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The Case of Removing Price Supports on Feed Grains: Estimated Effects On the U.S. and Nebraska Corn and Livestock Industries

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Abstract

A U.S.-Nebraska linked quarterly econometric model is used to examine impacts on the corn, beef and hog industries from immediate and gradual removal of price supports. The results indicate that the agriculture sector is more adversely affected from removal of price supports gradually than expeditiously. Also, the gradual adjustment approach produces greater cyclical movements in prices and quantities. Corn exports are not greatly affected under either market adjustment process.

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U.S. agricultural policy for the past five decades has developed programs which essentially prevent agricultural markets from achieving equilibrium (Bullock). Price support programs for wheat, feed grains, cotton, tobacco, peanuts, sugar, rice and dairy products have generally kept the prices of these commodities above the "market clearing" or equilibrium levels. Studies by Wallace; Gardner; Heien; and Lin et al. among others, calculate the direct and social costs of these farm programs. The 1985 "Farm Bill" is being drafted in very critical times for American agriculture. Amidst an increasing number of farm foreclosures, low agricultural product prices and reduced farm exports, there has been increased discussion of reverting back to a free market structure for agricultural products previously supported by price floors.

The objectives of this study are as follows:

(i) To examine the impacts on corn price, production, stocks and exports from gradual and expeditious removal of price supports, using the U.S.-Nebraska linked quarterly econometric model.

(ii) To analyze subsequent impacts on the national and state level cattle and hogs sectors.

(iii) To compare results with other studies and analyze short term and longer term implications for the U.S. feed grain and livestock sectors.

Subsequent sections of this paper include a background to price support removals and review of previous studies, a summary of the U.S.-Nebraska econometric model, results from two policy scenarios, and implications from these results.

Background and Review of Policy Studies

Although the case of agricultural price supports is often cited as an example of market distortion, debate over their potential removal has recently been associated with the drafting of the 1985 Farm Bill. Essentially, agricultural price supports create disequilibrium, because the product price fails to equalize quantity demanded with quantity supplied. As a result of price supports, surpluses accumulate. The federal government often becomes the owner of these surpluses through operations of the Commodity Credit Corporation.[1]

Current discussion of the 1985 Farm Bill emphasizes the importance of considering program options. Schuh argues that a domestic agricultural market characterized by pricing constraints for some commodities is counter-productive, especially in context of a world with flexible exchange rates and fluctuating dollar values. He asserts that price supports encourage other countries to increase their grain output and undersell the U.S. in the world market. To overcome this situation, he proposes deregulation of commodity and credit markets and elimination of the current farm program.[2]

Two recently published studies have estimated impacts from eliminating price supports and returning to a free market solution. First, the USDA/ERS has investigated the impact of eliminating price and income supports in the 1986-1990 period (see USDA/ERS, Agricultural Economic Report No. 526). The second study by Johnson et al. is done through the Food and Agricultural Policy Research Institute (FAPRI). This study evaluates several policy options, one of which is a free market scenario. The market option assumes a minimum government intervention policy under moderate to positive conditions for the U.S. and world economies and with loan rates moving toward world market prices and an elimination of target prices.

Both the USDA and FAPRI studies analyze grain and livestock impacts on an annual basis. An advantage of the model used in this research is the availability of quarterly impacts. This enables investigation of short-run effects and analysis of consumer and producer decision-making within a shorter temporal period. Another advantage of this model is the linkage of a state's agricultural system to the national agricultural market enabling evaluation of disaggregate impacts.

A limitation of this study as compared to work already done by the USDA and FAPRI is consideration of only three commodity markets - corn, cattle and hogs. This reflects the principal commodities for the State of Nebraska (see Azzam, Linsenmeyer and Baker).

General Overview of the Model

The conceptual framework guiding the specification of the model used in this study is illustrated in Figure 1. All the diagrams show the price-quantity relationships with the exception of diagrams h, j, and k, which indicate the technical links between the livestock and feed grain sectors. The U.S. is separated into two regions, Nebraska and the rest of the U.S. (ROUS).

Assume that the quantity of feed grains produced in year t-2 (QFG_{t-2}) is marketed in year t-1. Because supply from the previous period is inelastic with respect to the price in that year, its intersection with the farm level demand schedule yields the equilibrium price (PFG_{t-1}) in diagram c. The resulting price is transmitted to Nebraska and the ROUS and intersects their respective supply schedules, resulting in the production level for the current year (QFG_t), diagrams a and b. The smaller quantity produced is induced by the lower price in t-1 and now commands a higher price PFG_t. The demand schedule in diagram c is the horizontal summation of the regional

derived demand curves, diagram d and e, and the export demand schedule in diagram g.

The national derived demand for feed grains in diagram f is separated into two regional derived demand curves d and e. The latter interact with the technical conversion schedules h and j to determine livestock production in the two regions. Regional livestock production, diagrams h and j, is aggregated in diagram i to interact with the derived demand for livestock. The latter's intersection with the primary supply schedule determines the livestock price received at the farm level (PUS).

The current feed grain price PFG in diagram c determines feed grain output in the year t + 1. Holding all other non-price variables constant, the larger quantity produced in the year t + 1, due to the higher price in year t, will have a depressing effect on prices in year t + 2 and the cycle continues.

Naturally, shifts in production from year to year, coupled with other factors emanating from the livestock sector and/or the export market, will alter the illustrated behavioral relationships and result in a new set of market interactions. Suppose the derived demand for livestock, dd in diagram 1, shifts to the left. This will cause a leftward shift in the derived demand for feed grains in both regions. As a consequence, a smaller quantity of feedgrains will be demanded, and lower feed grain prices will result, ceteris paribus. The leftward shift in the derived demand schedule for feed grains means a leftward shift in the national demand for feed grains in diagram c, assuming no major developments in the export market. If the shift in demand is sizable, price may hit the flat portion of the demand schedule, in which case the support price r becomes the market price. At this point the government absorbs any difference between the quantity supplied and demanded at the support price.

The structural model consists of 42 equations and is arranged into four submodels: (1) a Nebraska livestock-feed submodel; (2) a ROUS livestock-feed submodel; (3) a joint submodel; and (4) market clearing equations and identities. The Nebraska submodel consists of equations for corn production, corn disappearance, corn stocks, cattle inshipments, beef cow inventory, commercial and farmer feeder cattle placements, fed beef supply, sows farrowing, and market hog inventory. The ROUS submodel explains corn production, corn stocks, beef cow inventory, fed and nonfed beef supply and sows farrowing. The joint (total U.S.) submodel consists of aggregate equations for feed demand, corn exports, hog slaughter, hog and beef ending stocks, and the prices of corn, fed and nonfed beef, feeder cattle and hogs.

All prices in the model are national prices. The value of each dependent variable in this ROUS submodel represents the difference between the U.S. and Nebraska levels. The key relationships can be summarized as follows: (i) regional corn production is specified as a function of own price, price of substitutes (sorghum for Nebraska and soybeans for the ROUS)[3], regional weather proxies, and a time trend; (ii) regional livestock production is assumed to be a function of own price, input price and previous placements and farrowings for beef and hogs respectively; (iii) the cattle inshipment equation links Nebraska placements to the cattle subsector in the ROUS; (iv) the Nebraska grain subsector is linked to the export market by including the national export variable in the Nebraska corn disappearance equation; (v) corn price is a function of its lagged price, excess demand and the price of soybeans; (vi) livestock producer price is related to its lagged value, per capita consumption, and per capita consumption of competing meats; and (vii) corn exports are hypothesized to be a function of lagged exports, lagged stocks, domestic feed consumption, and a trade weighted exchange rate.

The use of lagged endogenous variables in the model suggests that agricultural producers form adaptive expectations. Although our model assumes that farm producers have knowledge of farm policies prior to enactment, their decision-making process can be described only as "weakly rational".[4]

The Root Mean Square Error (RMSE) as a percent of the mean is used to measure the forecasting accuracy of the model, and these results are shown in Table 1. The static and dynamic ex-post simulation RMSE results are shown in the second and third columns respectively. Within sample (1969 IV - 1981 IV) evaluation results indicate that endogenous variables track corresponding historical data well. The last column contains RMSE coefficients measuring forecasting accuracy of the model outside the sample period (1982 I - 1982 IV).[5] The RMSE percent errors for the ex-post forecasts are for the most part larger than those for the historical simulations. This is expected because ex-post forecasts are being generated outside the sample period. In general, out-of-sample forecast evaluation results suggest that the simulation model performs satisfactorily.

A summary of the own price, cross price, and income flexibilities are given in Table 2. The fed beef, nonfed beef, and hog own price flexibilities are similar in magnitude to the reciprocal of the quarterly elasticities estimated by Arzac and Wilkinson. The income flexibilities indicate, as expected, that fed beef, nonfed beef, and hogs are normal goods. The complementary relationship of fed beef consumption on nonfed beef price was also found by Freebairn and Rausser. The evidence on cross price elasticities or flexibilities has been mixed and might be explained as spurious (Freebairn and Rausser) or attributed to dietary preferences and a reduction in meat consumption. In general, the estimated parameters are similar to those in previous studies on meat demand.

The own price flexibility of corn is estimated to be -0.26. Arzac and Wilkinson have shown a similar magnitude of corn price adjustment through multiplier analysis. Our model also illustrates that corn and soybean prices move in the same direction; i.e., a 1% increase in soybean price produces a 0.20% increase in corn price.

Policy Results

Expeditious Removal of Price Supports

Immediate and gradual free market adjustments were simulated with the U.S.-Nebraska linked quarterly econometric model. For the former scenario, the loan rates were removed (set equal to zero), and the model was simulated for twenty-one quarters. The alternative scenario, a gradual approach toward a free market, was structured similarly to recent 1985 Farm Bill proposals. Basically, loan rates are set at 75% of the previous three year moving average level for supported crops. The intent of this proposal is that by the end of the fifth year, each commodity's loan rate will be equal to or below the market price.

The results from expeditious removal of price and income supports are shown in Table 3. Because corn price is artificially kept above the market clearing level by the price support, corn producers and livestock feeders expect its removal to produce an immediate drop in corn price. This expectation of decreased corn prices precipitates an increase in the quantity of corn consumed and a decrease in corn acreage creating upward pressure on corn prices.[6] The first quarter impacts result in increased feed grain consumption and corn price increasing by 3.83%. The model shows the upward pressure on corn price continuing for the first four quarters, with quarterly corn price increases of 3.83%, 4.76%, 0.57% and 2.63%. These quarterly corn price increases are not large when compared to corn price escalations in the

mid-1970's. The remaining forecast quarters show corn price fluctuating with a maximum quarterly increase of 3.33% and a maximum quarterly decrease of 2.74%.

The U.S. price of fed beef in the first few quarters after removal of price supports reflects higher feed grain prices being captured in higher fed beef prices accompanied by reduced fed beef supply. However, the magnitude of these early quarterly price increases is less than 2%. The remaining forecast periods are characterized by fluctuating fed beef prices with a maximum price increase of 3.77% and a maximum price decrease of less than 1%.

Higher grain prices resulted in decreased supplies of fed beef and correspondingly reductions in the demand for feeder cattle. Thus, the model simulated reductions in feeder cattle price. The model results also illustrate the substitution of nonfed beef for fed beef. The increased nd for nonfed beef is marked by higher nonfed beef prices.

The effects on the hog sector are similar to impacts on fed beef. Higher corn and grain prices are characterized by initial reductions in hog supplies and increased hog prices. The percentage price increases for hogs are higher than for fed beef because hogs are more intensive users of feed concentrates than cattle.[7]

On the production side, the immediate impact from removal of corn price supports is a 10.04% decrease in corn production in the fourth quarter. In subsequent years, fourth quarter corn production is relatively stable with percentage changes less than 2% of the previous year.

The initial reduction in corn production and corresponding quarterly corn price increases are consistent with initial decreases in corn exports. As corn price fluctuates over the remaining periods, corn exports also fluctuate with a maximum quarterly increase of 2.94% and a maximum quarterly

decline of -2.89%. The effects on fed beef, nonfed beef, and hog supplies are consistent with movements in livestock and grain prices. Because corn price initially increases by larger percentages than increases in fed beef and hog prices, the simulation results show decreases in fed beef supply and hog supply. The substitution of nonfed beef for fed beef in production increases nonfed beef supplies. For most quarters, these supply changes are less than 3% in magnitude.

The Nebraska impacts from immediate removal of price supports are also shown in Table 3. The annual percentage effects on corn production are generally larger for Nebraska than for ROUS.[8] Movements in Nebraska fed beef supplies are similar in direction and magnitude to fed beef supplies for ROUS.

Gradual Removal of Price Supports

To reduce the magnitude of market impacts from removing price supports, a gradual adjustment to a free market has been proposed as an alternative policy consideration. As mentioned earlier, this alternative sets loan rates at 75% of the previous three year moving average level of each supported crop. The U.S., ROUS and Nebraska quantity and price impacts for this scenario are shown in Table 4.

Comparison of impacts from both scenarios can be summarized as follows:

(i) Gradual removal of price supports produces lower initial price impacts for corn, fed beef, nonfed beef, feeder cattle and hogs than the immediate removal of price supports. For both scenarios, quarterly price movements are generally in the same direction.

(ii) Longer term corn and hog price impacts, e.g., beyond the thirteenth quarter, are larger for the gradual scenario than the expeditious scenario.

(iii) Longer term fed beef, nonfed beef, and feeder cattle price impacts are larger for the expeditious scenario than the gradual scenario.

(iv) Short term corn production, corn exports, fed beef supply, nonfed beef supply, and hog supply are larger for the expeditious scenario than the gradual scenario. The opposite is true for longer term effects.

(v) For Nebraska, the expeditious scenario impacts for corn production and fed beef supply are larger in the short term than the longer term when compared to the gradual scenario.

(vi) The gradual scenario generally produces more pronounced cyclical impacts for most prices and quantities investigated than the expeditious scenario. This is primarily due to farmers' expectations and their adjustments based on these expectations.

Another means of comparing results from both scenarios is shown in Table 5. Note, these illustrated effects are not quarterly percentage changes. Rather, they are percentage changes from the base period in the fourth quarter for years following initiation of these programs. Differences in results from these two scenarios stem primarily from farmers' adjustments based on their expectations. Corn producers, realizing that the gradual program will reduce loan rates initially, decrease corn production. However, this reduction in production subsequently increases prices in the short term. As farmers respond to higher market prices (and probably lower loan rates) with increased production, this has a depressing effect on corn price. The degree by which corn farmers' production decisions are affected

will depend on the magnitude by which the market price for corn falls with respect to the loan rate. Our model shows that corn production and price will be lower than the base period at the end of the fourth and fifth years. Because both price and quantity of corn produced have fallen, total value of corn production will be lower than the base period. For livestock producers, the decrease in corn price with respect to the base period will tend to increase livestock production and reduce livestock prices.

Summary and Implications

The price forecasts for the USDA/ERS analysis of price support removal are shown in Table 6. These results can be compared to our immediate removal scenario. In Table 7, the FAPRI (Johnson, et al.) results are illustrated for the market option program which maintains minimum government support through adjusting loan rates by 80% of a moving five year average of market prices. This scenario is similar to our gradual removal option.

Comparisons of our model's results with other analyses, such as the USDA and FAPRI, should be done judiciously. One should note that the impacts shown in Table 5 are based on subsequent fourth quarter projections after initiation of each program rather than annual averages as shown in Tables 6 and 7. Generally, price changes immediately after harvest are larger than other times of the year, and annual models have longer adjustment periods for quantity responses than quarterly models.

By examining directional impacts, we see that major differences between the USDA projections and our immediate removal analysis stem from adjustments in the corn sector. Our quarterly model shows faster price and quantity adjustments and stabilization at new levels by the third year. Corn price, according the the USDA analysis, does not plateau after five years.

The FAPRI "market option" results and our gradual removal scenario produce very similar directional results. In the fourth and fifth years following initiation of this program, our price effects for corn and hogs are higher in magnitude than FAPRI's results. This may be attributable to the different procedures used in determining loan rates. Fed beef price changes, on the other hand, are very comparable in magnitude.

In summary, our model's simulation results for two adjustment procedures which return previously supported commodities to free market operations produced several unexpected findings. First, in terms of production value, corn, fed beef, and hog producers have lower values for the gradual adjustment scenario than the immediate adjustment scenario. This is shown by summing the price and production percentage changes in Table 5. After the fifth year, production values for corn, fed beef, and hog producers, in the case of the immediate scenario, are respectively 8.33%, 7.57%, and 12.71% higher than the base period. Likewise, the gradual scenario produces output values that have decreased from the base period by -12.73% and -6.02% for corn and hog producers respectively and only a slight increase of 0.50% for fed beef producers. Second, the gradual adjustment approach produces greater cyclical movements in prices and quantities than the expeditious removal option. Third, corn exports are not greatly affected under either market adjustment process. After five years, Table 5 shows corn exports changing by less than 4% (from the base period) under either scenario.

Our results indicate that agricultural producers do respond to market adjustments, and their responses are based on relevant market information concerning expectations on prices, policies, and other key variables. How agricultural producers formulate their expectations is crucial for policy analyses because producers respond quickly. Adaptive expectations are of

limited use in longer temporal period models (e.g., annual, semi-annual and even quarterly models) due to the speed of market responses. For this modeling limitation, a simultaneous consideration of endogenous and exogenous factors or a more "rational" approach regarding expectations is necessary to capture shorter term effects.

The authors recognize other limitations of this policy study. Of importance is the restriction of the number of commodities analyzed and exclusion of adjustments in resource usage. The latter limitation probably will have sizeable effects on the agricultural industry. The cyclical nature of results from the gradual adjustment scenario will likely have greater resource costs to agriculture than the expeditious removal of price supports.

Figure 1. Diagrammatic illustration of the conceptual framework.

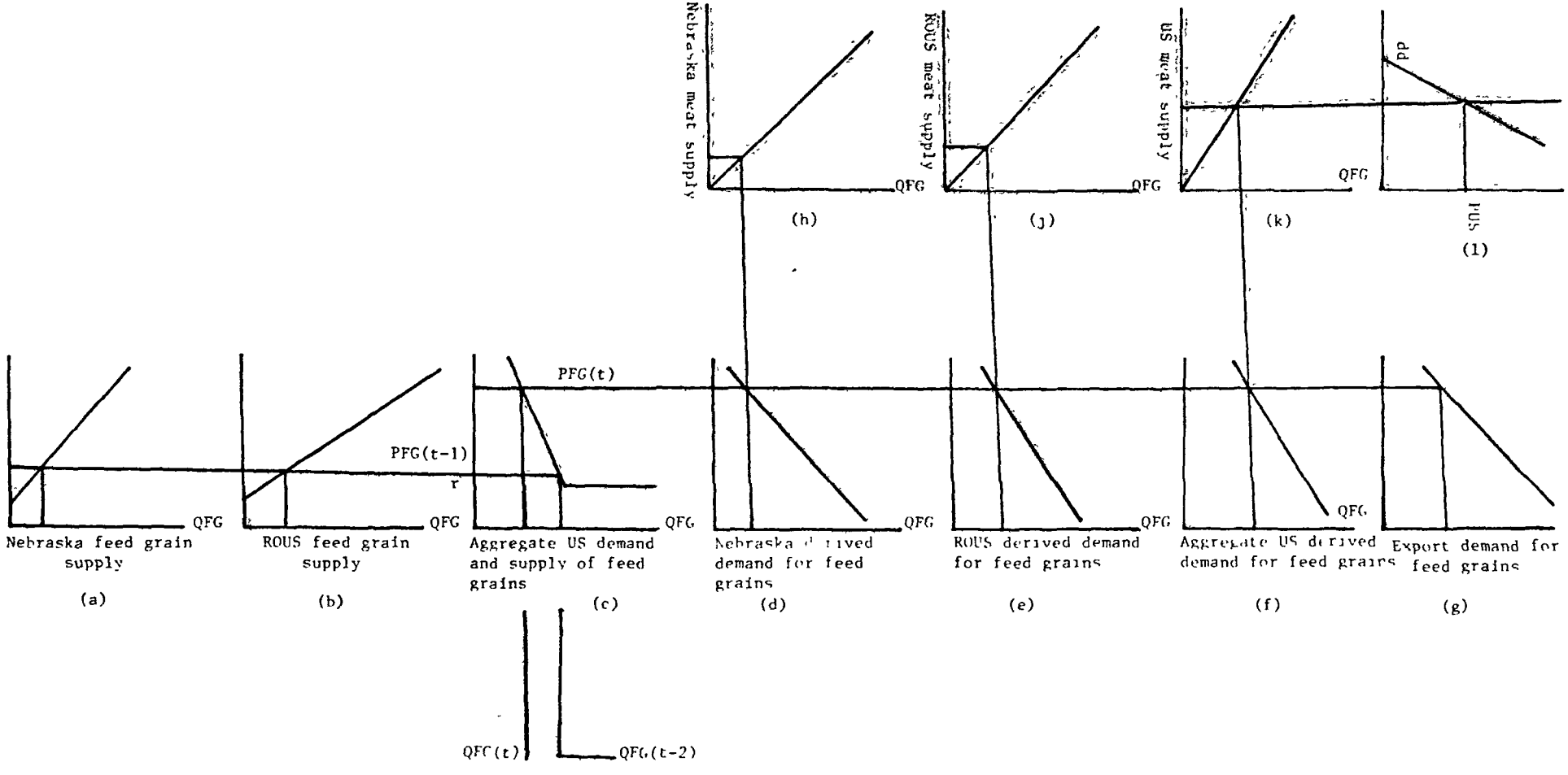

Table 1. FORECASTING ACCURACY OF THE MODEL.

	Ex-Post Simulation 1969 IV - 1981 IV		Ex-Post Forecast 1982 I - 1982 IV
	Static	Dynamic	
	Root-Mean-Square Percent Error		
Nebraska Sub-model			
Corn Production	.16	.22	.10
Corn Disappearance	.23	.26	.58
Corn Stocks	.31	.33	.43
Beef Cow Inventory	.04	.11	.01
Cattle on Feed			
a) Farmer-feeder lots	.09	.12	.12
b) Commercial lots	.10	.12	.27
Cattle Inshipments	.16	.18	.14
Fed Beef Supply	.07	.07	.14
Sows Farrowing	.07	.08	.17
Market Hog Inventory	.04	.07	.18
ROUS Sub-model			
Corn Production	.17	.17	.03
Corn Stocks	.14	.21	.32
Beef Cow Inventory	.04	.08	.02
Cattle of Feed	.07	.11	.09
Fed Beef Supply	.07	.10	.14
Nonfed Beef Supply	.19	.23	.16
Sows Farrowing	.07	.08	.14
Joint Sub-model			
Hog Supply	.04	.07	.07
Feed Demand	.08	.09	.04
Corn Exports	.27	.31	.30
Price of Corn	.10	.25	.56
Price of Fed Beef	.08	.19	.20
Price of Nonfed Beef	.07	.21	.15
Price of Hogs	.11	.22	.08
Price of Feeder Cattle	.07	.21	.15

Table 2. SUMMARY OF OWN, CROSS AND INCOME FLEXIBILITIES FOR LIVESTOCK PRICES.

Price of	Effect of 1% in Per Capita: Fed Beef Consumption	Nonfed Beef Consumption	Pork Consumption	Income
Fed Beef	-0.80	-0.41	-0.47	0.22
Nonfed Beef	1/	-0.42	-0.66	0.15
Hogs	-0.75	-0.31	-1.94	0.22

1/ The coefficient on per capita fed beef consumption in the nonfed beef price equation was of opposite sign and statistically significant at the 40% level.

Table 3. EXPEDIENT REMOVAL OF PRICE SUPPORTS - U.S., ROUS AND NEBRASKA PRICE AND QUANTITY IMPACTS[a] (Interim Multipliers)

Period	Price of Corn (U.S.)	Price of Fed Beef (U.S.)	Price of Nonfed Beef (U.S.)	Price of Feeder Cattle (U.S.)	Price of Hogs (U.S.)
	(Quarterly Percentage Changes)[b]				
1	3.83	0.19	-0.21	-0.58	0.20
2	4.76	0.24	-0.58	-1.11	-0.05
3	0.57	1.44	1.19	-0.80	6.12
4	2.63	1.79	2.41	-0.63	7.76
5	-0.89	0.49	2.38	0.30	4.24
6	1.52	0.37	2.20	0.04	3.15
7	-0.37	-0.76	1.06	-0.13	0.28
8	2.13	-0.86	0.09	-1.27	-0.06
9	-1.69	1.15	-0.38	-1.26	-0.41
10	1.27	0.24	-0.02	-1.39	0.45
11	0.56	-0.46	-0.63	-1.14	-1.13
12	3.03	-0.09	-0.93	-1.84	-0.26
13	-2.62	-0.21	-0.68	-0.93	0.02
14	1.19	2.09	0.89	-0.07	1.81
15	0.28	0.72	0.63	1.00	-0.40
16	1.34	0.78	0.59	0.49	0.40
17	-2.74	0.42	0.88	1.26	0.59
18	1.17	3.77	3.35	2.90	2.29
19	0.65	1.62	2.32	3.29	-0.48
20	1.46	1.31	1.70	1.98	0.27
21	3.33	0.72	1.81	2.54	0.70

Table 3. (Continued)

Period	Corn Production[c] (ROUS)	Corn Exports (U.S.)	Fed Beef Supply (ROUS)	Nonfed Beef Supply (U.S.)	Hog Supply (U S.)	Corn Production[c] (NEBRASKA)	Fed Beef Supply (NEBRASKA)
			(Quarterly Percentage Changes)[b]				
1	-10.04	0.09	-0.67	0 74	0 00	-20.98	-0.20
2		-5.40	-1.46	0.97	0.25		-0.27
3		-0 52	-1.24	4 28	-5.01		-3.64
4		2.94	-1.38	6 40	-5.95		-1.70
5	1.94	2.22	0.44	4 39	-2.88	4.71	0 16
6		-2.74	-0.39	2.78	-2.37		-0.58
7		-0.17	0.39	2 37	-0.98		0.51
8		2.81	-0.72	2.29	-0.07		-0 82
9	0.95	1.76	0.21	1.27	0.83	2.19	-0.13
10		-2.69	-0.87	-1 18	0 14		-0.83
11		-0.33	0.12	0 54	0.39		0.85
12		2.94	-1.14	1.04	0.08		-0.75
13	0.32	1.34	0.29	0.11	0.27	0.75	-0.61
14		-2.66	-0.95	-4.15	-0.20		-1.54
15		-0.18	0.75	-0.27	-0.32		2.07
16		2.84	-0.70	0.38	-0.55		0.11
17	0.01	0.99	0.64	-0.20	0.11	0.01	-0.02
18		-2.89	-0.34	-10.20	-0.02		-0.24
19		-0.46	0.63	-0.59	-0.14		1.39
20		2.59	-1.02	0.30	-0.14		0.00
21	0.01	0.69	0.96	-0.53	0.13	0.00	0.75

[a] Impacts begin on the fourth quarter with the historical fourth quarter as the base period.

[b] These percentage changes are calculated as effects from one period (quarter) to the next.

[c] Corn production occurs on the fourth quarter of each year.

Table 4. GRADUAL REMOVAL OF PRICE SUPPORTS: U.S., ROUS AND NEBRASKA PRICE AND QUANTITY IMPACTS[a] (Interim Multipliers)

Period	Price of Corn (U.S.)	Price of Fed Beef (U.S.)	Price of Nonfed Beef (U.S.)	Price of Feeder Cattle (U.S.)	Price of Hogs (U.S.)
	(Quarterly Percentage Changes)[b]				
1	0.47	0.02	-0.02	-0.07	0.02
2	0.69	0.03	-0.09	-0.15	-0.03
3	0.49	0.08	-0.14	-0.25	0.03
4	1.08	0.14	-0.19	-0.36	0.11
5	-1.08	0.17	0.19	0.02	-1.12
6	-0.89	0.29	0.55	0.23	3.39
7	-0.57	-0.03	0.60	0.48	0.56
8	-0.45	-0.17	0.56	0.47	0.32
9	-1.11	-0.43	0.08	0.29	-0.97
10	-2.07	-0.44	-0.23	-1.61	-1.66
11	-1.50	-0.40	-0.21	2.35	-1.21
12	-2.03	-0.31	-0.03	0.62	-0.77
13	0.34	-0.39	-0.60	0.20	-2.26
14	-2.20	-0.76	-1.08	0.21	-3.16
15	-2.42	-0.27	-0.63	0.38	-1.34
16	-8.37	-0.28	0.06	1.51	-1.10
17	5.71	-0.12	-0.79	0.31	-3.02
18	1.67	-1.22	-1.81	0.16	-5.12
19	0.25	0.09	-1.65	-0.67	-1.92
20	-4.91	0.21	-1.21	0.17	-1.92
21	6.74	1.04	-0.42	-0.25	1.39

Table 4. (Continued)

Period	Corn Production[c] (ROUS)	Corn Exports (U.S.)	Fed Beef Supply (ROUS)	Nonfed Beef Supply (U S.)	Hog Supply (U S.)	Corn Production[c] (NEBRASKA)	Fed Beef Supply (NEBRASKA)
			(Quarterly Percentage Changes)[b]				
1	-1.38	0 01	-0.10	0.09	0.00	-2.88	-0.03
2		-0.75	-0.16	0 13	0 06		-0.03
3		-0 23	-0.18	0.20	0 03		-0.51
4		0 38	-0.35	0.34	-0.02		-0.27
5	2.11	0 31	0 19	0.38	-0.76	4.47	-0.04
6		0.55	0.06	0.60	-0.94		-0.23
7		0.20	0.37	0.32	-0.49		0.94
8		0.04	0.32	0.29	-0.34		0.35
9	2.86	-0.11	0.31	-0.43	0.97	5.93	0.13
10		1.56	-0.37	-1.73	1.24		0.12
11		0.13	1.22	-1.34	0.61		1.22
12		-1.13	0.61	-1.42	0.33		0.85
13	-4.80	-0 76	0.06	-1.85	1.74	7.42	0.02
14		4.52	0.67	-1.94	1.85		0.15
15		1.87	0.30	-2.43	0.80		1.07
16		-2.32	1.63	-3.42	0.45		1.17
17	5.25	-2.31	-0.69	-2.77	1.92	-6.51	0.30
18		1.36	0.82	-1.96	2.85		1.41
19		0.34	-0.89	-2.52	1.26		-2.11
20		-2.65	0.57	-3.65	1.19		-0.15
21	-5.72	-1.56	-1.17	-0.44	-1.03	-11.52	0.08

[a] Impacts begin on the fourth quarter with the historical fourth quarter as the base period.

[b] These percentage changes are calculated as effects from one period (quarter) to the next.

[c] Corn production occurs on the fourth quarter of each year.

Table 5. COMPARISON OF INTERMEDIATE MULTIPLIERS AFTER EACH YEAR FOLLOWING BEGINNING OF POLICY SCENARIOS[a]

Year	Corn Price (U.S.)	Fed Beef Price (U.S.)	Nonfed Beef Price (U.S.)	Feeder Cattle Price (U.S.)	Hog Price (U.S.)
		(Percentage Change From Base Period)			
First Year					
E[b]	11.36	4.21	5.26	-2.79	19.39
G	1.65	0.44	-0.25	-0.81	0.99
Second Year					
E	13.09	1.73	8.44	-5.32	22.92
G	-1.38	0.10	1.55	0.66	2.26
Third Year					
E	15.55	1.20	5.96	-10.24	21.78
G	-6.48	-1.44	0.47	2.20	-3.65
Fourth Year					
E	15.56	5.31	9.16	-7.81	24.72
G	-13.55	-2.83	-1.97	4.67	-11.70
Fifth Year					
E	15.42	13.32	19.52	2.46	28.20
G	-10.58	-2.73	-6.87	4.06	-18.29

[a]Impacts evaluated in the fourth quarter of each succeeding year after beginning of expedient or gradual removal of price supports.

[b]E = expedient removal scenario
G = gradual removal scenario

Table 5. (Continued)

Year	Corn Production (ROUS)	Corn Exports (U.S.)	Fed Beef Supply (ROUS)	Nonfed Beef Supply (U.S.)	Hog Supply (U.S.)	Corn Production (NEBRASKA)	Fed Beef Supply (NEBRASKA)
			(Percentage Change From Base Period)				
First Year							
E	-8.26	-0.04	-3.67	17.82	-13.02	-17.26	-5.57
G	0.70	-0.28	-0.60	1.14	-0.69	1.46	-0.88
Second Year							
E	-7.39	1.54	-4.17	28.41	-15.27	-15.45	-6.53
	3.58	0.40	0.46	1.94	-1.48	7.48	0.30
Third Year							
E	-7.09	2.70	-5.70	29.06	-14.52	-14.82	-7.79
G	-1.39	0.18	1.99	-4.36	2.43	15.45	2.53
Fourth Year							
E	-7.08	3.64	-5.96	23.58	-15.34	-14.81	-7.25
G	3.79	1.78	3.93	-14.08	7.87	7.93	5.31
Fifth Year							
E	-7.09	3.48	-5.75	10.06	-15.49	-14.81	-5.48
G	-2.15	-0.80	3.23	-21.23	12.27	-4.50	4.47

Table 6. SUMMARY OF USDA/ERS PRICE IMPACTS FOR PROPOSED NO PRICE AND INCOME SUPPORT PROGRAM

YEAR	CORN PRICE	FED BEEF PRICE[a]	FEEDER CATTLE PRICE[b]	HOG PRICE[c]
	(Percentage Change From Base Period)[d]			
First Year	-9.43	4.48	1.24	-4.90
Second Year	-1.89	5.60	4.87	-10.78
Third Year	0.00	5.97	0.73	-6.86
Fourth Year	3.77	6.72	-0.87	-0.98
Fifth Year	7.55	10.45	2.04	10.78

[a] Choice Steers, Omaha

[b] Feeder Steers, Omaha

[c] Barrows and Gilts, 7 Markets

[d] Based on Annual Average Estimates

Table 7. SUMMARY OF FAPRI PRICE IMPACTS FOR MARKET OPTION SCENARIO

YEAR	CORN PRICE	FED BEEF PRICE[a]	HOG PRICE[b]
	(Percentage Change From Base Period)[c]		
First Year	--	--	--
Second Year	-5.60	1.16	-17.48
Third Year	-7.09	0.43	-10.68
Fourth Year	-9.70	-3.18	-7.77
Fifth Year	-0.75	-3.90	-6.80

[a] Choice Steers, Omaha

[b] Barrows and Gilts, 7 Markets

[c] Based on Annual Average Estimates

Notes

[1]There are a few exceptions like the dairy program.

[2]Schuh makes three caveats to his suggestion of eliminating domestic commodity programs. First, the elimination of these programs should be done gradually, especially for dairy. Second, a subsidy program should be available to provide financial support to small producers involved in internal growth. Third, a modest loan program should be available for periods of tight credit conditions.

[3]In the Great Plains region, sorghum is a major substitute for corn in livestock feed rations (Jackson, Grant, and Shafer).

[4]Nelson refers to purely extrapolative predictors as being formed by "weakly rational" expectations.

[5]Severe market adjustments in 1983 and 1984 due to the Payment-In-Kind (PIK) program limited out-of-sample forecasts to the four quarters in 1982.

[6]Similar market reactions will occur in other feed grains previously under price supports.

[7]Likewise, if the model included a broiler sector, the initial price impacts would be larger than hogs since broilers are more intensive users of feed than hogs.

[8]The differences between the two regions in the magnitude and delay of corn production response may be attributed to the following factors: 1) the dominance of corn as an irrigated crop in Nebraska; 2) Nebraska's low cross elasticity of supply with respect to other competing crops; and 3) the ability of the state to shift its effective supply of land relative to the ROUS where, in the aggregate, soybeans are a major competitor with corn.

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