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ANALYSIS OF U.S. EXPORT ENHANCEMENT TARGETING AND BONUS DETERMINATION CRITERIA

by

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Abstract

This research analyzes the criteria set from which policymakers have selected import markets to target EEP wheat bonuses. Results presented herein indicate that the administration of EEP has favored no specific criterion -- rather, the emphasis placed on various criteria has fluctuated over time. Although putting pressure on the EU was a much repeated justification for the program, expanding U.S. wheat exports and pressuring the Canadians guided targeting allocations as much as, if not more than, pressuring the EU. This research also develops a method for predicting which wheat import markets are likely to be important in the future, based on an identification of specific policy objectives.

Keywords: export enhancement program, wheat

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Analysis of U.S. Export Enhancement Targeting
and Bonu Determination Criteria

Under the Export Enhancement Program (EEP), the U.S. Government has targeted agricultural export subsidies, primarily for wheat, to specific import markets. The most publicized rationale for the EEP has been to induce the European Union (EU) to negotiate seriously regarding the reduction of their agricultural export subsidies and the reform of other trade-distorting agricultural policies perceived to be harmful to the United States. Countering the effect of harmful EU export subsidies has been one of the cited criteria upon which commodities have been selected for export assistance and upon which importers have been selected to receive export assistance bonuses.

Under the terms of the agreement that ended the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) in 1994, the United States and the EU agreed to reduce the value of expenditure on subsidized exports by at least 36 percent and to reduce the volume of subsidized exports by at least 21 percent, relative to a 1986-90 base. Although constrained, EEP will likely continue to be an important policy tool to meet U.S. wheat export objectives.

This paper analyzes the criteria set from which policymakers have selected import markets to target EEP wheat bonuses over the period 1986-93. The analytical approach is based on the use of a set of world wheat models that explicitly incorporate product

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differentiation among wheat classes and source countries. Based on analysis of how targeting and bonus determinations have been made in the past, the paper will present a method for predicting which wheat import markets are likely to be important in the future for specified targeting criteria.

This paper is organized in several sections. These sections deal with a brief description of the EEP and its targeting criteria; descriptions of the modeling approach and analytical method; results and implications; and a short conclusion.

Export Enhancement Program

As part of its strategy to revive U.S. agricultural exports after significant declines experienced in the early 1980's, the United States established the EEP in May 1985 under the authority of the Credit Commodity Corporation (CCC) Act of 1948. The EEP was subsequently reauthorized by the Food Security Act of 1985 and the Food, Agriculture, Conservation, and Trade Act of 1990. There have been a number of criteria which have guided the CCC's administration of the program:

I.   Each EEP offer must have the potential to develop, increase, or maintain markets for U.S. agricultural commodities.

II. EEP subsidies should help U.S. exporters displace the exports

of subsidizing competitors in specific countries.

III. The EEP should not have more than a minimal effect on non-subsidizing competitors.

IV. The overall EEP program level and subsidies for individual EEP sales should be maintained at the minimum budget level necessary to achieve the EEP's trade policy and export expansion goals.

Operationally, the EEP is a complex program that involves several steps. Proposals for EEP offers for commodities to specific countries can originate with U.S. agricultural commodity interests, foreign governments, private importers, USDA program specialists, and others. The proposals are reviewed first by USDA's Foreign Agricultural Service (FAS), then forwarded to the USDA Under Secretary for International Affairs and Commodity Programs for approval. If approved by the Under Secretary, the proposals are forwarded to an interagency review group. If the interagency review group approves the proposal, USDA announces the initiative.

After the initiative has been announced, the foreign buyer contacts exporters with sales specifications. The exporters then bid on the tender. Sales agreements between the foreign buyer and the U.S. exporter are contingent on FAS approval of price bids and bonus levels. If the price and bonus are accepted, the sale is announced.

After showing proof of export, exporters are awarded bonuses. Prior
to November 1991, bonuses were paid in the form of commodity
certificates that could be sold or exchanged for CCC-owned
commodities. The commodity certificates had a six-month life. Since
November 1991, the bonuses have been paid in cash.

Wheat has accounted for over 80 percent of the value of all EEP-
assisted sales. Other commodities that have received export
subsidies under the EEP include: barley, barley malt, wheat flour,
semolina, sorghum, rice, poultry feed, vegetable oil, frozen
poultry, dairy cattle, and table eggs.

Over the July-June marketing years 1986/87 through 1992/93, more
than $3.7 billion was expended on the wheat EEP. Figure 1 shows the
distribution of expenditures over the 7-year time frame. Figure 1
reveals that the highest yearly expenditures occurred in 1987/88
and 1991/92. Expenditures dipped during the middle
years of 1988/89 and 1989/90 due to tighter worldwide wheat supply
conditions. During the period EEP assisted sales have constituted
about 70 percent of all U.S. world wheat sales.

The first three criteria listed above are clearly related to the
targeting aspect of the bonuses. How these criteria are related to
the targeting of the bonuses is a key goal of this analysis. Table
1 shows unit subsidy values calculated from USDA data to correspond
to a July/June marketing year for import regions set out in the

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Millions of Dollars

Total EEP Subsidy

Source: USDA
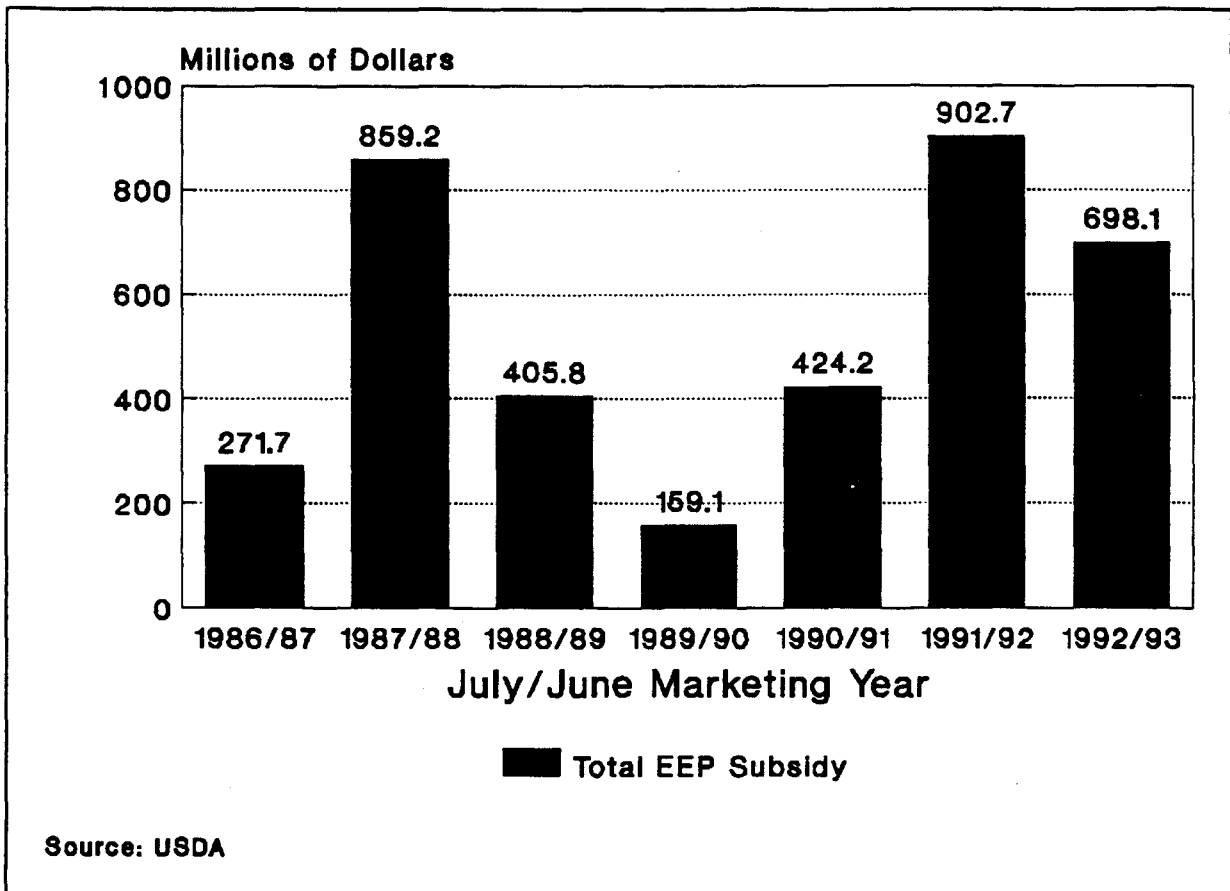
Figure 1
Export Enhancement Program for Wheat:
Yearly Subsidization, 1986/87-1992/93

model used later in the analysis. Some importers have been consistently targeted over the period (Egypt, China, Morocco, Other North Africa (Algeria)), while others have been targeted sporadically (Venezuela, Brazil, Pakistan).

Analytical Approach

The first three criteria listed in the previous section suggest that targets should be selected to accomplish either individually, or jointly, the following: maximize U.S. export prospects in

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certain markets; minimize export prospects of subsidizing export competitors - essentially the EU in the world wheat market; and have minimal effect on non-subsidizing export competitors, such as Argentina, Australia, and possibly Canada.

The problem is to find what combination of objectives the CCC has been trying to fulfill. The approach taken here is to make use of a set of world wheat models, described below, that have been constructed to replicate world wheat trade during each of the July/June marketing years from 1986 through 1992. These models have been located in a modeling-software system (GAMS) where it is possible to specify an objective function whose value can be either maximized or minimized subject to various model constraints. The objective functions are written to correspond to the EEP-objectives described above. The constraints summarize limits imposed by the physical, economic, and policy environments for world wheat trade.

The model solves for the individual importers targeted for EEP bonuses and the corresponding targeted-subsidy amounts that will maximize or minimize the objective function. Total EEP expenditure levels are constrained to be equal to or less than what actually spent in each of the years. The working hypothesis is that if the CCC has taken objectives I and II seriously, then there should be strong correlation between (1) importers actually targeted and the amount of the bonus extended to each, and (2) the solution to the corresponding constrained optimization problem that is being

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modeled. For objective III, on the other hand, the correlation between the actual and the subsidy targets and amounts should be small.

One of the problems is that it is unlikely that the CCC has pursued pure objectives - rather it is much more reasonable to expect a combination of objectives being pursued simultaneously. This research confronts this problem as follows: (1) it solves a series of constrained optimization problems corresponding to single objectives; (2) the set of these solutions are regressed on the actual targeted subsides with the restriction that the sum of the regression coefficients equal one. The coefficients are interpreted as weighting parameters that signify the importance of each of the objectives to the selection of targets and the amounts chosen for the targeted importers.

World Wheat Model

The world wheat model was originally built in the Static World Policy Simulation (SWOPSIM) modeling framework and later fitted into the GAMS modeling system in order to allow analysis of policy alternatives in an optimization framework. The model framework is static, partial equilibrium, and nonspatial. Supply and demand are functions of own- and cross-prices. Trade is the difference between domestic supply and demand. Domestic incentive prices depend on the level of consumer and producer support and on world prices

denominated in local currency. Price transmission elasticities regulate the extent to which domestic prices change when world prices change. World markets clear when net trade of a commodity across all regions sums to zero.

The model is consistent with the theory of differentiated wheat demand (Haley, 1994). Seven types of wheat are in the model. Six of the wheats are identified with the country-source of production: the United States, Canada, the EU, Australia, Argentina, and Saudi Arabia. The seventh type is a generic wheat category comprising wheat produced elsewhere.

There are 33 regions modeled. The 6 regions mentioned immediately above are wheat exporters. These countries can import wheat from each other. The other 27 regions are wheat importers. They include Mexico and Central America, Venezuela, Brazil, and other South America (Western Hemisphere); Italy, former Soviet Union, Other Western Europe, Eastern Europe (Europe); Morocco, Tunisia, Other North Africa (North Africa); Ghana, Togo, Other Sub-Saharan Africa (Africa); Egypt, Yemen, Other Near East (Near East); Pakistan, Sri Lanka, Japan, South Korea, Taiwan, China, the Philippines, Indonesia, Other East Asia (East Asia); and the Rest-of-the-World.

Armington's methodology is employed to calculate own- and cross-price elasticities for the wheat types. The first set of necessary elements for setting the demand elasticity parameters are an own-

price elasticity of demand for standard-quality wheat. These elasticities were obtained from ERS's trade liberalization studies (Sullivan and others, 1992; and Sullivan, 1990). The other set of necessary elements are estimates of: (1) between-class wheat substitution elasticities, and (2) within-class substitution elasticities differentiating wheat among the seven wheat sources. Estimates of these elements were made by the author, based on wheat import market surveys completed as part of the ERS Grain Quality project (Mercier, 1994). The procedure is explicitly documented in Haley (1994).

Analytical Procedures

There are two analytical tasks. The first is to find the pattern of targeting and optimal subsidies associated with each of the criteria I-III. The second is to make a determination of which criteria or linear combination thereof are consistent with the actual targeting and subsidy level patterns.

In order to formally describe the first task, the following nomenclature is used:

g   =   {major wheat exporters: United States (US), European Union (EU), Canada (CN), Australia (AU), Argentina (AR)}

h   =   {the set of g excluding the US}

i = {set of wheat importing countries}

$R_{g,i}$ = {net export revenue (export revenue less export subsidy cost) from wheat sales to importer i for exporter g}

O_g = {hypothesized objectives of EEP Targeting: maximize Σ $R_{US,i}$; minimize Σ $R_{h,i}$ }

e_i = {realized EEP subsidy targeted to importer i}

T = {value of total EEP subsidies}

r_h = {export subsidies targeted to importer i for non-US wheat exporters}

Ω = {coefficients of the (differentiated) wheat model}

Criterion I is represented as the determination of subsidies that maximizes U.S. export revenue net of the cost of the EEP[1]:

Criteria II and III are represented as the determination of subsidies that minimize the export revenue of j: the EU (criterion

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[1] "¯" over variable symbol signifies that its value is set exogenously.

$$\max_{e_{1,i}} \sum_i R_{i,US}(e_{1,i}, \overline{r_i}(e_{1,i}); \Omega)$$
$$st \sum_i e_{1,i} \leq \overline{T} \tag{1}$$

II), Argentina, Australia (criterion III), and Canada (criterion II or III).

$$\min_{e_{j,i}} \sum_i R_{j,i}(e_{j,i}, \overline{r_i}(e_{j,i}); \Omega)$$
$$st \sum_i e_{j,i} \leq \overline{T} \tag{2}$$

An additional set. of subsidy allocations is made assuming that a hypothesized linear combination of criterion I and II: that is, a 50 percent weighting to the maximization of net U.S. export revenue and a 50 percent weighting to the minimization of EU export revenue. This scenario is called the "naive weights" scenario.

The second analytical task is to determine a weighting of the criteria (composite objective O_{comp}) that most resembles historical subsidy allocations:

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$$O_{comp}=f(O_1, O_2, \ldots \ldots O_g) \qquad \text{(3)}$$

The composite objective is estimated:

$$\hat{E}^o=\beta_1 * E^*_1 + \beta_2 * E^*_2 + \ldots + \beta_g * E^*_g + \epsilon$$
$$\sum_{j=1}^{g} \beta_j = 1 \qquad \text{(4)}$$

where E^o is the observed vector of EEP subsidy allocations and E^*_j is the vector of the optimal EEP subsidies for objective j.

The estimates of the coefficients have a mean value (μ) and standard deviation (σ):

$$\beta_j \sim n(\mu_{\beta_j}, \sigma_{\beta_j})$$
$$j=1,2,\ldots,g \qquad \text{(5)}$$

This information, along with information regarding partial correlation coefficients retrievable from the variance-covariance matrix, can be used to generate a joint distribution set of weighting parameters.

These coefficients can in turn be used to solve for a distribution of optimal EEP subsidies for the composite objective:

$$\max_{e_{comp,i}} = [\beta_1 * O_1 - \sum_{j=1}^{h} \beta_j * O_j] \tag{6}$$

thereby producing:

$$\hat{E}^*_{comp} \sim n(\mu_{E^*_{comp}}, \sigma_E) \tag{7}$$

The correlation between mean values from vector μ_{E*comp} and the actual subsidy allocations should be high.

Modeling Results

Appendix tables 1-7 show detailed simulation modeling results for each of the marketing years 1986-1992 for equations 1 and 2, and the "naive weights" objective. Specific subsidy allocations are listed for the objectives. Targeting results for maximizing U.S. export revenue are referenced in the tables and below as MAXUS; results for minimization of the export revenue of the EU, Canada, Australia, and Argentina are, respectively: MINEU, MINCN, MINAU, and MINAR. The bottom row of the tables shows the correlation between the actual and the simulation results for each of the objectives.

Single Objectives for Targeting

The patterns of correlations are not very suggestive. The strongest result is for 1987, where there is a relatively high correlation (over 0.7) between actual allocations and those associated with MAXUS and NAIVE WTS. In 1991 and 1992, correlation between actual allocations and the NAIVE WTS is higher than 0.5 and also higher than other within-year correlations. In 1988 there is a seemingly high correlation between actual allocations and MINAR. There are no high correlations for 1986 or 1990.

Any higher-than-average correlation is primarily the result of a rough congruence between one or two narrow targeting predictions and what actually occurred. In 1987 MAXUS and NAIVE WTS indicate large subsidies to the Soviet Union. In 1988 MINAR indicates a large subsidy to China. NAIVE WTS' allocations to China and Egypt in 1991 and to the former Soviet Union and Morocco in 1992 are responsible for the higher than average correlations.

Probably the only conclusion that one can derive from examining these correlations is that no single objective has characterized the targeting, except possibly in 1987. The next step is examine multiple objectives.

Multiple Objectives for Targeting

Estimating equation 4 is the basis for determining multiple objectives for targeting. Each equation was estimated using Ordinary Least Squares and then tested for heteroscedasticity. If needed, the equation was reestimated correcting for the heteroscedasticity. In either case, the coefficients were restricted to sum to one. The coefficients were used to specify an objective function representing a linear combination of single objectives from the criteria set. The model was solved for the estimated objective and the targeting allocations were examined. In some cases, the objective function from the estimation procedure missed some important targeting allocations. In order to correct for this problem, appropriate indicator variables were specified for the reestimation of equation 4. Final regression results are shown in Table 2.

The statistical features of the estimated equations are generally good. The amounts of explained variance are fairly high for 4 of the years (1986, 1987, 1988, and 1991), moderate for 1 (1992), and poor for 2 (1989 and 1990). As a proportion of the whole, however, EEP expenditure in 1989 and 1990 was only about 15 percent, therefore reducing the importance of the poor results. There was some collinearity in the data, but this was mainly confined to modeling allocations associated with MINAU and MINAR. It is best to interpret those results jointly.

Along with estimated coefficient values and standard errors,

standardized regression (or beta) coefficients are shown as well.
A beta coefficient shows how much a standard deviation change in an
independent variable changes the dependent variable in terms of its
standard deviation. This rescaling makes it possible to compare
beta coefficients directly, making it possible to make statements
about the relative importance of the independent variables.

Figure 2 summarizes the relative importance of the criteria. The
yearly beta coefficients are weighted by proportions of that year's
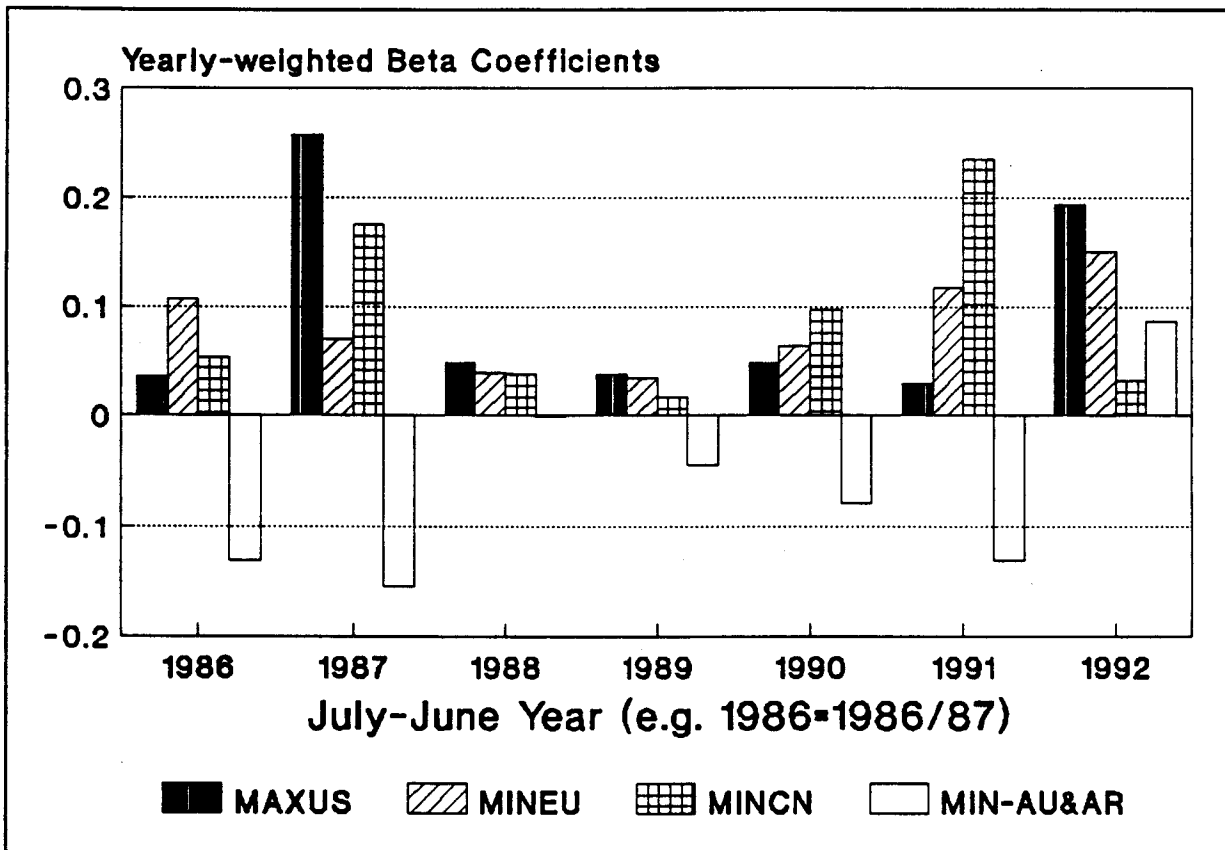
Figure 2
Revealed Policy Criteria Discerned
from the Targeting of the EEP

EEP expenditure level to the 7 year total. This weighting

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facilitates year-to-year comparisons.

The importance of policy criteria change from year-to-year. Maximization of U.S. export revenue was most highly important in the years 1987 and 1992. Only in 1986 was the goal of minimizing EU revenue the most important. Perhaps one surprising result is that minimizing Canadian export revenue has been an important objective throughout the period, being of primary importance in 1990 and 1991. For the most part, minimization of export revenue for Australia and Argentina has received negative weighting, indicating that criterion III has been largely applied by U.S. policy-implementers.

The last column of table 2 shows a weighted averaging of results. Low standard errors are associated with each of the averages for MAXUS, MINEU, and MINCN, indicating statistical significance. A comparison of beta values reveals that both maximization of U.S. export revenue and minimization of Canadian export revenue have been slightly more important than the minimization of EU export revenue, probably the most mentioned justification for the EEP throughout the period. It is interesting that MINEU started out as most important objective at the beginning of the program.

EEP Criteria and Targeting

Although no single targeting criterion, or set linear combination

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of criteria, has consistently guided the targeting of wheat EEP bonuses, the information generated in the modeling runs can still be used to gain insight into possible future EEP targeting allocations. Solutions from the analysis can be used to form quasi-probability orderings of importers and allocation proportions based on specific criteria. This procedure is best illustrated through example.

Table 3 shows targeted bonuses averaged over 1986-92 that were generated from the models as solutions to the optimization of objective functions corresponding to U.S. export revenue maximization (MAXUS), EU export revenue minimization (MINEU), and Canadian export revenue minimization (MINCN). Coefficients of variation for targets for each policy objective are shown in the last 3 columns. The coefficient of variation is the standard deviation divided by the corresponding mean value. It functions as a measure of stability, with lower values representing less variability about the mean value throughout the covered time period. It is dimensionless, thereby permitting comparison of coefficients even though subsidy levels may be disproportionate.

If any one of the shown objectives were to be pursued, the targeted importers could be ranked in ascending fashion according to the level of the corresponding coefficient of variation. Importers entering with low coefficient values are interpreted as more likely to be receiving subsidies than others for a particular targeting

objective. Average subsidy levels can be reported cumulatively to give an indication of the marginal contribution of each targeted importer to a total EEP expenditure level.

Table 4 shows more detailed information for the objective of minimizing Canadian export revenue. The targeted importers are ranked according to the coefficient of variation. Figure 3 shows the information graphically and illustrates the cumulative effect of adding additional targets.
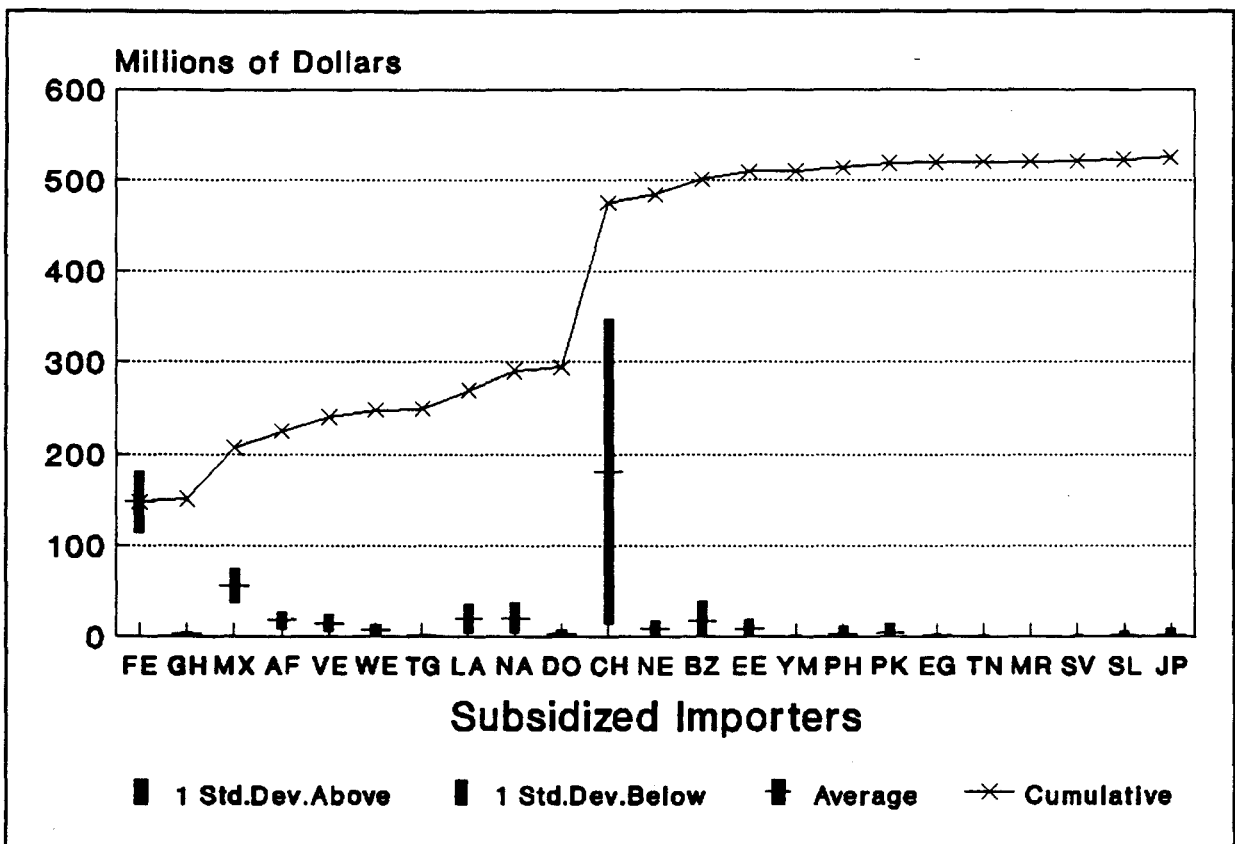
Figure 3
Targeting of EEP Subsidies With
Minimization of Canadian Export Revenue As Goal

Large contributions to total spending are made by these 3 importers, ranked in probable level of being targeted: Other Far East, Mexico and Central America, and then China. As is evident from the diagram and table, subsidies to China would have been likely very variable over the period. Without the contribution of analysis arguing to the contrary, this variability may lead one to suspect high but variable funding levels to result in the future as well.

Importers to the right of China have dual characteristics of low average subsidies and a high relative variability associated with yearly targeting and funding. Unless argued to the contrary, it is not reasonable to expect these importers to be chosen as targets, unless funding levels are exceptionally high, or Chinese subsidies, low.

Conclusions

The research presented in this paper is an analytic reminder that selection of criteria supporting policy implementation is typically a pragmatic affair; that is, criteria fluctuate in importance through time, although it is not necessarily or typically acknowledged. Results presented in this paper support the hypothesis that the administration of EEP has favored no specific criterion -- rather emphasis placed on criteria has fluctuated in importance over time. Although putting pressure on the EU was a

much repeated justification for the program, expanding U.S. wheat exports and pressuring the Canadians guided targeting allocations as much as, if not more than, pressuring the EU.

Discussions of new emphasis on program rationales are likely to be part of a continuing process that have guided justifications, as well as targeting allocations, for the EEP throughout its existence. This conclusion would imply that the process of determining future targets will probably not differ that much from the past. Changes emanating within individual imports markets (former Soviet Union, for example) will likely be more central than changes emanating within the United States as a result of the GATT agreement.

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Appendix -- Verification Procedure

Results of a verification procedure are shown in the last two columns (the ninth and tenth) of appendix tables 1-7. The allocations of the ninth column are based on the means of the estimated coefficients from table 2 being used as weighting parameters for the specification of the objective function. Except for 1988, the multiple objective correlation is higher than any of the single objective or NAIVE WTS correlations. In 4 of the 7 cases, the correlations are higher than 0.7, and are higher than 0.5 in all cases. The lower three correlations come from the years 1988, 1989, and 1990 whose joint proportion of the total EEP expenditure amounted to 27 percent.

Allocations in the tenth column take into account the stochastic nature of the regression estimates. For each year, a set of multiple objective functions were specified. The weights used in the functions were based on a joint probability distribution of coefficient values: the coefficients have the means shown in Table 2 but information contained in the variance-covariance matrix was used to account for how the values of the coefficients correlate or systematically vary among themselves.

The model was solved for each of the objective functions constituting the set. Subsidy allocations from each within-year solution produces a distribution of allocations with a calculated

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mean and variance. From this a 90 percent confidence interval was formed for each import target.

In appendix tables 1-7, if the actual allocation fell within the confidence interval, this actual number is reported as a predicted model result in the tenth column. If the actual allocation falls below the confidence interval range, the lower limit of the interval is reported in the column. Similarly, if the actual allocation is above the confidence interval range, the upper limit of the interval is reported in the column. The correlation of this allocation with the actual is reported in the appropriate table.

The expectation is that the correlation of actual allocations with an interval range should be higher than the corresponding correlation of the actual with a mean value. The improvement should be large where the actual/mean value correlation in the ninth column is low, such as in 1988, 1989, and 1990.

Correlations for 6 of the 7 years are above 0.9. The improvement over the actual/mean value correlation (column 9) is about 28 percent, and is especially great (as should be the case) for 1989 at 91 percent and for 1990 at 71 percent. Mediocre results are only associated with 1988, where the actual/interval range correlation is 0.762, which represents only a 29 percent improvement over the actual/mean value correlation.

Table 1 -- Export Enhancement Enhancement bonuses for U.S. wheat: July-June marketing year

Country/Region	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
			Dollars per metric ton				
Venezuela	--	--	--	--	--	1.29	13.78
Brazil	--	23.21	--	--	7.55	28.74	35.16
Mexico, Central America	--	12.18	10.84	2.53	1.95	4.84	1.99
Other South America	--	7.17	1.88	1.86	8.47	3.66	--
Other Western Europe	--	12.83	2.61	.28	45.17	36.47	36.00
Former Soviet Union	43.14	27.65	20.59	15.98	38.9	46.68	31.00
Eastern Europe	34.39	38.30	3.31	6.48	2.02	40.68	26.81
Morocco	40.93	30.44	18.47	15.14	41.98	42.11	35.34
Tunisia	24.32	33.43	--	5.65	45.71	41.02	35.50
Other North Africa	32.34	32.26	19.14	13.33	37.24	51.3	38.09
Ghana	40.21	34.82	22.06	16.88	44.07	55.95	35.01
Togo	40.21	34.82	22.06	16.88	44.07	55.95	35.01
Other Sub-Saharan Africa	7.15	9.41	8.41	16.57	5.75	55.95	29.52
Egypt	30.19	21.83	13.39	4.3	33.96	55.55	27.98
Yemen	--	8.98	21.42	9.94	20.24	30.89	34.38
Sri Lanka	33.69	31.62	11.86	7.33	35.38	44.97	27.03
Other Near East	15.16	12.27	9.64	3.64	15.2	7.62	16.98
China	34.25	35.42	20.38	5.15	27.32	43.47	40.00
Philippines	--	21.11	7.90	2.79	22.08	35.34	23.78
Other Far East	--	25.72	10.36	--	--	10.46	32.36

-- = None.
Source: Author's calculations for July - June marketing year, based on USDA data.

Table 2 -- Regression Results

Item		1986	1987	1988	1989	1990	1991	1992	Average
MAXUS	Regression Coeff.	.256	.713	.314	.806*	.271	.121*	.484	.403
	Std. Error	.084	.066	.059	.170	.137	.070	.139	.041
	Beta Coeff.	.491	1.119	.451	.883	.432	.122	1.037	.655
MINEU	Regression Coeff.	1.071	.316	.280	.783	.473	.617	.666	.544
	Std. Error	.146	.119	.201	.428	.262	.185	.218	.081
	Beta Coeff.	1.472	.302	.361	.821	.564	.487	.799	.584
MINCN	Regression Coeff.	.591	.764	.312	.372	.662	.775**	.123	.556
	Std. Error	.159	.164	.182	.480	.520	.159	.258	.101
	Beta Coeff.	.746	.756	.345	.399	.852	.974	.173	.649
MINAU	Regression Coeff.	-.631*	.740*	-.686*	.229*	-.279*	-.514	1.261*	.140
	Std. Error	.265	.253	.174	.531	.501	.136	.291	.114
	Beta Coeff.	-1.273	1.003	-1.185	.269	-.485	-.541	2.925	.383
MINAR	Regression Coeff.	-.287*	-1.533*	.780*	-1.190*	-.127*	-	-1.535*	-.643
	Std. Error	.272	.308	.279	.591	.600	-	.515	.149
	Beta Coeff.	-.523	-1.669	1.174	-1.313	-.210	-	-2.461	-.837
IMPORTER	Regression Coeff.	20.840	43.025	11.281*	-	-	263.543*	-	-
	Std. Error	10.607	32.925	41.305	-	-	33.484	-	-
	Importer	Soviet	Morocco	China	-	-	Soviet	-	-
IMPORTER	Regression Coeff.	55.829	-	-	-	-	-143.181**	-	-
	Std. Error	10.567	-	-	-	-	61.586	-	-
	Importer	Morocco	-	-	-	-	China	-	-
R2		.829	.865	.810	.232	.030	.930	.556	-
Proportion of Total EEP Expenditure		.073	.231	.109	.043	.114	.243	.188	-

"*" and "**" denote multicollinearity between the variables next to which they appear. "-" = not applicable.

Table 3 -- Average Targeted Subsidies and Coefficients of Variation

Targeted Importers	Average Subsidies --Millions of Dollars--			Coefficients of Variation		
	MAXUS	MINEU	MINCN	MAXUS	MINEU	MINCN
Venezuela	2.811	.000	15.197	2.130	NA	.640
Brazil	27.457	.431	17.382	1.640	1.740	1.204
Former Soviet Union	189.320	18.398	.345	.810	1.689	2.449
Morocco	3.815	19.680	.193	1.949	1.863	2.448
Tunisia	4.962	15.816	.467	1.426	.470	2.265
Ghana	.000	.198	3.465	NA	1.135	.333
Togo	.000	.311	1.223	NA	2.449	.745
Egypt	.000	73.854	1.263	NA	.644	2.098
Yemen	25.953	16.778	.539	.719	1.054	1.986
Pakistan	.000	2.652	4.878	NA	1.597	1.996
Sri Lanka	.000	1.964	1.759	NA	1.813	2.449
Japan	.000	.000	2.530	NA	NA	2.449
South Korea	.000	.000	.000	NA	NA	NA
China	.000	61.379	181.126	NA	1.000	.918
Philippines	.000	.000	3.784	NA	NA	1.987
Indonesia	2.476	.570	3.812	1.402	1.797	.885
Mexico, Central America	.765	1.639	55.825	2.449	2.062	.341
Other South America	.000	.000	20.165	NA	NA	.777
Other Western Europe	.176	.000	7.591	2.448	NA	.707
Eastern Europe	3.045	.000	8.411	2.125	NA	1.210
Other North Africa	33.618	69.835	20.939	1.060	.432	.795
Sub-Saharan Africa	11.264	54.683	18.362	1.482	.585	.519
Other Near East	225.902	16.081	8.925	.373	.508	1.000
Other Far East	.000	177.294	147.564	NA	.426	.231

NA = not applicable

Table 4 -- EEP Subsidies and Minimization of Canadian Export Revenue

Targeted Importer	Code	1986	1987	1988	1989	1990	1991	1992	Average	Standard Deviation	Coefficient of Variation
		----------------------- Millions of Dollars -----------------------------									
Other Far East	FE	108.045	201.637	146.568	97.161	142.059	159.499	177.980	147.564	34.069	.231
Ghana	GH	2.825	3.725	5.052	3.096	2.742	1.729	5.087	3.465	1.153	.333
Mexico, Central America	MX	39.836	86.288	74.007	28.456	41.354	57.026	63.808	55.825	19.041	.341
Sub-Saharan Africa	AF	.000	30.156	16.713	10.670	26.577	22.657	21.759	18.362	9.529	.519
Venezuela	VE	.000	21.065	21.270	.000	22.664	18.246	23.136	15.197	9.720	.640
Other Western Europe	WE	.000	14.577	11.215	.435	11.070	4.874	10.967	7.591	5.367	.707
Togo	TG	.759	1.596	1.874	.000	.000	2.527	1.803	1.223	.911	.745
Other South America	LA	15.987	39.653	.000	.000	15.026	31.492	38.998	20.165	15.675	.777
Other North Africa	NA	28.352	55.362	.000	8.287	25.118	13.070	16.382	20.939	16.641	.795
Indonesia	DO	6.627	8.432	7.766	.000	.419	1.686	1.754	3.812	3.374	.885
China	CH	11.841	321.453	121.300	.000	112.014	503.256	198.018	181.126	166.289	.918
Other Near East	NE	7.357	25.508	.000	.000	13.671	1.043	14.897	8.925	8.921	1.000
Brazil	BZ	17.946	8.454	.000	5.562	2.957	65.557	21.197	17.382	20.926	1.204
Eastern Europe	EE	24.414	22.139	.000	.779	.000	.000	11.545	8.411	10.176	1.210
Yemen	YM	.000	.675	.000	.000	3.099	.000	.000	.539	1.071	1.986
Philippines	PH	.000	.000	.000	4.719	.000	.000	21.769	3.784	7.521	1.987
Pakistan	PK	.000	5.962	.000	.000	.000	.000	28.183	4.878	9.734	1.996
Egypt	EG	7.683	.000	.000	.000	.000	1.161	.000	1.263	2.651	2.098
Tunisia	TN	.000	.217	.000	.000	3.050	.000	.000	.467	1.057	2.265
Morocco	MR	.000	.000	.000	.000	.000	1.354	.000	.193	.474	2.448
Former Soviet Union	SV	.000	.000	.000	.000	2.417	.000	.000	.345	.846	2.449
Sri Lanka	SL	.000	12.313	.000	.000	.000	.000	.000	1.759	4.309	2.449
Japan	JP	.000	.000	.000	.000	.000	17.711	.000	2.530	6.198	NA
SUM:		271.672	838.147	384.495	159.165	401.573	884.642	634.147	525.746	NA	NA

Appendix Table 1 -- Policy Objectives and EEP Targeting: Simulation Results for 1986

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL:MEAN	MODEL:90% CI
Brazil	.000	18.244	.000	17.946	.000	.000	9.655	14.330	7.527
Soviet Union	23.468	11.359	.080	.000	.340	.534	9.726	23.169	23.303
Morocco	55.829	.000	.000	.000	.000	.000	.000	55.479	55.704
Tunisia	11.224	.000	13.054	.000	2.971	3.622	8.034	2.885	5.760
Ghana	1.407	.000	.090	2.825	.394	.407	.000	2.205	1.685
Togo	.844	.000	.000	.759	.000	.000	.000	.257	.513
Egypt	58.093	.000	62.031	7.683	.000	.000	.000	21.146	38.574
Yemen	.000	23.401	1.603	.000	20.394	.000	18.012	.000	.000
Sri Lanka	7.445	.000	3.612	.000	10.536	.215	.000	.000	.000
China	4.829	.000	9.004	11.841	19.158	18.233	.000	.924	3.066
Indonesia	.000	.000	2.905	6.627	18.476	26.076	.000	.000	.000
Mexico, Central America	.000	5.354	.000	39.836	.000	.580	4.041	28.880	18.720
Other South America	.000	.000	.000	15.987	.000	.000	.000	2.034	.000
Eastern Europe	17.848	.000	.000	24.414	.000	.000	.000	14.377	17.848
Other North Africa	52.747	.000	36.284	28.352	11.201	12.872	39.764	37.276	44.430
Sub-Saharan Africa	8.329	48.439	25.907	.000	9.544	.129	55.032	7.531	8.329
Other Near East	29.607	164.873	9.889	7.357	.000	54.864	127.407	60.586	34.370
Other Far East	.000	.000	107.210	108.045	178.658	154.140	.000	.593	.000
SUM:	271.670	271.670	271.669	271.672	271.672	271.672	271.671	271.672	259.829
Correlation Between									
ACTUAL and Model:		.111	.230	.168	.235	.134	.241	.766	.988

Appendix Table 2 -- Policy Objectives and EEP Targeting: Simulation Results for 1987

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL: MEAN	MODEL:90% CI
Venezuela	.000	.000	.000	21.065	.000	35.847	.000	12.421	6.318
Brazil	1.601	3.422	.000	8.454	.171	.306	2.401	8.114	7.095
Soviet Union	347.892	493.545	.000	.000	.000	24.604	417.917	203.188	280.483
Morocco	43.025	.000	.000	.000	.000	.000	.000	42.982	43.025
Tunisia	17.366	.000	29.273	.217	9.765	5.491	15.908	8.145	11.662
Ghana	.982	.000	.285	3.725	.527	.612	.000	3.581	3.191
Togo	1.570	.000	.000	1.596	.000	.000	.000	.000	.000
Egypt	51.100	.000	174.660	.000	.000	.000	.000	.000	.000
Yemen	2.823	38.771	13.018	.675	52.088	.000	34.671	36.045	20.952
Pakistan	.000	.000	10.402	5.962	5.991	4.503	.705	3.569	2.548
Sri Lanka	5.176	.000	10.134	12.313	14.196	4.056	.000	9.458	8.260
China	159.248	.000	91.574	321.453	319.204	229.816	.000	266.811	237.995
Philippines	16.837	.000	.000	.000	.000	.000	.000	.000	.000
Indonesia	.000	.000	1.082	8.432	19.047	39.078	.000	4.680	2.196
Mexico, Central America	11.890	.000	1.678	86.288	3.959	13.501	.000	67.511	55.245
Other South America	7.925	.000	.000	39.653	.000	.000	.000	1.504	6.649
Other Western Europe	5.145	.000	.000	14.577	.000	.000	.000	8.256	5.145
Eastern Europe	63.923	.000	.000	22.139	.000	.000	.000	.000	.000
Other North Africa	69.327	.000	119.054	55.362	12.145	23.933	97.560	80.891	72.652
Sub-Saharan Africa	3.085	.000	86.470	30.156	18.092	20.899	39.634	36.951	31.113
Other Near East	21.951	323.476	24.477	25.508	.000	118.821	250.419	43.968	21.951
Other Far East	28.347	.000	297.105	201.637	404.029	337.747	.000	21.140	28.347
Sum:	859.213	859.214	859.212	859.212	859.214	859.214	859.215	859.215	844.828
Correlation Between ACTUAL and Model:		.756	.069	.254	.181	.193	.783	.843	.959

Appendix Table 3 -- Policy Objectives and EEP Targeting: Simulation Results for 1988

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL: MEAN	MODEL:90% CI
Venezuela	.000	.000	.000	21.270	.000	11.870	.000	2.574	.000
Soviet Union	94.488	197.012	.000	.000	.000	.000	143.924	18.636	59.478
Morocco	15.637	.000	.000	.000	.000	.000	.000	.000	.000
Tunisia	.000	.000	12.390	.000	.000	.000	12.476	4.619	.000
Ghana	.988	.000	.000	5.052	.000	.139	.000	2.191	.988
Togo	.726	.000	.000	1.874	.000	.000	.000	.000	.000
Egypt	39.131	.000	37.387	.000	.000	.000	.000	1.281	8.115
Yemen	2.142	13.925	2.347	.000	7.705	.000	12.073	.000	.000
Sri Lanka	4.174	.000	.000	.000	.000	.000	.000	.000	.000
China	154.603	.000	33.250	121.300	107.952	218.188	.000	152.809	153.175
Philippines	10.390	.000	.000	.000	.000	.000	.000	.000	.000
Indonesia	.000	.000	.000	7.766	.000	.000	.000	.786	.000
Mexico, Central America	18.133	.000	.000	74.007	.000	.000	.000	1.882	11.882
Other South America	2.748	.000	.000	.000	.000	.000	.000	.000	.000
Other Western Europe	.441	.000	.000	11.215	.000	.000	.000	1.828	.441
Eastern Europe	.079	2.558	.000	.000	.000	.000	1.409	.516	.079
Other North Africa	19.485	29.477	52.204	.000	.000	.000	78.879	34.741	19.485
Sub-Saharan Africa	1.128	.000	31.264	16.713	6.266	7.714	14.591	9.343	1.128
Other Near East	14.396	162.793	16.716	.000	.000	12.571	142.412	174.556	141.407
Other Far East	27.075	.000	220.206	146.568	283.842	155.282	.000	.000	.000
Sum:	405.764	405.765	405.764	405.765	405.765	405.764	405.764	405.762	396.178

| Correlation Between ACTUAL and Model: | | .347 | .163 | .537 | .350 | .742 | .284 | .590 | .762 |

Appendix Table 4 -- Policy Objectives and EEP Targeting: Simulation Results for 1989

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL: MEAN	MODEL: 90% CI
Brazil	.000	.000	.000	5.562	.000	.000	.000	.994	.000
Soviet Union	71.894	47.909	.000	.000	.000	.000	19.731	30.147	71.894
Morocco	6.243	5.221	4.689	.000	.000	.000	11.450	12.646	6.243
Tunisia	1.252	.000	9.117	.000	.000	.000	4.716	5.737	1.252
Ghana	.684	.000	.000	3.096	.000	.000	.000	1.042	.684
Togo	.737	.000	.000	.000	.000	.000	.000	.000	.000
Egypt	9.669	.000	10.218	.000	.000	.000	.000	.088	.765
Yemen	1.541	7.042	1.479	.000	8.829	.000	7.263	11.008	1.541
Pakistan	.000	.000	.000	.000	18.496	.000	.000	.000	.000
Sri Lanka	3.011	.000	.000	.000	.000	.000	.000	.000	.000
China	28.613	.000	.000	.000	.000	13.853	.000	.000	.000
Philippines	2.330	.000	.000	4.719	.000	.000	.000	.000	.000
Indonesia	.000	.000	.000	.000	3.323	3.988	.000	.727	.000
Mexico, Central America	2.127	.000	.000	28.456	.000	.000	.000	1.359	2.127
Other South America	2.114	.000	.000	.000	.000	.000	.000	.000	.000
Other Western Europe	.031	1.234	.000	.435	.000	.000	.000	1.562	.031
Eastern Europe	.104	.013	.000	.779	.000	.000	.000	.405	.104
Other North Africa	13.757	.000	28.319	8.287	.000	.000	26.734	33.848	15.866
Sub-Saharan Africa	4.710	.000	16.640	10.670	.000	3.520	6.994	10.608	4.710
Other Near East	10.349	97.745	.000	.000	.000	32.467	82.227	47.489	10.349
Other Far East	.000	.000	88.703	97.161	128.517	105.338	.000	1.504	.000
Sum:	159.166	159.164	159.165	159.165	159.165	159.166	159.115	159.164	115.566
Correlation Between ACTUAL and Model:		.460	.097	.145	.138	.063	.193	.505	.965

Appendix Table 5 -- Policy Objectives and EEP Targeting: Simulation Results for 1990

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

Importer	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL: MEAN	MODEL: 90% CI
Venezuela	.000	2.332	.000	22.664	.000	9.753	.000	13.200	.000
Brazil	.219	2.954	.000	2.957	.000	.000	1.581	2.189	.219
Soviet Union	87.525	74.988	.000	2.417	.000	.000	52.604	18.184	45.093
Morocco	18.390	.000	.000	.000	.000	.000	.000	.000	.000
Tunisia	19.992	8.702	18.933	3.050	2.167	4.493	19.759	13.448	19.992
Ghana	.015	.000	.389	2.742	.424	.507	.000	1.413	.015
Togo	3.231	.000	.000	.000	.000	.000	.000	.000	.000
Egypt	63.350	.000	78.172	.000	.000	.000	8.172	49.857	63.350
Yemen	7.792	47.415	11.419	3.099	42.291	.000	34.884	8.759	7.792
Sri Lanka	10.060	.000	.000	.000	19.230	.000	.000	.000	.000
China	96.849	.000	51.226	112.014	131.790	147.771	31.945	66.295	96.849
Philippines	28.947	.000	.000	.000	.000	.000	.000	.000	.000
Indonesia	.000	9.395	.000	.419	9.789	17.779	5.857	1.206	.000
Mexico, Central America	2.132	.000	.000	41.354	.000	.000	.000	22.213	2.132
Other South America	12.733	.000	.000	15.026	.000	.000	.000	1.528	7.179
Other Western Europe	7.047	.000	.000	11.070	.000	.004	.000	6.224	7.047
Eastern Europe	.315	18.745	.000	.000	.000	.000	10.103	1.891	.315
Other North Africa	46.736	35.127	93.915	25.118	4.824	14.325	90.756	71.648	46.736
Sub-Saharan Africa	2.320	19.146	38.557	26.577	11.540	13.247	37.522	35.204	26.316
Other Near East	16.583	205.434	17.911	13.671	.000	41.459	131.055	70.601	16.583
Other Far East	.000	.000	113.716	142.059	202.182	174.900	.000	40.379	.000
	424.236	424.238	424.238	424.237	424.237	424.238	424.238	424.239	339.618
Correlation Between ACTUAL and Model:		.141	.342	.211	.177	.271	.356	.550	.940

Appendix Table 6 -- Policy Objectives and EEP Targeting: Simulation Results for 1991

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL: MEAN	MODEL: 90% CI
Venezuela	.422	17.346	.000	18.246	.000	.000	15.454	12.807	10.566
Brazil	17.905	134.163	2.094	65.557	2.344	19.983	95.526	52.143	44.667
Former Soviet Union	343.845	252.620	84.893	.000	5.452	52.526	282.502	210.406	211.134
Morocco	9.747	21.483	26.237	1.354	4.826	8.030	33.527	5.325	8.297
Tunisia	5.631	20.372	6.073	.000	1.591	2.723	19.108	.856	1.658
Ghana	.048	.000	.624	1.729	.561	.670	.000	1.381	1.287
Togo	2.735	.000	2.178	2.527	.000	.000	.000	1.379	1.791
Egypt	117.063	.000	84.248	1.161	.000	57.401	.000	36.776	72.097
Yemen	19.461	51.115	46.308	.000	88.948	3.998	66.151	.000	.000
Pakistan	.000	.000	8.165	.000	90.644	.000	.000	.000	.000
Sri Lanka	16.151	.000	.000	.000	.000	48.229	.000	.000	.000
Japan	.000	.000	.000	17.711	.000	.000	.000	.000	.000
China	242.302	.000	195.210	503.256	243.236	229.687	.000	381.876	348.479
Philippines	45.801	.000	.000	.000	62.813	.000	.000	.000	.000
Indonesia	.000	2.026	.000	1.686	.000	4.645	1.577	1.192	.974
Mexico, Central America	4.635	.000	9.794	57.026	.000	4.877	.000	40.560	37.185
Other South America	3.085	.000	.000	31.492	.000	36.588	.000	16.202	11.585
Other Western Europe	3.939	.000	.000	4.874	.000	.000	.000	2.680	3.262
Eastern Europe	3.702	.000	.000	.000	.000	.000	.000	.000	.000
Other North Africa	38.937	77.740	81.491	13.070	12.557	20.747	111.923	24.442	33.326
Sub-Saharan Africa	14.961	.000	80.014	22.657	25.065	29.811	20.977	25.461	19.697
Other Near East	5.646	326.024	17.865	1.043	.000	58.901	256.144	15.194	5.646
Other Far East	6.874	.000	257.694	159.499	364.852	324.073	.000	74.210	49.476
Sum:	902.890	902.889	902.888	902.888	902.889	902.889	902.889	902.890	861.124
Correlation Between ACTUAL and Model:		.389	.483	.468	.207	.354	.501	.873	.919

Appendix Table 7 -- Policy Objectives and EEP Targeting: Simulation Results for 1992

Importer   Value of Subsidy Corresponding To Policy Objective in Millions of Dollars

	ACTUAL	MAXUS	MINEU	MINCN	MINAU	MINAR	NAIVE WTS.	MODEL: MEAN	MODEL: 90% CI
Venezuela	11.713	.000	.000	23.136	.000	6.091	.000	.000	.000
Brazil	5.309	33.415	.922	21.197	1.877	14.960	13.488	3.742	5.309
Former Soviet Union	152.830	247.805	43.810	.000	.000	37.754	203.323	76.157	152.830
Morocco	54.038	.000	106.837	.000	.000	20.946	52.240	41.803	54.038
Tunisia	12.247	5.658	21.872	.000	.000	4.713	19.924	12.461	12.247
Ghana	4.341	.000	.000	5.087	.000	.000	.000	.176	.862
Togo	1.645	.000	.000	1.803	.000	.000	.000	.000	.000
Egypt	90.769	.000	70.262	.000	.000	.000	.000	87.078	87.573
Yemen	31.905	.000	41.273	.000	63.388	3.603	22.152	51.377	35.556
Pakistan	27.195	.000	.000	28.183	52.604	.000	.000	8.441	23.761
Sri Lanka	12.187	.000	.000	.000	.000	.000	.000	.000	.000
South Korea	.000	.000	.000	.000	.000	11.878	.000	.000	.000
China	83.440	.000	49.388	198.018	137.682	124.501	49.324	104.326	83.440
Philippines	37.549	.000	.000	21.769	19.919	.000	.000	37.665	37.549
Indonesia	.000	5.910	.000	1.754	.000	12.095	2.789	.000	.000
Mexico, Central America	2.771	.000	.000	63.808	.000	.000	.000	.818	2.771
Other South America	.000	.000	.000	38.998	.000	54.132	.000	.272	.000
Other Western Europe	6.408	.000	.000	10.967	.000	1.630	.000	.692	3.397
Eastern Europe	16.917	.000	.000	11.545	.000	.000	.000	.000	.000
Other North Africa	33.938	92.980	77.578	16.382	2.364	18.501	94.528	53.196	33.938
Sub-Saharan Africa	48.659	11.266	103.929	21.759	7.868	54.787	75.164	51.026	48.659
Other Near East	21.955	300.967	25.706	14.897	.000	81.313	165.068	.206	1.398
Other Far East	42.183	.000	156.426	177.980	400.420	262.974	.000	168.564	122.184
Sum:	697.999	698.001	698.003	657.283	698.000	698.000	698.000	698.000	705.512
Correlation Between ACTUAL and Model:		.438	.526	.206	.176	.271	.654	.704	.948

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