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Cargo Preference: Its Impact on the U.S. Wheat Sector

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ABSTRACT

Cargo preference, the requirement that a portion of a country's waterborne commerce be carried in its own vessels, can affect a country's level of exports, export prices and revenue. The 1985 Farm Bill incrementally increases cargo preference on PL 480 shipments from 50 to 75 percent. Simulation of 50 to 75 percent cargo preference levels with a spatial price-equilibruim model indicate a slight decline in the value of U.S. wheat exports as cargo preference requirements increase. A provision of the 1985 Farm Bill requires the original 50 percent requirement of section 901(b) of the Merchant Marine Act of 1936 to resume effect if Congress fails to provide funding for the increased cargo preference levels. This provision reduces the share carried by U.S. vessels but increases the number of concessionary programs for which cargo preference applies. The impcat of this feature depends on whether the export guarantee program (GSM-102) is included and, if so, the extent to which import demand would decrease. The analysis shows inclusion of the GSM-102 program would sharply increase the subsidy to the US. maritime industry. An inoperable GSM-102 program would sharply curtail this subsidy. Should users of the export credit program (GSM-102) not be able to obtain another credit source for their imports, and a 50 percent cargo preference applied to all other government aid programs, drastic impacts on U.S. and world wheat trade would result.

I. INTRODUCTION

Maintenance of a strong merchant marine is an objective of most trading countries. Cargo preference, the requirement that a portion of a country's waterborne commerce be carried on that country's flag vessels, is one means by which governments aid their merchant marine. Although this practice provides less budget exposure for a government, it may come as an added cost to the exported commodity if the rates for the vessels receiving preference are above the competitively determined international rates of other vessels. As a result, cargo preference may shift the competitiveness of a country's traded commodities. Current U.S. legislation requires that a percentage of all PL 480 commodities be shipped on American flag vessels. Since rates for U.S. flag vessels are higher than non-U.S. flag vessels, changes in cargo preference requirements are of concern to the U.S. maritime industry, agricultural exporters, commodity industry groups, and the taxpayers. This study examines recent changes in U.S. cargo preference legislation and estimates its impact on the United States maritime industry, United States wheat industry, and international wheat trade. Since wheat is the dominant grain affected by cargo preference, that commodity is the focus of this study.

II. A CHRONOLOGY OF LEGISLATION

The governments of most nations possessing merchant fleets offer some form of financial assistance to their maritime industries. The Merchant Marine Act of 1928 was the first statute that granted substantial financial aid to U.S. maritime interests during peacetime. This was followed by the Merchant Marine Act of 1936. The intent of this Act was to create a merchant marine capable of transporting a substantial portion of the U.S.'s waterborne commerce. In 1954 Congress passed the Cargo Preference Act. This Act was an amendment to the 1936 legislation and dictated that at least 50 percent of the cargo generated by government-sponsored foreign aid programs be allocated to privately-owned ships of U.S. registry if available at reasonable rates. As a result, 50 percent of the U.S.'s grain shipments under Public Law 480 had to be transported in American vessels. In early 1985 a U.S. District Judge ruled that cargo preference also applied to the USDA's blended credit program. In reaction, the Secretary of Agriculture suspended the blended credit program, arguing that the increased transport costs would no longer make the program cost effective.

A compromise in the 1985 Farm Bill excluded the export credit guarantee (GSM) and other non-PL 480 programs from cargo preference, but mandated an increasing share of PL 480 shipments be transported aboard U.S. flag vessels. The amendment provides for the cargo preference requirement to increase to 60 percent for fiscal 1986, to 70 percent in 1987 and to 75 percent in 1988. The Department of Transportation (DOT) is required to finance the increased freight charges that result from the increased preference requirement.

In addition, the 1985 farm bill includes a section referred to as the snapback provision. If funding is not obtained through the Department of Transportation, the 1985 Farm Bill provision requires the original 50 percent requirement of section 901(b) of the Merchant Marine Act of 1936 to resume effect, i.e., to snapback. Because of the 1985 U.S. District Court ruling on the blended credit program, the USDA's export credit guarantee program (GSM) could be challenged in the Courts for inclusion under the 50 percent cargo preference requirement.

III. LITERATURE REVIEW

In the mid-1970's Vanags (1977) concluded that costs and benefits of cargo preference schemes are

analogous to the cost and benefits of protection in other industries. More recently, Castillo-Manuel (1980), using a spatial equilibrium model, analyzed the impact of various cargo preference schemes on the world and U.S. grain trade. Results show cargo preference is a protection mechanism for the U.S. maritime industry and a trade barrier to the U.S. grain industry. Paarlberg (1984) addressed the consequences of requiring various proportions of U.S. concessional and commercial wheat sales be shipped on U.S. flag vessels. In general, Paarlberg's analysis shows relatively modest impacts from increased cargo preference requirements. U.S. exports decline between 1-2 percent, while U.S. prices are slightly lower and foreign prices are slightly higher.

IV. CONCEPTUAL AND MATHEMATICAL MODEL

The relationship between the United States, other world exporters, and the total world is shown by the simplified model in Figure 1. In the absence of cargo preference, the equilibrium CIF price is OA. The United States would export quantity OG while other exporters would export OH. In total, exporters would export quantity OI (OG + OH) to world importers. Imposing cargo preference on the United States will shift the U.S.'s excess supply. This is facilitated in Figure 1 by shifting the excess supply function to the left (Xsus to X'sus) which subsequently affects a decline in world supply (Xsw to X'sw). This yields higher delivered prices (OF versus OC) and a reduction in quantity traded (OL versus OI). The United States exports less, OJ versus OG, at a higher delivered price, OD versus OA. Because the increased price only partially offsets the increased U.S. flag vessel cost the U.S. FOB price must be lowered to remain competitive. Other world exporters increase exports from OH to OK and receive the benefit of the higher price with no change in their transportation rates. World importers would import less at the higher delivered price. The extent price and quantity shift is determined by the excess supply and demand elasticities in impacted countries.

A spatial price-equilibrium model was used in this study to evaluate the impact of changing cargo preference levels on the U.S. and world wheat trade. The competitive, spatial price equilibruim model describes the pricing and allocation of a commodity between exporting and importing countries separated by transportation costs. The assumptions of this model are (1) the markets are competitive, (2) each country represents a distinct market, (3) a homogenous commodity is traded, (4) supply and demand can be expressed in a functional form, (5) transportation costs are constant, and (6) the countries may be specified a priori (Holland, 1985). These models are usually static with the solutions providing values given alternative policies or shocks. They do not provide information on the transition from one solution to another The competitive spatial price equilibrium model can be stated mathematically as a surplus supply/demand maximization model or as a set of equilibrium conditions (Holland, 1985). The model used in this study is an adaptation of an equilibirum wheat model developed by Holland and Sharples (1984). The model solutions were obtained on the IBM-XT personal computer using the GTP (Generalized Transportation Problem) program developed by Holland (1985).

A price linkage function in the spatial price equilbirum model depicts the price relationship between exporters and importers. The price linkage in this study assumes no tariff and all trading and transportation costs are expressed in dollars per metric ton. No conversion to internal country prices is made. Exchange rates are set at 1. Thus, the difference in export and import price for a given two country trade is the transportation costs between the two countries. The GTP program links importing and exporting countries by choosing the least cost supplier for each importing country. However, trade flow constraints can override the least cost choice; but once the constraints are met, the least cost criteria is followed to distribute remaining grain supplies (Holland, 1984). The excess supply and demand schedules are included in the GTP program in the following functional form:

$$\text{Quantity} = \text{Alpha} + \text{Beta} * (\text{Price})^{\text{Gamma}}$$

This expression allows scalar, linear, or nonlinear schedules.

The Vector Sandwich Method (VSM) algorithm is used in the GTP program to find a competitive, spatial price equilibrium (Holland, 1984). The VSM algorithm is one of a class of algorithms referred to as a fixed point, equilibria, homotopy, or path-following algorithms. All in this class are path-follow-

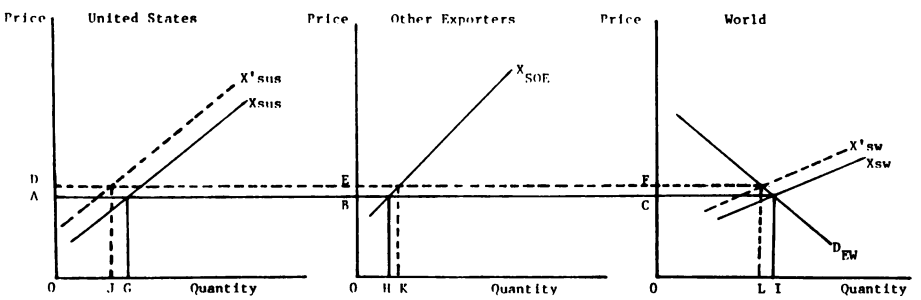

Figure 1. Cargo Preference imposed on the United States.

ing in the sense that given an initial point they follow a path to an equilibrium point (Holland, 1985). The VSM algorithm originally developed by Kuhn and Mackinnon (1975) to solve general equilibrium problems was applied to the generalized transportation problem by MacKinnon (1975).[1] Holland and Sharples (1984) applied the VSM algorithm to world wheat trade. We modified their world wheat trade model to reflect current conditions and cargo preference requirements..

V. PROCEDURE

The first step in the estimation process was to construct a partial equilibruim wheat trade model incorporating excess supply and demand equations for a base period. To this we added a matrix of wheat shipping costs and a set of contraints representing bilateral trade agreements existing in the base period. The final step was to vary the assumptions on cargo preference (transportation cost) in order to obtain alternative equilibrium (Holland and Sharples, 1984).

The model was specified to include 9 exporting countries/regions and 17 importing country/regions. Excess supply and demand elasticities for the world exporting and importing country/regions are given in Table 1.[2] Excess supply functions based on these elasticities and defined to pass through the base period price-quantity were derived for each country/region. Each of the 17 importing regions in the model has an excess demand function defined to pass through the base period price-quantity.

United States excess supply was separated into three groups: U.S. commercial, U.S. PL 480, and U.S. GSM. Excess supply elasticities for commercial and GSM sectors were assumed to be identical. The GSM program is primarily an export finance program. Thus, U.S. wheat exporters would be in-

TABLE 1

International Wheat Exporters and Importers and Their Assumed Excess Supply/Demand Elasticities, 1985/86-1986/87 Average

Exporters	(a) Net Exports/Imports	(b) Excess Supply/Demand Elasticities
	--------- 1000 Metric Tons---------	
Net Exporters:		
Canada	17,690	.50
U.S. Commercial	16,271	1.92
Argentina	5,361	.10
EEC-10	15,250	1.00
O.W. Europe	1,302	1.00
Australia	5,179	.25
U.S. PL 480	4,410	1.00
U.S. GSM	6,569	1.92
Net Importers:		
Central America	1,475	-0.2
Brazil	1,750	-0.2
O.S. America	3,630	-0.4
EEC-10	2,575	0.0
O.W. Europe	772	0.0
East Europe	3,425	0.0
Soviet Union	15,850	0.0
Rep. of China	6,800	-0.8
Japan	5,445	0.0
East Asia	7,253	-0.4
Southeast Asia	600	-0.6
South Asia	3,216	-0.8
West Asia	8,705	0.0
North Africa	12,959	0.0
Central Africa	1,800	-0.8
South Africa	470	0.0
Others	10,026	0.0

a
Source: U.S. Department of Agriculture, a,b, and c.

b
Source: Holland and Sharples, 1984.

TABLE 2
Estimated Base Period Transportation Costs[a]

Importer	Exporter								
	Canada	United States	Argentina	EEC-10	West Europe	Australia	Other	U.S. PL 480[b]	U.S. GSM
					$/MT				
Central America	15.62	13.14	20.31	16.18	20.23	22.25	16.00	19.97	13.14
Brazil	16.99	13.20	12.14	16.18	20.23	22.25	20.00	30.36	13.20
Other S. America	18.61	12.86	16.59	17.56	20.23	20.88	19.00	28.41	12.86
EEC-10	10.68	11.73	20.47	-	9.71	26.87	10.00	26.90	11.73
West Europe	12.46	16.10	20.23	9.71	-	32.04	10.00	37.03	16.10
East Europe	12.95	15.15	20.72	9.95	10.11	22.66	8.00	34.04	15.15
Soviet Union	13.19	16.02	20.31	12.14	12.14	15.94	8.00	36.05	16.02
Peoples Rep. China	22.82	23.25	28.48	24.28	28.32	18.77	25.00	53.48	23.25
Japan	16.43	12.25	21.12	21.69	24.28	14.73	20.00	28.18	12.25
East Asia	21.52	15.29	27.51	24.28	28.32	18.77	25.00	34.47	15.29
Southeast Asia	31.40	26.70	22.25	28.40	32.37	17.15	28.00	61.41	26.70
South Asia	29.94	27.12	21.69	31.56	32.37	22.66	32.00	63.98	27.12
West Asia	19.02	11.19	25.73	14.65	16.18	28.56	18.00	22.82	11.19
North Africa	21.44	21.35	21.85	11.81	12.14	26.14	16.00	50.63	21.35
Central Africa	25.25	31.12	23.06	25.57	24.28	26.62	26.00	76.03	31.12
South Africa	28.65	15.00	25.97	28.32	28.32	20.88	30.00	57.61	15.00
Others	20.00	22.00	23.00	19.00	19.00	25.00	24.00	50.60	22.00

[a]Compiled from unpublished data furnished by Sharples.

[b]Average (blended) transportation cost with 65 percent cargo preference requirement.

different as to whether to make commercial or GSM sales. However, the PL 480 surplus supply elasticity is different. Each fiscal year, the U.S. government allocates limited funds for PL 480 wheat exports. If the price of wheat varies, the fund remains unchanged, indicating an opposite proportional variation in quantity.[3] Thus, the PL 480 excess supply elasticity was assumed at 1.0 (or unity). PL 480 freight costs were assumed to be paid from U.S. funds allocated for shipments. Interactions of the model's excess supply and demand in the world impacted slightly on the PL 480 sector, i.e. total cost for PL 480 (grain plus transportation costs) varies slightly across simulations.

Transportation costs between exporters and importers were furnished by Sharples (1986) (Table 2). However, transportation costs associated with shipping on American flag vessels are higher than on foreign flag vessels. Reported 1982-1985 costs of shipping on foreign and U.S. flag vessels between U.S. ports and the 17 importing regions were analyzed to estimate the ratios of U.S. to foreign flag vessel cost by importing region. Blended transportation costs between U.S. and foreign ports were then estimated for each assumed cargo preference level (Table 3). The weighted average ratio of U.S. to foreign shipping coasts was used to estimate costs for missing data. We assumed foreign flag vessels would not change rates as the level of U.S. cargo preference shifts.

VI. CARGO PREFERENCE ASSUMPTIONS

Recent legislation stipulates that increasing increments of PL 480 sales (>50 percent) be shipped on American vessels. This level rises to a maximum of 75 percent in 1988. The Department of Transportation (DOT) is required to finance the increased freight charges incurred in any fiscal year resulting from the increased preference requirement. If funding is not budgeted and the DOT cannot fund the increased costs, a snapback provision will take effect. That provision requires that the pre-1986 cargo preference level, 50 percent, become applicable. Exports under the CCC Export Guarantee Program (GSM) would not fall under this requirement. However, in the event the courts or Congress includes the GSM program under the cargo preference requirement, importers would have to pay the additional cost of shipping half of their purchase on U.S. vessels—a requirement that may offset the benefits of the GSM program, rendering it inoperable. Because there are several possible outcomes resulting from recent legislation, this study focuses on six different cargo preference scenarios:

1) 50 percent cargo preference requirement on PL 480 sales.
2) 65 percent cargo preference requirement on PL 480 sales.
3) 75 percent cargo preference requirement on PL 480 sales.
4) 50 percent cargo preference requirement on PL 480 and GSM sales.
5) 50 percent cargo preference requirement on PL 480 sales, GSM program inoperable, and no assumed change in importers demand.
6) Same as (5) but importer's demand is assumed to decline by average GSM sale levels.

These six cargo preference arrangements were programmed assuming U.S. and world wheat trade levels consistent with 1985/86-1986/87 excess supply elasticities.

TABLE 3
Estimated Transportation Rate from U.S. Ports to World Markets.

Country/Region	Foreign Vessels (1)	American Vessels (2)	Average Transportation Costs 50% cargo preference	65% cargo preference	75% cargo preference	1982/85 Ratio American to Foreign Rate
	$/Metric Ton					
Central America	13.14	23.65	18.40	19.99	21.02	1.80
Brazil	13.20	39.60	26.40	30.36	33.00	3.00 a
Other South America	12.86	36.78	24.82	28.41	30.80	2.86
EEC Importers	11.73	35.19	23.46	26.98	29.32	3.00 a
Other W. Europe Importers	16.10	48.30	32.20	37.03	40.25	3.00 a
Eastern Europe	15.15	45.45	30.30	34.84	37.83	3.00 a
Soviet Union	16.02	48.06	32.04	36.85	40.05	3.00 a
China	23.25	69.75	46.50	53.48	58.12	3.00 a
Japan	12.25	36.75	24.50	28.18	30.62	3.00 a
East Asia	15.29	44.80	30.04	34.47	37.42	2.93
South East Asia	26.70	80.10	53.40	61.41	66.75	3.00 a
South Asia	27.12	83.80	55.46	63.96	69.63	3.09
West Asia	11.19	29.09	20.14	22.82	24.62	2.60
North Africa	21.35	66.40	43.80	50.63	55.14	3.11
Central Africa	31.12	100.21	65.66	76.03	82.94	3.22
South Africa	15.00	80.55	47.78	57.61	64.18	5.37
Others	22.00	66.00	44.00	50.60	55.00	3.00 a

a No American vessel rates reported. Ratio based on weighted average of rates reported for both foreign and American vessels.

VII. RESULTS

The results involve two main sections—one which includes outcomes where the level of cargo preference is varied on PL 480 exports only and the other where the GSM program is part of the cargo preference requirement. Each main section includes subsections. Because recent legislation requires increasing increments of PL 480 sales to be shipped on American vessels, the assumptions which involve a 50, 65, and 75 percent cargo preference requirement are contrasted. This comparison is included in one subsection. Concern has been expressed by some that the GSM program may eventually be included under the cargo preference program. An evaluation of this event with three assumptions on GSM importer responses is presented.

A. Cargo Preference on PL 480 Sales

PL 480 wheat exports averaged 4.4 million metric tons during 1985/86-1986/87. Prior to implementation of the 1985 farm bill 50 percent of these quantities were shipped on American flag vessels. This proportion increases incrementally through time to 75 percent by 1988. The 50 percent level of cargo preference is used as a basis for comparison with the other scenarios.

50 Percent Cargo Preference:

Including the 50 percent cargo preference requirement on PL 480 exports increases revenues to the U.S. maritime industry $94 million above the cost of shipping the wheat on foreign flag vessels. The model estimates world wheat trade at 85,569,000 metric tons and a CIF price of $137.17 per metric ton (Table 4). An estimated 4,669,000 metric tons would be exported under PL 480 while other U.S. and world exports total 80,900,000 metric tons. With these assumptions U.S. wheat export value totals $3,121 million. It would cost $517 million to transport U.S. wheat to importing countries (Table 4). The value of U.S. PL 480 wheat exports and shipping costs equal $721 million.

50 vs. 65 Percent Cargo Preference:

Expanding the cargo preference requirement to 65 percent on U.S. PL 480 exports increases revenues to the U.S. maritime industry $121 million over the charges associated with shipping the wheat on foreign flag vessels, a 29 percent increase over the 50 percent cargo preference requirement. This increase in cargo preference lowers total world exports to 85,558,000 metric tons and raises average world CIF price to $137.56 per metric ton. Non-U.S. wheat exports increase 21,000 metric tons. The decline in PL 480 exports, 101,000 metric tons, more than offsets the increase in U.S. commercial (47,000 metric ton) and GSM (22,000 metric ton) exports. The shift in U.S. export prices was not enough to offset the overall drop in U.S. exports, accordingly, the value of U.S. wheat exports declined $11 million. Government expenditures on PL 480 rise slightly with the increase in cargo preference.

50 vs. 75 Percent Cargo Preference:

Increasing the cargo preference requirement from 50 to 75 percent on PL 480 exports lowers total U.S. exports 38,000 metric tons but increases transportation cost of these exports from $190 to $234 million. The U.S. maritime industry receives $139 million above the charges associated with shipping the wheat at competitive foreign flag rates. Commercial and GSM exports increase, but not enough to offset reductions in PL 480 exports. The added cost of American vessels lower PL 480 exports. Value of U.S. wheat exports drop $12 million. Transportation costs for all U.S. wheat exports increase from $517 million to $562 million. Government program costs increase $20 million. Exports from other countries increase 25,000 metric tons, absorbing most of the

TABLE 4
Impact of Alternative Cargo Preference Policies.

Item	Cargo Preference on PL 480 at 50%	Cargo Preference on PL 480 at 65%	Cargo Preference on PL 480 at 75%	Cargo Preference on PL 480 and GSM, GSM Inoperable, Demand Unchanged	Cargo Preference on PL 480 and GSM, GSM Inoperable, Demand Lower	GSM Operable
			1,000 Metric Ton			
EXPORTS:						
United States						
Commercial	14,446	14,493	14,496	21,105	17,203	14,572
PL 480	4,669	4,568	4,558	4,669	4,415	4,692
GSM	6,659	6,681	6,682	-	-	6,414
Total	25,774	25,742	25,736	25,774	21,618	25,678
O. Exporters	59,795	59,816	59,820	59,795	58,820	59,855
World	85,569	85,558	85,556	85,569	80,438	85,533
			Dollars/Metric Ton			
PRICE:						
United States						
Commercial	122.69	122.90	122.91	122.69	110.30	123.95
PL 480	113.74	111.27	111.04	113.74	106.98	114.30
GSM	122.69	122.90	122.91	-	-	117.43
World FOB	119.64	119.71	119.71	119.64	110.24	119.75
World CIF	137.17	137.56	137.78	137.17	127.76	138.54
			Million Dollars			
VALUE OF WHEAT:						
United States						
Commercial	1,773	1,781	1,781	2,590	1,897	1,796
PL 480	531	508	506	531	472	536
GSM	817	821	822	-	-	753
Total	3,121	3,110	3,109	3,121	2,369	3,085
O. Exporters	7,116	7,132	7,133	7,116	6,498	7,157
World FOB	10,237	10,242	10,242	10,237	8,867	10,242
World CIF	11,738	11,179	11,738	11,738	10,272	11,850
			Million Dollars			
TRANSPORTATION COSTS:						
United States						
Commercial	215	215	216	327	253	217
PL 480	190	216	234	190	185	191
GSM	112	112	112	-	-	216
Total	517	543	562	517	438	623
World	1,501	1,527	1,546	1,501	1,409	1,608
SUBSIDY TO U.S. MARITIME INDUSTRY:						
PL 480	94	121	139	94	92	94
GSM	0	0	0	-	-	107
Total	94	121	139	94	92	201

loss in U.S. exports. FOB world price increases slightly yielding a modest rise in quantities supplied by other exporting countries.

B. Cargo Preference on PL 480 and GSM Programs

There is concern that GSM exports may eventually be included under the cargo preference requirement. Because of uncertainties regarding the effects of expanding the cargo preference requirement to include the GSM program, three different scenarios are examined.

50 Percent Cargo Preference on GSM:

If 50 percent of GSM sales had to be shipped on American flag vessels, the U.S. maritime industry would receive payments which exceed the charges foreign flag vessels by about $201 million—$94 million from PL 480 and $107 million from GSM exports. The additional shipping cost of PL 480 exports would be paid by the importers using the program. U.S. wheat exports total 25,678,000 metric tons and are valued at $3,085 million (Table 4). World exports were estimated at 85,533,000 metric tons with an export value of $10,242 million. Government program cost plus value of PL 480 sales and transportation cost equals $741 million. Should the advantage of the GSM program to importers be less than the added cost of the assumed 50 percent cargo preference requirement, then importers probably would not use the GSM program, rendering it inoperable. If this happens, the question of whether these importers could find credit for their purchases is relevant. Two scenarios concerning an inoperable GSM program and resulting import demand are contrasted below with an operable GSM program.

Inoperable GSM, Demand Unchanged:

If the 50 percent cargo preference level is required on all governmentaided exports and the GSM program is rendered inoperable due to its added cost, the U.S. maritime industry would lose returns compared to an operable GSM program regardless of what happens to the demand of the former users of the GSM program. However, the U.S. wheat industry gains provided the demand for GSM exports can be shifted to effective commercial exports. Total U.S. wheat exports increase 96,000 metric tons with an increased value of $36 million. Government program costs decline $6 million, $727 to $721 million. Total value of world wheat exports decline $5 million. Importers benefit with reduced cost ($107 million) and total CIF wheat value declines from $11,850 million to $11,738 million.

Inoperable GSM, Demand Lowered:

An inoperable GSM program under the cargo preference requirement could trigger a lower world demand for wheat if importing countries that use the GSM program cannot find another credit source. U.S. wheat exports drop 16 percent as compared to the scenario with a 50 percent cargo preference on PL 480 and GSM sales. However, exports from non-U.S. exporters decline only 2 percent. Most of the decline in world exports would be borne by the United States wheat industry through a decline in demand and lower wheat prices. Thus, the sharp decline in U.S. wheat exports coupled with a decline in prices lowers the value of U.S. wheat exports 23 percent, $3,085,000 to $2,369,000. Subsidy to the U.S. maritime industry would decline from $201 million to $92 million. Thus, if the GSM program becomes inoperable and countries historically participating in this program are unable to secure alternative funding sources, the U.S. wheat and maritime industries are both dramatically impacted. Including the GSM program under the cargo preference requirement is to the advantage of the U.S. maritime industry provided the GSM program remains viable. If the GSM program is not viable because of the added cost of shipping on American vessels, then the U.S. maritime industry subsidy falls to a much lower level. The impact of an inoperable GSM program on the U.S. wheat industry depends upon what happens to demand for wheat imports in the GSM importing nations. Should these countries not be able to purchase wheat, the U.S. wheat industry and the world wheat exporters face a sharp decline in exports, price, and export value. The U.S. would absorb a larger portion of these declines than non-U.S. wheat exporters.

VIII. CONCLUSIONS

Cargo preference, the requirement that a portion of a country's waterborne commerce be carried in its own vessels, can affect a country's level of exports, export prices, and revenue from exports if that country's vessel costs are high. Shipping costs on U.S. vessels are 2.5 to 3 times of many other countries, accordingly U.S. wheat exports and wheat producers are unfavorably impacted, as are wheat importing nations. However, other exporting countries benefit when the United States imposes cargo preference requirements.

Under the 1985 farm bill, the Secretary of Transportation is required to finance increased ocean freight charges above the 50 percent cargo preference level. If funding is not obtained, the 1985 farm bill requires the original 50 percent requirement of section 901(b) of the Merchant Marine Act of 1936 to resume effect. This provision reduces the proportion of grain moving under cargo preference, but opens the door for possibly other programs coming under cargo preference requirements. Revenues to the U.S. maritime industry are maximized when a portion of all government-aided exports are required to move on U.S. vessels provided these program remain viable. If the GSM program is included under cargo preference policy, then U.S. wheat exports, export prices and total value of wheat exports would decline compared to that situation where only PL 480 sales are included in the cargo preference requirement.

If the GSM program is included under cargo preference requirements, but becomes inoperable, and

import demand is unchanged, then U.S. exports and export value increases, but revenue to the U.S. maritime industry is reduced. However, should users of the GSM program not be able to obtain credit for their imports (i.e., effectively lowering their excess demand) the value of world wheat trade declines sharply. The U.S. wheat industry would bear a major portion of this negative impact.

ENDNOTES

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1. More details on the VSM algorithm can be obtained from reports by Holland and Sharples; Holland; Kuhn and MacKinnon; Zangwill and Garcia.
2. Elasticity of excess supply expresses the percentage change in quantity supplied for export in response to a one percent change in export price, other factors held constant. In the short run it may be estimated as follows:

$$Ex = \frac{(Qc)(Ec) + (Qd)(Ed)}{-Qx}$$

Where Ex = elasticity of excess supply
Ec = carryover or ending stacks
Qd = quantity of domestic use
Ed = elasticity of demand for domestic use
Qx = quantity exported

3. The Government, through a political process, can change the level of funds available for PL 480 wheat exports. This would impact on the model solutions. However, we assumed the allocated funds would not change appreciably for this shortrun comparative analysis.

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