

Reducing Disharmonies in the U.S. Crops and Dairy Sectors

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Abstract

Various measures have been proposed to "harmonize" agricultural policies in the United States and the European Community. Short-run and long-run consequences of implementing three such measures are evaluated using econometric models developed by the Food and Agricultural Policy Research Institute.

Given conditions prevailing during the 1986/87 crop year, a 10-percent reduction in corn and wheat target prices has relatively small effects on production and market prices. Yields fall, but planted area increases because lower participation rates mean less land is idled by government programs. Establishing a target-price program for soybeans increases soybean production and reduces soybean prices. A 25-percent reduction in milk support prices reduces production, increases consumption, and significantly reduces government purchases. The combined long-run effect of implementing all three measures is a \$5.8-billion reduction in government costs, a \$6.4-billion decline in producer net returns, and a \$3.7-billion gain to milk consumers.

Introduction

As part of a broader effort to evaluate disharmonies within the European Community, within the United States, and between the U.S. and the EC, we evaluate changes in U.S. commodity programs that move towards more harmony in supporting different commodities. It is not suggested that the policy scenarios evaluated here represent complete harmony of support programs across commodities, but rather that the scenarios move in the direction of fewer disharmonies across the commodity sectors.

The scenarios evaluated for the crop sector are to reduce target prices for wheat and corn by 10 percent and to introduce a direct payments program for soybeans with a target price set equal to 10 percent above the current loan rate. In order to more clearly show the contribution of each change in policy to the combined results, the target price reduction on corn and wheat is evaluated first, then the analysis of a target price program is given for soybeans, and finally an analysis of the two program changes when implemented together. The scenario evaluated in the dairy sector is to reduce milk producer price supports by 25 percent.

Analytical Approach

Econometric commodity models developed and maintained by the Center for Agricultural and Rural Development are used to conduct the analysis. These models are documented in the reports cited in the References. A new supply component was developed for the crops models to make the target price explicit in the acreage and yield models (Appendix C).

The supply components of the wheat, corn, and soybean models are based on a set of equations that estimate the participation rate in government acreage reduction programs and the acreage planted both inside and outside the programs. These participation rates respond to the differences between the net returns expected by participants and nonparticipants. The participant net returns are based on the receipts participants earn both from the market and from government payments, while the nonparticipant net returns are based on the market price. Thus, when target prices are reduced, payments decline and participation declines, and more area is planted by nonparticipants. Whether or not the net result of this is an increase or a decrease in total area planted and crops produced depends on the acreage reduction provisions and the behavioral parameters of the acreage and yield components of the model.

A simplified mathematical representation of corn production is presented below. The key policy provision of interest in this analysis is the target price (TPC). This variable influences the participant net returns (1), and thereby the participation rate (3). The target price also directly affects the yield (7). Yield is affected because the national yields increase in response to higher guaranteed prices.

$$\text{PRTN} = (\text{TPC} * \text{YLD} - \text{VARC}) * (1 - R) \quad 0 \leq R \leq 1 \quad (1)$$

$$\text{NPRTN} = \text{PC} * \text{YLD} - \text{VARC} \quad (2)$$

$$\text{PRATE} = f(\text{PRTN} - \text{NPRTN}) \quad f_1 > 0 \quad (3)$$

$$\text{APGM} = \text{PRATE} * \text{BASE} * (1 - R) \quad (4)$$

$$\text{ANPGM} = g[\text{PRATE} * \text{BASE}, \text{lag}(\text{PC})/\text{lag}(\text{PS}), \text{lag}(\text{ANPGM})] \quad (5)$$

$$-1 < g_1 < 0,$$

$$g_2, g_3 > 0$$

$$\text{AT} = \text{APGM} + \text{ANPGM} \quad (6)$$

$$\text{YLD} = h[\text{TPC}, (1 - R)] \quad h_1 > 0, h_2 < 0 \quad (7)$$

$$\text{PDN} = \text{AT} * \text{YLD} \quad (8)$$

where

ANPGN = nonprogram acreage planted
 APGM = program acreage planted
 AT = total planted acreage
 BASE = base acreage
 NPRTN = net returns to nonparticipants
 PC = farm price of corn
 PS = farm price of soybeans
 PRATE = program participation rate
 PRTN = net returns to participants
 R = required proportion of base idled by participants
 TPC = target price of corn
 VARC = variable cost of production
 YLD = national acreage yield per acre

The effect on total acreage planted (AT) of changes in the net returns to participants (PRTN) is derived in Equation 9. Acreage planted decreases in response to lower target prices (lower PRTN) if the required proportion of base idled (R) is less than the rate of slippage $(1 + g_1)$.

$$\frac{\partial \text{AT}}{\partial (\text{PRTN})} = f_1 * \text{BASE} * (1 - R + g_1) \begin{matrix} \geq \\ < \end{matrix} 0, \text{ if } (1 + g_1) \begin{matrix} \geq \\ < \end{matrix} R \quad (9)$$

An illustration of what is expected to occur as target price is reduced is presented in Figure 1. The supply curve S^0 represents the supply that accounts for the area removed from production by

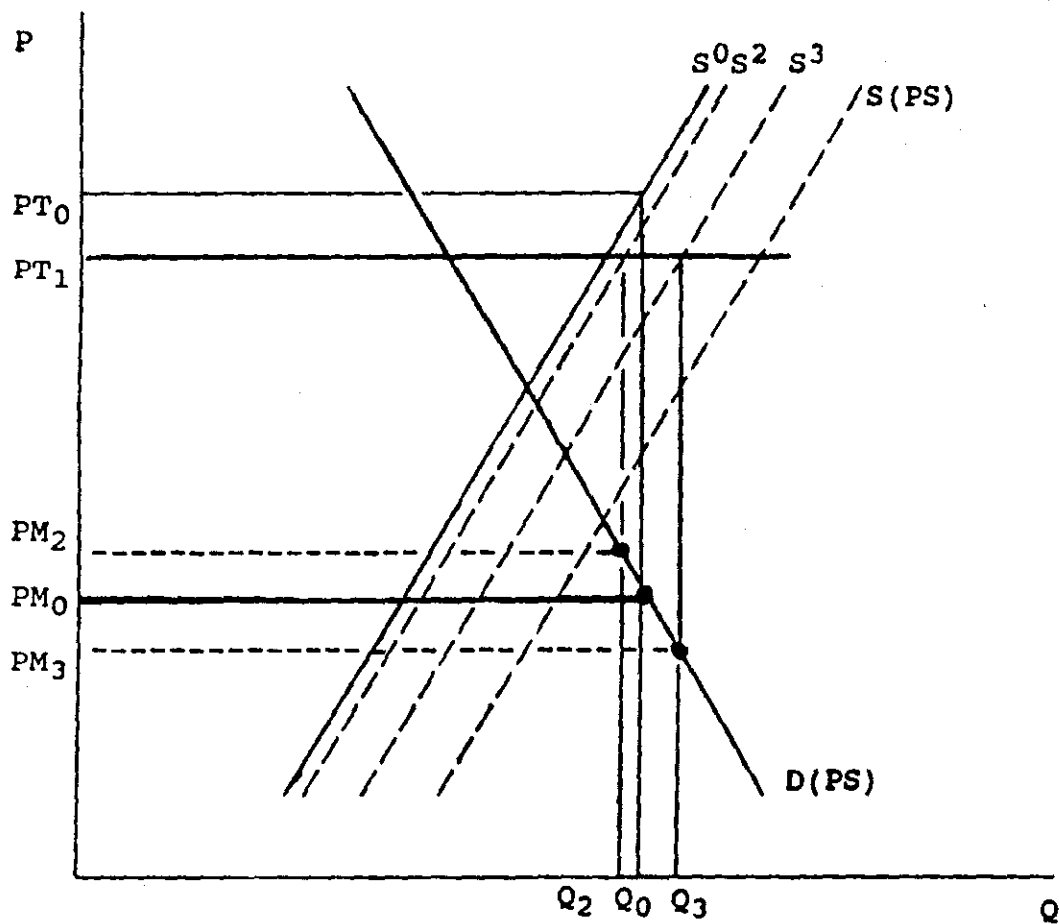


Figure 1. Possible Impacts of Reducing Target Price from PT_0 to PT_1 .

$S(PS)$ - Supply curve with no program

S^0 - Supply curve adjusted for acreage reduction

S^2, S^3 - Alternative effects of lower participation

participating farmers. As the target price declines, participation decreases and this supply curve moves to the right. If it moves to S^2 , there is a net decline in production to Q_2 and an increase in market prices to PM_2 . If it moves to S^3 , there is net increase in supply to Q_3 and a decline in market prices to PM_3 .

Crop Sector Policy Scenarios

The analysis of the target price reduction was conducted in crop year 1986/87, so that it would be based on the conditions existing under the Food Security Act of 1985. The long-run effects of the target price change were simulated by replicating 1986/87 conditions over six periods to allow the model to reach a new long-run equilibrium. The results reported in Table 1 show both the first period effects and the long-run effects. The long-run effects allow both the lagged behavior and the cross-commodity effects in the model to interact in reaching a new equilibrium. In this case, the differences between the first year and long-run effects are not very large. The long-run effects on wheat and corn price are smaller, while the impact on soybean and soymeal prices are larger as a result of the interaction with corn in the feed market.

On the question of whether production increases or decreases, there is a slight decline in corn production and a slight increase in wheat and soybean production. However, all of these changes are quite small. The large impacts of the decline in target prices are the decline in government costs of over \$3 billion and the decline by a similar amount in farm net returns. It is to be expected that net returns to producers would decline in a similar magnitude with government costs, since these costs are direct transfer payments made to farmers.

Table 1. Impacts of Reducing Target Prices for Corn and Wheat with No Changes in Soybean Program Provisions

Variable	"Short-run" Effects				"Long-run" Effects			
	Baseline	Scenario	Diff.	% Diff.	Baseline	Scenario	Diff.	% Diff.
Wheat Price (\$/bu.)	2.29	2.31	0.02	0.87%	2.49	2.50	0.01	0.40%
Corn Price (\$/bu.)	1.65	1.75	0.10	6.06%	1.83	1.89	0.06	3.28%
Soybean Price (\$/bu.)	4.65	4.63	-0.02	-0.43%	4.85	4.73	-0.12	-2.47%
Soymeal Price (\$/ton)	142.00	142.17	0.17	0.12%	145.35	143.59	-1.76	-1.21%
Wheat Partic. Rate (%)	81.0	75.5	-5.5	-6.79%	88.3	82.5	-5.8	-6.57%
Corn Partic. Rate (%)	85.0	76.0	-9.0	-10.59%	84.7	76.0	-8.7	-10.27%
Wheat Area (mil. acres)	71.8	72.4	0.6	0.84%	68.3	69.3	1.0	1.46%
Corn Area (mil. acres)	76.6	76.7	0.1	0.13%	75.1	75.9	0.8	1.07%
Soybean Area (mil. acres)	61.8	62.8	1.0	1.62%	61.3	62.5	1.2	1.96%
Wheat Prod. (mil. bu.)	2077	2081	4	0.19%	1959	1978	19	0.97%
Corn Prod. (mil. bu.)	8223	8055	-168	-2.04%	8066	7974	-92	-1.14%
Soybean Prod. (mil. bu.)	2009	2042	33	1.64%	1991	2031	40	2.01%
Soymeal Prod. (1000 tons)	25721	25782	61	0.24%	25452	25630	178	0.70%
Wheat Domestic Use (mil. bu.)	1086	1095	9	0.83%	1150	1159	9	0.78%
Corn Domestic Use (mil. bu.)	5509	5457	-52	-0.94%	5571	5513	-58	-1.04%
Bean Domestic Use (mil. bu.)	1175	1179	4	0.34%	1167	1175	8	0.69%
Meal Domestic Use (1000 tons)	19857	19965	108	0.54%	19891	20049	158	0.79%
Wheat Stocks (mil. bu.)	1903	1899	-4	-0.21%	1730	1738	8	0.46%
Corn Stocks (mil. bu.)	5441	5346	-95	-1.75%	5184	5182	-2	-0.04%
Soybean Stocks (mil. bu.)	622	649	27	4.34%	604	631	27	4.47%
Soymeal Stocks (1000 tons)	334	336	2	0.60%	335	338	3	0.90%
Wheat Exports (mil. bu.)	1002	1002	0	0.00%	993	994	1	0.10%
Corn Exports (mil. bu.)	1314	1293	-21	-1.60%	1352	1320	-32	-2.37%
Soybean Exports (mil. bu.)	748	750	2	0.27%	756	760	4	0.53%
Soymeal Exports (1000 tons)	5850	5800	-50	-0.85%	5547	5564	17	0.31%
Wheat Deficiency (mil. \$)	3667	2658	-1009	-27.50%	3816	2754	-1062	-27.83%
Corn Deficiency (mil. \$)	6568	4285	-2283	-34.75%	6545	4285	-2259	-34.52%
Soybean Deficiency (mil. \$)	0	0	0	---	0	0	0	---
Wheat Diversion (mil. \$)	212	196	-16	-7.69%	229	216	-12	-5.36%
Corn Diversion (mil. \$)	93	77	-15	-16.67%	85	77	-8	-9.09%
Gov't Cost (Def+Div, mil. \$)	10539	7217	-3323	-31.53%	10674	7333	-3341	-31.30%
Wheat Net Returns (mil. \$)	3564	2598	-966	-27.10%	4009	2983	-1026	-25.60%
Corn Net Returns (mil. \$)	8674	6935	-1739	-20.05%	10058	8026	-2032	-20.20%
Soybean Net Returns (mil. \$)	5246	5292	46	0.88%	5593	5464	-129	-2.31%
Total Net Returns (mil. \$)	17484	14826	-2659	-15.21%	19661	16473	-3187	-16.21%

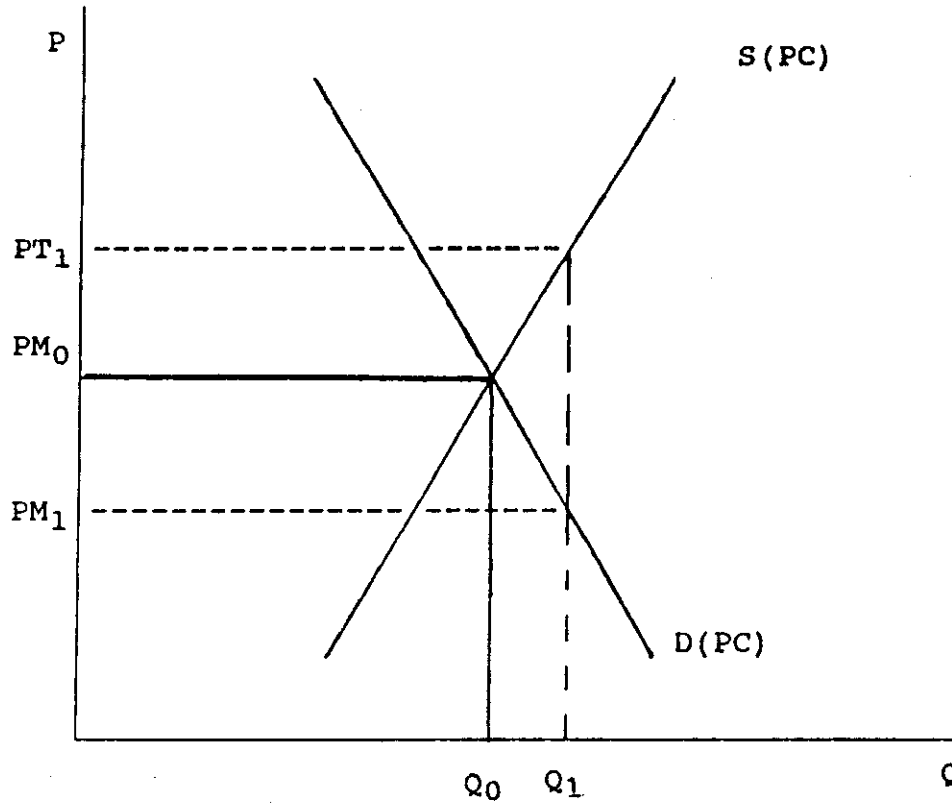


Figure 2. Expected Impacts of Introducing Target Price PT_1 to Soybean Sector.

The soybean sector in the United States now has a loan rate but no target price-deficiency payment scheme. The deficiency payment was introduced in this analysis by setting a target price at 10 percent above the current loan rate and holding the target price at that level of \$5.25 a bushel (\$193 per metric ton). The effect of this new policy on the soybean sector is illustrated in Figure 2. Producer price and net returns are expected to increase, while market prices decline from PM_0 to PM_1 . There should also be cross-commodity effects with corn both through feed demand and through the supply side of the model. Corn feed demand would tend to decrease in response to lower soymeal prices, and corn supply would tend to decrease as soybean producer profits increase.

The first-year and long-run effects of this change in the soybean program are presented in Table 2. In the first year the major effect is an increase in government costs and net returns, as the direct payments to soybean producers are added to the government program. In the long run soybean market prices fall by about 5 percent, but effects on corn feed use and production are offsetting, leaving corn prices essentially the same. There is a near doubling of government soybean stocks, since the loan rate prevents the price from falling as low as it would in a free market equilibrium. This increase in government stocks represents another aspect of increased government costs. The increased direct payment costs are an estimated \$945 million, and producer net returns increase by \$868 million. If the cost of the increased government soybean and corn stocks is merely the storage costs, another \$64 million dollars is added to the change in government costs, raising it to over \$1 billion.

Table 2. Impacts of a Direct Payments Program for Soybeans With No Changes in Corn and Wheat Program Provisions

Variable	"Short-run" Effects				"Long-run" Effects			
	Baseline	Scenario	Diff.	% Diff.	Baseline	Scenario	Diff.	% Diff.
Wheat Price (\$/bu.)	2.29	2.28	-0.01	-0.44%	2.49	2.48	-0.01	-0.40%
Corn Price (\$/bu.)	1.65	1.66	0.01	0.61%	1.83	1.84	0.01	0.55%
Soybean Price (\$/bu.)	4.65	4.61	-0.04	-0.86%	4.85	4.61	-0.24	-4.95%
Soymeal Price (\$/ton)	142.00	141.34	-0.66	-0.46%	145.35	141.42	-3.93	-2.70%
Wheat Partic. Rate (%)	81.0	81.0	0.0	0.00%	88.3	88.5	0.2	0.23%
Corn Partic. Rate (%)	85.0	84.5	-0.5	-0.59%	84.7	83.3	-1.4	-1.65%
Wheat Area (mil. acres)	71.8	71.8	0.0	0.00%	68.3	68.3	0.0	0.00%
Corn Area (mil. acres)	76.6	76.5	-0.1	-0.13%	75.1	74.8	-0.3	-0.40%
Soybean Area (mil. acres)	61.8	62.5	0.7	1.13%	61.3	65.3	4.0	6.53%
Wheat Prod. (mil. bu.)	2077	2077	0	0.00%	1959	1957	-2	-0.10%
Corn Prod. (mil. bu.)	8223	8209	-14	-0.17%	8066	8038	-28	-0.35%
Soybean Prod. (mil. bu.)	2009	2030	21	1.05%	1991	2125	134	6.73%
Soymeal Prod. (1000 tons)	25721	25776	55	0.21%	25452	25781	329	1.29%
Wheat Domestic Use (mil. bu.)	1086	1088	2	0.18%	1150	1152	2	0.17%
Corn Domestic Use (mil. bu.)	5509	5500	-9	-0.16%	5571	5546	-25	-0.45%
Bean Domestic Use (mil. bu.)	1175	1181	6	0.51%	1167	1187	20	1.71%
Meal Domestic Use (1000 tons)	19857	19900	43	0.22%	19891	20095	204	1.03%
Wheat Stocks (mil. bu.)	1903	1898	-5	-0.26%	1730	1729	-1	-0.06%
Corn Stocks (mil. bu.)	5441	5438	-3	-0.06%	5184	5198	14	0.27%
Soybean Stocks (mil. bu.)	622	637	15	2.41%	604	714	110	18.21%
Soymeal Stocks (1000 tons)	334	335	1	0.30%	335	338	3	0.90%
Wheat Exports (mil. bu.)	1002	1005	3	0.30%	993	990	-3	-0.30%
Corn Exports (mil. bu.)	1314	1311	-3	-0.23%	1352	1336	-16	-1.18%
Soybean Exports (mil. bu.)	748	748	0	0.00%	756	760	4	0.53%
Soymeal Exports (1000 tons)	5850	5860	10	0.17%	5547	5667	120	2.16%
Wheat Deficiency (mil. \$)	3667	3667	0	0.00%	3816	3845	29	0.76%
Corn Deficiency (mil. \$)	6568	6529	-39	-0.59%	6545	6436	-108	-1.65%
Soybean Deficiency (mil. \$)	0	974	974	---	0	1020	1020	---
Wheat Diversion (mil. \$)	212	212	0	0.00%	229	233	4	1.79%
Corn Diversion (mil. \$)	93	85	-8	-8.33%	85	85	0	0.00%
Gov't Cost (Def+Div, mil. \$)	10539	11468	928	8.81%	10674	11619	945	8.85%
Wheat Net Returns (mil. \$)	3564	3544	-21	-0.58%	4009	4012	3	0.07%
Corn Net Returns (mil. \$)	8674	8705	30	0.35%	10058	10029	-29	-0.29%
Soybean Net Returns (mil. \$)	5246	6190	944	18.00%	5593	6488	895	16.00%
Total Net Returns (mil. \$)	17484	18438	954	5.46%	19661	20529	869	4.42%

Table 3. Impacts of a Direct Payment Program for Soybeans and Lower Target Prices for Corn and Wheat

Variable	"Short-run" Effects				"Long-run" Effects			
	Baseline	Scenario	Diff.	% Diff.	Baseline	Scenario	Diff.	% Diff.
Wheat Price (\$/bu.)	2.29	2.31	0.02	0.87%	2.49	2.50	0.01	0.40%
Corn Price (\$/bu.)	1.65	1.76	0.11	6.67%	1.83	1.90	0.07	3.83%
Soybean Price (\$/bu.)	4.65	4.60	-0.05	-1.08%	4.85	4.60	-0.25	-5.15%
Soymeal Price (\$/ton)	142.00	141.69	-0.31	-0.22%	145.35	141.45	-3.90	-2.68%
Wheat Partic. Rate (%)	81.0	75.5	-5.5	-6.79%	88.3	82.3	-6.0	-6.80%
Corn Partic. Rate (%)	85.0	75.5	-9.5	-11.18%	84.7	74.3	-10.4	-12.28%
Wheat Area (mil. acres)	71.8	72.4	0.6	0.84%	68.3	69.4	1.1	1.61%
Corn Area (mil. acres)	76.6	76.6	0.0	0.00%	75.1	75.5	0.4	0.53%
Soybean Area (mil. acres)	61.8	63.5	1.7	2.75%	61.3	67.6	6.3	10.28%
Wheat Prod. (mil. bu.)	2077	2081	4	0.19%	1959	1979	20	1.02%
Corn Prod. (mil. bu.)	8223	8041	-182	-2.21%	8066	7938	-128	-1.59%
Soybean Prod. (mil. bu.)	2009	2063	54	2.69%	1991	2201	210	10.55%
Soymeal Prod. (1000 tons)	25721	25823	102	0.40%	25452	25808	356	1.40%
Wheat Domestic Use (mil. bu.)	1086	1096	10	0.92%	1150	1161	11	0.96%
Corn Domestic Use (mil. bu.)	5509	5450	-59	-1.07%	5571	5493	-78	-1.40%
Bean Domestic Use (mil. bu.)	1175	1185	10	0.85%	1167	1190	23	1.97%
Meal Domestic Use (1000 tons)	19857	20000	143	0.72%	19891	20166	275	1.38%
Wheat Stocks (mil. bu.)	1903	1897	-6	-0.32%	1730	1741	11	0.64%
Corn Stocks (mil. bu.)	5441	5341	-100	-1.84%	5184	5177	-7	-0.14%
Soybean Stocks (mil. bu.)	622	663	41	6.59%	604	785	181	29.97%
Soymeal Stocks (1000 tons)	334	337	3	0.90%	335	340	5	1.49%
Wheat Exports (mil. bu.)	1002	1002	0	0.00%	993	991	-2	-0.20%
Corn Exports (mil. bu.)	1314	1290	-24	-1.83%	1352	1309	-43	-3.18%
Soybean Exports (mil. bu.)	748	750	2	0.27%	756	762	6	0.79%
Soymeal Exports (1000 tons)	5850	5807	-43	-0.74%	5547	5622	75	1.35%
Wheat Deficiency (mil. \$)	3667	2658	-1009	-27.51%	3816	2710	-1106	-28.98%
Corn Deficiency (mil. \$)	6568	4257	-2311	-35.18%	6545	4189	-2356	-35.99%
Soybean Deficiency (mil. \$)	0	990	990	---	0	1056	1056	---
Wheat Diversion (mil. \$)	212	196	-16	-7.64%	229	216	-13	-5.49%
Corn Diversion (mil. \$)	93	77	-16	-16.76%	85	77	-8	-9.19%
Gov't Cost (Def+Div, mil. \$)	10539	8178	-2361	-22.41%	10674	8248	-2426	-22.73%
Wheat Net Returns (mil. \$)	3564	2598	-966	-27.11%	4009	2938	-1071	-26.72%
Corn Net Returns (mil. \$)	8674	6977	-1697	-19.57%	10058	8006	-2052	-20.40%
Soybean Net Returns (mil. \$)	5246	6271	1025	19.54%	5593	6866	1273	22.75%
Total Net Returns (mil. \$)	17484	15846	-1638	-9.37%	19661	17810	-1851	-9.41%

The combined effects of these two policy changes is presented in Table 3. Again, the long-run impacts are different from the short-run ones, primarily for corn, soybean, and soymeal prices and for government stocks of corn and soybeans. Corn prices increase by nearly 4 percent, and soybean prices decline by more than 5 percent. There are relatively small changes in corn and wheat production but a significant 10 percent increase in soybean production. This increased soybean production drives the soybean price below the loan rate but also results in a more than doubling of soybean government stocks and a slight increase in corn government stocks.

The storage costs for these increased government stocks would be about \$100 million per year. This cost is far overpowered by the \$2.4 billion decline in direct payments to farmers. The latter includes a \$3.4 billion decline in payments to corn and wheat producers and a \$1 billion increase in payments to soybean producers--the result of the move toward harmonization in these programs. Similarly, the net returns to wheat and corn producers decline by about \$1.3 billion. The net effect across these commodities is a decline of \$1.85 billion in producer net returns.

It is useful to keep in mind that many producers in the Midwest are both corn and soybean producers. It appears that such producers would incur a net loss in income, since soybean returns increase but corn returns decline by a greater amount. The net returns per acre (Appendix Tables A.2, A.3, A.14, and A.15) decline by \$29 per acre for corn and increase by \$7.6 per acre for soybeans.

Dairy Sector Program Changes

Under the Food Security Act of 1985 dairy price supports are scheduled to decline \$0.50 per cwt every year that the government purchases exceed 5 billion pounds and to increase by the same amount when purchases fall below 2 billion pounds. Under this policy rule, our projections are that dairy price supports would fall from the current level of \$11.60 per cwt to \$9.10 per cwt by 1991. For consistency with other analyses we assume that the support rate for the baseline is the 1987 level of \$11.29 per cwt. The alternative scenario evaluated for the harmonization study was to drop dairy support prices in calendar year 1987 by 25 percent to \$8.47 per cwt.

The two scenarios are compared in Table 4. In the first year there is a 2.8 billion pound decrease in production and a 3.3 billion pound increase in manufacturing milk use, which practically eliminates the need for government purchases. This reduces government costs by over \$1 billion and net returns by nearly \$4 billion. In the long run, the baseline production is much higher due to the continuing growth of cow numbers. Thus, in the long-run analyses government purchases decline by more than 20 billion pounds and government costs decline by about \$3.3 billion per year. In the long run, net returns are reduced by \$4.5 billion annually as a result of the 25 percent cut in dairy price supports.

Table 4. Comparison of dairy baseline with the effects of dropping dairy supports by 25 percent in 1987

	<u>"Short-run" Effects</u>			<u>"Long-run" Effects</u>		
	Base	Scenario	Diff.	Base	Scenario	Diff.
Price support (\$/cwt)	11.29	8.47	-2.82	11.29	8.47	-2.82
Farm price (\$/cwt)	12.32	9.50	-2.82	10.13	10.00	-0.13
Milk production						
(bil lb.)	140.1	137.3	-2.8	153.3	136.5	-16.8
Mfg. milk use (bil lb.)	80.0	83.3	3.3	80.0	83.3	3.3
Govt purchases						
(bil lb.)	7.3	0.7	-6.6	20.5	0.0	-20.5
Cost of purchases (bil \$)	1.76	0.66	-1.10	3.35	0.0	-3.35
Net returns (bil \$)	5.24	1.26	-3.98	6.12	1.60	-4.52

SOURCE: Appendix Tables B.1 and B.2.

Summary and Conclusions

The combined effects of reducing target prices for corn and wheat and reducing support prices for the dairy sector would reduce government costs for these commodities by about \$6.7 billion and reduce farm net returns for these commodities by about \$7.7 billion. If the direct payment programs for soybeans are added to the reduced support levels for corn, wheat, and dairy, the cost savings are reduced to \$5.8 billion per year and the loss in net returns is about \$6.4 billion.

In the case of the dairy sector, there are gains to consumers of about \$3.7 billion, so the net social welfare change would be positive. There are also net gains to consumers of wheat, corn, and soybeans, but they are not large. The net welfare gain for crops through these policy changes is still positive, because the government cost savings exceed the decline in net returns.

A problem in the scenario with the introduction of direct payments for soybean producers is that it creates incentives for more soybean production and generates undesirable surplus conditions in the soybean market. Even though this combination appears to be more harmonious in terms of supports for grains and soybeans, it probably could be introduced only in combination with an acreage reduction program for soybeans. The change in soybean policy conflicts with the general U.S. policy objective of moving toward more market-oriented policies, creating a new disharmony. Therefore, it is more appropriate to define U.S. crop policy changes without the introduction of a soybean target price.

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APPENDIX A

Detailed Tables
on the
Crops Policy Scenarios

Table A.1. Baseline WHEAT Supply and Utilization

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
(Million Acres)							
Base Acreage	91.3	91.3	91.3	91.3	91.3	91.3	91.3
Set Aside %	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Diversion %	10.0	10.0	10.0	10.0	10.0	10.0	10.0
LTCR Acres	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Set Aside Acres	16.6	18.2	18.4	18.3	18.2	18.2	18.1
Diversion Acres	5.2	5.7	5.7	5.7	5.7	5.7	5.6
Partic. Rate %	81.0	88.5	89.4	89.0	88.5	88.5	88.3
Planted Area	71.8	68.7	68.1	68.1	68.3	68.3	68.3
Harvested Area	60.5	57.4	56.8	56.8	57.0	57.0	57.1
Yield	34.3	34.3	34.3	34.3	34.3	34.3	34.3
Base Yield	37.1	37.1	37.1	37.1	37.1	37.1	37.1
(Million Bushels)							
SUPPLY							
Beg. Stocks	1,905	1,905	1,905	1,905	1,905	1,905	1,905
Production	2,077	1,971	1,950	1,950	1,956	1,957	1,959
Imports	9	9	9	9	9	9	9
TOTAL SUPPLY	3,991	3,885	3,864	3,864	3,870	3,871	3,873
DOMESTIC							
Feed	309	327	338	340	341	341	341
Food	691	701	708	714	718	721	723
Seed, etc.	86	85	85	86	86	86	86
TOTAL	1,086	1,113	1,132	1,139	1,145	1,147	1,150
TOTAL EXPORTS	1,002	1,027	1,002	999	998	994	993
TOTAL DEMAND	2,088	2,140	2,134	2,138	2,142	2,142	2,143
ENDING STOCKS	1,903	1,745	1,730	1,726	1,728	1,729	1,730
Farmer Held	640	640	640	640	640	640	640
CCC Owned	890	784	781	780	779	780	780
Under Loan	300	250	248	245	245	246	246
"Free" Stocks	73	71	61	61	64	63	64
PRICES:							
Farm Price	\$2.29	\$2.43	\$2.45	\$2.48	\$2.48	\$2.49	\$2.49
Loan Rate	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Target Price	\$4.38	\$4.38	\$4.38	\$4.38	\$4.38	\$4.38	\$4.38
Reserve Entry	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Reserve Release	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45
Cost per Acre	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52
Cost per Bushel	\$1.79	\$1.79	\$1.79	\$1.79	\$1.79	\$1.79	\$1.79
Part. Return/Acre	\$61.21	\$61.16	\$61.12	\$61.06	\$61.06	\$61.04	\$61.04
Non-Part. Returns	\$17.04	\$21.84	\$22.53	\$23.56	\$23.56	\$23.90	\$23.90

Table A.2. Baseline CORN Supply and Utilization

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
(Million Acres)							
Base Acreage	82.4	82.4	82.4	82.4	82.4	82.4	82.4
Set Aside %	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Diversion %	2.5	2.5	2.5	2.5	2.5	2.5	2.5
LTCR Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Set Aside Acres	11.5	11.6	11.5	11.5	11.5	11.5	11.5
Diversion Acres	1.2	1.2	1.2	1.2	1.1	1.1	1.1
Partic. Rate %	85.0	85.3	84.9	84.8	84.7	84.7	84.7
Planted Area	76.6	75.4	75.1	75.1	75.1	75.1	75.1
Harvested Area	68.9	67.9	67.6	67.6	67.6	67.6	67.6
Yield	119.3	119.3	119.3	119.3	119.3	119.3	119.3
Base Yield	105.6	105.6	105.6	105.6	105.6	105.6	105.6
(Million Bushels)							
SUPPLY							
Beg. Stocks	4,038	4,038	4,038	4,038	4,038	4,038	4,038
Production	8,223	8,104	8,072	8,070	8,066	8,067	8,066
Imports	3	3	3	3	3	3	3
TOTAL SUPPLY	12,264	12,145	12,113	12,111	12,107	12,108	12,107
DOMESTIC							
Feed	4,328	4,383	4,371	4,376	4,377	4,378	4,380
Food	913	921	922	923	923	923	923
Gasohol	250	250	250	250	250	250	250
Seed	18	18	18	18	18	18	18
TOTAL	5,509	5,573	5,561	5,566	5,567	5,569	5,571
TOTAL EXPORTS	1,314	1,349	1,361	1,350	1,349	1,352	1,352
TOTAL DEMAND	6,823	6,922	6,922	6,916	6,917	6,921	6,923
ENDING STOCKS	5,441	5,223	5,191	5,194	5,190	5,187	5,184
Farmer Held	2,000	2,000	2,000	2,000	2,000	2,000	2,000
CCC Owned	1,375	1,235	1,221	1,222	1,219	1,216	1,213
Under Loan	1,515	1,350	1,330	1,331	1,329	1,327	1,325
"Free" Stocks	551	638	640	641	642	644	646
PRICES:							
Farm Price	\$1.65	\$1.78	\$1.84	\$1.83	\$1.83	\$1.83	\$1.83
Chicago Price	\$1.81	\$1.94	\$2.00	\$1.99	\$1.99	\$1.99	\$1.99
Corn Loan Rate	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Target Price	\$3.03	\$3.03	\$3.03	\$3.03	\$3.03	\$3.03	\$3.03
Reserve Entry	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Reserve Release	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25
Cost per Acre	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86
Cost per Bushel	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22
Part. Return/Acre	\$158.26	\$158.26	\$158.26	\$158.26	\$158.26	\$158.26	\$158.26
Non-Part. Returns	\$50.98	\$66.49	\$73.65	\$72.46	\$72.46	\$72.46	\$72.46

Table A.3. Baseline SOYBEAN Supply and Utilization

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
ACREAGE (Million Acres)							
LTCR Acres	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Planted Area	61.8	61.6	61.5	61.4	61.4	61.3	61.3
Harvested Area	59.4	59.2	59.2	59.0	59.0	58.9	58.9
Yield (Bu/Acre)	33.8	33.8	33.8	33.8	33.8	33.8	33.8
SUPPLY (Million Bushels)							
Beg. Stocks	536	536	536	536	536	536	536
Production	2,009	2,002	1,999	1,993	1,994	1,992	1,991
TOTAL SUPPLY	2,545	2,538	2,535	2,529	2,530	2,528	2,527
DOMESTIC							
Crush	1,083	1,077	1,076	1,073	1,073	1,071	1,072
Seed & Residual	92	96	96	96	96	96	96
TOTAL	1,175	1,173	1,171	1,169	1,168	1,167	1,167
TOTAL EXPORTS	748	753	756	757	757	756	756
TOTAL DEMAND	1,923	1,926	1,927	1,925	1,925	1,923	1,924
ENDING STOCKS							
CCC Owned	222	198	188	184	183	184	183
"Free" Stocks	400	414	420	421	421	421	421
PRICES:							
Farm Price	\$4.65	\$4.77	\$4.79	\$4.83	\$4.83	\$4.84	\$4.85
Chicago Price	\$4.70	\$4.83	\$4.85	\$4.95	\$4.92	\$4.96	\$4.95
Loan Rate	\$4.77	\$4.77	\$4.77	\$4.77	\$4.77	\$4.77	\$4.77
Bean/Corn Ratio	2.82	2.68	2.60	2.64	2.64	2.64	2.65
Soymeal Price	\$142.00	\$144.30	\$144.58	\$145.05	\$144.97	\$144.89	\$145.35
Soyoil Price	16.2	16.8	16.9	17.1	17.1	17.2	17.2
Crush. Margin	\$0.47	\$0.47	\$0.47	\$0.46	\$0.46	\$0.46	\$0.46
Cost per Acre	\$66.28	\$66.28	\$66.28	\$66.28	\$66.28	\$66.28	\$66.28
Cost per Bushel	\$1.96	\$1.96	\$1.96	\$1.96	\$1.96	\$1.96	\$1.96
Return/Bu.	\$2.69	\$2.82	\$2.83	\$2.88	\$2.86	\$2.88	\$2.89
Return/Acre	\$90.89	\$94.95	\$95.62	\$96.97	\$96.97	\$97.31	\$97.65

Table A.4. Baseline SOYBEAN Meal Supply and Utilization

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
SUPPLY							
Production	25,721	25,579	25,548	25,481	25,476	25,446	25,452
Beg. Stocks	320	320	320	320	320	320	320
TOTAL SUPPLY	26,041	25,899	25,868	25,801	25,796	25,766	25,772
DOMESTIC USE							
Production	19,857	19,883	19,939	19,906	19,909	19,859	19,891
EXPORTS	5,850	5,681	5,594	5,561	5,552	5,572	5,547
TOTAL DEMAND	25,707	25,563	25,533	25,466	25,461	25,431	25,437
ENDING STOCKS	334	335	336	335	335	334	335
DECATUR PRICE	\$142.00	\$144.30	\$144.58	\$145.05	\$144.97	\$144.89	\$145.35

Table A.5. Impact on WHEAT Supply and Utilization of
Reducing Target Prices for Corn and Wheat with No
Changes in Soybean Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
	(Million Acres)						
Base Acreage	91.3	91.3	91.3	91.3	91.3	91.3	91.3
Set Aside %	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Diversion %	10.0	10.0	10.0	10.0	10.0	10.0	10.0
LTCR Acres	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Set Aside Acres	15.5	17.1	17.1	17.1	17.0	17.0	17.0
Diversion Acres	4.8	5.3	5.3	5.3	5.3	5.3	5.3
Partic. Rate %	75.5	83.0	83.3	83.1	82.5	82.5	82.5
Planted Area	72.4	69.6	69.1	69.1	69.3	69.3	69.3
Harvested Area	61.1	58.3	57.9	57.9	58.0	58.1	58.1
Yield	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Base Yield	37.1	37.1	37.1	37.1	37.1	37.1	37.1
SUPPLY	(Million Bushels)						
Beg. Stocks	1,905	1,905	1,905	1,905	1,905	1,905	1,905
Production	2,081	1,987	1,971	1,971	1,976	1,978	1,978
Imports	9	9	9	9	9	9	9
TOTAL SUPPLY	3,995	3,901	3,885	3,885	3,890	3,892	3,892
DOMESTIC							
Feed	317	335	345	347	349	349	349
Food	691	701	708	714	718	721	724
Seed, etc.	87	87	87	87	87	87	87
TOTAL	1,095	1,122	1,140	1,148	1,154	1,157	1,159
TOTAL EXPORTS	1,002	1,028	1,004	998	997	997	994
TOTAL DEMAND	2,097	2,151	2,144	2,146	2,151	2,154	2,154
ENDING STOCKS	1,899	1,750	1,741	1,739	1,740	1,738	1,738
Farmer Held	640	640	640	640	640	640	640
CCC Owned	885	783	782	782	780	778	779
Under Loan	296	249	248	248	247	245	245
"Free" Stocks	78	78	71	69	73	75	74
PRICES:							
Farm Price	\$2.31	\$2.45	\$2.46	\$2.49	\$2.49	\$2.49	\$2.50
Loan Rate	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Target Price	\$3.94	\$3.94	\$3.94	\$3.94	\$3.94	\$3.94	\$3.94
Reserve Entry	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Reserve Release	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45
Cost per Acre	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52
Cost per Bushel	\$1.81	\$1.81	\$1.81	\$1.81	\$1.81	\$1.81	\$1.81
Part. Return/Acre	\$49.83	\$49.73	\$49.71	\$49.64	\$49.64	\$49.64	\$49.62
Non-Part. Returns	\$17.13	\$21.90	\$22.24	\$23.26	\$23.26	\$23.26	\$23.60

Table A.6. Impact on CORN Supply and Utilization of
Reducing Target Prices for Corn and Wheat with No
Changes in Soybean Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
	(Million Acres)						
Base Acreage	82.4	82.4	82.4	82.4	82.4	82.4	82.4
Set Aside %	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Diversion %	2.5	2.5	2.5	2.5	2.5	2.5	2.5
LTCR Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Set Aside Acres	10.2	10.3	10.3	10.3	10.2	10.3	10.2
Diversion Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Partic. Rate %	76.0	76.3	76.3	76.2	76.1	76.1	76.0
Planted Area	76.7	76.1	76.0	76.0	75.9	75.9	75.9
Harvested Area	68.8	68.3	68.2	68.2	68.1	68.1	68.1
Yield	117.0	117.0	117.0	117.0	117.0	117.0	117.0
Base Yield	105.6	105.6	105.6	105.6	105.6	105.6	105.6
SUPPLY	(Million Bushels)						
Beg. Stocks	4,038	4,038	4,038	4,038	4,038	4,038	4,038
Production	8,055	7,996	7,983	7,980	7,974	7,976	7,974
Imports	3	3	3	3	3	3	3
TOTAL SUPPLY	12,096	12,037	12,024	12,021	12,015	12,017	12,015
DOMESTIC							
Feed	4,277	4,322	4,316	4,319	4,319	4,319	4,322
Food	912	920	922	922	922	922	922
Gasohol	250	250	250	250	250	250	250
Seed	18	18	18	18	18	18	18
TOTAL	5,457	5,510	5,506	5,510	5,510	5,510	5,513
TOTAL EXPORTS	1,293	1,320	1,328	1,319	1,318	1,320	1,320
TOTAL DEMAND	6,750	6,830	6,834	6,828	6,828	6,829	6,833
ENDING STOCKS	5,346	5,207	5,190	5,192	5,187	5,188	5,182
Farmer Held	2,000	2,000	2,000	2,000	2,000	2,000	2,000
CCC Owned	1,320	1,233	1,226	1,228	1,225	1,226	1,228
Under Loan	1,455	1,349	1,340	1,342	1,336	1,336	1,339
"Free" Stocks	571	625	624	622	626	626	615
PRICES:							
Farm Price	\$1.75	\$1.85	\$1.89	\$1.89	\$1.89	\$1.89	\$1.89
Chicago Price	\$1.91	\$2.01	\$2.05	\$2.05	\$2.05	\$2.05	\$2.05
Corn Loan Rate	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Target Price	\$2.73	\$2.73	\$2.73	\$2.73	\$2.73	\$2.73	\$2.73
Reserve Entry	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Reserve Release	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25
Cost per Acre	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86
Cost per Bushel	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25
Part. Return/Acre	\$129.19	\$129.19	\$129.19	\$129.19	\$129.19	\$129.19	\$129.19
Non-Part. Returns	\$58.97	\$70.67	\$75.35	\$75.35	\$75.35	\$75.35	\$75.35

Table A.7. Impact on SOYBEAN Supply and Utilization of
Reducing Target Prices for Corn and Wheat with No
Changes in Soybean Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
ACREAGE (Million Acres)							
LTCR Acres	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Planted Area	62.8	62.9	62.6	62.4	62.5	62.4	62.5
Harvested Area	60.4	60.5	60.2	60.0	60.1	60.0	60.1
Yield (Bu/Acre)	33.8	33.8	33.8	33.8	33.8	33.8	33.8
SUPPLY (Million Bushels)							
Beg. Stocks	536	536	536	536	536	536	536
Production	2,042	2,045	2,034	2,029	2,032	2,029	2,031
TOTAL SUPPLY	2,578	2,581	2,570	2,565	2,568	2,565	2,567
DOMESTIC							
Crush	1,086	1,085	1,084	1,080	1,081	1,079	1,079
Seed & Residual	94	97	97	97	97	97	96
TOTAL	1,179	1,183	1,181	1,178	1,178	1,176	1,175
TOTAL EXPORTS	750	756	759	760	760	760	760
TOTAL DEMAND	1,929	1,938	1,940	1,938	1,938	1,936	1,935
ENDING STOCKS							
CCC Owned	649	643	631	627	630	630	631
"Free" Stocks	261	239	219	215	217	218	215
	388	404	412	412	413	412	416
PRICES:							
Farm Price	\$4.63	\$4.63	\$4.65	\$4.71	\$4.70	\$4.72	\$4.73
Chicago Price	\$4.68	\$4.68	\$4.70	\$4.82	\$4.78	\$4.83	\$4.82
Loan Rate	\$4.77	\$4.77	\$4.77	\$4.77	\$4.77	\$4.77	\$4.77
Bean/Corn Ratio	2.65	2.50	2.46	2.49	2.49	2.50	2.50
Soymeal Price	\$142.17	\$142.08	\$142.38	\$143.30	\$143.04	\$143.13	\$143.59
Soyoil Price	16.0	16.1	16.2	16.5	16.4	16.6	16.6
Crush. Margin	\$0.48	\$0.48	\$0.48	\$0.47	\$0.47	\$0.47	\$0.47
Cost per Acre	\$66.28	\$66.28	\$66.28	\$66.28	\$66.28	\$66.28	\$66.28
Cost per Bushel	\$1.96	\$1.96	\$1.96	\$1.96	\$1.96	\$1.96	\$1.96
Return/Bu.	\$2.67	\$2.68	\$2.69	\$2.76	\$2.73	\$2.76	\$2.77
Return/Acre	\$90.21	\$90.21	\$90.89	\$92.92	\$92.58	\$93.26	\$93.59

Table A.8. Impact on SOYBEAN MEAL Supply and Utilization
of Reducing Target Prices for Corn and Wheat with No
Changes in Soybean Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
SUPPLY							
Production	25,782	25,776	25,746	25,660	25,667	25,625	25,630
Beg. Stocks	320	320	320	320	320	320	320
TOTAL SUPPLY	26,102	26,096	26,066	25,980	25,987	25,945	25,950
DOMESTIC USE							
Exports	5,800	5,683	5,621	5,580	5,574	5,590	5,564
TOTAL DEMAND	25,765	25,758	25,727	25,642	25,649	25,607	25,613
ENDING STOCKS	336	338	339	338	338	337	338
DECATUR PRICE	\$142.17	\$142.08	\$142.38	\$143.30	\$143.04	\$143.13	\$143.59

Table A.9. Impact on WHEAT Supply and Utilization of
a Direct Payments Program for Soybeans with No
Changes in Corn and Wheat Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
(Million Acres)							
Base Acreage	91.3	91.3	91.3	91.3	91.3	91.3	91.3
Set Aside %	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Diversion %	10.0	10.0	10.0	10.0	10.0	10.0	10.0
LTCR Acres	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Set Aside Acres	16.6	18.1	18.3	18.3	18.2	18.2	18.2
Diversion Acres	5.2	5.6	5.7	5.7	5.7	5.7	5.7
Partic. Rate %	81.0	88.3	89.2	89.2	88.5	88.6	88.5

Planted Area	71.8	68.7	68.1	68.1	68.2	68.2	68.3
Harvested Area	60.5	57.4	56.9	56.8	57.0	57.0	57.0
Yield	34.3	34.3	34.3	34.3	34.3	34.3	34.3
Base Yield	37.1	37.1	37.1	37.1	37.1	37.1	37.1

SUPPLY (Million Bushels)							
Beg. Stocks	1,905	1,905	1,905	1,905	1,905	1,905	1,905
Production	2,077	1,971	1,952	1,949	1,956	1,956	1,957
Imports	9	9	9	9	9	9	9
TOTAL SUPPLY	3,991	3,885	3,866	3,863	3,870	3,870	3,871

DOMESTIC							
Feed	311	329	341	342	343	343	343
Food	691	701	708	714	718	721	724
Seed, etc.	86	85	85	86	86	86	86
TOTAL	1,088	1,115	1,134	1,141	1,147	1,150	1,152

TOTAL EXPORTS	1,005	1,027	1,002	996	994	991	990

TOTAL DEMAND	2,093	2,143	2,136	2,137	2,141	2,141	2,142

ENDING STOCKS							
Farmer Held	640	640	640	640	640	640	640
CCC Owned	885	782	780	780	778	779	779
Under Loan	295	249	247	246	246	246	246
"Free" Stocks	78	72	63	60	64	64	64

PRICES:							
Farm Price	\$2.28	\$2.44	\$2.44	\$2.48	\$2.47	\$2.48	\$2.48
Loan Rate	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Target Price	\$4.38	\$4.38	\$4.38	\$4.38	\$4.38	\$4.38	\$4.38
Reserve Entry	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Reserve Release	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45
Cost per Acre	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52
Cost per Bushel	\$1.79	\$1.79	\$1.79	\$1.79	\$1.79	\$1.79	\$1.79
Part. Return/Acre	\$61.21	\$61.14	\$61.14	\$61.06	\$61.08	\$61.06	\$61.06
Non-Part. Returns	\$16.69	\$22.18	\$22.18	\$23.56	\$23.21	\$23.56	\$23.56

Table A.10. Impact on CORN Supply and Utilization of
a Direct Payments Program for Soybeans with No
Changes in Corn and Wheat Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
(Million Acres)							
Base Acreage	82.4	82.4	82.4	82.4	82.4	82.4	82.4
Set Aside %	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Diversion %	2.5	2.5	2.5	2.5	2.5	2.5	2.5
LTCR Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Set Aside Acres	11.5	11.3	11.3	11.3	11.3	11.3	11.3
Diversion Acres	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Partic. Rate %	84.5	83.3	83.3	83.3	83.3	83.3	83.3

Planted Area	76.5	74.9	74.8	74.8	74.8	74.8	74.8
Harvested Area	68.8	67.5	67.4	67.4	67.4	67.4	67.4
Yield	119.3	119.3	119.3	119.3	119.3	119.3	119.3
Base Yield	105.6	105.6	105.6	105.6	105.6	105.6	105.6

SUPPLY (Million Bushels)							
Beg. Stocks	4,038	4,038	4,038	4,038	4,038	4,038	4,038
Production	8,209	8,053	8,040	8,038	8,038	8,038	8,038
Imports	3	3	3	3	3	3	3
TOTAL SUPPLY	12,250	12,094	12,081	12,079	12,079	12,079	12,079

DOMESTIC							
Feed	4,319	4,359	4,347	4,353	4,353	4,354	4,355
Food	913	921	922	922	923	923	923
Gasohol	250	250	250	250	250	250	250
Seed	18	18	18	18	18	18	18
TOTAL	5,500	5,548	5,537	5,543	5,544	5,545	5,546

TOTAL EXPORTS	1,311	1,339	1,348	1,335	1,335	1,336	1,336

TOTAL DEMAND	6,811	6,886	6,885	6,879	6,878	6,881	6,882

ENDING STOCKS							
Farmer Held	2,000	2,000	2,000	2,000	2,000	2,000	2,000
CCC Owned	1,371	1,228	1,225	1,227	1,228	1,226	1,225
Under Loan	1,515	1,343	1,338	1,342	1,342	1,340	1,339
"Free" Stocks	552	637	633	632	631	633	634

PRICES:							
Farm Price	\$1.66	\$1.81	\$1.85	\$1.84	\$1.84	\$1.84	\$1.84
Chicago Price	\$1.82	\$1.97	\$2.01	\$2.00	\$2.00	\$2.00	\$2.00
Corn Loan Rate	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Target Price	\$3.03	\$3.03	\$3.03	\$3.03	\$3.03	\$3.03	\$3.03
Reserve Entry	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Reserve Release	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25
Cost per Acre	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86
Cost per Bushel	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22
Part. Return/Acre	\$158.26	\$158.26	\$158.26	\$158.26	\$158.26	\$158.26	\$158.26
Non-Part. Returns	\$52.18	\$70.07	\$74.84	\$73.65	\$73.65	\$73.65	\$73.65

Table A.12. Impact on SOYBEAN MEAL Supply and Utilization
of a Direct Payments Program for Soybeans with No
Changes in Corn and Wheat Program Provisions

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
SUPPLY							
Production	25,776	25,796	25,791	25,779	25,778	25,761	25,781
Beg. Stocks	320	320	320	320	320	320	320
TOTAL SUPPLY	26,096	26,116	26,111	26,099	26,098	26,081	26,101
DOMESTIC USE	19,900	20,048	20,099	20,097	20,098	20,056	20,095
EXPORTS	5,860	5,731	5,673	5,663	5,661	5,687	5,667
TOTAL DEMAND	25,761	25,778	25,772	25,760	25,759	25,743	25,763
ENDING STOCKS	335	338	339	338	338	338	338
DECATUR PRICE	\$141.34	\$141.64	\$141.56	\$141.39	\$141.36	\$141.11	\$141.42

Table A.13. Impact on WHEAT Supply and Utilization of
a Direct Payment Program for Soybeans and Lower
Target Prices for Corn and Wheat

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
(Million Acres)							
Base Acreage	91.3	91.3	91.3	91.3	91.3	91.3	91.3
Set Aside %	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Diversion %	10.0	10.0	10.0	10.0	10.0	10.0	10.0
LTCR Acres	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Set Aside Acres	15.5	17.1	17.1	17.0	17.0	17.0	16.9
Diversion Acres	4.8	5.3	5.3	5.3	5.3	5.3	5.3
Partic. Rate %	75.5	83.0	83.1	82.9	82.5	82.5	82.3

Planted Area	72.4	69.6	69.2	69.2	69.3	69.3	69.4
Harvested Area	61.1	58.3	57.9	57.9	58.0	58.1	58.1
Yield	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Base Yield	37.1	37.1	37.1	37.1	37.1	37.1	37.1

SUPPLY (Million Bushels)							
Beg. Stocks	1,905	1,905	1,905	1,905	1,905	1,905	1,905
Production	2,081	1,987	1,973	1,973	1,977	1,978	1,979
Imports	9	9	9	9	9	9	9
TOTAL SUPPLY	3,995	3,901	3,887	3,887	3,891	3,892	3,893

DOMESTIC							
Feed	318	338	347	350	351	351	350
Food	691	701	708	714	718	721	724
Seed, etc.	87	87	87	87	87	87	87
TOTAL	1,096	1,125	1,142	1,151	1,156	1,160	1,161

TOTAL EXPORTS	1,002	1,027	1,003	999	996	993	991

TOTAL DEMAND	2,098	2,153	2,145	2,150	2,153	2,153	2,152

ENDING STOCKS							
Farmer Held	640	640	640	640	640	640	640
CCC Owned	883	781	782	780	778	779	780
Under Loan	295	248	249	246	246	246	247
"Free" Stocks	79	79	71	72	74	74	74

PRICES:							
Farm Price	\$2.31	\$2.46	\$2.47	\$2.49	\$2.49	\$2.50	\$2.50
Loan Rate	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Target Price	\$3.94	\$3.94	\$3.94	\$3.94	\$3.94	\$3.94	\$3.94
Reserve Entry	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40
Reserve Release	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45	\$4.45
Cost per Acre	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52	\$61.52
Cost per Bushel	\$1.81	\$1.81	\$1.81	\$1.81	\$1.81	\$1.81	\$1.81
Part. Return/Acre	\$49.83	\$49.71	\$49.69	\$49.64	\$49.64	\$49.62	\$49.62
Non-Part. Returns	\$17.13	\$22.24	\$22.58	\$23.26	\$23.26	\$23.60	\$23.60

Table A.14. Impact on CORN Supply and Utilization of
a Direct Payment Program for Soybeans and Lower
Target Prices for Corn and Wheat

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
(Million Acres)							
Base Acreage	82.4	82.4	82.4	82.4	82.4	82.4	82.4
Set Aside %	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Diversion %	2.5	2.5	2.5	2.5	2.5	2.5	2.5
LTCR Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Set Aside Acres	10.2	10.0	10.0	10.0	10.0	10.0	10.0
Diversion Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Partic. Rate %	75.5	74.3	74.3	74.3	74.3	74.3	74.3
Planted Area	76.6	75.6	75.6	75.5	75.5	75.5	75.5
Harvested Area	68.7	67.9	67.8	67.8	67.8	67.8	67.8
Yield	117.0	117.0	117.0	117.0	117.0	117.0	117.0
Base Yield	105.6	105.6	105.6	105.6	105.6	105.6	105.6
(Million Bushels)							
SUPPLY							
Beg. Stocks	4,038	4,038	4,038	4,038	4,038	4,038	4,038
Production	8,041	7,945	7,938	7,938	7,938	7,938	7,938
Imports	3	3	3	3	3	3	3
TOTAL SUPPLY	12,082	11,986	11,979	11,979	11,979	11,979	11,979
DOMESTIC							
Feed	4,270	4,298	4,295	4,296	4,296	4,297	4,303
Food	912	920	921	922	922	922	922
Gasohol	250	250	250	250	250	250	250
Seed	18	18	18	18	18	18	18
TOTAL	5,450	5,486	5,485	5,486	5,486	5,487	5,493
TOTAL EXPORTS	1,290	1,309	1,316	1,306	1,305	1,306	1,309
TOTAL DEMAND	6,741	6,795	6,801	6,792	6,791	6,793	6,802
ENDING STOCKS	5,341	5,191	5,178	5,186	5,187	5,186	5,177
Farmer Held	2,000	2,000	2,000	2,000	2,000	2,000	2,000
CCC Owned	1,317	1,228	1,220	1,226	1,227	1,226	1,225
Under Loan	1,450	1,340	1,335	1,342	1,342	1,340	1,339
"Free" Stocks	574	623	623	618	618	620	613
PRICES:							
Farm Price	\$1.76	\$1.89	\$1.91	\$1.91	\$1.91	\$1.91	\$1.90
Chicago Price	\$1.92	\$2.05	\$2.07	\$2.07	\$2.07	\$2.07	\$2.06
Corn Loan Rate	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Target Price	\$2.73	\$2.73	\$2.73	\$2.73	\$2.73	\$2.73	\$2.73
Reserve Entry	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92	\$1.92
Reserve Release	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25
Cost per Acre	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86	\$145.86
Cost per Bushel	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25
Part. Return/Acre	\$129.19	\$129.19	\$129.19	\$129.19	\$129.19	\$129.19	\$129.19
Non-Part. Returns	\$60.14	\$75.35	\$77.69	\$77.69	\$77.69	\$77.69	\$76.52

Table A.16. Impact on SOYBEAN MEAL Supply and Utilization
of a Direct Payment Program for Soybeans and Lower
Target Prices for Corn and Wheat

Variable/Year	86/87	86/87+1	86/87+2	86/87+3	86/87+4	86/87+5	86/87+6
SUPPLY							
Production	25,823	25,829	25,816	25,810	25,808	25,791	25,808
Beg. Stocks	320	320	320	320	320	320	320
TOTAL SUPPLY	26,143	26,149	26,136	26,130	26,128	26,111	26,128
DOMESTIC USE							
Exports	5,807	5,673	5,626	5,614	5,611	5,637	5,622
TOTAL DEMAND	25,807	25,810	25,797	25,789	25,788	25,772	25,788
ENDING STOCKS	337	339	340	340	340	339	340
DECATUR PRICE	\$141.69	\$141.78	\$141.58	\$141.48	\$141.45	\$141.20	\$141.45

APPENDIX B

Detailed Tables
on the
Dairy Policy Scenarios

Table B.1 Baseline U.S. Dairy Sector Supply, Use, Prices, Costs
and Income With 1987 Policy and Economic Assumptions

	1987	1987+1	1987+2	1987+3	1987+4	1987+5	1987+6	1987+7	1987+8
Milk Cows (Mil)	10.39	10.51	10.64	10.76	10.88	11.00	11.12	11.25	11.37
Output per cow (Thou lb)	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48
Total Milk Prod (Bil lb)	140.12	141.77	143.42	145.06	146.71	148.36	150.01	151.66	153.33
Mfg Milk Com use (Bil lb)	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Fluid Milk Cons (Bil lb)	50.45	50.45	50.45	50.45	50.45	50.45	50.45	50.45	50.45
Govt Purchases (Bil lb)	7.27	8.92	10.57	12.21	13.86	15.51	17.16	18.81	20.48
Govt Cost (Mil dollars)	1761.10	1459.95	1729.80	1999.64	2269.49	2539.34	2809.19	3079.03	3353.30
Prices (\$/cwt)									
Support	11.29	11.29	11.29	11.29	11.29	11.29	11.29	11.29	11.29
Farm, All Milk	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32
Net Returns (\$/cwt)	3.74	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
Net Returns (Bil dollars)	5.24	5.66	5.72	5.79	5.85	5.92	5.99	6.05	6.12

Appendix C

Crop Production Models
with Explicit Program Variables

Crop Production Models with Explicit Program Variables

The corn and wheat program participation models are based on the assumption that producers are faced with a discrete and a continuous choice in their planting decision. The discrete choice is whether or not to participate in the commodity program and thus comply with its acreage restriction requirements. The continuous choice is how many acres to plant, given the discrete compliance decision. For producers who choose to participate, the planting decision is mandated by the program; nonparticipants have flexibility in their planting decision.

The participation decision is based upon the comparison of expected net returns in and out of the program. Expected net returns are calculated on a per acre basis. Expected net returns are based on lagged prices and trend yields. Other variables in the expected net returns calculation are actual values for the given year.

The participation rate is determined simply by the explanatory variables that represent the producers' expected net returns for their production choices in and out of the program. Corn producers can either participate and comply with corn acres planting restrictions, or not comply and then plant corn or soybeans. Wheat producers can either choose to participate or not to participate.

From the participation equation, the number of acres planted in the program is known directly. The participant-planted acres is the participation rate multiplied by the base acres and by the program planting rate. The participant planting rate is the percent of base acres planted when enrolled

in the program; e.g., if the diversion rate was 10 percent and the set-aside rate was 10 percent, the participant planting rate would be 80 percent.

Nonparticipant acres is determined by the lagged corn-soybean price ratio in the corn model and expected net returns for nonparticipants in the wheat model. In addition to these explanatory variables, the acreage removed by the respective program is included as an explanatory variable, along with a trend and a lagged dependent variable. The variable that represents acreage removed by the program is simply the participation rate multiplied by base acres. This effectively represents the acres occupied by participants, including planted, diverted, and set aside acres.

The total acreage planted is determined through an identity. Total acreage planted is the summation of participant and nonparticipant planted acreage. The long-term conservation reserve is subtracted in the forecast period.

Wheat and corn yields are expected to increase with higher target prices, as variable inputs rise in response to greater profit incentives. Yields are expected to decline as participants are permitted to plant a larger share of their base, since the least productive land is the first to be removed from production. A trend variable is used to represent technology.

To give a more complete description of the two models, the corn and wheat participation and acreage planted equations will be described in turn. A soybean-acres-planted equation is also estimated. The corn model supply equations are described first, after which the soybean-acres-planted equation is examined. Next, the wheat participation rate and supply equations are presented in a similar manner. Finally, a comparison of implied supply and

participation elasticities with respect to market and target prices is provided.

Corn Participation Rate and Acreage Model

The corn participation rate equation (CORPART) has explanatory variables of the difference between participant corn net returns and nonparticipant corn net returns, the difference between soybean net returns and nonparticipant corn net returns, and a series of zero-one dummy variables for years for which there was no commodity program.

The net returns are arranged so that the implied coefficients of soybean net returns and nonparticipant corn net returns sum to one. This is done so that changes in net returns of production choices other than participation do not have a larger effect than changes in participation net returns. The estimated CORPART equation follows:

$$\begin{aligned} \text{CORPART} = & 0.5362 + 0.3895 * (\text{CORPRTNR} - \text{CORNPNR})/\text{USPW80} \\ & (17.7) \quad (2.14) \\ & - 0.1144 * (\text{USOYNPNR} - \text{CORNPNR})/\text{USPW80} \\ & (0.94) \\ & - 0.5902 \text{ DM174} - 0.6166 * \text{DM175} - 0.6213 * \text{DM176} \\ & (4.28) \quad (4.01) \quad (3.96) \\ & - 0.4825 * \text{DM177} - 0.5418 * \text{DM180} - 0.5578 * \text{DM181} \\ & (3.74) \quad (4.47) \quad (4.47) \end{aligned}$$

$$R^2 = 0.86$$

$$\text{D.W.} = 1.66$$

The first variable after the intercept is expected participant corn net returns (CORPRTNR) less expected nonparticipant corn net returns (CORNPNR). The next variable is expected soybean net returns (SOYNPNR) less expected nonparticipant corn net returns. The equation includes a series of dummy variables for years when there was no program.

Acres planted in the program is derived by the following calculation:

CORN PARTICIPANT PLANTED ACRES =

$$\text{CORPART} * \text{CORBA} * (1 - \text{CORDR} - \text{CORSR})$$

This is the participation rate multiplied by the corn base acres and then multiplied by the planting rate, or the percent of base land area planted by participants.

Nonparticipant planted acres (CORNPA) has explanatory variables of the lagged corn-soybean price ratio, the participation rate multiplied by corn base acres, and a lagged dependent variable. The participation rate multiplied by the corn base represents the acres planted, diverted, and set aside by program participants. The estimated equation follows:

$$\begin{aligned} \text{CORNPA} = & 68.4936 + 13.97 * \text{CORPF.1/SOYPF.1} \\ & (12.11) \quad (1.29) \\ & - 0.8124 * \text{CORPART} * \text{CORBA} + 0.1065 * \text{CORNPA.1} \\ & (25.53) \quad (2.87) \end{aligned}$$

$$R^2 = 0.98$$

$$\text{D.W.} = 1.67$$

The total corn planted acres (CORTPA) is derived from an identity which sums participant and nonparticipant planted acres and subtracts long-term conservation reserve (CORLTCR):

$$\text{CORTPA} = \text{CORNPA} + \text{CORPART} * \text{CORBA} * \text{CORPLTR} - \text{CORLTCR}$$

Total production is total planted acres times yield. The yield is related to corn program variables in the following equation:

$$\begin{aligned} \text{CORYLD} = & -5942.25 - 14.16 * \text{CORPLTR} + 830.49 * \text{CORPT/USPW80} \\ & (7.00) \quad (0.79) \qquad (1.09) \\ & + 3.05 * \text{TREND} - 37.65 \text{DM183} \\ & (7.13) \qquad (3.23) \end{aligned}$$

$$R = 0.84$$

$$\text{D.W.} = 2.51$$

Soybean Acreage Model

Total soybean acres planted (SOYSA) is linked to the corn participation decision. Increased participation in the corn program reduces the soybean acres planted. Thus, soybean planted acreage is a function of expected net returns for soybeans, expected net returns for nonparticipant corn, the corn participant rate multiplied by the corn base, a trend, a lagged dependent variable, and a zero-one dummy variable for years in which there was no corn program. Again the variable CORPART * CORBA represents the acres planted, diverted, and set aside by corn program participants.

The estimated soybean planted acreage equation is the following:

$$\begin{aligned} \text{SOYSA} = & -850.959 + 13.76 * (\text{SOYPF.1} * \text{SOYYD} - \text{SOYVC})/\text{USPW80} \\ & (1.68) \quad (6.77) \\ & - 6.77 * (\text{CORPFE} * \text{CORYD} - \text{CORVC})/\text{USPW80} \\ & (4.86) \\ & - 0.14 * \text{CORPART} * \text{CORBA} \\ & (3.01) \\ & + 0.437 * \text{TREND} - 9.04 * \text{DM1NPRG} \\ & (1.67) \qquad (4.45) \end{aligned}$$

$$R^2 = 0.99$$

$$\text{D.W.} = 2.28$$

Wheat Participation Rate and Acreage Model

The wheat participation rate equation has explanatory variables of expected net returns for wheat program participants (WHENRPRG) less expected

net returns for nonparticipants, a zero-one dummy variable for the year 1963, and a dummy variable for years when there was no wheat program (1974-1977 and 1980-1981). The dummy variable for 1963 is included for the relatively low participation rate reported (46 percent) in the presence of a mandatory program. It is believed that the 46 percent value is the percent of participants who enrolled in the voluntary diversion portion of the mandatory program. The estimated equation follows:

$$\begin{aligned} \text{WHEPART} &= 66.50 + 55.67 * [\text{WHENRPRG} - (\text{WHEPF.1} * \text{WHEYDT} - \text{WHEVC})] / \text{USPW80} \\ &\quad (16.78) \quad (3.37) \\ &\quad - 18.26 * \text{DM163} - 66.50 * \text{DMINPRG} \\ &\quad (1.63) \quad (11.52) \end{aligned}$$

$$R^2 = 0.93$$

$$\text{D.W.} = 1.39$$

The nonparticipant planted acres equation for wheat is quite similar to the corn nonparticipant planted acres equation. The explanatory variables in the nonparticipant planted acres equation are expected nonparticipant net returns, the participation rate multiplied by wheat base acres, a lagged dependent variable, a trend, and a zero-one dummy variable for the year 1983. The variable $\text{WHEPART}/100 * \text{WHEPRB}$ essentially reflects the acres removed by program participants. This would include participant planted acres, diverted land, and set-aside land. The apparent redundancy of including both a trend variable and a lagged dependent variable is done so that the total of nonparticipant planted acres does not reduce to negative values in the forecast period. The long-term conservation reserve, along with great incentives to participate in the wheat program caused forecast values of nonparticipant planted acres to be minimal or nonpositive. The dummy variable for the year 1983 is included for the PIK year, which was a unique program year.

The estimated nonparticipant planted acres equation is the following:

$$\begin{aligned} \text{WHENPA} = & -3274.24 + 7.97 * (\text{WHEPF.1} * \text{WHEYDT} - \text{WHEVC})/\text{USPW80} \\ & (8.40) \quad (1.97) \\ & - 0.8249 * \text{WHEPART}/100 * \text{WHEPRB} \\ & (12.66) \\ & + 0.0738 * \text{WHENPA.1} + 1.68 * \text{TREND} \\ & (1.29) \quad (8.52) \\ & + 13.15 * \text{DM183} \\ & (2.59) \end{aligned}$$

$$R^2 = 0.98$$

$$\text{D.W.} = 1.46$$

Total planted acres is derived from the following identity:

$$\text{WHESA} = \text{WHENPA} + (\text{WHEPART}/100) * \text{WHEPRB} * \text{WHEPLTR} - \text{WHELTCR}$$

Thus, total planted acres is the summation of nonparticipant planted acres (WHENPA) and participant planted acres $[(\text{WHEPART}/100) * \text{WHEPRB} * \text{WHEPLTR}]$, less long-term conservation reserve (WHELTCR).

Total production is total planted acres times yield. The yield is related to wheat program variables in the following equation:

$$\begin{aligned} \text{WHEYLD} = & -1180.48 - 8.45 * \text{WHEPLTR} + 65.13 * \text{WHEPT}/\text{USPW80} \\ & (7.56) \quad (3.77) \quad (2.04) \\ & + 0.616 * \text{TREND} \\ & (7.92) \end{aligned}$$

$$R^2 = 0.93$$

$$\text{D.W.} = 2.09$$

Structural Elasticities of the Production Models

The summary of elasticities reported in Table C.1 indicates how participation rates, area planted, and yields respond to market prices and target prices in the model. The corn participation rate declines if either corn or soybean prices increase. This is because many corn producers who produce soybeans as well take into account the net returns for soybean production as well as corn when making their participation decisions. For the same reason corn and soybean prices both have positive effects on nonparticipating corn acreage. For total planting of corn and soybeans, the net effects have the expected signs; that is, positive own-price elasticities and negative cross-price elasticities. The wheat participation rate also declines as wheat market prices increase, and nonparticipant acres increase with higher wheat prices. The total wheat area planted has a positive response to market prices.

Target prices increase participation rates for both wheat and corn. Thus, the net effect of a higher corn target price is to increase participation in reduced acreage programs and reduce area planted to corn and soybeans. Similarly, higher wheat target prices reduce total wheat area planted. As expected, target prices also have a sizable impact on nonparticipant area planted. Higher target prices do have the effect of increasing yields of corn and wheat, so the overall production effect could be positive under some conditions. These elasticities are evaluated at 1989 levels of the variables, and they would change from year to year depending on the levels of the variables concerned.

Table C.1. Implied Elasticities for Corn, Soybeans, and Wheat

Market Price Elasticities (1989 levels)

	<u>Market Price Change</u>		
	<u>Corn</u>	<u>Soybeans</u>	<u>Wheat</u>
Corn participation rate	-0.50	-0.16	--
Wheat participation rate	--	--	-0.43
Total corn area planted	0.12	-0.03	--
Total soybean area planted	-0.10	0.32	--
Total wheat area planted	--	--	0.23
Nonparticipant corn acres	1.37	0.26	--
Nonparticipant wheat acres	--	--	1.55

Target Price Elasticities (1989 levels)

	<u>Target Price Change</u>	
	<u>Corn</u>	<u>Wheat</u>
Corn participation rate	0.89	--
Wheat participation rate	--	0.50
Total corn area planted	-0.11	--
Total soybean area planted	-0.15	--
Total wheat area planted	--	-0.18
Nonparticipant acres	-2.02	-1.5
Yield response	0.16	0.06

Appendix D

**Corn, Soybean, and Wheat
Variable Definitions**

Corn and Soybean Variable Definitions

- CORNPA = Corn nonprogram planted area (mil acres)
 = $CORTPA - CORPART * CORBA * (1 - CORSR - CORDR) - CORPLTR$
- CORPART = Computed corn part. rate (program planted + set aside + diverted)/base
 = $(CORPRG + CORARP + CORDIV)/CORBA$
- CORPARTR = Reported corn participation rate--part. base/total base
- CORTPA = Corn total planted area (mil acres)
- CORBA = Corn base acres (mil acres)
- CORDP = Corn diversion payments per diverted acre (\$/acre)
 diversion payments/total diverted acres
 = $CORDIV/(CORPART * CORBA)$
- CORPLTR = Planting rate for participants $(1 - CORSR - CORDR)$
- CORLTCR = Corn acreage in Long-Term Conservation Reserve (mil acres)
- CORPARTD = Difference between calculated and ASCS participation rate
 = $CORPARTR - CORPART * 100$
- CORPFE = Corn expected price: higher of lagged farm price and loan rate (\$/bu)
- CORPTE = Corn: higher of target price, loan rate, or lagged farm price (\$/bu)
- CORSR = Corn set aside, as portion of base of those in program
 = $CORARP/(CORPART * CPRBA)$
- CORVC = Corn variable costs per planted acre (\$/acre)
- CORYD = Trend corn yield (bu/acre)
- CORYDB = Corn program yield (bu/acre)

CORARP = Corn area in acreage reduction program (mil acres)
 CORDIV = Corn area diverted (mil acres)
 CORPRG = Corn planted under gov't. programs (mil acres)
 CORPF = Corn farm price (\$/bu)
 CORPL = Corn loan rate (\$/bu)
 CORPT = Corn target price (\$/bu)
 CORPRTNR = Corn participant net returns (\$/acre)
 = (CORPTE - CORPFE) * CORYDB * (1 - CORSR - CORDR)
 + CORDR * CORDP + CORPFE * CORYD * (1 - CORSR - CORDR)
 - (1 - CORSR - CORDR) * CORVC - .2 * CORVC * (CORSR + CORDR)
 CORNPNR = Corn nonparticipant net returns (\$/acre)
 = CORPFE * CORYD - CORVC
 SOYNPNR = Soybean net returns (\$/acre)
 = SOYPF.1 * SOYYD - SOYVC
 SOYPF = Soybean farm price (\$/bu)
 SOYVC = Soybean variable costs (\$/acre)
 SOYYD = Trend soybean yield (bu/acre)
 USPW80 = U.S. producer price index, all commodities (1980 = 100)

Wheat Variable Definitions

WHEPART = Wheat program participation rate
 = $\frac{\text{compliance acres}}{\text{base acres}}$
 = $\frac{\text{compliance planted} + \text{set-aside} + \text{diverted}}{\text{base acres}}$

WHENRPRG = Program participants' net returns
 = WHENRPRM, if year = 1962-1985,
 defined according to annual programs
 = $(WHEPT - WHEPF.1) * (1 - WHEDR - WHESR) * WHEYDB$
 + $(WHEDR * WHEDP)$
 + $WHEPF.1 * WHEYDT * (1 - WHEDR - WHESR)$
 - $(1 - WHEDR - WHESR) * WHEVC$, if year = 1986-1994

WHEPF.1 = Lagged farm price

WHEYDT = Trend wheat yield (bu/acre)

WHEVC = Wheat variable cost (\$/acre)

USPW80 = U.S. producer price index, all commodities (1980 = 100)

DM163 = Dummy variable for year 1963. A mandatory program was in effect,
 but participation rate was 46%. This value is assumed to be the
 participation rate in the voluntary diversion part of the
 program.
 = 1 if year = 1963
 = 0 otherwise

DM1NPRG = No wheat acreage program dummy variable
 = 1 if year = 1974-1977, 1980-1981
 = 0 otherwise

WHEPT = Wheat target price (\$/bu)

WHENPA = Nonparticipant planted acres (mil acres)

- WHEPRB = Base acres except for year = 1971-1973 (mil acres)
 = $\frac{WHEBSE}{0.48}$ if year = 1971-1973,
 where
 WHEBSE = domestic allotment. Domestic allotment was assumed to
 be 48% of equivalent total allotment or base.
- DM183 = Dummy variable for PIK year
 = 1 if year = 1983
 = 0 otherwise
- WHEPLTR = Planting rate for participants
 = WHEPTR + DMIS86 * (1 - WHEDR - WHESR)
- WHELTCR = Acres diverted to long-term conservation reserve (mil acres)
- WHEPTR = Planting rate for participants if year = 1962-1985
 = $1 - \frac{WHEDIV}{WHEBSE}$ if year = 1962-1970
 = $1 - \frac{WHEFDIV}{WHESA}$ if year = 1971-1973
 = (1 - WHEDR - WHESR) if year = 1978, 1979, 1982-1985
 = 1 otherwise
- WHESA = Total planted acres (mil acres)
- WHEDIV = Diverted acres (mil acres)
- WHEARP = Set-aside acres (mil acres)
- WHEPRG = Acres planted in program (mil acres)
- WHEDR = Diversion rate
 = $WHEDIV / (WHEDIV + WHEARP + WHEPRG)$
- WHESR = Set-aside rate
 = $WHEARP / (WHEDIV + WHEARP + WHEPRG)$

DMIS86 = 0 if year = 1962-1985
= 1 otherwise

WHEPL = Loan rate (\$/bu)

WHEDP = Wheat diversion payment (\$/bu)

WHEBSE = Base acres (mil acres)

WHEYDB = Program yield (bu/acre)

WHEPIK = Land diverted under PIK (mil acres)