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Evaluation of Export Enhancement, Dollar Depreciation, and Loan Rate Reduction for Wheat

Stephen L. Haley

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EVALUATION OF EXPORT ENHANCEMENT, DOLLAR DEPRECIATION, AND LOAN RATE REDUCTION FOR WHEAT, by Stephen L. Haley, Agriculture and Trade Analysis Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 89-6.

ABSTRACT

This report evaluates the effect of export enhancement, dollar depreciation, and a 5-percent loan rate reduction on U.S. wheat exports for the 1986/87 crop year. Depending on one's interpretation of the European Community's motivation for its own targeted subsidy program, U.S. export enhancement bonuses have likely increased the U.S. price of wheat between 7 and 22 percent, U.S. wheat export volume between 10 and 31 percent, and U.S. wheat export revenue between 18 and 61 percent. Together, a 5-percent loan rate reduction and a change in the real value of the dollar corresponding to the actual change between the fall of 1986 and 1987 would have increased U.S. wheat export volume by over 5 percent and U.S. export revenue by over 6 percent. The loan rate reduction causes a greater response in expanding wheat sales, but the exchange rate change is potentially more important for increasing U.S. wheat export revenue. The EC's comparative disadvantage in world wheat trade makes it extremely vulnerable to policies of the United States and to currency realignments.

Keywords: export enhancement, spatial equilibrium model, international trade, wheat

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Evaluation of Export Enhancement, Dollar Depreciation, and Loan Rate Reduction for Wheat

Stephen L. Haley

INTRODUCTION

There has been a dramatic turnaround in U.S. wheat exports during the past 2 years (1).[1] Wheat exports bottomed out at 24.9 million metric tons in the 1985/86 crop year. Export volume increased over 9 percent to 27.3 million metric tons in 1986/87 and increased 59 percent to 43.3 million metric tons in 1987/88. U.S. world market share increased from 31 percent in 1986/87 to over 41 percent in 1987/88. U.S. wheat stocks declined by 30 percent, a sign of growth in the export market.

There have been a number of factors cited to explain the turnaround. Some of these factors have resulted from changes in U.S. farm policy. The Food Security Act (FSA) of 1985 provided for lower loan rates, steady target prices, and a targeted export subsidy program (Export Enhancement Program--EEP). Other factors contributing to the turnaround include a depreciation in the value of the U.S. dollar and production shortfalls outside the United States. A problem for policymakers has been to sort out the relative contribution of each of these factors to the turnabout. More knowledge of the contribution of each of these factors can aid policymakers in the design of policy.

This study assesses the relative effect of EEP, dollar depreciation, and a lower loan rate on U.S. wheat exports. The period of analysis is the 1986/87 July-June crop year. The methodology is based on a single-commodity spatial equilibrium model. The model incorporates the major features of U.S. and European Community (EC) agricultural policy. For the United States, these policies include targeted export bonuses, the target price, the loan rate, required acreage set-aside program, PL-480 food aid/credit program, and the GSM-102 credit guarantee program. For the EC, the policies consist principally of wheat export restitutions. Analysis consists of changing one or more of the assumptions underlying the base model. A change in any assumption provides a "shock" to the model which forces it to adjust to a new equilibrium. The analysis proceeds by comparing the altered equilibrium solution with the base solution.

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[1] Underscored numbers in parentheses refer to sources listed in the References.

THE BASE MODEL

The Spatial Equilibrium Model

The spatial equilibrium model has been in use for some time. Sharples and Dixit (10) and Holland (5) provide a concise mathematical exposition. Thompson (11) reviews previous studies based on the spatial approach. A number of assumptions are made to make the spatial approach relevant to this study:

(1) Wheat is a homogeneous commodity, not differentiated by variety or by country of origin.

(2) A fixed per unit transport cost exists for wheat shipped from region "a" to region "b." The supply of transport services is perfectly elastic.

(3) World wheat trade is in equilibrium for the 1986/87 crop year.

(4) Importers are risk neutral. They do not diversify their wheat purchases among several suppliers to spread risk.

Export and import behavior are functions of price alone. No account is taken of prices of closely related products. Total exports of a country are the sum of shipments to individual importing countries. Likewise, total imports of a country are the sum received from exporting countries. Export and import prices are related by the following equation:

$$e_j(p_j - t_j) \leq e_i(p_i - s_{ij}) + tr_{ij} \qquad (1)$$

where:

p_j is the c.i.f. price of importing region j, U.S. dollar/metric ton (mt),

p_i is the f.o.b. price of exporting region i, U.S. dollar/mt,

e_i and e_j are exchange rates of regions i and j relative to the U.S. dollar,

s_{ij} is a unit export subsidy targeted by i to j,

t_j is a (uniform) import tariff for j, and

tr_{ij} is the metric ton cost of transporting wheat from i to j.

When there is trade between two countries, the dollar import price is equal to the dollar export price adjusted for tariffs, subsidies, and transport costs (unless there is a binding suboptimal trade agreement between the two countries). When there is no trade, the equation becomes a strict inequality; that is, the importing country imports its wheat from a less costly exporter.

If an exporter targets a particular importer with a subsidy, it changes the price linkage relationship between the two countries. A subsidy acts like a reduction in the cost of transporting wheat from the exporter to the importer. Unless

excess demand is perfectly inelastic, the importer increases its wheat purchases at a lower import price when the subsidy is offered. Increased purchases drive up the subsidizing exporter price. If two exporters ship wheat to the same importer, their export prices will differ by the difference in their respective costs of transferring wheat to that importer. A subsidy will change the preexisting relationship between the importer's and competitor's price. The subsidy forces the competitor out of that market and into a less advantageous trade relationship with another importer. The subsidy, therefore, allows the subsidizing country to raise its border price without the price of the competitor rising as well.[2]

The 21 regions in the model are listed in table 1. Except for the United States and the EC, net trade of a region is a function of the domestic price of wheat in a reduced-form net trade equation. The net trade equation is derived from underlying supply and demand equations for wheat. For the United States and the EC, production and consumption are modeled explicitly through the supply and demand equations. For the United States, this formulation allows the producer and consumer price of wheat to differ. For the EC, the formulation permits it to change from a net exporter to a net importer given certain policy changes.

Supply and demand elasticities used in this study are from the Economic Research Service trade liberalization model (4). Supply and demand elasticities were used to calculate net trade elasticities except in the cases of the United States and the EC. For minor wheat exporters (Other Western Europe and Saudi Arabia), excess supply has been made perfectly inelastic; that is, factors determining excess supply are assumed to be exogenous. In like fashion, excess demand for small importers (Mexico and South Asia) has been made perfectly inelastic. The rest of the world is treated as a residual importer in the base to get total excess supply to equal total excess demand. Model elasticities are reported in table 8.

Transport rates reported in table 2 are unweighted averages calculated from (2). In certain cases where specific quotations were not available, the rates were interpolated from (10).

U.S. Targeted Subsidies

The model accounts for the EEP and two other targeted export programs: PL-480 and GSM-102. Sales under export enhancement and bonus amounts were compiled from the U.S. Wheat Associates letters (13). The quantity sold

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[2] As formulated, the model treats export enhancement bonuses as cash subsidies. In actual operation, traders receive the bonuses in terms of generic certificates that are redeemable for Commodity Credit Corporation (CCC) commodities. Traders may sell certificates for cash or redeem them for any CCC commodity (not necessarily wheat). Houck notes that an in-kind subsidy causes the release of stocks which is both price-depressing and depressing of commercial sales (6). To get the same price and quantity result as a cash subsidy, the unit level of the in-kind subsidy must be higher than the cash subsidy. The model used in this report may, therefore, overestimate the effectiveness of the EEP. But one must keep in mind that the wheat EEP does not act as a pure in-kind subsidy program (because the certificate need not be redeemed for wheat). A more thoroughly specified model would be multicommodity in nature. It would allow certificates issued for wheat bonuses to be redeemable for other CCC commodities.

Table 1--Region names and composition

Region or country	Composition
United States	United States
European Community	Belgium, Britain, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain
Canada	Canada
Australia	Australia
Argentina	Argentina
Other Western Europe	Austria, Finland, Iceland, Malta, Norway, Sweden, Switzerland
Saudi Arabia	Saudi Arabia
Eastern Europe	Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania, Yugoslavia
Soviet Union	Soviet Union
China	China
Brazil	Brazil
Mexico	Mexico
Other Latin America	All Latin America except Argentina, Brazil, and Mexico
North Africa	Algeria, Egypt, Libya, Morocco, Tunisia
Africa	All African countries except those in North Africa
West Asia	Bahrain, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, North and South Yemen, Oman, Qatar, Syria, Turkey, United Arab Emirates
South Asia	Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka
Southeast Asia	Burma, Cambodia, Laos, Vietnam, Thailand
East Asia	Brunei, Hong Kong, Indonesia, Malaysia, Korea, Papua-New Guinea, Philippines, Singapore, Taiwan, Western Samoa
Japan	Japan

multiplied by the per unit bonus produces the total export enhancement subsidy. PL-480 and GSM-102 shipments were compiled from a Foreign Agricultural Service publication listing completed sales under these programs by value (3). The quantity sold or donated under PL-480 for the first 3 months of the crop year was calculated by dividing the value of sale/donation by $132.72. The quantity for the next 9 months was calculated by dividing by $111.94. These prices are average border prices for each of the periods. All PL-480 shipments were treated as donations. In other words, the total value of the shipment counts as a subsidy (or transfer) from the United States to the recipient country. For the GSM-102 program, the value of the guaranteed sale amount was multiplied by 0.12 to arrive at the subsidy. This fraction represents the ratio of claims (either paid or rescheduled) made against the program to the value of credit guaranteed for fiscal years 1981-85.

The value of each of the subsidies was added for each of the regions. This amount was divided by the quantity sold by the United States to the region to arrive at a per-unit subsidy. Also calculated was the percentage contribution of each of the programs to the total. This information is reported in table 3 in the first four columns. The fifth column reports the per-unit subsidy, subtracting out the portion attributable to export enhancement.

Table 2--Transport rates

Importers	Exporters				
	United States	European Community	Canada	Australia	Argentina
	Dollars per metric ton				
Eastern Europe	10.94	8.58	11.88	24.50	22.50
Soviet Union	14.50	13.00	19.75	24.50	20.38
China	21.57	21.39	17.33	13.92	23.23
Brazil	13.53	13.42	19.00	23.00	16.76
Mexico	10.18	18.00	13.33	15.75	15.17
Other Latin America	13.64	17.83	16.03	23.00	22.59
Africa	38.07	30.88	35.50	38.25	35.63
North Africa	17.56	14.60	20.25	27.64	33.38
West Asia	17.58	13.81	20.43	18.89	29.70
South Asia	21.48	20.36	18.43	15.38	19.50
Southeast Asia	21.90	19.00	21.90	21.42	32.12
East Asia	16.42	19.38	13.95	17.38	30.64
Japan	15.56	21.33	15.83	15.43	24.02
United States	-36.47	100.00	100.00	100.00	100.00
Rest of world	20.00	20.00	20.00	20.00	20.00

Equation 1 shows that a targeted subsidy acts like a reduction in the unit transport costs between two regions. The model's base solution is determined by subtracting the targeted subsidy from the corresponding transport cost, and then allowing for the model to solve for an equilibrium. The constant term is adjusted to yield a base solution close to actual production/trade levels for the 1986/87 crop year. The effect of removing the EEP subsidies can be seen by subtracting the fifth column of table 3 from the transport costs instead of the fourth column, and then solving for a new equilibrium.

U.S. Deficiency Payments and Acreage Set-Asides

U.S. target price and loan rates have implications for U.S. wheat exports. The difference between the target price and the higher of the onfarm price or loan rate constitutes the per-unit deficiency payment.[3] Eligibility for participation in the U.S. programs requires a retirement of acreage base from production for the crop year. The deficiency payment is a producer subsidy because the farmer receives a return greater than the market price of the crop. The set-aside requirement taxes farmers because it restricts their production (although they may crop more intensively on the remaining base, and nonparticipating farmers may increase their wheat acreage).

Table 3--U.S. targeted assistance
for wheat exports, 1986/87

| Target | Contribution of various forms of targeted assistance | | | Per unit subsidy | |
	EEP	PL-480	GSM-102	Total	Less EEP
	--- Percent ---			-- Dollars per metric ton --	
Eastern Europe	100	0	0	31.27	0
Soviet Union	100	0	0	42.68	0
China	100	0	0	34.25	0
Brazil	0	0	100	9.71	9.71
Other Latin America	0	96	4	35.34	35.34
Africa	14	86	0	47.45	40.81
North Africa	40	51	9	69.01	41.41
West Asia	58	18	24	30.49	12.81
South Asia	8	92	0	66.08	60.79
East Asia	0	73	27	19.37	19.37

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[3]See Paarlberg and others (9) for a concise explanation of the trade effects of various domestic programs.

The model handles deficiency payments and the set-aside as follows. The target price for the 1986/87 crop year was $4.38/bushel, and the set-aside requirement was 22.5 percent. An adjusted target price was calculated by multiplying 1 less 0.225 times $4.38. The metric ton equivalent is $124.47. This amount less the loan rate of $88/mt is $36.47. This amount forms a wedge between the model's producer price and consumer price. It is assumed that all wheat farmers participate in the program. U.S. production and consumption are modeled explicitly, as mentioned previously. In the model, the United States is modeled as an exporter and importer of wheat. To capture the effect of the deficiency payment, we set the transport cost between the United States as producer and as consumer to -$36.47. This wedge means that the consumer price is always $36.47 less than the producer price. The negative transport cost assures that the United States "imports" wheat only from itself.

A reduction in the loan rate is modeled as an increase in the wedge between the producer and consumer prices. The loan rate reduction acts as a reduction in transport costs from the United States to all importers. For instance, a 5-percent reduction in the loan rate decreases U.S. transport costs by $4.40. The reduction increases the domestic producer-consumer price wedge by $4.40 to $40.87. The effect of the loan rate reduction is to increase domestic and foreign wheat consumption. Because the model does not deal explicitly with flows in and out of public stocks, implications of the loan rate change on public stock levels cannot be made on the basis of the model's solution.[4]

EC Export Restitutions

The EC supports its domestic wheat price by setting an intervention price at which domestic producers may sell their wheat above the world price (8). Quantities not consumed domestically are sold in the international market at prevailing world prices. The difference between the world price and the EC intervention price constitutes the export restitution. The net prices of EC milling and feed wheat to the foreign buyer are $90/mt and $73/mt, respectively, according to FAS (3). These prices imply a base restitution or subsidy of about $170/mt. In other words, EC producers receive approximately $260/mt for milling wheat and $243/mt for feed wheat.

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[4] Flows in and out of public stocks are usually modeled as very price responsive (9). It is possible to reinterpret the U.S. portion of the model to better account for public stock flows. The base production and consumption elasticities imply a U.S. wheat trade elasticity of 1.69. If U.S. production were fixed at the base value for all scenarios involving changes in EEP, exchange rates, and the loan rate, the base consumption elasticity would have to equal 1.47 to maintain the trade elasticity at 1.69. This relatively elastic consumption response more nearly mimics changes in stocks due to changes in the price of wheat. The base model was adjusted to reflect this alternative specification, and all scenarios described in this report were run to judge the sensitivity of the model to the altered interpretation. In all scenarios, the results were close to if not equal to those described in the body of this report. If one is willing to accept a U.S. trade elasticity in the neighborhood of 1.69, then reliance on changes in stocks rather than in production and consumption as an explanation for U.S. wheat export behavior is justified. Also see footnote 2.

Table 4--Calculation of EC targeted subsidies

Region/country	Date of sale	Quantity sold	Commodity	Unit price	Target	Value of target
		1,000 metric tons		Dollars per metric ton		1,000 dollars
Soviet Union	1/08/87	2,000	Wheat	76.00	14.00	28,000.00
Brazil	8/08/86	25	Wheat	90.70	-.70	-17.50
	10/30/86	25	Wheat	73.45	16.55	413.75
	10/30/86	100	Wheat	76.98	13.02	1,302.00
	2/11/87	75	Wheat	85.50	4.50	337.50
	4/03/87	75	Wheat	83.49	6.51	488.25
	4/10/87	25	Wheat	84.40	5.60	280.00
	5/27/87	50	Wheat	82.25	7.75	193.75
	6/04/87	25	Wheat	81.50	8.50	212.50
	6/11/87	25	Wheat	79.75	10.25	256.25
	6/25/87	25	Wheat	80.27	9.73	243.25
	6/25/87	25	Wheat	78.85	11.15	278.75
Total		475			8.40	3,988.50
Colombia	4/02/87	25	Wheat	108.00*	-.17	-4.25
	4/03/87	25	Wheat	111.20*	-3.37	-84.25
	4/10/87	10	Wheat	85.50	4.50	45.00
	5/12/87	20	Wheat	86.20	3.80	76.00
	5/13/87	50	Wheat	88.00	2.00	100.00
Total		130			1.02	132.50
North Africa:						
Algeria	10/28/86	200	Soft	63.50	26.50	5,300.00
Egypt	11/20/86	375	Soft	80.00	10.00	3,750.00
	5/08/87	50	Wheat	90.50*	14.10	705.00
	6/18/87	150	Wheat	75.00	15.00	2,250.00
	6/19/87	22	Wheat	91.00	-1.00	-22.00
Total		797			15.04	11,983.00
West Asia:						
Turkey	9/08/86	50	Wheat	82.75	7.25	362.50
	11/26/86	100	Wheat	67.00	23.00	2,300.00
	12/03/86	100	Wheat	67.00	23.00	2,300.00
Syria	11/25/86	400	Wheat	81.78	8.22	3,286.40
Israel	1/09/87	15	Wheat	58.75	31.25	468.75
Total		665			13.11	8,717.65
East Asia:						
Korea	10/28/86	50	Feed	72.20	.80	40.00
Philippines	2/20/87	25	Wheat	90.40*	18.98	474.50
Total		75			6.86	514.50

* price : c&f

The model incorporates export restitutions by making adjustments to EC-foreign country transport costs. Unlike the U.S. case (in terms of the model as well as real world), there is no distinction between EC producer and consumer prices. Therefore, the transport cost between the EC as exporter and importer is set to zero. It is assumed that the EC exports its wheat at about one-half the cost of producing it. If the average price to the foreign buyer is $90/mt, then the average cost of production is $180/mt. The difference between this amount and what the farmer receives is treated as a rent payment which has no effect on the level of wheat production. This assumption produces a reasonable lower bound on the degree to which the EC subsidies distort the world wheat market. Without any specific EC targeting of subsidies, EC-foreign country transport costs from table 2 are reduced by $90 in the model.[5]

The transport cost adjustment described above is assumed to capture the uniform nature of EC restitutions. However, the EC targets its subsidies to meet competitive pressures from other exporters, especially the United States. The targeted subsidies can imply a pattern of trade different from that implied by uniform subsidies alone. The EC, however, generally does not reveal the terms of its sales. Lack of knowledge of target amounts presents problems for the modeler. However, there is information that can be used to get around this problem. FAS compiles monthly industry reports on the terms of significant wheat sales (3). A listing of these sales for the crop year 1986/87 is reported in table 4. The sales are organized by region. The date of the sale, the quantity sold, whether the wheat was of milling variety or feed,

Table 5--Targeted EC subsidies

Region	Amount
	Dollars per metric ton
Soviet Union	14.00
Brazil	8.40
Other Latin America	1.02
North Africa	38.16
West Asia	13.11
East Asia	6.86

[5] Most model results do not change if the higher restitution figure of $170/mt is used instead of $90/mt. Although the EC-importer transport costs are further reduced by $80/mt, the constant terms in the EC production and consumption equations are revised to give the same base solution. The only significant effect of using the higher subsidy figure involves the scenario where the EC eliminates all wheat restitutions and is allowed to import wheat. The model result is that the EC will import over 17 million metric tons of wheat if there were no restitutions. This import level is probably much too high given the number of fixed resources currently engaged in EC wheat production. To yield more plausible results, the uniform subsidy of $90/mt was used in this report.

and the unit f.o.b. (unless otherwise noted) price are shown.

For milling wheat, the difference between the unit price and reported net price to the foreign buyer ($90) constitutes a targeted subsidy in excess of the uniform subsidy amount (also $90). For feed wheat, the net price to the foreign buyer is $73. For instances where the unit price is not f.o.b., an adjustment is made for the transport cost in arriving at the amount of the targeted subsidy. The total value of the targeted subsidy for each sale is in the last column of the table. For each region, the sum of individual targeted subsidies is divided by the sum of reported sales to arrive at an average subsidy per mt. This number is shown in table 4 and is also summarized in table 5. The EC targeted subsidy to North Africa had to be revised upward from $15.04 to $38.16 (above the base subsidy of $90/mt) to generate an accurate trade flow between the EC and North Africa in the base solution. In the base model, all EC sales to the listed regions are assumed to have been made, incorporating uniform and calculated targeted subsidies.

Trade Flow Constraints

There were a number of long-term trade agreements (LTA's) in force for the 1986/87 crop year. These trading agreements set minimum trade flows between the contracting exporters and importers and should be recognized in the base solution to the model. The lower trade bounds are listed in table 6. The sources of these data are the International Wheat Council and FAS (3, 14).

Table 6--Wheat trade flow constraints

Importers	Exporters					
	United States	European Community	Canada	Australia	Argentina	Saudi Arabia
	1,000 metric tons					
Eastern Europe	-	-	-	-	50	-
Soviet Union	4,000	-	5,000	-	-	-
China	1,000	-	-	-	-	-
Brazil	-	-	750	-	1,400	-
Mexico	-	-	-	-	-	-
Other Latin Am.	1,305	-	-	-	900	-
Africa	677	-	-	-	-	-
North Africa	1,901	800	750	2,000	-	200
West Asia	89	-	-	895	-	-
South Asia	607	-	-	-	-	50
Southeast Asia	-	-	-	-	-	-
East Asia	1,069	-	-	-	-	50
Japan	3,206	-	600	450	-	-
European Com.	-	-	-	-	-	820

- = no trade flow restriction

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LTA's constitute only a portion of minimum trade flows between the United States and importing regions. LTA's cover all U.S. wheat exports to the Soviet Union (4 million metric tons) and China (1 million metric tons) and a portion of wheat exports to East Asia (570,000 mt). All other commitments, except to Japan, represent actual PL-480 shipments which are assumed not to change in any of the model scenarios. The model's lower bound on U.S.-Japanese wheat trade is the actual level of trade for the crop year. This constraint had to be placed because the model did not originally indicate a trade flow between the United States and Japan. An interpretation of this constraint is that Japan purchases U.S. wheat for noneconomic (or political) reasons.

The Base Solution

The base model is created using all the information described above. Holland's GTP modeling framework is used to generate the base model solution and other solutions implied by the various scenarios to be described below (5). The base trade flow matrix is shown in table 7, and base solution prices, net wheat trade, and model elasticities are shown in table 8. Table 9 compares actual wheat exports (from FAS) with the values generated by the model solution. All model values except the residual "rest of world" are within 7 percent of actual values. Table 10 compares actual U.S. wheat exports from (12) with model

Table 7--Base trade flow solution

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	-	1,352	-	50	811	2,213
Soviet Union	4,000	7,493	5,000	-	-	-	16,493
China	1,000	-	-	7,025	-	-	8,025
Brazil	-	457	750	-	1,400	-	2,607
Mexico	-	-	497	-	-	-	497
Other Latin Am.	4,743	-	1,537	-	270	-	6,550
Africa	5,026	-	-	-	-	-	5,026
North Africa	6,419	3,044	750	2,000	-	200	12,413
West Asia	89	4,491	-	4,655	-	-	9,235
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	-	1,453	-	-	1,453
East Asia	1,069	-	7,173	-	-	50	8,292
Japan	3,206	-	1,532	450	-	-	5,188
United States	32,089	-	-	-	-	-	-
European Com.	-	-	-	-	-	820	-
Rest of world	-	-	846	-	2,544	-	3,390
Net exports	27,916	14,665	19,437	15,583	4,264	1,931	83,796

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Table 8--Base assumptions

Region	Price	Volume	Trade elasticity
	Dollar per metric ton	1,000 metric tons	Coefficient
Exporters:			
United States	127.36	60,006	0.60
European Community	189.47	14,665	3.58
Other Western Europe	92.93	811	0
Canada	89.63	19,436	.85
Australia	90.07	15,584	.96
Argentina	85.36	4,264	1.63
Saudi Arabia	547.00	1,100	0
Importers:			
Eastern Europe	101.51	2,213	-9.01
Soviet Union	98.47	16,493	-2.55
China	103.99	8,025	-2.76
Brazil	104.49	2,607	-2.28
Mexico	102.96	497	0
Other Latin America	105.66	6,550	-.61
Africa	117.98	5,026	-.86
North Africa	75.91	12,413	-.42
West Africa	100.17	9,235	-1.20
South Asia	82.76	2,414	0
Southeast Asia	111.49	1,453	-.66
East Asia	103.58	8,292	-.58
Japan	105.46	5,188	-.43
United States	90.89	32,090	-.35
Rest of world	109.63	3,390	0

Table 9--Actual and model net wheat exports

Region	Net trade	Base solution	Ratio of base to actual
	1,000 metric tons		Ratio
Exporters:			
United States	26,752	27,916	1.04
European Community	15,718	14,665	.93
Canada	20,782	19,437	.94
Australia	15,650	15,583	1.00
Argentina	4,440	4,264	.96
Other Western Europe	811	811	1.00
Saudi Arabia	1,120	1,120	1.00
Importers:			
Eastern Europe	2,200	2,213	1.01
Soviet Union	15,500	16,493	1.06
China	8,500	8,025	.94
Brazil	2,800	2,607	.93
Mexico	497	497	1.00
Other Latin America	6,711	6,550	.98
Africa	4,993	5,026	1.01
North Africa	12,495	12,413	.99
West Asia	9,059	9,235	1.02
South Asia	2,414	2,414	1.00
Southeast Asia	1,495	1,453	.97
East Asia	8,369	8,292	.99
Japan	5,390	5,188	.96
Rest of world	4,850	3,390	.70

results. For three of the four regions that receive most of export enhancement bonuses (North Africa, Soviet Union, and China), the values are close. The model sum of all U.S. wheat exports to regions that receive bonuses is within 10 percent of the actual sum.

EVALUATION OF EXPORT ENHANCEMENT

The Export Enhancement Program is evaluated by removing the targeted bonuses and solving for the new equilibrium in their absence. A comparison can be made with the base solution (which includes the effects of EEP and all other subsidy programs) to evaluate the effect on the price of wheat, the quantity exported, sales revenue, and world market share. There are four scenarios in which this EEP removal is made. The scenarios are described in table 11. A summary of the effect of each of the scenarios on prices, export volume, and world market shares is reported in table 12.

Table 10--U.S. wheat export sales, 1986/87

Region	Amount sold	Base model solution
	1,000 metric tons	
Eastern Europe	1,034	-
Soviet Union	4,000	4,000
China	1,000	1,000
Brazil	578	-
Mexico	174	-
Other Latin America	4,390	4,743
Africa	1,888	5,026
North Africa	6,096	6,419
West Asia	1,976	89
South Asia	1,185	2,364
Southeast Asia	-	-
East Asia	4,331	1,069
Japan	3,206	3,206

- = no trade

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Table 11--Scenarios where EEP is removed

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1. EC targeted subsidies and EC uniform subsidy of $90/mt.

2. No EC targeted subsidies, but EC uniform subsidy of $90/mt.

3. No EC targeted or uniform subsidies, but EC is self-sufficient.

4. No EC targeted or uniform subsidies and EC imports wheat.

Table 12--Effect of EEP removal

		Scenarios			
Effect/region	Base	EC targeting	No EC targeting	EC self-sufficiency	No EC subsidies
Dollars per metric ton					
Prices:					
United States[1]	90.89	74.28	84.73	86.18	86.18
European Com.	189.47	193.85	181.18	119.04	109.51
Canada	89.63	93.85	89.21	97.21	98.81
Australia	90.07	94.45	92.62	98.08	99.29
Argentina	89.63	93.85	89.21	97.21	98.18
1,000 metric tons					
Export volume:					
United States	27,916	21,218	25,431	26,020	26,020
European Com.	14,665	15,630	12,843	-820	-2,916
Canada	19,437	20,207	19,360	20,820	21,112
Australia	15,583	16,316	16,010	16,920	17,121
Argentina	4,264	4,598	4,231	4,863	4,939
Percent					
World market share:					
United States	33	26	32	37	38
European Com.	17	19	16	0	0
Canada	23	25	24	29	31
Australia	18	20	20	24	25
Argentina	5	6	5	7	7

1. U.S. price is consumption/traded price. U.S. producer price is equal to amount in table plus $36.47.

In the first scenario, the bonuses are removed and the EC retains its uniform and targeted subsidy scheme as in the base solution. Trade flow constraints between the United States and the Soviet Union and China are removed.[6] Table 13 shows the new equilibrium trade flows. In the second scenario, the EC removes its targeted subsidies, but it keeps its uniform subsidies. Table 14 shows the new equilibrium trade flows. In the third scenario, the EC removes all export subsidies, but it retains a basic self-sufficiency in wheat production (except for importing 820,000 mt of Saudi wheat as per agreement). Table 15 shows the trade flow results. In the fourth scenario, the EC removes all export subsidies and allows the unhindered importation of wheat. Table 16 shows the trade flow results. Table 17 shows the effect on U.S. wheat export revenue of each of the scenarios.

Table 13--Trade flow solution: EEP removal/
EC targeted subsidies

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	-	526	-	50	811	1,387
Soviet Union	-	9,774	5,000	-	-	-	14,774
China	-	-	-	7,017	-	-	7,017
Brazil	-	181	750	-	1,400	-	2,331
Mexico	-	-	497	-	-	-	497
Other Latin Am.	6,946	-	-	-	270	-	7,216
Africa	5,385	-	-	-	-	-	5,385
North Africa	1,901	7,256	750	2,000	-	200	12,107
West Asia	89	1,827	-	6,849	-	-	8,765
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	1,414	-	-	-	1,414
East Asia	1,327	-	6,713	-	-	50	8,090
Japan	3,206	-	1,457	450	-	-	5,113
United States	34,233	-	-	-	-	-	-
European Com.	-	-	-	-	2,588	820	-
Rest of world	-	-	3,100	-	290	-	3,390
Net exports	21,218	15,630	20,207	16,316	4,598	1,931	79,900

- = no trade

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[6] Removal of these trade flow constraints implies that the Soviet Union and China would not honor their commitments unless they received an EEP bonus. See U.S. Wheat Associates letters dated 10-3-86 and 5-1-87 for a discussion of the Soviet case (13).

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Model results indicate that without EC export subsidies, the EC is no longer a net exporter of wheat. Although it becomes an importer of wheat when permitted, the amount it imports is small enough to term the EC as basically self-sufficient in wheat production without the subsidies.[7] Because U.S. wheat trade is unaffected by these EC wheat imports, no distinction is made between scenarios 3 and 4 for the remainder of this section.

Probably the best way to evaluate the effect of EEP is to compare scenario 2 with the base. Scenario 2 assumes that the EC selected the targeted subsidies shown in table 5 because of EEP. This scenario indicates that EEP increased the U.S. price of wheat as much as 7.3 percent above what it would have been in its absence. Likewise, EEP raised U.S. wheat export volume as much as 9.8 percent. The ratio

Table 14--Trade flow solution: EEP removal/No EC targeted subsidies/
EC uniform subsidy ($90/mt)

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	2,355	-	-	50	148	2,553
Soviet Union	-	8,706	5,000	-	-	549	14,255
China	-	-	2,752	4,687	-	-	7,439
Brazil	-	423	750	-	1,400	27	2,600
Mexico	-	-	497	-	-	-	497
Other Latin Am.	6,527	-	-	-	270	-	6,797
Africa	5,008	-	-	-	-	-	5,008
North Africa	7,168	800	750	2,000	-	200	10,918
West Asia	89	-	-	8,873	-	-	8,962
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	1,379	-	-	-	87	1,466
East Asia	1,069	-	7,192	-	-	50	8,311
Japan	3,206	-	1,540	450	-	-	5,196
United States	32,885	-	-	-	-	-	-
European Com.	-	-	-	-	-	820	-
Rest of world	-	-	879	-	2,511	-	3,390
Net exports	25,431	12,843	19,360	16,010	4,231	1,931	79,806

- = no trade

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[7] See footnote 5.

reported in table 17 indicates export revenue was 18 percent higher than otherwise. EEP allowed the United States to increase its world market share by about 1 percent. All in all, EEP contributed to a modest revitalization of the U.S. wheat industry.

If one wants to make the argument that EC targeting at the levels in table 5 would have taken place without EEP, then scenario 1 is more relevant for evaluating EEP.[8] In this case, EEP benefited the U.S. wheat industry much more than described above. EEP increased the U.S. price by 22.4 percent. It increased U.S. wheat exports by 31.2 percent. It increased U.S. export revenue by 61 percent. U.S. world market share has increased 7 percentage points from a non-EEP share of only 26 percent.

Table 15--Trade flow solution: EEP removal/EC self-sufficiency

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	-	683	-	50	-	733
Soviet Union	-	-	8,440	-	-	811	9,251
China	-	-	-	6,183	-	-	6,183
Brazil	-	-	750	-	1,261	-	2,011
Mexico	-	-	497	-	-	-	497
Other Latin Am.	6,469	-	-	-	270	-	6,739
Africa	4,956	-	-	-	-	-	4,956
North Africa	7,867	-	750	2,000	-	200	10,817
West Asia	89	-	-	8,287	-	-	8,376
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	1,383	-	-	-	1,383
East Asia	1,069	-	6,811	-	-	50	7,930
Japan	3,206	-	1,398	450	-	-	5,054
United States	32,697	-	-	-	-	-	-
European Com.	-	-	-	-	-	820	820
Rest of world	-	-	108	-	3,282	-	3,390
Net exports	26,020	-	20,820	16,920	4,863	1,931	70,554

- = no trade

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[8] EC price, quantity exported, and world market share are much higher than in the second scenario. If one assumes that an aggressive EC policy is directed to maximizing market share or EC farm income, it would seem reasonable to expect the type of targeted subsidies in the first scenario even without the EEP prodding.

Table 16--Trade flow solution: EEP removal/EC as wheat importer

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total

1,000 metric tons

Importers	United States	European Community	Canada	Australia	Argentina	Other	Total
Eastern Europe	-	-	371	-	50	-	421
Soviet Union	-	-	7,783	-	30	811	8,624
China	-	-	-	5,906	-	-	5,906
Brazil	-	-	750	-	1,199	-	1,949
Mexico	-	-	497	-	-	-	497
Other Latin Am.	6,469	-	-	-	270	-	6,739
Africa	4,956	-	-	-	-	-	4,956
North Africa	7,867	-	750	2,000	-	200	10,817
West Asia	89	-	-	8,158	-	-	8,247
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	760	607	-	-	1,367
East Asia	1,069	-	5,915	-	-	870	7,854
Japan	3,206	-	1,370	450	-	-	5,026
United States	32,697	-	-	-	-	-	-
European Com.	-	-	2,916	-	-	-	2,916
Rest of world	-	-	-	-	3,390	-	3,390
Net exports	26,020	-	21,112	17,121	4,939	1,931	71,123

- = no trade

Table 17--U.S. export revenue with no EEP

Scenario	U.S. export revenue	Ratio of base value to scenario value
	Billion dollars	Ratio
Base	2.54	
EC targeting	1.58	1.61
No EC targeting	2.15	1.18
EC self-sufficiency	2.24	1.13

Scenario 3 describes a 1986/87 crop year with neither EEP bonuses nor EC subsidies. Comparison with the base indicates that EEP more than offsets the negative effects of EC wheat policies on the United States. The base U.S. price is 5.5 percent higher than in the case with no subsidies. The quantity exported is 7.3 percent higher, and export revenue is 13 percent higher than otherwise. Without EC wheat exports, U.S. world market share is higher than the base (37 vs 33 percent), but the higher market share is due to a total wheat trade volume decrease of 16 percent from 83.8 million metric tons to 70.6 million metric tons. The U.S. position that EEP is necessary to counter unfair EC trading practices may be sufficiently justifiable, but this research suggests that the magnitude of the EEP bonuses have benefited the U.S. wheat industry beyond the cost inflicted by the EC.[9]

Table 18 expands the analysis to look at the effect on the quantity of wheat traded if EEP and EC subsidies are removed. As alluded to above, world wheat trade decreases by 13.2 million metric tons. If only EEP were removed and EC subsidies retained, the volume decrease is 3.9 million metric tons, or 31 percent of the total. If the EC subsidies were removed and EEP retained, the volume decrease is 8.5 million metric tons, or 69 percent of the total. Clearly, EC subsidies have had a greater effect on the growth in world wheat trade. Argentina, Australia, and Canada collectively increase wheat exports by 3.3 million metric tons with no EEP or EC subsidies. If only EC subsidies were

Table 18 -- Change in wheat trade volume
due to U.S. and EC trade reform

	Scenario		
Region	EEP removal, EC subsidies	No EC subsidies, EEP	EEP removal, No EC subsidies
	1,000 metric tons		
United States	-6,698	2,932	-1,896
European Community	965	-14,665	-14,665
Canada	770	1,325	1,383
Australia	733	1,337	1,337
Argentina	334	574	599
Total	-3,896	-8,497	-13,242

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[9] When initiated in 1985, EEP was meant to deal with other problems afflicting U.S. wheat trade besides unfair EC trading practices. These included unfair practices of other competitors, temporarily high fixed-loan rates, and the high value of the U.S. dollar. These latter two problems have decreased in importance over time, and the unfair practices of other exporters are relatively minor compared with the magnitude of the EC restitutions.

removed, their gain would be 3.2 million metric tons, or 97 percent of the figure incorporating EEP removal. If only EEP were removed, the gain would be 1.8 million metric tons, or 57 percent of the larger amount. In contrast to the total wheat trade in each of these scenarios, distributional effects are not additive. Moreover, these results seem to indicate that EC subsidies have had a stronger negative effect on other major exporter wheat trade than the EEP bonuses have had.

EVALUATION OF EXCHANGE RATE AND LOAN RATE CHANGES

The model allows an examination of the effect of changes in exchange rates and deficiency payments on wheat trade in the 1986/87 crop year. The procedure for simulating a loan rate reduction in the model has already been explained. It basically involves a reduction in U.S. transport costs to all importers and a widening of the wedge between the producer and consumer price of wheat in the United States. The loan rate is reduced by 5 percent, or $4.40, in this exercise. This reduction reflects the maximum amount by which the basic loan rate can be reduced from one year to the next according to the Food Security Act. Simulating changes in exchange rates relative to the U.S. dollar changes price linkage

Table 19--Real exchange rate change, 1986-87

Region	Rate of change relative to U.S. dollar
	Percent
European Community	17.9
Other Western Europe[1]	14.5
Canada	6.0
Australia	-5.6
Argentina	-19.5
Brazil	-7.9
Mexico	10.0
Other Latin America[2]	-31.6
North Africa [3]	11.6
East Asia[4]	3.6
Japan	19.0

1. Change in value of Swedish currency.
2. Change in value of Venezuelan currency.
3. Trade-weighted average of change in value of currencies of Algeria, Egypt, and Morocco.
4. Trade-weighted average of change in value of currencies of Korea, Malaysia, and the Philippines.

Table 20--Scenarios involving exchange rate change and loan rate reduction

1. Exchange rate change, but fixed loan rate.

2. Exchange rate change, no EC quantity adjustment, fixed loan rate.

3. Five-percent loan rate reduction, but no exchange rate change.

4. Exchange rate change and 5-percent loan rate reduction.

Table 21--Trade flow solution, exchange rate change

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
1,000 metric tons							
Eastern Europe	-	-	1,079	-	50	811	1,940
Soviet Union	4,000	6,945	5,000	-	-	-	15,945
China	1,000	-	-	6,704	-	-	7,704
Brazil	-	-	750	-	1,400	-	2,150
Mexico	-	-	497	-	-	-	497
Other Latin Am.	2,652	-	1,586	-	270	-	4,508
Africa	4,975	-	-	-	-	-	4,975
North Africa	9,125	800	750	2,000	-	200	12,875
West Asia	89	2,869	-	6,127	-	-	9,085
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	-	1,440	-	-	1,440
East Asia	1,069	-	7,280	-	-	50	8,399
Japan	3,206	-	1,809	450	-	-	5,465
United States	31,909	-	-	-	-	-	-
European Com.	-	51,275	-	-	990	820	-
Rest of world	-	-	-	-	3,390	-	3,390
Net exports	28,480	8,804	18,751	16,721	6,100	1,931	80,787

- = no trade

relationships as seen in equation 1. The exchange rates of the market-oriented regions are adjusted to reflect real changes relative to the U.S. dollar between the fall of 1986 and the fall of 1987. Data are from the International Monetary Fund (7). The real exchange rate changes used in this exercise are shown in table 19. Although major currencies such as the European Currency Unit (ecu), Japanese yen, and Canadian dollar have appreciated relative to the U.S. dollar, other important currencies such as the Australian dollar and Argentine austral have depreciated.

Four scenarios are run to evaluate the loan rate and exchange rate effects. Descriptions of the scenarios are summarized in table 20. The first two scenarios involve only the exchange rate changes. The first scenario assumes that subsidies are fixed, and that wheat production and consumption adjust to new equilibrium values. The second scenario assumes changes in EC subsidies to maintain production and consumption at base levels. Tables 21 and 22 show the respective model solutions for trade flows between exporters and importers. The third scenario involves only the 5-percent loan rate reduction. Table 23 shows the

Table 22--Trade flow solution; exchange rate change
and no EC adjustment

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	-	1,629	-	50	811	2,490
Soviet Union	4,000	8,049	5,000	-	-	-	17,049
China	1,000	-	-	7,352	-	-	8,352
Brazil	-	-	750	-	1,413	-	2,163
Mexico	-	-	-	-	497	-	497
Other Latin Am.	3,528	-	876	-	270	-	4,674
Africa	5,077	-	-	-	-	-	5,077
North Africa	7,010	3,091	750	2,000	-	200	13,051
West Asia	89	4,344	-	4,955	-	-	9,388
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	-	1,467	-	-	1,467
East Asia	1,069	-	7,410	-	-	50	8,529
Japan	3,206	-	1,851	450	-	-	5,507
United States	32,273	-	-	-	-	-	-
European Com.	-	50,996	-	-	-	820	-
Rest of world	-	-	-	-	3,390	-	3,390
Net exports	27,343	14,664	18,266	16,224	5,620	1,931	84,048

- = no trade

trade flow solution. The fourth scenario involves exchange rate change with the EC quantity adjustment and loan rate changes. Table 24 shows the trade flow solution. Table 25 compares the scenario solutions 1,3, and 4 with the base solution for price, quantity traded, and market share. Table 26 focuses on changes in the quantity of wheat exported for each of the major exporters for each of scenarios 1, 3, and 4. Table 27 shows the effects on U.S. export revenue.

The exchange rate changes have a positive effect on those exporters whose currencies have depreciated (Australia and Argentina), and a negative effect on those whose currencies have appreciated (the EC and Canada). The value of the dollar has depreciated against most, but not all, other currencies. If EC restitutions are held constant, U.S. wheat exports increase by 564,000 metric tons and the traded U.S. wheat price increases to $92.28 from $90.89. The EC loses a great deal of its exports (5.9 million metric tons), and as a consequence, total world wheat trade declines by 3 million metric tons.

Table 23--Trade flow solution; 5-percent loan rate reduction

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	-	1,456	-	50	811	2,317
Soviet Union	4,000	7,702	5,000	-	-	-	16,702
China	1,000	-	-	7,148	-	-	8,148
Brazil	-	490	750	-	1,400	-	2,640
Mexico	-	-	497	-	-	-	497
Other Latin Am.	5,044	-	1,258	-	270	-	6,572
Africa	5,045	-	-	-	-	-	5,045
North Africa	7,091	2,409	750	2,000	-	200	12,450
West Asia	89	4,765	-	4,438	-	-	9,292
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	-	1,458	-	-	1,458
East Asia	1,069	-	7,198	-	-	50	8,317
Japan	3,206	-	1,542	450	-	-	5,198
United States	32,159	-	-	-	-	-	-
European Com.	-	51,025	-	-	-	820	-
Rest of world	-	-	888	-	2,502	-	3,390
Net exports	28,908	14,546	19,339	15,494	4,222	1,931	84,440

- = no trade

23

The reduction in the U.S. loan rate benefits only the United States. Its trade volume increases by 992,000 metric tons, but the U.S. price decreases by 64 cents/mt to $90.35. The quantity effect, however, dominates the price effect (showing elastic excess demand) and thus U.S. export revenue increases by 2.8 percent to $2.61 billion. Other wheat exporters lose slightly in terms of trade volume, but there is an overall increased world wheat trade volume.

The exchange rate and loan rate changes complement each other from the U.S. perspective. U.S. wheat exports increase by 1.6 million metric tons. Table 26 shows that 36 percent of the increase is due to the exchange rate change, and that 64 percent is due to the loan rate reduction. U.S. export revenue increases by 6.3 percent to $2.7 billion. Because the loan rate has a damping effect on the U.S. price, the exchange rate plays a larger role in increasing export revenue. Its contribution is 56 percent of the increase. If EC subsidies change to maintain base EC production and consumption levels, there is no exchange rate effect on U.S. export revenue.

Table 24--Trade flow solution; exchange rate change
and 5-percent loan rate reduction

Importers	Exporters						
	United States	European Community	Canada	Australia	Argentina	Other	Total
	1,000 metric tons						
Eastern Europe	-	-	1,187	-	50	811	2,048
Soviet Union	4,000	7,148	5,000	-	-	-	16,148
China	1,000	-	-	6,823	-	-	7,823
Brazil	-	-	750	-	1,400	-	2,150
Mexico	-	-	497	-	-	-	497
Other Latin Am.	3,579	-	692	-	270	-	4,541
Africa	4,995	-	-	-	-	-	4,995
North Africa	9,161	800	750	2,000	-	200	12,911
West Asia	89	2,484	-	6,568	-	-	9,141
South Asia	2,364	-	-	-	-	50	2,414
Southeast Asia	-	-	656	789	-	-	1,445
East Asia	1,069	-	7,305	-	-	50	8,424
Japan	3,206	-	1,818	450	-	-	5,474
United States	31,980	-	-	-	-	-	-
European Com.	-	51,384	-	-	940	820	-
Rest of world	-	-	-	-	3,390	-	3,390
Net exports	29,463	8,672	18,655	16,630	6,050	1,931	81,401

- = no trade

Wheat exporters other than the United States are more affected by exchange rates in terms of wheat sales than they are by the reduction in the U.S. loan rate. The small reduction in their export volume due to the U.S. loan rate reduction is swamped by the effect of the exchange rate changes. Without large changes in restitutions, the EC's loss of wheat sales is of such a magnitude that it offsets the expansion in wheat sales of the United States, Australia, and Argentina. This extreme vulnerability of the EC to exchange rate changes implies that its level of restitutions or subsidies must fluctuate nearly as much to keep the EC as a major player in the world wheat market.

Table 25--Effect of loan rate reduction and
dollar revaluation on wheat exporters

Effect/ region	Scenario				
	Base	Exchange rate change, EC adjustment	Exchange rate change, no EC adjustment	Loan rate reduction (5 percent)	Exchange rate and loan rate reduction (EC adjustment)
	Dollars per metric ton				
Prices:					
United States	90.89	92.28	89.46	90.35	91.73
European Com.	189.47	190.86	188.04	188.93	190.35
Canada	89.63	91.02	88.21	89.09	90.47
Australia	90.07	91.46	88.64	89.53	90.95
Argentina	89.63	90.87	81.88	89.09	90.35
	1,000 metric tons				
Export volume:					
United States	27,916	28,480	27,343	28,908	29,463
European Com.	14,665	8,604	14,665	14,546	8,672
Canada	19,437	18,751	18,266	19,339	18,655
Australia	15,583	16,721	16,224	15,494	16,630
Argentina	4,264	6,100	5,620	4,222	6,050
	Percent				
World market share:					
United States	33	35	33	34	36
European Com.	17	11	17	17	11
Canada	23	23	22	23	23
Australia	18	21	19	18	20
Argentina	5	7	7	5	7

Table 26--Change in wheat export volume
due to exchange rate and loan rate changes

Region	Scenario		
	Exchange rate change, loan rate fixed	Loan rate reduction, exchange rate fixed	Exchange rate change, loan rate reduction
	1,000 metric tons		
United States	564	992	1,547
European Community	-5,861	-119	-5,993
Canada	-685	-97	-781
Australia	1,138	-89	1,046
Argentina	1,836	-42	1,786
Total	-3,008	645	-2,395

Table 27--U.S. export revenue resulting
from exchange rate and loan rate change

Scenario	Export revenue	Change from base
	Billion dollars	Percent
Base	2.54	
Exchange rate change	2.63	3.5
Exchange rate change, no EC quantity adjustment	2.54	0
Loan rate reduction	2.61	2.8
Exchange rate change and loan rate reduction	2.70	6.3

CONCLUSIONS

Export enhancement, dollar depreciation, and the loan rate reduction have all had a significant effect on U.S. wheat exports for the 1986/87 crop year. The magnitude of the export enhancement effect depends on one's assumptions regarding EC targeted subsidies to various wheat importers. Two possibilities are that these subsidies were extended to counter EEP bonuses or that they were extended independently to maximize EC market share, farm income, or some other related domestic goal. In the first instance, EEP is evaluated in a situation where the EC uniformly subsidizes its wheat exports at least $90/mt. In this case, EEP likely increased the U.S. price of wheat over 7 percent, U.S. wheat export volume by nearly 10 percent, and U.S. export revenue by 18 percent. In the second instance, EEP is evaluated with EC targeted subsidies intact. In this case, measurement of the EEP effect is much higher: it likely increased U.S. wheat price by over 22 percent, U.S. wheat export volume by over 31 percent, and U.S. wheat export revenue by 61 percent. The true effect of EEP probably falls between these two extreme cases.

Together, a 5-percent loan rate reduction and a change in the real value of the dollar corresponding to the actual change between the fall of 1986 and 1987 would have increased U.S. wheat export volume by over 5 percent and U.S. export revenue by over 6 percent. All else constant, the loan rate reduction causes a greater response in expanding wheat sales, but the exchange rate change is potentially more important for increasing U.S. wheat export revenue.

Without its export subsidies, the model indicates that the EC would be a wheat importer rather than exporter. The scenarios imply that the EC's comparative disadvantage in world wheat trade makes it extremely vulnerable to policies of the United States and to currency realignments. This vulnerability helps explain why the EC attempts to insulate itself from shocks affecting the world wheat market.

REFERENCES

(1)   <u>Agricultural Outlook</u>. U.S. Dept. Agr., Econ. Res. Serv., Jan.-Feb. 1988.

(2)   <u>Charting Annual 1987</u>. Maritime Research, Inc. Parlin, NJ.

(3)   <u>Export Markets for U.S. Grain and Products</u>. U.S. Dept. Agr., For. Agr. Serv., various issues.

(4)   Gardiner, W.H., K. Liu, and V.O. Roningen. "Elasticities in the Trade Liberalization (TLIB) Model," U.S. Dept. Agr., Econ. Res. Serv., forthcoming.

(5)   Holland, F.D. "GTP: A Microcomputer Program for the Spatial Equilibrium Problem," Staff Report AGES850514. U.S. Dept. Agr., Econ. Res. Serv., May 1985.

(6)   Houck, J.P. "Market Effects of In-Kind Subsidies," working paper #88-5, International Agricultural Trade Research Consortium, Oct. 1988.

(7)   <u>International Financial Statistics</u>. International Monetary Fund. Washington, DC.

(8)   Newman, M., T. Fulton, and L. Glaser. <u>A Comparison of Agriculture in the United States and the European Community</u>. FAER-233. U.S. Dept. Agr., Econ. Res. Serv., Oct. 1987.

(9)   Paarlberg, P.L., A.J. Webb, A. Morey, and J.A. Sharples. "Impacts of Policy on U.S. Agricultural Trade," Staff Report AGES840802. U.S. Dept. Agr., Econ. Res. Serv., Aug. 1985.

(10) Sharples, J.A., and P.M. Dixit. "Forces that Could Expand U.S. Wheat Exports: Estimates From a World Wheat Trade Model," Staff Report AGES870811. U.S. Dept. Agr., Econ. Res. Serv., Jan. 1988.

(11) Thompson, R.L. <u>A Survey of Recent U.S. Developments in International Agricultural Trade Models</u>. BLA-21. U.S. Dept. Agr., Econ. Res. Serv., Sept. 1981.

(12) U.S. Department of Agriculture, Economic Research Service. <u>Foreign Agricultural Trade of the United States</u> (FATUS). various issues.

(13) <u>U.S. Wheat Letter</u>. U.S. Wheat Associates, various issues.

(14) <u>World Wheat Statistics</u>. International Wheat Council, London, 1986.