of durum at producing regions, distribution costs of durum from producing regions to mills and ports for export, and distribution costs of semolina from mills to final domestic and foreign consuming regions.

The model includes seven durum-exporting countries and eight importing countries. Exporting countries, which account for over 90 percent of world durum exports, are the United States, Canada, France, Greece, Spain-Portugal, Turkey, and Mexico. Importing countries, which account for 83 percent of world durum imports, are Italy, Algeria, Tunisia, the former USSR, Germany-Poland, Venezuela, Japan-Korea, and other European countries. The United States is divided into 28 durum-producing regions and 24 consuming regions. Canada is divided into five producing regions and three consuming regions. Other exporting countries each have one producing region and one consuming region.

Durum is moved from producing regions to ports for export and to mills for semolina production. Semolina produced at mills is shipped to domestic consuming regions representing the location of the major pasta plant or plants in the region.
Mode of domestic transportation used for this study is rail. Barges are not used to ship durum, mainly because durum-producing regions in the United States and Canada are not located near the Mississippi or Columbia-Snake River systems. Consequently, shipping durum to water access points by rail and then using a barge is not justified economically. Durum moved to ports is shipped to importing countries on ocean vessels. Semolina processed at mills is moved to consuming regions (pasta plants) by rail.

The base model optimizes durum production and trade flows with existing trade policies of exporting and importing countries. Trade policies included in the base model are U.S. and Canadian import tariffs, Canadian import license and rail rate subsidy for export shipments, the U.S. EEP, and the EC ERP. Trade restrictions used by importing countries are not included in this study because they are applied evenly to all exporting countries and thus may not alter trade flows. Also, the primary focus of this study is on competition among exporting countries. Other policies, such as long-term agreements (LTA) and credit sales, are not included because these policies are not used consistently.

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RESULTS

Several models are developed on the basis of trade policies used by exporting countries. The models are as follows:

1. Model 1 (Base Model) is the same as the model described above with the existing trade restricting policies.

2. Model 2 is the same as the base model except for the exclusion of U.S. and Canadian tariffs and the Canadian import license for trading durum and semolina between the United States and Canada.

3. Model 3 is the same as Model 2 except for the additional exclusion of the Canadian rail rate subsidy.

4. Model 4 is the same as the base model without the U.S. EEP.

5. Model 5 is the same as the base model without the EC ERP.

6. Model 6 is the same as the base model without any trade restrictions or subsidies.

The base model solutions are compared with optimal solutions of alternative models to evaluate the impacts of trade policies used by exporting countries on production and trade of durum and semolina.

Optimal durum production for Model 1 in the major exporting countries is 3.15 mmt in the United States, 1.65 mmt in Canada, 1.55 mmt in France, and .25 mmt in Greece (Table 1). The United States is the leading exporter of durum at 1.66 mmt followed by Canada with 1.53 mmt, and the EC (France and Greece) with .93 mmt (Table 2). The United States does not export durum or semolina to Canada, but imports approximately 0.09 mmt from Canada.

Table 1. Actual durum production in 1989 and optimal durum production of alternative models.

Region	Actual	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	mmt						
North Dakota	1.82	2.40	2.53	2.58	1.67	2.40	3.11
South Dakota	0.08	0.08	0.08	0.12	0.07	0.08	0.12
Montana	0.18	0.05	0.05	0.05	0.05	0.05	0.05
Minnesota	0.03	0.06	0.06	0.06	0.01	0.06	0.06
Calif.-Ariz.	0.24	0.56	0.56	0.56	0.56	0.56	0.56
U.S. Total	**2.56**	**3.15**	**3.28**	**3.37**	**2.36**	**3.15**	**3.90**
Saskatchewan	3.06	1.10	1.10	1.10	1.84	1.85	1.10
Manitoba	0.24	0.07	0.04	0.04	0.04	0.04	0.04
Alberta	0.82	0.48	0.57	0.30	0.57	0.56	0.57
Canada Total	**4.12**	**1.65**	**1.71**	**1.45**	**2.44**	**2.45**	**1.71**
France	**1.50**	**1.55**	**1.53**	**1.60**	**1.60**	**0.80**	**0.80**
Greece	**1.23**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Spain-Portugal	**0.68**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**
Turkey	**2.15**	**2.20**	**2.20**	**2.20**	**2.20**	**2.20**	**2.20**
Mexico	**0.50**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**

NOTE: Totals may not add because of rounding.

Table 2. Quantities of durum exported by major exporting countries in the base and alternative models.

Models	United States	Canada	France	Greece
	mmt			
1	1.662	1.525	0.874	0.057
2	1.769	1.695	0.851	0.057
3	2.423	1.327	0.923	0.057
4	0.827	2.320	0.923	0.057
5	1.663	2.332	0.123	0.057
6	2.814	1.589	0.123	0.057

Under the current trade system with existing trade policies, California-Arizona is the most competitive durum producing region because it is near the export port at Long Beach and is the only major durum-producing area in the western United States, giving it a transportation advantage in meeting this area's pasta consumption. South Dakota is the second most competitive region, followed by North Dakota.

South Dakota's low production costs and its transportation advantage in shipping durum to two major mills in Missouri make it a competitive durum producer. North Dakota is a competitive durum producer because of its proximity to the port at Duluth and major mills located in Minneapolis and Grand Forks. Montana is the least competitive durum producer in the United States because of its long distance to both ports and mills. Most of the durum produced in Montana is shipped either to Utah for milling or competes with durum grown in the Dakotas and Minnesota for export through the port at Duluth.

Alberta is the most competitive region in producing and marketing durum in Canada, but less competitive than major producing states in the United States. Alberta has a transportation advantage over Saskatchewan in shipping durum to the Vancouver port and the western United States. This transportation advantage offsets Alberta's higher production cost and gives it a competitive advantage in exporting through Vancouver and to the Western United States. Canada's major mills are located in Ontario and Quebec near population centers, which gives Saskatchewan a competitive advantage in producing durum for domestic consumption.

Manitoba is the least competitive province because of higher production costs relative to Alberta and Saskatchewan. Manitoba's transportation advantage to the port at Thunder Bay does not offset Saskatchewan's advantage in production costs. France, Greece, Spain-Portugal, Turkey, and Mexico are not competitive in producing durum because production costs in these countries are higher than those in the United States and Canada.

Effects of U.S.-Canadian FTA

When U.S. and Canadian tariffs and the Canadian import license for trading durum and semolina between these two countries are removed (Model 2), both the United States and Canada increase durum production due to an overall increase in the two countries' competitive position in the world market. Production remained the same in Greece but decreased slightly in France. The quantity of durum traded between the two countries in Model 2 is substanially larger than that in Model 1. The United States exports 0.10 mmt of durum to Canada and imports 0.24 mmt of durum and semolina from Canada. The other producing regions had little change in production (Table 1).

Removing the Canadian rail subsidy (WGTA) in Model 3 makes Canada less competitive in the world market. Durum production decreases in Canada, especially in Alberta. Both North and South Dakota increase durum production, thus increasing total U.S. production. France also increases production while Greece has no change. Eliminating the WGTA rail subsidy increases U.S. exports from 1.66 mmt (Model 1) to 2.42 mmt and decreases Canadian exports from 1.53 mmt (Model 1) to 1.33 mmt. This is mainly because some producing regions in Canada would lose their comparative advantage over the United States in exporting durum if WGTA rail subsidies are eliminated. Eliminating the rail subsidies, however, does not affect bilateral trade flows of durum and semolina between the two countries.

Effects of Removing EEP and ERP

Eliminating the EEP (Model 4) reduces durum production in the United States, particularly in North Dakota where production declines 30 percent. Durum production also decreases in Minnesota. Both Saskatchewan and Alberta increase durum production, Saskatchewan by 40 percent. France has a small increase in durum production. The EEP significantly influences world trade of durum. Without the EEP, U.S. exports decline from 1.66 mmt to .83 mmt while Canadian exports increase from 1.53 mmt to 2.32 mmt. The EEP does not affect bilateral trade of durum and semolina between the two countries. Exports of durum from France and Greece do not change when the United States eliminates the EEP.

Removing the ERP in the EC (France and Greece) decreases durum production in France but not in Greece. The United States increases production slightly while Canada had a large increase in durum production, mostly in Saskatchewan (Table 1). French exports decline from .87 mmt to .12 mmt when the EC eliminates the ER program. Canadian exports increase to 2.33 mmt while the United States maintains its exports at the level in Model 1. There is no change in bilateral trade between the United States and Canada.

U.S. Competitiveness under Free Trade

Worldwide free trade of durum without subsidies and tariffs is simulated in Model 6. The United States gains the most, increasing production from 3.15 mmt to 3.90 mmt. North Dakota accounted for all of this increase, with two-thirds of it going for export. Canadian production increases slightly from 1.65 mmt in Model 1 to 1.71 mmt in Model 6. Production in France declines 50 percent under free trade because of higher production costs. U.S. exports increase to 2.82 mmt under a complete free trade system (Model 6) while the EC's exports decline to .12 mmt and Canadian and Greek exports remain almost the same as in Model 1. This implies that worldwide free trade improves the U.S. competitive position in producing durum while France and Greece lose their competitiveness. This free trade option increases bilateral trade volume of durum and semolina between the United States and Canada. The United States exports .11 mmt of durum to Canada and imports .28 mmt of durum and semolina.

Competitiveness in Semolina Production

The United States has 16 durum mills and Canada four. Competition is based on costs of durum sent to them and costs from durum mills to pasta consumption regions. The mill in Arizona is the most competitive in the United States in Model 1, primarily because it is near the only durum-producing region in the Western United States. The mills in Massachusetts, Oregon, and Utah are the least competitive. In general, the farther a mill is from a producing region, the less competitive the mill. Mills in North Dakota, Minnesota, and Missouri compete with mills in Alberta and Saskatchewan for the pasta market in the Western United States. The most competitive Canadian mill is in Alberta near the U.S.-Canadian border, making it competitive in shipping semolina to the Western United States.

The U.S.-Canadian FTA increases competitiveness of Canadian mills in Alberta and Saskatchewan but decreases competitiveness of all U.S. mills. Canadian semolina exports to the United States increase from .09 mmt in Model 1 to .12 mmt in Model 2. Most of the increase is from the mill in West Toronto, which shipped semolina to New York in Model 2, displacing semolina shipped from Minneapolis to New York in Model 1. Mills in North Dakota, Arizona, and Montana are the only mills more competitive than the mill in Alberta.

The order of mill competitiveness for Models 3 through 6 does not change. Mills in Arizona, North Dakota, and Minnesota remain the most competitive while mills in Oregon, Utah, and Massachusetts remain the least competitive.

CONCLUDING REMARKS

A computer model was developed to evaluate optimal production and distribution of durum for milling and export under various trade policy options.

Eliminating import tariffs on durum traded between the United States and Canada has little impact on durum production and export flows of durum. However, eliminating the rail subsidy under the WGTA significantly increases durum production in the United States and U.S. exports to Canada and other importing countries. The FTA significantly increases the trade volume of durum.

The EEP and ERP are important for the United States and EC, mainly France, in maintaining world market shares. Canada gains its market shares when either the EEP or the ERP is eliminated.

The United States has a competitive advantage in producing durum over other exporting countries and benefits the most under a free trade system. Free trade would decrease France's production due to high production costs and stimulate bilateral trade of durum between the United States and Canada.

The U.S. milling industry is more competitive than the Canadian milling industry. The milling industry is less sensitive to changes in trade policies because semolina is produced to meet domestic demand rather than for exports. Semolina is traded between the United States and Canada, but the quantity is small compared to the quantity of durum traded between these two countries. Mills in North Dakota are highly competitive over other states and provinces in Canada. This implies North Dakota could increase milling capacity, thereby making durum production more competitive in the world market.

REFERENCES

Haley, S. and Krissoff, B. 1988. "The Value of the Dollar and Competitiveness of U.S. Wheat Exports." ERS Staff Report No. AGES880218. USDA National Economics Division, Washington, D.C.

Koo and Drennan. 1990. "Optimal Agricultural Production and Trade: Implications on International Competitiveness." Agricultural Economics Report No. 251. Department of Agricultural Economics, North Dakota State University.

Perkins, P. 1987. "Measuring Economic Competitiveness in Trade," proceedings, U.S. Competitiveness in the World Wheat Market. ERS Staff Report No. AGES86093. USDA National Economics Division, Washington, D.C.

Shane, M. 1987. "Patterns and Trends in World Wheat Competitiveness." ERS Staff Report No. AGES861126. USDA National Economics Division, Washington, D.C.

Sharples, J. 1987. "U.S. Competitiveness in the World Wheat Market: A Prototype Study." proceedings, U.S. Competitiveness in the World Wheat Market. ERS Staff Report No. AGES860903. USDA National Economics Division, Washington, D.C.

Sharples, J. and Milham, N. 1990. "Longrun Competitiveness of Australian Agriculture." Foreign Agricultural Economics Report No. 243. USDA/ERS National Economics Division, Washington, D.C.

Stanton, B.F. March 1986. "Production Costs for Cereals in the European Community: Comparison with the United States." Agricultural Experiment Station Report No. 86-2. Cornell University, Ithaca, N.Y.

Strain, Greg, and Guy Baudry. December 1987. "Grain and Oilseed Enterprise Budgets for the Canadian Prairies." Unpublished Staff Paper, Agriculture Canada.

Vollrath, T. 1989. "Competitiveness and Protection in World Agriculture." Agriculture Information Bulletin No. 567. USDA/ERS National Economics Division, Washington, D.C.