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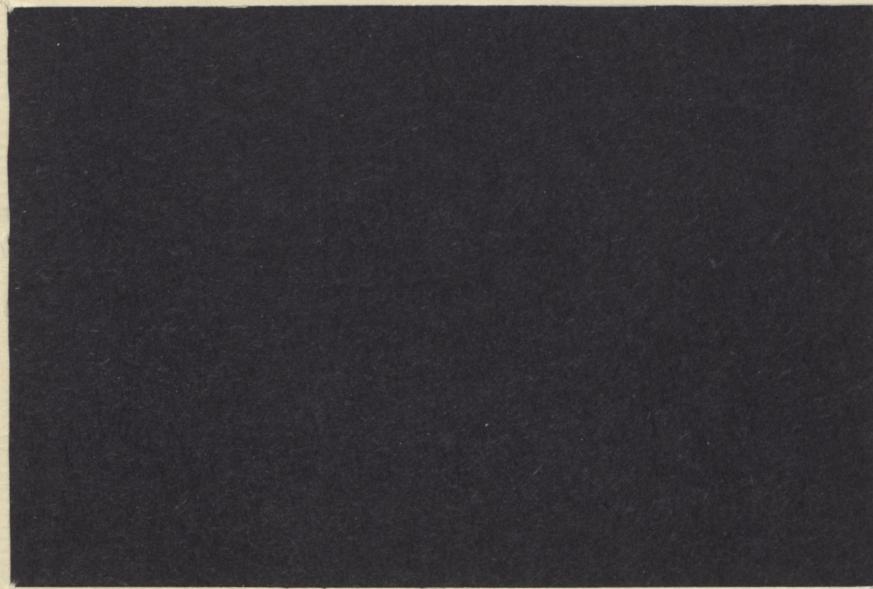
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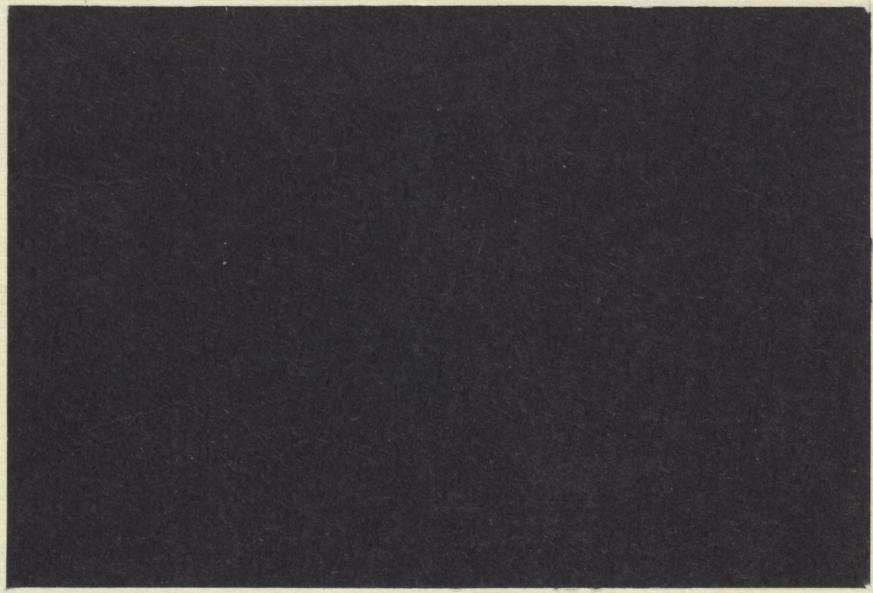


## FAPRI Staff Report

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**AN EVALUATION OF THREE PROPOSED PROGRAM  
DESIGNS FOR THE 1985 FARM BILL:  
MAJOR AGRICULTURAL COMMODITY MARKETS**

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## AN EVALUATION OF THREE PROPOSED PROGRAM DESIGNS FOR THE 1985 FARM BILL: MAJOR AGRICULTURAL COMMODITY MARKETS

### 1. Introduction

The 1985 Farm Bill will set into law the policies and programs designed to govern U.S. agriculture through the end of the decade. A principle component of this legislation will be mandated policies with program designs for major agricultural commodities. These policies and programs will affect agricultural commodity markets, government budgets, net farm income, and other indicators of the performance of the U.S. agricultural sector. Since U.S. programs and policies govern world markets, the 1985 Farm Bill will have important international implications.

The economic significance of the different policies and their effects within and outside agriculture and for domestic and world markets underscore the complexity of the decision problem. Providing policy makers with a solid analytical basis for assessing consequences of alternative policy actions and similar information to the stakeholders in the policy formation process are important to the development of satisfactory legislation. It is the objective of this paper to contribute to the policy dialogue for the 1985 Farm Bill, providing a comprehensive evaluation of projected outcomes for three widely discussed options for regulating major agricultural commodity markets. Obviously, the 1985 Farm Bill will not conform exactly to any one of these three options. However, the information from the evaluations and the evaluation exercises should contribute to the capacities of policy makers to anticipate with more reliability the impacts of their final decisions.

The performance of the agricultural sector is influenced by a number of factors besides the choice of an agricultural policy. Alternatively, outcomes for the same agricultural policy will be different depending on initial conditions in the agricultural sector, the performance of the U.S. domestic economy, and the export markets for U.S. agricultural commodities. For the present policy decision, these three factors are especially important. There is increasing evidence of financial stress in agriculture. There is considerable uncertainty regarding the growth and performance of the U.S. domestic economy. Export potentials are uncertain due to the debt load of the developing economies, relatively slow growth rates for developed economies and high exchange rates. These conditions will impact not only the 1985 Farm Bill but, as well, the performance of the prescribed policies.

The three policy options for the 1985 Farm Bill to be evaluated in the present exercise include:

- The "Base Line": A continuation of the current policy under moderate to positive conditions for the U.S. and world economies with minimum loan and target rates set at 1984/85 levels.

- The "Market Option": A minimum government intervention policy under moderate to positive conditions for the U.S. and world economies and with loan rates moving more toward world market prices and an elimination of the target price.
- The "Expanded Export Baseline": A continuation of the current policy under more optimistic conditions for the U.S. and world economies and with minimum loan and target rates set at 1984/85 levels.

These three policy options will be evaluated using the large scale econometric model operated by the Food and Agricultural Policy Research Institute (FAPRI). The discussion of policy outcomes and the process by which they are developed will proceed as follows. In Section 2, the FAPRI agricultural policy model is described briefly. The description includes highly summarized information on its dimensions and economic structure. The policy evaluation process based on the FAPRI model is outlined in Section 3. This process involves a sequence of steps taken to assemble information on variables conditioning agriculture, operate the FAPRI model using these variables and policy assumptions, balance the model across commodity markets, and finally, calculate outcomes or performance measures. Section 4 describes the three policy options. Sections 5, 6, and 7 provide performance information for the three policy options. The final section is designed to compare and contrast these policy outcomes and highlight the controllable and uncontrollable factors most important in determining these outcomes.

## 2. The Agricultural Policy Model

The FAPRI annual agricultural policy model has components representing each of the markets for the major commodities. These are for livestock: beef, pork, poultry, and dairy, and for crops: feed grains (corn, sorghum, oats and barley), soybeans, wheat, rice, and cotton. The econometric models for the commodity components include behavioral relationships for production, stocks, exports, imports, final consumption and, if appropriate, consumption of the commodities as intermediate products. Each of these econometric models can be operated to determine market prices and associated variables on a "stand alone basis" or integrated into larger systems with other commodity components. Illustrative sketches of the structures for the crops and livestock models are represented in Figures 1 and 2 for hogs and corn.

The commodity components of the FAPRI agricultural policy model are linked for the policy analysis exercises as indicated in Figure 3. These linkages between the agricultural commodity markets reflect the simultaneity of price determination processes in U.S. agriculture. For example, livestock prices condition the demand for feed grains while feed grain prices, in turn, influence investment and production decisions for livestock and livestock prices. Accurately reflecting these linkages across commodity markets is especially important for policy evaluation. Government policies for the major commodity markets in the U.S. have historically been only for crops. Thus, to analyze the full implications of the policies, linkages to the livestock sector must be developed and implemented.

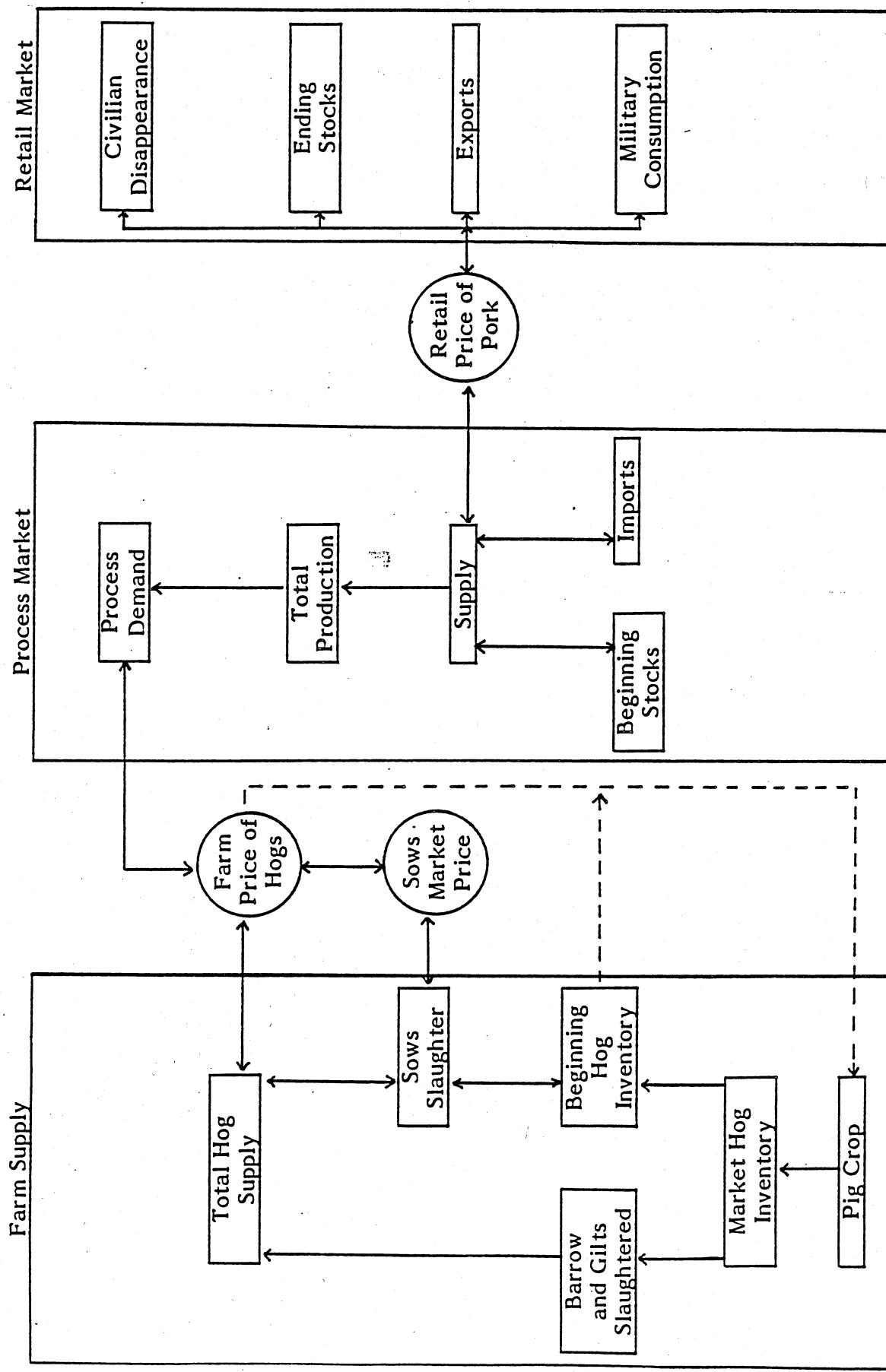


Figure 1. A Schematic Illustration of the Structure for the Hog Model in the FAPRI Policy Modeling System.

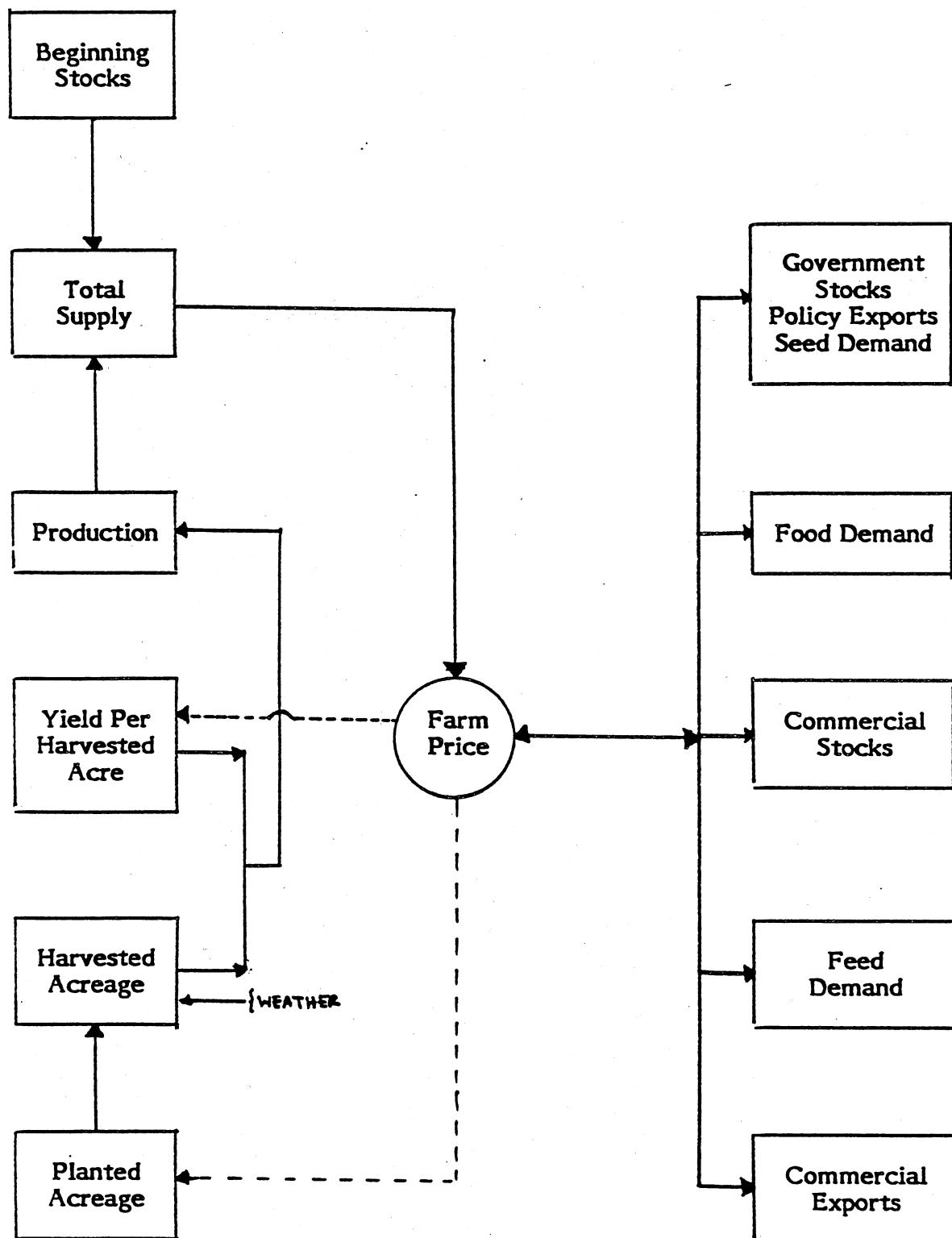


Figure 2. A Schematic Illustration of the Structure for the Corn Model in the FAPRI Policy Modeling System.

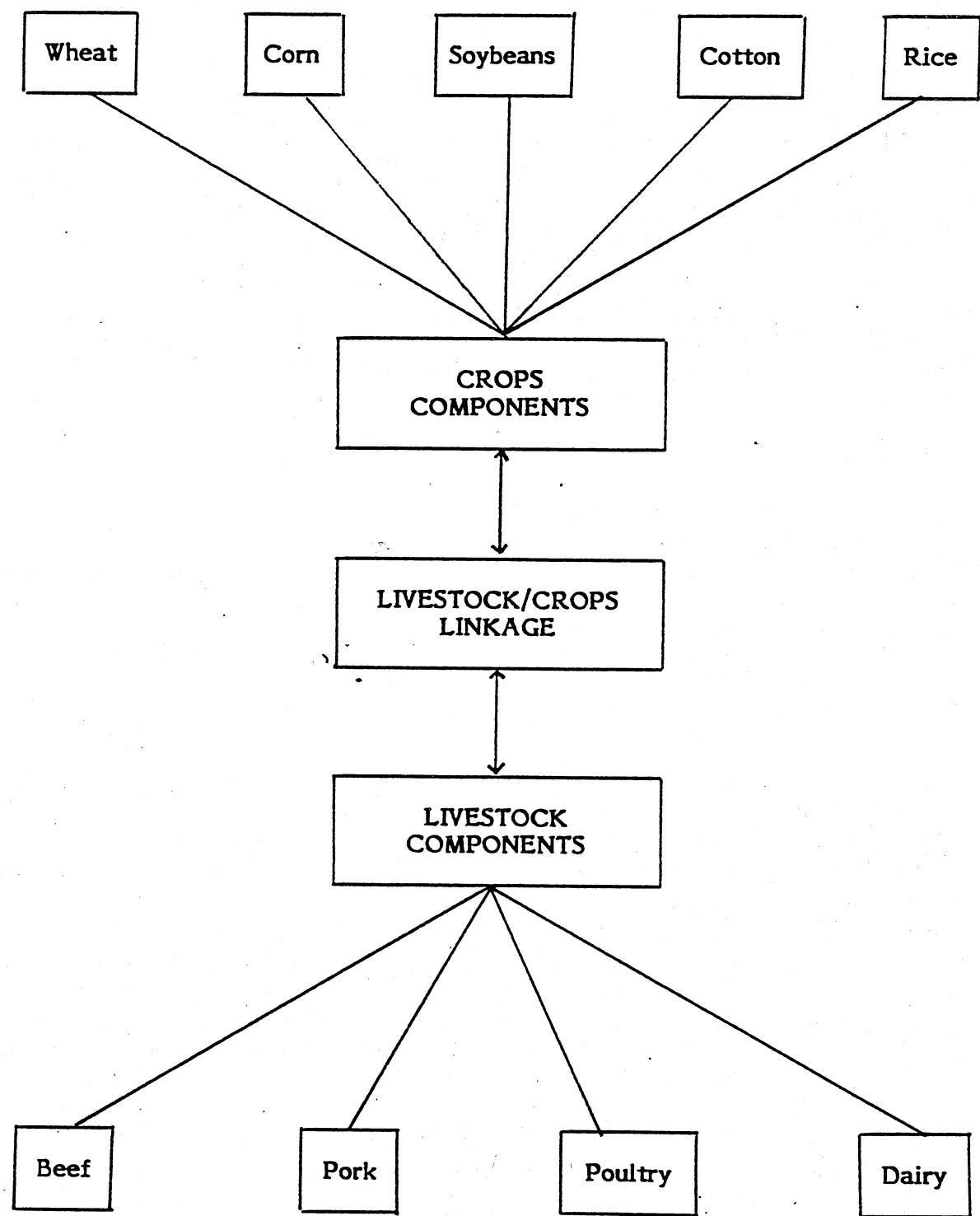


Figure 3. Linkages Among Commodity Components in the FAPRI Policy Modeling System.

In addition to the commodity components, the FAPRI agricultural policy model contains farm income and government components. The farm income component utilizes information from major commodity markets along with simplified information of specialized commodities including farm expenses in generating estimates of gross farm income, net farm income, and other sector-wide performance measures. The government component generates costs associated with desired policy objectives and budget exposure. In addition, this component calculates other characteristics showing the extent of government intervention in agriculture.

The dimensions of the FAPRI model are, by necessity, relatively large. First, the model resides on an extensive set of predetermined or exogenous variables. These variables reflect the U.S. domestic economy, the world economy, climatic conditions, and other determinants of prices in agricultural commodity markets. These conditioning or predetermined variables are presently over 1,100 in number. The number of endogenous variables or variables determined by the model is 325; 130 for livestock, 110 for crops, with the remainder for farm income and government cost. The model has 250 behavioral equations and 75 identities. To suggest the size of the commodity components, the pork model illustrated in Figure 1 has 17 behavioral equations while the corn model illustrated in Figure 2 has 12 behavioral equations. For the current policy exercises, the model was estimated from annual data for the period 1961-1982.

There are a number of key structural parameters in the FAPRI agricultural policy model. A complete review of these structural parameters and the model specification is not within the purview of the present discussion. However, some parameters that will be helpful in subsequent analyses of policy options are shown in Table 1. Observe from Table 1 that the export elasticities evaluated at mean 1961 to 1982 prices are relatively inelastic for the FAPRI model. Generally, short term elasticities are under 1 in absolute value, longer term elasticities are larger than 1. Selected domestic retail demand elasticity estimates utilized in the model are also listed in Table 1. Again, they are evaluated at means for the sample period. The remainder of the elasticity estimates presented in Table 1 are for stocks, acreage, and income. It should be observed that the estimates in Table 1 are relatively conservative compared to those developed in models not as comprehensive as the FAPRI agricultural policy model. Finally, these elasticity estimates should be regarded as indicators of the structure implicit in the model. We have taken liberties in defining "representative values" for purposes of communicating the structural responsiveness of key behavioral subcomponents of the FAPRI agricultural policy model to the conditioning variables.

### 3. Policy Evaluation Process

The policy evaluation process is essentially an exercise conducted with the estimated FAPRI agricultural policy model and additional information related to:

- Initial conditions for the agricultural sector,
- Projections of external factors for the U.S. economy,
- Projections of factors affecting imports and exports,

Table 1

REPRESENTATIVE STRUCTURAL ELASTICITIES FROM THE  
FAPRI AGRICULTURAL POLICY MODEL

Commodity	Demand						Acreage Response Elasticity <sup>d</sup>			
	Feed Elasticity	Share <sup>a</sup>	Food Elasticity	Share	Exports Elasticity	Stocks Elasticity				
Corn	-.28	.51	-.10	11	-.17	.25	-.18	10	-.20	.13
Wheat	-2.79	.9	-.05	16	-.25	.36	-.69	35	-.42	.21
Soybeans <sup>b</sup> (Crush)	-1.06	.50	--	--	-1.52	.37	-.29	9	-1.11	.47
Soymeal	-.58	.75	--	--	-.27	.24	--	--	-0.50	--
Rice	--	--	-.10	21	-.25	.41	-.80	27	-0.21	.40
Cotton <sup>c</sup>	-.11	.34	--	--	-.35	.38	-.33	28	-0.22	.15

<sup>a</sup>Shares are computed at 1983/84 levels for the indicated variables.

<sup>b</sup>Bean crush demand.

<sup>c</sup>Cotton mill demand.

<sup>d</sup>Foreign supply elasticities for major competitors, corn: Thailand, .40; South Africa, .06; Argentina, .10; soybeans: Brazil, .01; Argentina, .12; and wheat: Australia, 1.26; Canada, .47; Argentina, .20.

- Assumptions on sequences of policy parameters.

The policy exercises are, of course, implicitly forward looking. For this reason, the external factors affecting agricultural for the U.S. economy and imports and exports and the parameters for the three policy regimes must be specified or projected over a future evaluation period. For the present exercise, this period is 1984/85 to 1989/90, six years. The initial conditions are specified implicitly by calibrating the model to the 1983/84 crop year. The sequences of policy parameters are constructed to specialize the three program options. It will be shown in Section 4 that implementing these three policy options requires highly structured sets of assumptions on target prices, loan rates, stock levels, and other policy parameters.

### Satellite Structure

The policy analysis with the FAPRI model incorporates a satellite hypothesis. Specifically, variables reflecting the U.S. general economy and foreign economics are taken as predetermined or determined outside the model. Policy parameters for the three alternatives are introduced in the period of reference. Then, the agricultural policy model is solved annually and sequentially. After the agricultural policy model is solved, performance variables of interest are calculated. These performance variables fall into three general categories:

- market
- government
- industry or sector

This satellite relationship of the FAPRI agricultural policy model, the implementation of the policy regimes and the generation of the performance variables, is illustrated in Figure 4.

The approach utilized in implementing the policies was to calculate government costs as a residual. Specifically, market prices within the parameters for the policy regime are maintained by reduced acreage and paid diversion programs. Supply levels required to achieve prices consistent with the three policy options are obtained with these two policy instruments and government stocks. Government stocks targets are imposed, based on long term relationships between domestic U.S. production and consumption levels. The assumption underlying the imposed stocks target is that the "system" over the past has been rational. When the policy instruments are implemented to achieve prices within the bounds of the program options, government costs are generated. The supply control instruments impact substitution relationships across commodities through the acreage equations. Program participation rates or acreage levels and supply levels are determined using implied prices for participation in government programs and, as well, models external to the FAPRI agricultural policy model that generate break-even prices for representative firms.

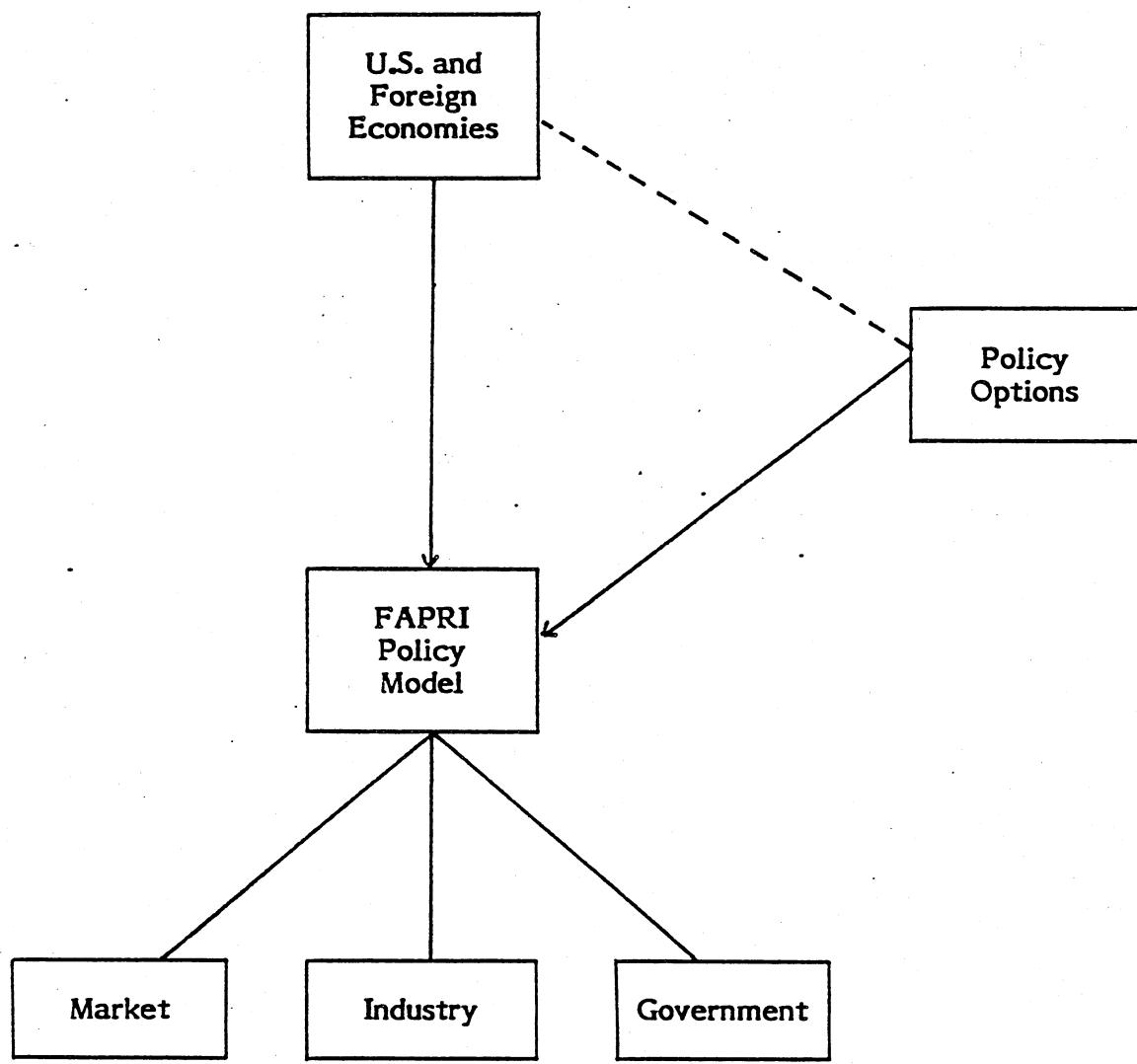


Figure 4. Policy Evaluation Process for the FAPRI Model.

### The Process

The solution to the FAPRI policy model and the rolling of the annual solutions of the model through the policy evaluation period involves a sequence of steps. At each point in this sequence, temporally current information is introduced, the model is rolled forward, and the results are crosschecked with those from previous annual solutions. That is, there is crosschecking as the annual sequential solution progresses to determine if the model is producing consistent and plausible results. This aspect of the solution process necessarily requires judgmental input. The important point is that the policy evaluation exercise is not conducted within a "black box" or with a "push-button" model.

Step One in the process is to identify the general economic assumptions for the U.S. and foreign economies. These assumptions, for the present exercise, are drawn from other sources. Assumptions on exchange rates, economic growth, interest rates, and other factors must be implicitly consistent. That is, the values for the projection period must be consistent with relative values for these variables experienced in the past by the U.S. and world economies and with a particular model. The Congressional Budget Office, Wharton Econometrics and other private and public groups produce sets of these projections. For the present exercise, projections from the two previously mentioned organizations were utilized. It is important to emphasize that utilizing these projections as predetermined and the operation of the model on a satellite basis ignores potentially important feedbacks to general price levels and the general economy from agriculture.

Step Two involves the development of the foreign sector projections. This requires both the use of the external information driving the model and structural equations in the FAPRI agricultural policy model. For the major exporters and importers, general economy assumptions on economies and projections for the future are from Wharton Econometrics. Partial reduced form equations from the FAPRI agricultural policy model are then applied to estimate anticipated exports and/or imports. The result is a trade component in the model that is partly predetermined and partly from a partial reduced form estimation.

Step Three in the evaluation entails specifications of policy parameters for each commodity market, loan rates, target prices, government costs, reduced acreage programs, paid diversion parameters, and other factors. These factors are described in detail in Section 4. However, some "tuning" of the way the policies are implemented is undertaken as the policy evaluation exercise evolves. That is, it is difficult to specify the parameter values for a particular policy option several years into the future and attain required prices and other performance variables without first experimenting with alternative parameter values in the model.

Step Four is to align the annual solutions to the FAPRI agricultural policy model. There are, in fact, three functions for this process. First, the information on exports and imports is incorporated into the model. Then, general economic assumptions are utilized to condition the demands for the livestock sector. The livestock sector and demands for feed grains, wheat and other crops commodities are then determined provisionally for the U.S. and

foreign markets. With these provisionally determined livestock demands and associated feed use requirements, the crops portion of the model is incorporated. The crops portion of the model generates supplies of commodities consistent with particular policy assumptions, the model structure, and effects of conditioning variables. The policy parameters are then adjusted to achieve prices, stocks, and other market variables consistent with the policy prescriptions. The final solution is attained by iterating between the livestock and crops components, adjusting to achieve the parameters prescribed by the policy.

Step Five of the evaluation involves iterating forward from the base year over the policy analysis period. Specifically, in each year, a sequence indicated by the above four steps is repeated. For each year, consequences for the policy are evaluated relative to the outcomes in previous years. Thus, the "solution process" for the model is not simultaneous and does not involve a general optimization within the model. Instead, it is sequential, with judgment exercised to introduce policy parameters that "balance" impacts across the years and maintain levels for performance variables that are consistent with those prescribed by the policy. This sequence of steps and the iterative process is illustrated in Figure 5.

#### 4. Policy Alternatives

The three policy options to be evaluated in the present exercise were identified broadly in Section 1. The purpose of this discussion is to compare and contrast these policy options and relate them to more general policy goals and objectives for the agricultural sector. The previous paper by Rausser and Foster has emphasized and developed general sets of criteria by which the performance of the agricultural sector is evaluated. These evaluations are, of course, from the viewpoints of the farm sector, consumers, government, and other participants in the policy process. The policy options selected for evaluation have implications for each of these more general objectives. The current analysis is more restricted, however. Implications are developed for three sets of performance measures indicated in Section 3: government, commodity markets, and the industry. Perhaps in the case of the industry, the evaluation is most incomplete relative to the broader policy framework. Expanded analyses of these policies could be directed to assessments of income transfer, risk, food security, price levels, program adaptability, the structure of the agricultural sector, resource use and conservation, and political stability. In the conduct of exercises on the specific policy options, the perspective for the more general goals and performance measures for the agricultural sector should not be lost. These policy evaluations should be regarded as inputs to the more general policy decision process that will determine the 1985 Farm Bill.

Details on the three policy options for major agricultural commodity markets selected for analysis are listed below. The list contains highlights for comparing and contrasting the policies. A tabular summary of the policy alternatives is presented in Table 2. The entries in Table 2 have been abstracted from the values used in the evaluations. Actual values for the parameters, loan rates, target prices, reductions in acreage, government costs, and other features

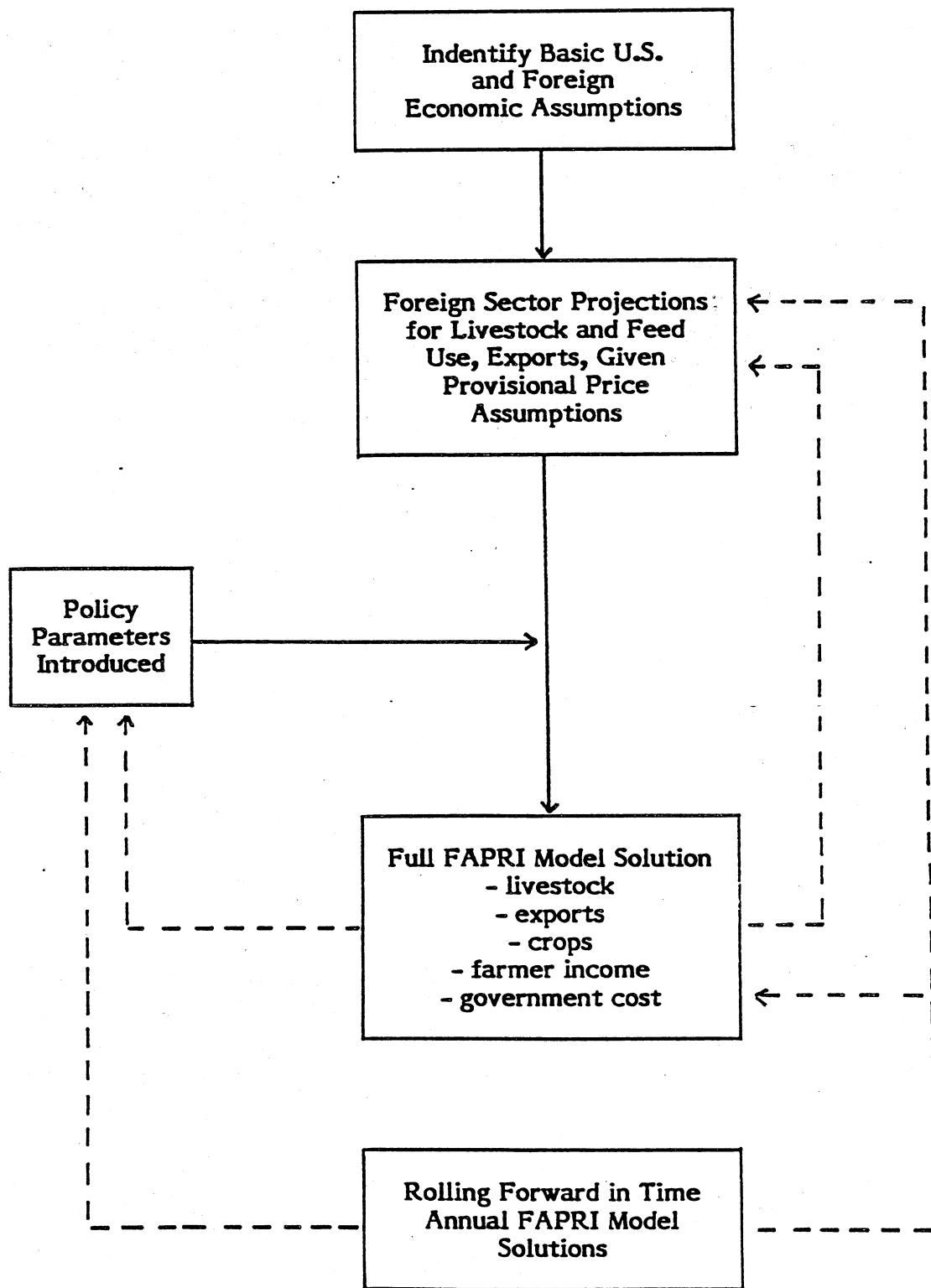


Figure 5. Policy Evaluation Process with FAPRI Model.

Table 2  
VALUES FOR SELECTED POLICY PARAMETERS APPLIED IN THE EXERCISES EVALUATING THE THREE ALTERNATIVES

Year/ Crop	Loan Rate	Target Rate	Baseline				Market Option				Expanded Export/Baseline								
			Reserve		Set Aside	Paid Diver.	Pmt. Rate		Loan Rate	Target Rate	Entry Release	Set Aside	Paid Diver.	Loan Rate	Target Rate	Entry Release	Set- Aside	Paid Diver.	Pmt. Rate
			Reserve	Release			Reserve	Release											
Corna <sup>a</sup>																			
84/85	2.55	3.03	2.55	3.25	10d	—d	2.55	3.03	2.55	3.25	—e	2.55	3.03	2.55	3.25	10d	—d		
85/86	2.55	3.03	2.55	3.25	10	—	2.55	3.03	2.55	3.25	—	2.55	3.03	2.55	3.25	10	—		
86/87	2.55	3.03	2.55	3.25	10	—	2.12	—	2.12	3.25	NAC	2.55	3.03	2.55	3.25	10	—		
87/88	2.55	3.03	2.55	3.25	10	10	1.50	2.12	—	3.25	NAC	2.55	3.03	2.55	3.25	10	—		
88/89	2.55	3.03	2.55	3.25	10	10	1.50	2.08	—	2.08	NAC	2.55	3.03	2.55	3.25	10	1.50		
89/90	2.55	3.03	2.55	3.25	10	10	1.50	2.04	—	2.08	NAC	2.55	3.03	2.55	3.25	10	—		
Wheata <sup>a</sup>																			
84/85	3.30	4.38	3.30	4.45	30	10-20	PIK 80	3.30	4.38	3.30	4.45	—	—	3.30	4.38	3.30	4.45	30	10-20 PIK 80
85/86	3.30	4.38	3.30	4.45	20	10	2.70	3.30	4.38	3.30	4.45	—	—	3.30	4.38	3.30	4.45	20	10 2.70
86/87	3.30	4.38	3.30	4.45	20	10	2.70	2.80	—	2.80	4.45	NAC	3.30	4.38	3.30	4.45	20	10 2.70	
87/88	3.30	4.38	3.30	4.45	20	10	2.70	2.76	—	2.76	4.45	NAC	3.30	4.38	3.30	4.45	20	10 2.70	
88/89	3.30	4.38	3.30	4.45	20	10	2.70	2.68	—	2.68	4.45	NAC	3.30	4.38	3.30	4.45	20	—	
89/90	3.30	4.38	3.30	4.45	20	10	2.70	2.64	—	2.64	4.45	NAC	3.30	4.38	3.30	4.45	20	10 2.70	
Cotton <sup>b</sup>																			
84/85	56	81	—	—	25	—	—	56	81	—	—	—	—	—	56	81	—	—	
85/86	56	81	—	—	15	10	0.30	56	81	—	—	NAC	NAC	56	81	—	—		
86/87	56	81	—	—	15	10	0.30	46	—	—	—	NAC	NAC	56	81	—	—		
87/88	56	81	—	—	15	10	0.30	47	—	—	—	NAC	NAC	56	81	—	—		
88/89	56	81	—	—	20	—	—	50	—	—	—	NAC	NAC	56	81	—	—		
89/90	56	81	—	—	20	—	—	50	—	—	—	NAC	NAC	56	81	—	—		
Ricec																			
84/85	8.14	11.90	—	—	25	—	—	8.14	11.90	—	—	—	—	—	3.14	11.90	—	—	
85/86	8.00	11.90	—	—	20	15	3.50	8.14	11.90	—	—	—	—	—	3.00	11.90	—	—	
86/87	8.00	11.90	—	—	20	15	3.50	6.73	—	—	—	NAC	NAC	8.00	11.90	—	—		
87/88	8.00	11.90	—	—	20	15	3.50	6.66	—	—	—	NAC	NAC	8.00	11.90	—	—		
88/89	8.00	11.90	—	—	25	—	—	6.41	—	—	—	NAC	NAC	8.00	11.90	—	—		
89/90	8.00	11.90	—	—	25	—	—	5.95	—	—	—	NAC	NAC	8.00	11.90	—	—		

<sup>a</sup>Dollars per bushel. <sup>b</sup>Cents per pound. <sup>c</sup>Dollars per cwt. <sup>d</sup>Percent. <sup>e</sup>No acreage control.

are provided in the sections in which the policies are evaluated and in Appendix A.

### Baseline

This policy through 1989/90 requires parameters for program operation on loan and target rates, PL-480 shipments, government stocks and acreage control instruments. The following criteria have been utilized in establishing the program parameters used to implement the baseline.

- \* Loan rates and target price minimums set at 1984/85 levels.
- \* Upward adjustment in loan and target price to reflect 5 year moving average farm price with high-low prices removed for feed grains, wheat and rice.
- \* Cotton loan rate set at the lower of 85 percent of the preceding 3-year average domestic price or 90 percent of the average price in northern Europe with a minimum of 55 cents a pound.
- \* Soybean loan established at 75 percent of the simple average of prices received by farmers over the preceding 5 marketing years—excluding the high and low years—with a minimum level of \$5.02 per bushel.
- \* Target prices at a constant percentage of loan rates, 1984/85 as the base.
- \* Reserve programs for feed grains and wheat with reserve entry price set at the loan rate. No limit on level of reserves.
- \* Paid diversion and reduced acreage control programs implemented if stocks exceed long term average levels.
- \* Base acreages for all crops maintained at 1984/85 levels.

### Market Option

This program maintains minimum government support and corresponding levels of market intervention. Loan rates are adjusted up or down according to a fixed percentage of a moving average market price. The price support is insured by government acreage programs, when necessary, however participants receive no deficiency or diversion payments. Government CCC stocks are released when the market prices reach 105 percent of the floating loan rate. Program participants have the option of defaulting CCC loans for bottom side price protection.

- \* Loan rates for feed grains, cotton, wheat and rice set at 80 percent of the five year average market price where maximum and minimum years have been removed.

- \* Target prices eliminated.
- \* Floating average based programs utilized in years where CCC stocks reach excessive levels.
- \* Participants are insured the loan rate by access to the 9 month non-recourse loan with the CCC.
- \* CCC reserves released when market prices exceed 105 percent of the floating loan rate for non-reserve commodities. For reserve commodities, present contract release prices are maintained.
- \* Farmer-held reserve (FHR) program restricted with no accumulation allowed.
- \* PL-480 and AID program maintained but not exceeding levels for the 1981 farm program.

#### Expanded Export Baseline

This program is identical to the baseline except in the assumptions on factors conditioning the export markets for agricultural commodities. That is, the policy parameters and instruments are the same as those for the baseline. Export market possibilities are enhanced. This is accomplished by an artificial assumption of lower exchange rates and higher economic growth in the developed foreign economies. Details for these external assumptions are provided in Section 7.

#### 5. The Baseline Option

This program evaluation traces the continuation of the 1981 Farm Bill from 1984/85 through 1989/90. Details on commodities markets evaluated are contained in commodity balance sheets in Appendix A. Commodity market results highlighted in this summary of the outcome for the baseline option are for corn, soybeans, wheat, cotton and rice for crops and beef, pork and poultry for livestock. The sequence of the presentation of conditioning information and the analysis is as described in Section 3.

#### General Economic Assumptions

The assumptions for the general economy are in data provided in Table 1 of Appendix B. Key factors in this forecast that impact directly on agriculture include:

- \* Federal government deficit moving from \$175 billion in FY84 to \$263 billion by FY89.

- \* Growth in the nominal GNP falling from a high of 11.5 percent in 1984 to a low of 7.9 percent in 1989. In real terms, the GNP (in 1972 dollars) projected to grow at 7.3 percent in 1984, falling to 3.6 percent in 1985, and averaging about 3 percent per year through 1989.
- \* Civilian unemployment declining from 7.3 percent in 1984 to 6.3 percent in 1989.
- \* 3-month T-bill rates declining from 10 percent in 1984 to 9.7 percent in 1985, and holding at 8.9 percent through 1989.
- \* Dollar devaluing in 1985, through the remainder of the projection period. Total fall of 18 percent from current levels, with biggest decline in 1986.

#### Foreign Projections and Assumptions

Alignment with the international markets necessitates an evaluation of competitive production potential, foreign demand growth, foreign farm programs and political implications. For the baseline, foreign economic growth is reflected by the expected movement in real gross domestic products of major developed, underdeveloped and centrally planned economies. These forecasts or projections are contained in Table 2 of Appendix B. The average growth rates projected for the next five years:

- \* Japan, 3.6 percent
- \* Europe, 2.0 percent
- \* Developing countries, 3.9 percent
- \* Centrally planned economies, 3.1 percent

Supply levels for major foreign production regions were generated from regression models designed to estimate planted areas. These equations include as explanatory variables internal prices, world market conditions, and rates of exchange. Yields were projected using simple trend analysis. This analysis, together with the consumption projections, shows that foreign export demand is not likely to expand sufficiently rapidly to sustain significant growth in U.S. commodity exports. The potential dollar devaluation may change these projections. However, even with the projected economic expansion, it is unlikely the current 1.5 to 2.5 percent per year livestock herd growth would increase significantly. Foreign production of competing grains will keep pace with demand growth, resulting in increased competition from other producers for traditional and non-traditional foreign markets for U.S. commodities.

#### U.S. Crop and Livestock Markets

These evaluations are based on the FAPRI agricultural policy model. International and domestic projections are fed into the econometric model to determine livestock demands for feed grains. Policy parameters along with the model structure determine equilibrium prices and other market related variables.

## Crops

### Wheat (Table 3)

- \* Strong government control programs are required throughout the forecast moving acreage from a low of 78.8 million in 1985/86 to a high of 83.1 in 1989/90.
- \* Domestic demand remains at around 1.0 billion bushels, the trended increase in food use is offset by declining feed use.
- \* Export demand reaches 1.82 billion bushels by 1989/90 with year over year increases of approximately 50 million bushels. Commercial exports to increase at about 20 million bushels per year. The modest export growth is due to strong foreign supplies, a highly valued dollar and the heavy debt load of underdeveloped countries. Exports to centrally planned economies increase by approximately 30 million bushels per year.
- \* Prices remain in the \$3.40 per bushel range, increasing to \$3.72 by 1989/90.
- \* Returns to producers over variable production cost are around \$50-\$55 per acre.

### Corn (Table 4)

- \* Acreage control programs are required throughout the evaluation period; 10 percent reduced acreage in 1985/86 and 1986/87 with 10 percent reduced acreage and 10 percent paid diversion in 1987/88, 1988/89 and 1989/90.
- \* Domestic use increases from 5.1 billion bushels in 1984/85 to 5.8 in 1989/90, 2.7 percent per year reflecting the 3 percent growth forecast for real GNP.
- \* Export demand increases moderately from 7.1 billion bushels in 1984/85 to about 8.0 billion in 1989/90. Foreign grain competition, moderate growth in foreign livestock economies, a relatively strong dollar and competition from the U.S. soybean industry are major factors contributing to this slow rate of growth.
- \* Prices in the \$2.60's through 1986/87 and increasing to \$2.90, reflecting the stronger acreage control programs in 1987/88-1989/90.
- \* Returns to producers over variable production cost are around \$110-130 per acre.

### Soybeans (Table 5)

- \* Bean/corn price ratio holding soybean acreage below 70 million until 1989/90.

Table 3

FAPRI POLICY PROJECTIONS, WHEAT: THE 1981 FARM PROGRAM CONTINUATION (B), THE MARKET OPTION (M), AND THE EXPANDED EXPORTS OPTION WITH BASELINE PARAMETERS (E)

Variable/Year	Program Option	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Planted Acres (Millions of Acres)	B	76.4	79.5	78.8	80.1	80.8	81.9	83.1
	M	--	--	--	82.8	83.6	84.6	85.5
	E	--	--	--	80.1	80.7	85.9	84.8
Domestic Use (Millions of Bu.)	B	1,112	1,067	1,031	1,030	999	1,027	1,038
	M	--	--	--	1,081	1,087	1,081	1,077
	E	--	--	--	1,030	989	1,025	1,028
Total Exports (Millions of Bu.)	B	1,429	1,602	1,583	1,657	1,708	1,749	1,820
	M	--	--	--	1,689	1,748	1,805	1,879
	E	--	--	--	1,663	1,743	1,823	1,903
Total Carryover (Millions of Bu.)	B	1,398	1,302	1,306	1,273	1,271	1,268	1,255
	M	--	--	--	1,278	1,245	1,223	1,192
	E	--	--	--	1,267	1,239	1,302	1,273
Farm Price (Dollars per Bu.)	B	3.53	3.40	3.40	3.46	3.66	3.72	3.72
	M	--	--	--	3.21	3.25	3.32	3.48
	E	--	--	--	3.48	3.69	3.67	3.84
Loan Rate (Dollars per Bu.)	B	3.65	3.30	3.30	3.30	3.30	3.30	3.30
	M	--	--	--	2.79	2.75	2.68	2.66
	E	--	--	--	3.30	3.30	3.30	3.30
Returns Over Variable Costs (Dollars per Acre)	B	67.23	56.17	60.84	57.13	56.42	53.71	51.71
	M	--	--	--	29.67	27.68	27.52	32.03
	E	--	--	--	57.79	56.19	50.00	58.84
Government Cost (Millions of \$)	B	3,419	2,203	2,858	2,520	2,200	2,094	1,890
	M	--	--	--	654	627	627	627
	E	--	--	--	2,520	2,068	1,656	2,145

Table 4

FAPRI POLICY PROJECTIONS, CORN: THE 1981 FARM PROGRAM CONTINUATION (B), THE MARKET OPTION (M), AND THE EXPANDED EXPORTS OPTION WITH BASELINE PARAMETERS (E)

Variable/Year	Program Option	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Planted Acres (Millions of Acres)	B	60.2	79.8	81.9	82.0	78.0	76.9	76.3
	M	--	--	--	81.8	81.7	81.5	81.3
	E	--	--	--	82.0	82.6	78.4	81.7
Domestic Use (Millions of Bu.)	B	4,691	5,074	5,443	5,604	5,512	5,622	5,774
	M	--	--	--	5,690	5,700	5,837	5,980
	E	--	--	--	5,674	5,556	5,614	5,746
Total Exports (Millions of Bu.)	B	1,856	2,121	2,080	2,135	2,151	2,224	2,264
	M	--	--	--	2,161	2,228	2,385	2,456
	E	--	--	--	2,260	2,440	2,620	2,800
Total Carryover (Millions of Bu.)	B	740	1,073	1,385	1,615	1,658	1,525	1,256
	M	--	--	--	1,481	1,621	1,576	1,419
	E	--	--	--	1,419	1,580	1,209	982
Farm Price (Dollars per Bu.)	B	3.20	2.68	2.64	2.63	2.87	2.90	2.92
	M	--	--	--	2.53	2.49	2.49	2.66
	E	--	--	--	2.65	2.80	3.00	2.99
Loan Rate (Dollars per Bu.)	B	2.65	2.55	2.55	2.55	2.55	2.55	2.55
	M	--	--	--	2.13	2.13	2.09	2.04
	E	--	--	--	2.55	2.55	2.55	2.55
Returns Over Variable Costs (Dollars per Acre)	B	145.96	105.61	91.69	91.79	108.55	99.77	100.40
	M	--	--	--	63.48	54.21	41.97	62.02
	E	--	--	--	93.85	96.08	117.55	100.41
Government Cost (Millions of \$)	B	6,971	1,755	1,791	2,265	2,157	1,365	1,446
	M	--	--	--	601	601	601	601
	E	--	--	--	2,211	1,609	1,800	692

Table 5

FAPRI POLICY PROJECTIONS, SOYBEANS: THE 1981 FARM PROGRAM CONTINUATION (B), THE MARKET OPTION (M), AND THE EXPANDED EXPORTS OPTION WITH BASELINE PARAMETERS (E)

Variable/Year	Program Option	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Planted Acres (Millions of Acres)	B	63.1	68.2	67.6	67.0	67.2	67.8	71.5
	M	--	--	--	66.8	68.3	70.6	73.2
	E	--	--	--	67.0	67.7	71.3	72.9
Domestic Use (Millions of Bu.)	B	1,066	1,132	1,166	1,189	1,198	1,212	1,235
	M	--	--	--	1,194	1,216	1,239	1,254
	E	--	--	--	1,199	1,208	1,224	1,247
Total Exports (Millions of Bu.)	B	740	780	821	868	908	955	1,000
	M	--	--	--	870	928	986	1,029
	E	--	--	--	876	931	986	1,040
Total Carryover (Millions of Bu.)	B	175	164	241	224	183	120	128
	M	--	--	--	210	166	134	147
	E	--	--	--	216	179	125	126
Farm Price (Dollars per Bu.)	B	7.75	6.27	5.98	6.13	6.62	6.97	6.82
	M	--	--	--	6.03	6.16	6.21	6.50
	E	--	--	--	6.20	6.74	7.42	7.45
Loan Rate (Dollars per Bu.)	B	5.02	5.02	5.02	5.02	5.02	5.02	5.02
	M	--	--	--	4.57	4.57	4.62	4.60
	E	--	--	--	5.02	5.02	5.02	5.02
Returns Over Variable Costs (Dollars per Acre)	B	118.19	89.91	89.20	92.26	104.04	111.46	104.45
	M	118.19	89.91	96.04	89.84	90.08	85.95	94.71
	E	118.19	89.91	89.20	93.56	106.58	124.55	123.11
Government Cost (Millions of \$)	B	0	0	0	0	0	0	0
	M	--	--	--	--	--	--	--
	E	--	--	--	--	--	--	--

- \* Domestic soybean crush increases at approximately 2 percent per year from 1.1 billion bushels in 1984/85 to 1.24 billion bushels in 1989/90.
- \* Exports increases at about 5.6 percent per year from 780 million bushels in 1984/85 to around 1,000 million in 1989/90. Export levels reflect strong foreign competition, a strong dollar and a moderate rate of growth in foreign livestock economies.
- \* Prices at the lower \$6.00 per bushel level increasing to \$6.50 per bushel by 1987/88 and at the \$7.00 per bushel level by 1989/90.
- \* Returns to producers over variable production cost are around \$90-115 per acre.

#### Cotton (Table 6)

- \* Acreage projected to remain at 11.5 million through 1987/88, then increasing to 12.0 million by 1989/90. Strong acreage control programs are required.
- \* Domestic use grows with the general economy, ranging from 1.5 to 3.5 percent per year, with total mill use at 6.40 million bales by 1989/90.
- \* Export growth at an average of 2.5 percent per year reaching 7.1 million bales by 1989/90. Expected strong supplies in China, Pakistan and Mexico, a strong U.S. dollar and moderate expansion in foreign economies contribute to this export projection.
- \* Prices reflect the excess supply capacity remaining near \$.60 per pound until 1987/88 and increasing to \$.70 per pound by 1989/90.

#### Rice (Table 7)

- \* Production controls necessary throughout the projection period holding acreage between 2.8 to 3.0 million through 1989/90, approximately 1.2 million below the 1984/85 ASCS base.
- \* Domestic use follows economic and population growth, with both food and brewery use increasing by 2.2 percent per year.
- \* Export growth at about 1.5 to 1.6 percent per year reflecting the growing competition from Thailand and the \$5.00 to \$7.00 per hundredweight U.S./Thailand price differential. U.S. prices will have to drop sharply for export trade to increase. Rice price at Rotterdam averaged \$527 per metric ton for U.S. exports in 1983 compared with \$369 per metric ton for Thai exports, roughly a \$7.20 per cwt. differential.
- \* Rice prices increase moderately from \$8.54 per cwt. in 1985/86 to \$9.43 per cwt. in 1989/90. Most of the price strength is associated with production controls.

Table 6

FAPRI POLICY PROJECTIONS, COTTON: THE 1981 FARM PROGRAM CONTINUATION (B), THE MARKET OPTION (M), AND THE EXPANDED EXPORTS OPTION WITH BASELINE PARAMETERS (E)

Variable/Year	Program Option	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Planted Acres (Millions of Acres)	B	7.9	11.1	11.0	11.5	11.5	12.0	12.0
	M	--	--	--	11.2	10.8	12.4	12.7
	E	--	--	--	11.5	12.1	12.2	12.8
Domestic Use (Millions of Bales)	B	5.90	5.54	5.65	5.80	6.00	6.22	6.40
	M	--	--	--	5.84	6.00	6.22	6.42
	E	--	--	--	5.80	5.63	5.46	5.29
Total Exports (Millions of Bales)	B	6.80	6.10	6.13	6.33	6.55	6.92	7.05
	M	--	--	--	6.60	6.55	7.00	7.15
	E	--	--	--	7.00	7.67	8.34	9.01
Total Carryover (Millions of Bales)	B	2.84	4.58	4.27	4.29	3.99	3.79	3.97
	M	--	--	--	3.75	2.76	2.94	3.23
	E	--	--	--	3.62	3.25	2.62	2.30
Farm Price (Dollars per Lb.)	B	0.67	0.59	0.61	0.60	0.67	0.69	0.71
	M	--	--	--	0.55	0.69	0.67	0.67
	E	--	--	--	0.67	0.72	0.75	0.85
Loan Rate (Dollars per Lb.)	B	0.56	0.56	0.46	0.56	0.56	0.56	0.56
	M	--	--	--	0.46	0.47	0.50	0.50
	E	--	--	--	0.56	0.56	0.56	0.56
Returns Over Variable Costs (Dollars per Acre)	B	305.50	182.64	140.67	123.62	119.61	94.62	92.82
	M	--	--	--	-0.30	60.47	41.42	33.38
	E	--	--	--	122.95	133.60	114.50	148.24
Government Cost (Millions of \$)	B	1,363	1,098	1,805	1,290	955	648	561
	M	1,363	1,098	1,805	(491)	0	0	0
	E	1,363	1,098	1,606	945	394	(88)	0

Table 7

## FAPRI POLICY PROJECTIONS, RICE: THE 1981 FARM PROGRAM CONTINUATION (B), THE MARKET OPTION (M), AND THE EXPANDED EXPORTS OPTION WITH BASELINE PARAMETERS (E)

Variable/Year	Program Option	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Planted Acres (Millions of Acres)	B	2.19	2.85	2.85	2.85	2.85	3.00	3.00
	M	--	--	--	3.02	2.88	2.84	2.85
	E	--	--	--	2.85	3.00	3.25	3.50
Domestic Use (Millions of Cwt.)	B	49.7	55.7	58.4	59.2	60.1	61.0	62.0
	M	--	--	--	60.8	62.2	63.1	64.3
	E	--	--	--	61.4	63.6	65.8	68.0
Total Exports (Millions of Cwt.)	B	70.3	68.0	68.0	69.8	70.7	72.0	73.5
	M	--	--	--	71.0	72.2	73.6	75.1
	E	--	--	--	75.3	80.8	86.3	9.18
Total Carryover (Millions of Cwt.)	B	47.0	58.8	58.1	55.3	51.0	52.1	51.2
	M	--	--	--	60.3	53.9	44.0	32.0
	E	--	--	--	47.6	36.8	30.7	29.2
Farm Price (Dollars per Cwt.)	B	8.50	8.54	8.54	8.90	9.34	9.23	9.43
	M	--	--	--	7.07	6.80	6.64	6.81
	E	--	--	--	9.14	9.38	9.39	9.85
Loan Rate (Dollars per Cwt.)	B	8.14	8.00	8.00	8.00	8.00	8.00	8.00
	M	--	--	--	6.73	6.66	6.41	5.95
	E	--	--	--	8.00	8.00	8.00	8.00
Returns Over Variable Costs (Dollars per Acre)	B	474.77	313.48	295.58	278.59	263.67	222.12	211.32
	M	--	--	--	48.39	22.55	1.16	-4.72
	E	--	--	--	257.09	216.02	156.88	134.94
Government Cost (Millions of \$)	B	664	568	571	512	447	387	367
	M	--	--	--	(52)	(9)	(40)	(58)
	E	--	--	--	442	273	189	243

## Livestock

### Beef (Table 8)

- \* Beef production is projected to decline in 1985 and 1986 reflecting inventory increases, decreasing from 23.5 billion pounds in 1984 to around 22.2 billion in 1986. The expansion cycle reaches a peak of 23.5 billion pounds by 1990, regaining levels attained in 1983. Current demand projections imply little upward trend in this expected production cycle.
- \* Prices for Omaha steers should increase from \$62.5 per cwt. in 1983 to a peak of \$72 in 1986. This supply induced price strength will begin to moderate after 1986, dropping to \$67 per cwt. by 1989. With a movement away from beef at the retail market, the overall price trend remains low.

### Pork (Table 8)

- \* Pork production enters a building phase in 1986 that terminates a steady decline from 15.9 billion pounds in 1981 to around 14.1 billion in 1985. Production peaks at around 16.1 billion by 1987 followed by a sharp decline through 1989.
- \* Prices should move opposite the supply cycle with a peak of \$53 per cwt. in 1985 and 1989. The low price year is 1987; \$47.25. This cyclical pattern occurs around a moderate upward trend reflecting a moderate increase in consumer demand.

### Broilers (Table 8)

- \* Supplies of broilers follow the longer term trend increasing at about 2 percent per year throughout the projection period.
- \* Wholesale prices follow the pork price cycle with highest prices in 1985 and 1989.

### Farm Income (Table 9)

- \* Due to higher levels of farm receipts and a major upward revision in inventories, 1984 net farm income should reach \$31.8 billion. This is almost double the \$16.1 billion figure experienced in 1983.
- \* The generally weaker agricultural market prices result in a significant eroding of farm income over the evaluation period.
- \* While the general forecast is for a weaker farm economy over the next six years a major agricultural downturn is projected for 1987 with farm income at \$20.0 billion. In real terms this is \$6.9 billion smaller than the level for 1983.

Table 8

FAPRI POLICY PROJECTIONS: LIVESTOCK, THE 1981 FARM PROGRAM  
CONTINUATION (B) AND THE MARKET OPTION (M)

Commodity and Variable/Year	Program Option	1984	1985	1986	1987	1988	1989	1990
<b>Beef</b>								
Omaha Price (\$/cwt.)	B	\$65.30	\$69.20	\$72.00	\$69.50	\$68.00	\$67.00	\$67.50
	M	\$65.30	\$69.20	\$72.00	\$70.00	\$69.50	\$67.00	\$66.50
Marketings (million pounds)								
	B	23,475	22,700	22,200	22,600	23,100	23,400	23,500
	M	23,475	22,700	22,200	22,450	22,690	23,200	23,570
<b>Pork</b>								
7 Market Price (\$/cwt.)	B	\$48.70	\$53.00	\$49.50	\$45.00	\$49.00	\$51.00	\$51.00
	M	\$48.70	\$53.00	\$49.50	\$42.50	\$46.00	\$47.50	\$48.00
Marketings (million pounds)								
	B	14,550	14,100	15,500	16,100	15,500	15,200	15,700
	M	14,550	14,100	15,500	16,600	15,940	15,600	15,850
<b>Poultry</b>								
9 City Weighted Price (\$/lb.)	B	\$51.00	\$52.90	\$48.70	\$47.60	\$50.50	\$54.00	\$49.00
	M	\$51.00	\$52.90	\$48.70	\$44.00	\$45.00	\$46.00	\$46.00
Marketings (million pounds)								
	B	12,959	13,562	13,924	14,481	14,814	15,100	15,553
	M	12,959	13,562	13,924	14,481	15,133	15,738	16,210

Table 9

FAPRI POLICY PROJECTIONS, FARM INCOME AND GOVERNMENT COST: THE 1981  
 FARM PROGRAM CONTINUATION (B), THE MARKET OPTION (M), AND THE  
 EXPANDED EXPORTS OPTION WITH BASELINE PARAMETERS (E)

Year	Program Option	1983	1984	1985	1986	1987	1988	1989	1990
Total Farm Cash Receipts	B	138.72	143.13	150.75	156.08	159.42	165.07	169.42	175.10
	M	--	--	--	155.56	156.40	159.78	164.25	171.93
	E	--	--	--	156.72	160.57	166.25	171.18	177.76
Direct Government Payments	B	9.29	8.70	5.12	5.73	4.76	3.34	3.29	4.28
	M	--	--	--	0.00	0.00	0.00	0.00	0.00
	E	--	--	--	5.17	3.80	3.18	2.31	3.67
Realized Gross Farm Income	B	163.16	167.93	172.74	179.58	182.61	187.68	192.88	200.51
	M	--	--	--	173.36	175.02	179.24	184.63	193.16
	E	--	--	--	179.86	182.84	188.74	193.78	202.72
Net Farm Income	B	16.10	31.81	25.73	25.64	24.58	20.04	22.39	25.66
	M	--	--	--	18.08	16.81	14.67	16.60	15.63
	E	--	--	--	26.02	24.90	21.01	22.75	26.97
Net Farm Income (1972\$)	B	7.48	14.25	11.03	10.41	9.57	7.44	7.89	8.54
	M	--	--	--	7.34	6.54	5.46	5.85	5.20
	E	--	--	--	10.57	9.69	7.80	8.02	8.98

- \* An improvement in the agricultural economy is expected in both 1988 and 1989 with farm income levels of \$22.4 billion and \$25.7 billion. Principal factors responsible are growth in revenues along with modest increases in farm production expenses.
- \* During 1986 total production expenses will exceed total farm cash receipts by \$664 million. While the difference between receipts and expenses has been declining over the past 60 years, 1986 will be the first time in U.S. history that this difference has been negative.
- \* A major factor supporting farm incomes through 1989/90 is the relative increase in non-money and other farm incomes.

#### Government Cost (Table 10)

- \* Acreage control programs are required throughout the evaluation period.
- \* The combination of deficiency, diversion, storage and other cost requires from \$4.7 to \$6.4 billion over the projection period for the crops sector alone.

#### Summary

##### Current factors during the agricultural industry:

- \* Slow recovery from recession in domestic and foreign economies.
- \* Strong dollar in world markets.
- \* High debt load of underdeveloped countries.
- \* Increased production potential both in competing countries and importing regions.
- \* Long term agreements signed by Soviets with five competing export countries.
- \* High interest rates stressing a capital intensive agriculture with declining asset values.
- \* Moderate levels of net farm income declining from around \$14.25 billion in 1972 dollars to around \$8.28 billion in 1990.
- \* Potential severe cash flow problems for up to 20 percent of producers in \$50,000 to \$200,000 gross sales category.

While it is difficult to rank these factors in degree of importance, the world growth rate seems to be most critical. With 2 to 2 1/2 percent growth in Japanese livestock industry and 1 to 1 1/2 percent growth in other developed regions. Exports of feed grains, soybeans, and soybean meal and oil will increase

Table 10

GOVERNMENT DIRECT FARM PAYMENTS AND OTHER COSTS: THE 1981 FARM PROGRAM  
 CONTINUATION (B), THE MARKET OPTIONS (M), AND THE EXPANDED EXPORT  
 OPTION WITH BASELINE PARAMETERS (E)

Year	Program Option	Millions of Dollars					
		1984	1985	1986	1987	1988	1989
Total Feed Grains	B	1,798	1,122	2,177	1,928	980	1,235
	M	--	--	0	0	0	0
	E	--	--	2,177	1,364	1,687	528
Total Food Grains	B	1,913	2,600	2,338	1,953	1,787	1,563
	M	--	--	0	0	0	0
	E	--	2,505	2,323	1,736	1,229	1,778
Total Cotton	B	1,088	1,193	1,216	881	574	487
	M	--	--	0	0	0	0
	E	--	994	871	702	267	0
Total Direct Government Payments	B	4,799	4,915	5,731	4,762	3,341	3,285
	M	--	--	0	0	0	0
	E	--	--	5,371	3,802	3,183	2,306
Total Other Government Costs	B	1,292	2,655	1,595	1,603	1,529	1,381
	M	--	--	869	1,376	1,345	1,327
	E	--	--	1,471	1,055	824	992
Total Government Cost For Grains	B	6,091	7,570	7,325	6,365	4,870	4,666
	M	--	--	869	1,376	1,345	1,327
	E	--	7,276	6,842	4,857	4,007	3,299

only moderately from current levels. The wheat sector is critically impacted by the heavy underdeveloped country debt load. Wheat exports will also be diversely impacted, perhaps even moving downward in the next few years for these regions. Rice and cotton will face strong competition with exports reflecting moderate expansion in world importing economies.

This export situation is further complicated by stronger foreign production. Coupled with slack demand and increased foreign supplies, the U.S. is faced with a narrowing trade gap. For these reasons, it will be difficult to turn the slow export market around unless demand side factors increase significantly over projected levels.

A final factor is the significance of the government program payments necessary to maintain the current supply-demand balance. With an approximately 200 million ASCS base acreage for corn, wheat, cotton and rice, strong program controls will be necessary. Planted area will have to be held to around 175 million acres or 25 million acres below this ASCS base level to balance the markets at existing loan and target prices.

## 6. The Market Option

### General Economic and Foreign Sector Assumptions

This analysis utilizes the same general economic assumptions as for the baseline. Alignment of the international trade sector for this policy required extensions of the model in two critical areas. First, as U.S. market prices begin to fall, demand equations had to be introduced to measure the expected trade differentials over the evaluation period. Second, the downside price movements imply production response patterns in both the domestic and foreign markets that are different than the baseline. For these reasons, selected components of the model for domestic and foreign demand and corresponding supply responses were modified for this policy evaluation.

### U.S. Crop and Livestock Sector

#### Crops

##### Wheat (Table 3)

- \* Planted area exceeds the baseline by approximately 2 million acres for each year. No acreage controls are imposed.
- \* Domestic demand exceeds that for the baseline by 30-70 million bushels per year, with the majority of the growth in feed demand.
- \* Commercial exports increase approximately 3 percent per year over the baseline. Further export market expansion is limited by the inelastic demand implicit in the FAPRI model and foreign supply response.

- \* Farm prices range \$.20 to \$.40 per bushel below those for the baseline, holding at approximately \$3.25 per bushel.
- \* Returns per acre average \$30, approximately \$22 per acre below the baseline estimates. The increased supply and corresponding increased acreages are not sufficient to offset the impact of the price decline on gross receipts.

Corn (Table 4)

- \* Acreage averages 3 million per year over the baseline or approximately 4 percent per year. No acreage control programs are applied during the evalaution period.
- \* Domestic demand significantly increases over the baseline due to an extension of the expansion phase of the livestock cycle. Lower feed grain prices provide the stimulus for livestock inventory building in excess of baseline estimate, resulting in an approximately 3 percent year over year increase in feed demand.
- \* Export demand reflects a 5 percent average annual increase over the baseline, about 100 million bushels higher each year.
- \* Prices range from a low of \$2.42 per bushel in 1988/89 to a high of \$2.66 per bushel in 1989/90. The price strength at the end of the period reflects the expansion in the livestock industry.
- \* Returns to producers over variable cost of production are lower than for the baseline by about \$45 per acre.

Soybeans (Table 5)

- \* Acreage projected to average about 1.4 million above baseline.
- \* Crush demand reflects the expansion in the U.S. livestock industry, averaging about 20 million bushels year over year increase.
- \* Exports respond to the lower price projections with beans averaging about 20 million bushels annually over the baseline.
- \* Prices range from a low of \$6.01 per bushel in 1875/86 to \$6.50 in 1989/90, approximately 5 percent below the baseline.
- \* Returns per acre to producers average 14 percent below those from the baseline design.

Cotton (Table 6)

- \* Planted area initially below the baseline, but increasing to slightly more than the baseline by the end of the evaluation period. A slight over-supply in 1986/87 relative to demand results in a low price incentive with price and acreage realignment.

- \* Strong competition, especially from the USSR even with lower prices limits exports, resulting in a moderate increase over the baseline.
- \* Prices are near the baseline solution in all years except 1986/87. Slight over-supply with lower support results in \$.06 drop in price. Acreage adjustment in following years produce a price path very near the baseline level. In general prices continue to reflect excess supply capacity.

#### Rice (Table 7)

- \* Overall decrease in production, lower acreage resulting from lower prices. No production control program.
- \* Domestic utilization increasing about 1 percent reflecting food consumption trends.
- \* Marginal increase in exports of about 1 percent per year reflecting the non-competitive position of U.S. rice exports in the world market, domestic prices \$3.00 to \$5.00 per cwt. higher than world prices.
- \* Inelastic demand and limited export demand results in a low price path given U.S. potential supply capacity.
- \* Lower loan rates with reduced market price support has a significant impact on returns to rice producers. Projected prices for the four year period will cover only average variable production cost.

#### Livestock

##### Beef (Table 8)

- \* Total supply averaging 1 percent less than the baseline each year until 1990, when the results of the extended herd building cycle begin to reach the market.
- \* Similar price cycle to the baseline with a peak in 1986 and differential prices 1 to 2.2 percent above those for the baseline. Moderate trend growth in the price path.

##### Pork (Table 8)

- \* Pork production 3 percent above the 16.1 billion pound peak in 1987, remaining 2 1/2 to 3 percent above the baseline.
- \* From 1987 through 1989 prices average about 6 percent below the baseline. The cycle is imposed on a slight upward growth trend.

##### Broilers (Table 8)

- \* Increase of 1 percent in annual poultry production over the baseline.

- \* Wholesale prices average 4 to 6 percent lower than those for the baseline.

#### Farm Income (Table 9)

- \* Projected reductions in net farm income averaging for the 5 year period, 1985/1990 about 30 percent below the baseline level. Farm income moving down from \$23.7 billion to the \$16.4 billion level during the evaluation period.
- \* Note that farm income is affected not only by an elimination in government payments but weaker market prices also lower farm cash receipts by over 2.0 percent.

#### Government Cost (Table 10)

- \* No acreage control programs in effect. Program cost for the crops sector at approximately \$1.3 billion per year.

#### Summary

U.S. agriculture has traditionally received income support through commodity programs. Moving in the direction of a market oriented program with less price support demonstrates rather dramatically the current influence of these programs on the agricultural industry, especially in the present world market environment exhibiting sluggish domestic and export demand.

This situation is further evident in the demand expansion that is associated with the overall price declines experienced in the market option. U.S. agriculture is traditionally characterized as an inelastic demand industry. Therefore, with price declines, other things unchanged, result in declining total revenues for producers. Model parameters, indicated in Section 4, reflect inelastic domestic and foreign market demand, short term, for all markets except soybeans. Thus, results from this modeling system necessarily imply that reductions in market prices will reduce revenues for crop producers. The simultaneous solution does result in an expansion of exports from foreign livestock sector growth and food utilization plus reductions in foreign supplies. Also, domestic utilization is projected to increase with a corresponding expansion over the baseline, of the U.S. livestock industry. However, since the market oriented policy alternative is initiated in a sluggish demand environment, the supply side of the crops sector takes up a considerable amount of the necessary slack. This occurs because planted area is presently substantially below the ASCS base acreage without production control programs.

All crops sectors would be severely impacted by the market program, especially rice and cotton. Declining rice prices would move to make the U.S. a stronger competitor in the world market. However, the projected level of price decline still would not be low enough to offset the Thailand price differential with U.S. prices. For cotton, the large stocks and initially higher prices produce

the same pattern of results. Lower prices, expanded domestic and export demand, and no government payments for acreage controls or price support together will substantially reduce net farm income for U.S. agriculture. Net farm income will move down from around \$25.7 billion in 1985 to \$15.6 billion in 1990. At this level, current asset values in agriculture will have to adjust. The departure from current loan levels and the related 15 to 18 percent price support reduction implies that U.S. agriculture will have to initially absorb most of the adjustment cost associated with the movement to the more market driven program.

If export expansion with a market oriented agriculture becomes the objective of the U.S. agricultural industry, these results suggest investigating a more moderate strategy for approaching this goal than an immediate shift to the market oriented program. Step down strategies might allow considerable more adjustment time for an industry with non-mobile assets. The choice of this program option was made to demonstrate the overall impact of an immediate move to a market oriented agriculture. Results indicate that the demand side is not immediately responsive enough to compensate for the estimated price decline, especially with the world economy in its present condition.

As a final note relative to the market oriented loan rate strategy, examination of the simulated price paths over time suggests one to two year lags in responding to market conditions. This is especially the case in variability up and down markets. A sequence of good or bad crops can distort this loan rate and the price protection signal to producers. Where should the focus be with regard to U.S. support prices? The rolling average loan rate is one alternative, however, given the lag time for response built into this loan rate formula, agriculture again becomes subjected to the possibility of imbalanced supply response corresponding to support signals inconsistent with present market conditions.

## 7. Expanded Exports with Baseline Policy

### Farm Program Operation

Program parameters for the expanded growth scenario are identical to those for the baseline. All loan and target prices are maintained at a minimum of the 1984/85 levels, upward adjustments of loans and targets are governed by moving average of market prices. No limit is placed on reserves and acreage control programs are applied if expected carryover exceeds long term average levels.

### General Economic Assumptions

The intent of this evaluation is to examine and contrast the baseline solution with a stronger general economic outlook. Values of conditioning variables selected for this scenario are based on previous growth periods in domestic and export demand. General economic indicators were imposed that reflect this more favorable economic situation.

- \* Federal government deficit ranging from a high of \$35 billion to a low of around \$15 billion.
- \* Growth in real GNP averaging near 4.5 percent per year.
- \* Civilian unemployment averaging 6.7 percent per year.
- \* Lower interest rates, 3-month T-Bill averaging 6.8 percent.
- \* Lower exchange value of the dollar, an average devaluation rate for the dollar of 3.75 percent per year.

### Foreign Projections and Assumptions

Real growth rates for the next five years are assumed to average:

- \* Developed countries, 4 percent
- \* Developing countries, 6 percent
- \* Centrally planned economies, 4.5 percent

### U.S. Crop and Livestock

This general expansion in demand growth is exhibited more prominently in export than in the domestic commodity markets. Export growth tends to raise overall crop price levels, resulting in a relatively higher use of concentrates for feed in the livestock sector. The combination of higher input prices and increased domestic demand growth tends to hold the domestic livestock herd at about the baseline level. The expanded economic growth is reflected more strongly in the export market.

#### Crops

##### Wheat (Table 3)

- \* Planted area is approximately the same as the baseline in 1986/87 and 1987/88 but increases 2 to 5 million acres in 1988/89 and 1989/90. Even with the expanded economic growth, acreage controls are required in all years, 20 percent reduced acreage program, 10 percent paid diversion in both 1988/89 and 1989/90 and 20 percent reduced acreage program in 1988/89 and 1989/90.
- \* Domestic demand approximately the same as in the baseline. Acreage controls necessary to maintain supply-demand balance generate approximately the same domestic price path as in the baseline.
- \* Commercial exports average approximately 50 million bushels per year over baseline, reaching 1.9 billion in 1989/90, about 80 million above the corresponding baseline export level.

- \* Farm prices are likely to be about the same as for the baseline, given the magnitude of U.S. production potential. Acreage control programs are required throughout, resulting in similar price paths to the baseline.
- \* Returns per acre at approximately \$55 or same as the baseline.

Corn (Table 4)

- \* Acreage averaging about 3 million per year over the baseline. Reduced acreage programs required in 1986/87 and 1987/88. Set-aside and paid diversion programs required in 1988/89 and 1989/90.
- \* Domestic utilization slightly below that for the baseline. Income expansion of about 1.5 percent for livestock demand offset by feed price increases.
- \* Export demand averaging year over year increases of about 180 million bushels as contrast to about 40 million per year for the baseline.
- \* Prices slightly higher than baseline in 1987/88 and 1988/89. Price levels in 1988/89 and 1989/90 reflect the release of farmer-held reserves, holding the season average price at an upper bound of \$3.08.
- \* Returns per acre \$10 to \$15 above those for the baseline.

Soybeans (Table 5)

- \* Acreage averaging about 4 million per year over baseline.
- \* Crush demand at approximately the same level in the baseline, reflecting limited change in U.S. livestock and moderate expansion of meal exports.
- \* Export projected to average 10 million bushels over baseline. Total growth for each year averaging approximately 55 million bushels as contrasted to 45 million in the baseline.
- \* Prices average \$.20 to \$.40 above those for the baseline.
- \* Returns to producers over base period at around \$20 per acre.

Cotton (Table 6)

- \* Acreage slightly above baseline, averaging 25 thousand per year.
- \* Domestic utilization trending downward, reflecting higher prices and competition from synthetics.
- \* Exports increasing at about 11 percent per year as contrasted to the baseline level of 3.7 percent per year.

- \* Prices slightly higher than base period but moderated by the release of CCC reserves and slightly higher acreage.
- \* Returns to producers approximately 30 per acre.

#### Rice (Table 7)

- \* Acreage averaging about 250 thousand above the baseline, production controls required in all years.
- \* Domestic demand increasing at about 4 percent per year in contrast to 1.5 for the baseline evaluation.
- \* Commercial exports average an increase of 8.75 percent per year compared to the baseline figure of 2 percent per year.
- \* Prices only about \$.20 to \$.30 per hundredweight higher than base due to the relatively large CCC carryover releases. These releases occur at 115 percent of loan rate.

#### Livestock

- \* Feed grain and high protein prices are very near baseline prices. For this reason, it is likely that the livestock industry will be unchanged from the baseline solution. As the prices for livestock were nearly the same as the baseline, they were not repeated in Table 8.

#### Government Cost (Table 10)

Total government cost will likely range between \$3.2 to \$4.8 billion. Demand expansion from the better world economic conditions is not sufficient enough to completely compensate for the U.S. current production potential.

#### Summary

This option was selected to demonstrate the impact that growth in the world general economies may have on U.S. agriculture. Imposed demand strength similar to previous growth periods for U.S. agriculture does increase prices, acreage and reduce government costs resulting in slightly more strength in net farm income than exhibited by the baseline.

An important consequence of investigating this option is the contrast it permits for commodity price paths relative to the baseline. For example, corn prices are very nearly the same level under both options. Why? The answer is the increases in farmer-held reserves in 1984/85 and 1985/86 given current crop projections. The release price of \$3.25 per bushel becomes a top side constraint on the corn price. Export expansion could trigger the release of reserves leaving prices at or near the same level for the two options evaluated.

In the case of wheat, the excess supply capacity is the deciding factor in holding price paths for this option. Acreage controls are necessary to maintain prices moderately above loan rates even with stronger domestic and foreign markets. The differential between the baseline and this option is apparent, however, from less restrictive production controls and reduced government budget exposure.

This type of an economic boom period would be beneficial to crop producers in U.S. agriculture. However, the livestock sector will eventually bear some of the pressure from an extended period with expected increases in crop prices. In this case, the cycle and evaluation period were not long enough to fully evaluate this type of reduction. Even by 1989/90 total planted area will be about 15 million below the current ASCS base for corn, wheat, cotton and rice. Thus, the expanded export market option was not sufficient to move U.S. agriculture out of an excess supply position and had some negative impact on the U.S. livestock sector.

## 8. Overview

How will the choices for U.S. agriculture and the performance of U.S. agriculture be governed by the 1985 Farm Bill? Three policy options have been examined to provide insights for their impacts on agriculture:

- Maintaining the current 1981 farm program
- Moving toward a more market oriented agriculture
- Enhancing the export market

These options have been evaluated for market, government, and industry performance parameters. It is important that these performance measures be viewed as a subset of those for evaluating agricultural policy more generally. For example, they relate only indirectly to the structure, stability, and other broad features by which the performance of agriculture is evaluated. However, these policy exercises provide information that suggests the decisions on the 1985 Farm Bill will be critical in shaping U.S. agriculture.

The situation for agriculture through the end of the decade as implied by these policy exercises is likely to be difficult. U.S. agriculture has important excess supply potential at prices dictated by current loan and target rates. World economic conditions, even if generously interpreted, appear insufficient to move agriculture from this excess supply condition. That is, world markets even under optimistic conditions, are not adequate to remove U.S. agriculture excess capacity at baseline loan rateprices. Finally, there is increasing evidence of financial stress in agriculture. Financial stress means simply that agricultural debt to asset ratios have increased and that prospective revenues are not sufficient to service these debts. Thus, there is an additional stock or capacity problem. It is a debt in agriculture considerably higher than in the past and that for many farms can not be serviced at market prices consistent with baseline loan and target rates. The consequence of policies similar to the three options evaluated could be a substantial re-evaluation and restructuring of assets in agriculture.

These three policy exercises do not seem to provide a clear way to address the high debt load and excess supply situation. The baseline policy option requires large government costs to sustain loan and target rate prices at 1984/85 levels. Moreover, under this option, the excess supply condition in U.S. agriculture continues through the end of the decade. Increased production levels of competitors, high exchange rates, relatively low growth in world economies, high debt loads in developing economies, and high interest rates are important contributors to a continuation of the excess capacity under the baseline evaluation.

The market oriented option results in decreased government exposure. However, for this option agriculture would be required to take up a large share of the adjustment costs for the transition toward a more market oriented economy. The FAPRI model structure, if correct, indicates that demand responses in domestic and international markets will not generate farm incomes consistent with those of the baseline at the lower prices for agricultural commodities. Under the market oriented floating loan rate, prices for basic agricultural commodities would fall from 15 to 20 percent. While these reductions in prices of the crops commodities result in some improvement in the livestock sector, the general implication with the sluggish domestic and foreign demand is for substantially reduced net farm income. This lowered net farm income and the current debt load for agriculture suggest that a rapid movement to a market oriented agriculture, substantial adjustment costs and re-evaluations of agricultural assets will occur. Perhaps the reduction or differential from the baseline in budget exposure could be used to ease the adjustment.

Possibly the most stark of the evaluation exercises is for the repetition of the baseline but with an expanded export potential. Even with relatively generous assumptions for expanding exports, the policy exercise indicates that it would be difficult to move prices through the end of the decade off the loan rates for most agricultural commodities. The enhanced export situation simply results in a "taking up" of some of the excess capacity in U.S. agriculture. The livestock industry was more or less unaffected. Gross farm income levels were similar to the baseline. The result of the enhanced export situation is then simply to reduce the government budget costs for maintaining current loan and target rates. The conclusion is that if policies similar to the 1981 farm bill are continued, it will be necessary to have a greatly enhanced world economic situation to provide enough demand strength that the prices of basic agricultural commodities can move away from present loan levels.

Perhaps the 1985 Farm Bill provides an opportunity to view agricultural policy from a different dimension. That is, instead of analyzing consequences of particular loan and target changes and their impacts on the current structure of agriculture, it be more necessary to develop more general criteria for evaluating the sector. These objectives or goals for agriculture could then be evaluated relative to different policy choices. The farm financial stress, the large excess capacity in U.S. agriculture, the potential for budget restrictions, and the sluggish U.S. and world economies indicate that policy situations like those evaluated in the current exercises are likely to result in important structural changes for U.S. agriculture. Do we want these structural changes to occur? Will these changes move U.S. agriculture toward a structure more consistent with broad goals for the sector? These are questions that should govern the

debate for the 1985 Farm Bill. Tinkering with loan rates and target rates within the current commodity market regulation framework, of course, has important economic impacts and distributive effects for U.S. agriculture but they are limited relative to the overall growth in domestic and foreign economies and associated movements in conditioning variables, e.g., interest rates. The results of these policy exercises and the current situation for U.S. agriculture internally and relative to the rest of the world indicate, however, that it would be unfortunate to focus the agricultural policy debate within the traditional loan rate and target rate framework and without first giving attention to the structure desired for agriculture and the distributive implications of this decision.

