NCCC-134

The Food Security Act of 1985:

Longer Term International Projections

by

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The Food Security Act of 1985 (FSA) is evaluated using a ten-year projection prepared by the Food and Agricultural Policy Research Institute (FAPRI) using macroeconomic projections provided by Wharton Econometrics (FAPRI 1-88). The purpose of this exercise is to provide a base to evaluate implications of current and projected agricultural policies of the U.S. and other countries in the context of a likely world macroeconomic and financial environment. This paper includes a brief discussion of the structural models, the macroeconomic assumptions, and the policy parameters. The results of the projection exercise are present thereafter, followed briefly by conclusions.

FAPRI Policy Model

The FAPRI annual agricultural policy model has components for each of the major commodities. These include livestock: beef, pork, poultry, and dairy, and crops: feed grains (corn, sorghum, oats, and barley), soybeans, wheat, rice and cotton (for a more complete documentation, see Bahrenian et al, Brandt et al (1985a and b, 1987), CARD, Devadoss et al, Johnson, et al, Meyers et al,). 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.

The commodity components are linked for the policy analysis exercises. These linkages between the commodity markets are designed to 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 correspondingly, livestock prices. These linkages across commodity markets are especially important for policy evaluation.

In addition to the commodity components, the FAPRI policy model has farm income and government components. The farm income component utilizes output for the major commodity components, along with simplified information on the specialized commodities and farm expenses, to generate estimates of gross farm income, net farm income, and other sector-wide performance measures. The government component estimates costs by commodity program and total budget exposure.

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The dimensions of the FAPRI model are, by necessity, relatively large. 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 345; 150 for livestock, 110 for crops, with the remainder for farm income and government cost. The model has 270 behavioral equations and 75 identities.

There are a number of key structural parameters in the FAPRI agricultural policy model. A complete review of these parameters and the model specification is not within the purview of the present discussion. However, selected parameters are provided in Table 1. Observe from Table 1 that the short term export elasticities evaluated at 1987 prices are relatively inelastic for the FAPRI model (with the exception of soymeal which includes a cross effect from soybean price). Selected domestic retail meat demand elasticity estimates utilized in the model are also listed in Table 1, evaluated at 1987 levels.

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. Thus, FAPRI policy evaluation exercises are not conducted with 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 are drawn from other sources. Assumptions on exchange rates, economic growth, interest rates, and other factors must be implicitly consistent. It is important to emphasize that utilizing these projections as predetermined and the operation of the model on a satellite basis ignores potentially important potential 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 the WEFA Group (formerly Wharton Econometric Forecasting Associates). 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. Some "tuning" of the way the policies are implemented occurs 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.

TABLE 1   REPRESENTATIVE STRUCTURAL CROP ELASTICITIES FROM THE FAPRI AGRICULTURAL POLICY MODEL[a]

Commodity	Feed Elasticity	Feed Share %	Food Elasticity	Food Share %	Exports Elasticity	Exports Share %	Stocks Elasticity	Stocks Share %	Total	Acreage Response
Corn	-.17	41	-.16	9	-.32	15	-.72	35	-.38	.12
Wheat	-.51	7	-.01	21	-.51	37	-.79	35	-.51	.15
Soybeans	-.67	55			-.51	33	-.16	12	-.56	.19
Soymeal	-.09	74			-1.30	26			-.41	

Commodity	Retail Prices Beef	Pork	Broilers	Income	Supply Response
Beef	-.53	.33	.12	.20	.25
Pork	.44	-.90	.10	.35	.09
Broilers	.19	.05	-.54	.75	.02

[a]Elasticities and shares are calculated at their 1987 values.

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 demands for feed grains and the demands for 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 generates supplies of commodities consistent with the policy assumptions, the model structure, and effects of the exogenous 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.

The Macroeconomic Environment

The macroeconomic environment over the 10-year projection period contrasts sharply with that of the early 1980s. Then, low or negative real GDP growth was experienced in many countries. This low-growth period followed the high-growth rates of the late 1970s.

Table 2 summarizes selected variable projections of the U.S. and world economic environments (made by the WEFA Group). Although still sluggish, the recovery of the world economies from the performance in the early 1980s has a significant impact on the level of demand and trade in the 10-year projection period. The rate of real GDP growth, while substantially improved, is not as high as during the 1970s. Demand and trade recover from levels of the early 1980s but do not approach the levels of the boom years of the 1970s. The growth patterns in the developing market economies are diverse, with some struggling under heavy external debt, and others, like the Asian NICs experiencing sustained growth.

The purchasing power of the U.S. dollar relative to many developed country currencies is projected to continue declining, but at a lower rate through 1989 and then recover marginally thereafter. This exchange rate projection supports the U.S. competitive position in export markets, and is more pronounced for currencies in Western Europe and Japan than for most other countries. The U.S. dollar is even projected to appreciate relative to currencies of Australia, Argentina, and Brazil during the latter part of the projection period.

U.S. Agricultural Program Provisions

The FSA, as amended by the budget compromise legislation passed in late 1987, specifies major agricultural program provisions through 1990. In some

TABLE 2 DOMESTIC AND FOREIGN ECONOMIC PROJECTIONS[a]

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Real GNP (% change)	2.9	2.4	3.8	1.9	3.4	2.7	3.1	2.8	3.2	3.0	2.5
GNP Deflator (% change)	2.9	3.7	4.0	4.1	3.5	3.5	3.6	3.9	4.4	4.6	5.0
Civilian Unemployment Rate (%)	6.2	6.2	6.2	6.5	6.1	5.9	5.4	5.1	4.9	4.8	4.9
3-Month T-Bill Rate (%)	5.8	6.3	7.6	6.9	6.5	6.4	6.6	7.4	8.0	8.3	8.8
Moody's AAA Corporate Bond Rate (%)	9.3	10.4	11.0	9.6	9.0	9.0	9.5	10.0	10.8	11.3	11.6
Federal Budget Surplus (Bil. $)	-154.4	-176.6	-173.8	-164.9	-126.6	-119.8	-112.3	-104.1	-95.5	-88.6	-79.3
Current Account (Bil. $)	-156.1	-142.4	-146.4	-137.6	-137.0	-129.7					
Foreign and Domestic Variables											
Saudi Light ($ per barrel)	16.7	16.9	17.0	17.1	19.0	20.5	21.4	22.4	23.4	24.4	25.5
Effective Exchange Rate MERM United States (% change)	-10.2	-7.1	-1.8	2.2	3.7	3.1	1.0	1.0	1.0	1.0	1.0
Real GDP (% change)[b]											
World	2.8	2.4	2.8	2.5	3.3	3.1	2.6	2.6	2.6	2.6	2.6
Africa	-1.0	0.6	2.8	2.7	2.5	3.1	2.9	2.9	2.9	2.9	2.9
Latin America	3.4	0.6	2.3	2.5	3.3	3.9	4.0	4.0	4.0	4.0	4.0
Pacific Basin	7.8	5.5	5.8	3.9	5.4	6.0	4.0	4.0	4.0	4.0	4.0
Western Europe	2.4	2.0	2.4	2.5	3.1	2.7	2.7	2.7	2.7	2.7	2.7
Centrally Planned	3.3	3.2	3.3	3.0	3.0	3.1	2.5	2.5	2.5	2.5	2.5

[a]The projections given in this table are taken from World Economic Outlook, The WEFA Group, December 1987.

[b]Since the WEFA projection of these variables go only up to 1992, the values of these variables for 1992 to 1996 are assumed as constant at some reasonable values.

cases, the legislation is quite specific. For example, target prices for major program crops can only be changed by congressional action. In other areas, the Secretary of Agriculture is given considerable discretion. Within specified limits, the Secretary can choose to change acreage reduction requirements, set loan rates, make more or less payments in generic certificates and utilize the Export Enhancement Program for particular countries and commodities.

FAPRI projections incorporate a series of assumptions about how the Secretary of Agriculture will implement the existing legislation, and policies after the FSA85 expires in 1990. In general, it is assumed the current management strategies will prevail and that future legislation will continue the directions established in the FSA85. This implies reduction in support prices and continued use of programs to control production and encourage the utilization of commodities currently in excess supply.

Target Prices

The budget compromise legislation of 1987 resulted in a modest reduction in 1988/89 and 1989/90 target prices from the levels specified in the FSA85. For 1990/91, we assume that target prices will return to the levels specified in FSA. For most major commodities, the 1990/91 target price is approximately 10 percent below 1986/87 levels. After 1990/91, we assume that new legislation will reduce target prices by 2 percent per year. Particularly for government costs and net farm income, this is a very important assumption. Continued target price reductions seem to be more consistent with the assumption that future policies will sustain the directions established by the FSA85.

Loan Rates

Loan rates for program commodities also were changed by the 1987 budget compromise legislation. Deficiency payments are determined by the difference between the target price on the one hand, and the greater of the market price and the loan rate on the other. The budget compromise reduced target prices and increased loan rates to reduce potential deficiency payments.

For all program commodities, we assume that loan rates will be reduced in 1989/90. In 1990/91, however, cotton, rice, and soybean loan rates will not be reduced, because they will have reached the minimum levels permitted by the FSA85. For those commodities, no further loan rate reductions are assumed in the 1990s. For feed grains and wheat, however, loan rates are set on the basis of rules established by the FSA85. Loan rates are set equal to 75 percent of the average market price for the previous five marketing years, excluding the years with the highest and the lowest prices. A further qualification is that loan rates may not fall more than 5 percent in a given year. The Secretary has the authority to set loan rates at higher levels. It is assumed he will not use that authority.

Annual Acreage Programs

To reduce supplies of major commodities, 1987/88 and 1988/89 Acreage Reduction Programs (ARPs) for most commodities were set at or near maximum permitted levels. An additional Paid Land Diversion (PLD) program was in effect for feed grains. In general, it is assumed that ARPs and PLDs will remain high until stocks are reduced to "normal" levels.

Conservation Reserve Program

Approximately 17 million acres of land were removed from production in 1987/88 by the Conservation Reserve Program (CRP). As a result, the base area that qualifies for program payments was reduced by almost 11 million acres, with wheat being most affected. By 1990/91, we assume that 45 million acres will be enrolled in the CRP (FSA specifies 40 to 45 million acres). Sign-up has been heavy in the Plains and Mountain states, coming from land that would otherwise have been planted in wheat, sorghum, barley, and oats. However, sign-up will reach maximum allowed levels in many countries in these states. As a result, the proportion of future sign-up taking place in the Corn Belt will have to increase. Thus, the number of corn base acres enrolled in the CRP is projected to almost triple between 1987/88 and 1990/91.

Generic Certificates Usage

The use of generic certificates to make program payments has had a major impact on commodity markets and government costs. Largely because of certificates, 1986/87 and 1987/88 corn market prices have averaged significantly below the loan rate. In addition, certificates can be exchanged for Commodity Credit Corporation (CCC) stocks of grain, even when market prices are below the levels normally required for CCC sales. This has played an important role in reducing CCC stocks and market prices of wheat, in particular.

We assume that heavy usage of certificates will continue until carryover stocks have been reduced to more normal levels (i.e., half of all payments will be made in certificates through the 1989/90 marketing year). It is assumed that no certificates will be issued for deficiency and diversion payments after 1993/94. It is assumed, however, that one-fourth of CRP rental payments will be made in certificates, beginning in 1991/92. Those certificates will permit further liquidation of CCC stocks.

Export Programs

We assume that the Export Enhancement Program (EEP) and other export programs will continue, but at reduced levels. As market prices increase and government stocks decline, there is less incentive to utilize export subsidies. In addition, opposition to such policies in other exporting countries may lead to mutual agreements to reduce levels of export subsidization.

Dairy

The support price for milk fell to $10.60 per hundredweight on January 1, 1988, as stipulated by FSA, given projected net government purchases of dairy products. Another $.50 per hundredweight reduction in the support price is likely to occur in 1989, because purchases in 1989 also are likely to exceed five billion pounds of milk equivalent. After 1989, net purchases are projected to remain below five billion pounds, so no further adjustment of the support price is expected.

Results

Space will not permit a full presentation of the 10 year projections. Interested readers are referred to FAPRI #1-88 for complete details. This

section will briefly examine corn and soybeans, beef, pork and broilers as well as government costs and net farm income.

Crop Commodities

Corn

Excess capacity continues to be the major theme for the U.S. corn industry. Ending stocks are projected to fall by approximately 650 million bushels in 1987/88, but still remain above 4.2 billion bushels at the end of this crop year (Table 3). Unless severe drought conditions occur in the United States or in other major producing countries, it is not likely that stocks will fall below 2 billion bushels until the early 1990s.

Government administration of the feed grain program is likely to be the most important determinant of corn prices for the next two to three years. Normal weather assumptions and current management strategies imply that the ARP rate will be set at the maximum permitted level through 1990/91, and that an additional 10 percent PLD program will be offered for 1988/89 and 1989/90.

Market prices in 1987/88 have improved considerably from the low levels of 1986/87, and further increases are anticipated. However, heavy use of generic certificates in making program payments and the high level of carryover stocks make it unlikely that annual market prices will exceed $2.00 per bushel before 1990/91.

The FSA and the budget compromise legislation of 1987 specify that the corn target price will fall from $3.03 per bushel in 1987/88 to $2.93 in 1988/89, and $2.75 by 1990/91. This analysis assumes that target prices will be reduced by 2 percent per year in the 1990s, after the FSA85 expires. This implies a lower level of government support and is likely to result in reduced profits for farmers participating in the corn program.

Supply

Reducing excess supplies of corn will be a major objective of government policies for corn during the next few years. Strong programs to reduce production will be necessary through 1990/91 to reduce carryover to the 2-billion-bushel level. Planted area is projected to remain below 70 million acres for each of the next three crop years.

Between 1987 and 1990, the number of corn base acres enrolled in the CRP is projected to increase from 2.4 million to 7.0 million. Because more land will be removed by the long-term CRP and stocks will be reduced, there will be less need for large annual acreage programs in the 1990s. PLD programs are therefore eliminated in 1990/91, and the ARP rate is reduced to 10 percent in 1991/92 and 5 percent in 1993/94. The net result is that planted area averages about 75 million acres between 1991 and 1996. With a 10-bushel-per-acre increase in yields between 1988 and 1996, corn production is projected to increase from 7.0 billion bushels in 1988 to 8.6 billion bushels in 1996, still below the record 1985 level.

TABLE 3   U.S. CORN AND SOYBEAN SUPPLY AND UTILIZATION

Variable	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97
CORN											
Planted Acres (mil.)	76.7	65.7	67.3	68.4	69.8	73.9	73.8	76.0	75.8	75.7	75.7
Production (mil. bu.)	8,250	7,064	7,013	7,196	7,408	7,863	7,962	8,267	8,349	8,454	8,556
Domestic Use											
Feed (mil. bu.)	4,715	4,807	4,973	4,910	4,840	4,820	4,700	4,747	4,762	4,793	4,770
Food (mil. bu.)	889	901	913	932	947	971	991	1,014	1,036	1,058	1,080
Gasohol (mil. bu.)	285	300	320	340	360	380	400	420	440	460	480
Seed (mil. bu.)	17	18	18	19	20	20	21	21	21	21	21
Total Domestic (mil. bu.)	5,906	6,025	6,224	6,201	6,167	6,191	6,112	6,202	6,359	6,333	6,352
Total Exports (mil. bu.)	1,504	1,701	1,691	1,661	1,746	1,852	1,912	2,011	2,103	2,194	2,293
Ending Stocks (mil. bu.)	4,882	4,222	3,322	2,657	2,153	1,973	1,913	1,967	1,955	1,883	1,795
Prices and Returns											
Farm Price/bu.	$1.50	$1.71	$1.90	$1.96	$2.00	$2.05	$2.17	$2.16	$2.19	$2.31	$2.40
Part. Return/ac.	$163.38	$158.01	$140.18	$129.50	$120.36	$129.34	$122.53	$120.10	$108.77	$99.09	$87.95
Non-Part. Returns/ac.	$40.19	$65.21	$74.43	$74.92	$76.70	$78.21	$88.91	$82.50	$79.17	$86.90	$89.84
SOYBEANS											
Planted Acres (mil.)	60.4	57.4	61.8	64.6	62.9	61.6	63.8	62.9	64.4	64.8	65.3
Production (mil. bu.)	1,940	1,905	2,002	2,107	2,077	2,059	2,148	2,141	2,213	2,247	2,285
Domestic Use											
Crush (mil. bu.)	1,179	1,192	1,171	1,199	1,212	1,221	1,248	1,262	1,289	1,316	1,339
Seed & Residual (mil. bu.)	104	95	98	96	95	97	96	98	99	99	105
Total Domestic (mil. bu.)	1,283	1,287	1,269	1,295	1,306	1,319	1,344	1,360	1,388	1,415	1,444
Total Exports (mil. bu.)	757	771	746	744	757	773	783	800	815	834	850
Ending Stocks (mil. bu.)	436	284	270	338	351	318	338	319	329	326	317
Prices and Returns											
Farm Price/bu.	$4.80	$5.63	$6.24	$5.28	$5.11	$5.86	$5.39	$5.83	$5.63	$5.73	$5.84
Net Return/ac.	$94.58	$123.92	$136.61	$102.57	$96.63	$121.35	$103.61	$117.42	$107.44	$107.97	$108.42

Demand

Grain-consuming animal units (GCAUs) are expected to change only modestly over time, in part because beef and pork are not in phase with each other. Feed use is projected to peak at almost 5.0 billion bushels in 1988/89, and then decline slightly through 1992/93.

Domestic corn utilization is projected to increase from 6.0 billion bushels in 1987/88 to almost 6.4 billion in 1996/97, a growth of less than 6 percent. U.S. corn exports are expected to grow by almost 35 percent between 1987/88 and 1996/97. Even in 1996/97, however, projected U.S. corn exports are less than the record levels of 1979/80 and 1980/81.

Stocks

Beginning stocks in 1987/88 totaled almost 4.9 billion bushels, equivalent to 69 percent of the crop harvested in the fall of 1987. This record carryover level is projected to decline by about 650 million bushels to about 4.2 billion bushels at the beginning of the 1988/89 crop year.

Prices and Returns

Area control programs and generic certificates will dominate U.S. corn prices for the next few years. Modest price increases are projected between now and the early 1990s due to the supply-reducing effects of acreage control programs. The use of generic certificates, however, will sharply reduce carryover stocks, even at prices under $2.00 per bushel. Substantial price increases are unlikely between now and the early 1990s unless a severe drought occurs. After 1990/91, lower stock levels and relaxed acreage programs mean that market prices will be more sensitive to unexpected changes in supply or demand conditions. Prices are projected to increase by 60 percent between 1986/87 and 1996/97. For perspective, however, it should be observed that the $2.40 per bushel corn price in 1996/97 is still lower than the season average price in every year between 1979/80 and 1984/85.

Because variable production costs are projected to increase almost 5 percent per year, net returns to participants are likely to fall steadily during the next decade, from $158 per acre in 1987/88 to $88 in 1996/97. For non-participants, higher corn prices and yields more than offset higher production costs and net returns increase from $65 per acre in 1987/88 to $90 in 1996/97. Although the gap between participant and nonparticipant net returns narrows, only in 1996/97 is the average farmer better off not participating in the government program. Even then, rational producers might choose to participate, because low loan rates mean that producers outside the program face substantial risk from bumper crops or reduced demand. Participation rates are projected to fall from 77 percent in 1988/89 to 58 percent by 1996/97.

Soybeans

Normally a 3-to-1 ratio between soybean and corn prices would imply significant shifts in planted area favoring soybeans over feed grains. Although the ratio is projected to exceed 3-to-1 in each year between 1986/87 and 1988/89, the projected shift from corn to soybean production is relatively modest (Table 3).

The main reason for limited shifting is that the target price of corn is much higher than the market price. Even if soybean prices reach the projected 1988/89 level of $6.24 per bushel, net returns to corn participants will exceed net returns to soybean farmers, even though the 1988/89 corn price is projected to be just $1.90 per bushel. As a result, only part of the projected 7-million-acre increase in soybean acreage between 1987/88 and 1989/90 will occur in the Corn Belt. The rest of the increase will have to come in the South, where soybean production fell sharply in the mid 1980s due to low prices and returns.

In contrast, producers in Argentina and Brazil are reacting to the 3-to-1 price ratio and shifting production away from feed grains and toward soybeans. Therefore, the current U.S. program management strategy has tended to hurt the competitive position of U.S. soybeans in world markets. U.S. soybean exports are projected to hold at current levels between now and 1990/91. With declining corn target prices, the corn-soybean price ratio returns to a more normal 2.5-to-1 after 1990/91, and soybean exports increase.

Supply

In 1987/88, soybean acreage fell to its lowest level in the last 10 years. Low market prices, the relative attractiveness of wheat and feed grain programs, and the CRP were major factors contributing to the decline. Given projected soybean prices above $6 per bushel in 1988/89 and further reductions in corn target prices, soybean acreage is projected to increase another 2.8 million acres in 1989/90. After 1989/90, projected soybean acreage varies from 61 to 65 million acres. Although these levels are sharply higher than those of 1987/88, they remain below the 1979/80 peak of 71 million acres. However, considering that the CRP will remove approximately 6 million acres that might otherwise have been planted in soybeans, projected plantings are quite high. Assuming yields increase by 2.6 bushels per acre between 1988/89 and 1996/97, soybean production should increase from about 1.9 billion bushels in 1987/88 to 2.0 billion in 1988/89 and 2.3 billion in 1996/97.

Demand

Demand for soybeans derives from the demand for meal and oil. In 1987/88, demand for both meal and oil has increased, driving up the price of meal by 10 percent and the price of oil by 20 percent above 1986/87 levels. In spite of higher soybean prices, crushing margins (the difference between the price of soybeans and the value of the products that result when soybeans are crushed) remain high, and a modest increase in soybean crush is expected. Domestic demand for meal has increased due to a 5 percent increase in High-Protein Animal Units (HPAUs) and higher exports to the Soviet Union. Oil exports are substantially higher this year due in part to sales under the EEP to India and Pakistan. Even with the higher soybean prices, soybean exports are expected to increase slightly in 1987/88.

In 1988/89, a modest decrease in both crush and soybean exports is projected. Domestic meal demand will remain strong due to another 5 percent increase in HPAUs. Meal prices will near $200 per ton. Projected exports of soybeans, meal and oil fall, however, as competition from South American intensifies. After 1988/89, domestic demand for meal is expected to remain relatively flat at about 21 million tons per year. Changes in HPAUs after 1988/89 are modest, and meal prices generally move in the same direction as

HPAUs. Per capita domestic oil use is projected to increase very slightly. Population growth accounts for most of the projected increase in domestic oil use.

Stocks

Current projections of soybean carryover stocks for the 1987/88 marketing year are substantially below those of just a few months ago. A part of this is due to unexpected strength in demand, largely due to Soviet, Indian, and Pakistani imports. More important factors were sharp downward revisions in the estimated size of the 1987 soybean crop and in the 1986 crop carryover. The result was a marked increase in soybean prices during the past few months and a massive sell-off of CCC soybean stocks.

Carryover stocks of soybeans are expected to fluctuate around the 300-million-bushel level during the next 10 years. Actual stock levels will be more variable than those indicated. Unanticipated changes in production or demand will have corresponding impacts on carryover stocks.

Prices and Returns

Soybean prices are projected to increase from $4.80 per bushel in 1986/87 to $5.63 in 1987/88 and $6.24 in 1988/89. A price above $6 per bushel is difficult to sustain, however, since it tends to stimulate increased production in the United States and in South America. Between 1988/89 and 1996/97, soybean prices are projected to vary between $5.11 and $5.86 per bushel as the soybean-corn price ratio is expected to return to more normal levels.

Net returns for soybean producers are projected to peak at $137 per acre in 1988/89, and to average slightly more than $100 per acre in later years. These levels of returns are substantially above those received by corn nonparticipants, but below those received by corn participants until the mid-1990s. By 1996/97, projected net returns to corn participants and nonparticipants and to soybean producers are all between $87 and $109 per acre.

Livestock

In 1997, total meat production (beef, pork, broilers, and turkeys) will be 8.2 percent higher than in 1986. Increases in broilers (31 percent), turkeys (34 percent), and pork (8.9 percent) more than offset the decline (-9 percent) in beef production. The increase in total meat production is lower than the July 1987 forecast (FAPRI Report #4-87) of 11 percent. The lower projection is due to higher feed costs that reduce the supply expansion, and to lower income growth assumptions that dampen demand for meat products throughout the projection period.

Total meat production rises continuously throughout the decade (except for minor declines in 1991 and 1994). But domestic meat production capacity just keeps pace with domestic population growth. From 1987 to 1989, the reduction in beef production is more than offset by expanding pork, broiler, and turkey production.

Current meat consumption trends continue. Per capita beef consumption declines by 16.6 percent from 1986 to 1997 (Table 4). The reduction in beef

consumption is offset by continued increases in broiler (17.5 percent) and turkey (24.1 percent) per capita consumption levels, as well as a slight increase (1.6 percent in per capita pork consumption.

The per capita consumption trends reflect shifts in consumption shares from been to poultry products. Considering the four meat categories, the per capita consumption share of beef drops to 31.7 percent in 1997 from 38.2 percent in 1986. Poultry, especially chicken, gains from the drop in beef consumption. The consumption share of broilers increases to 32 percent in 1997 from 27.4 percent in 1986. The consumption share of turkeys increases to 7.9 percent in 1997 from 6.4 percent in 1986. The consumption share of pork remains relatively constant.

Consumers benefit from the abundant meat supplies that result in downward pressure on meat prices. Consumers' meat expenditures grow at a rate less than the rate of inflation. Meat expenditures decline through 1992, and then show a modest increase through 1997.

Per capita consumption of meats (beef, pork, broilers, and turkey) peaks in 1990 at 218 pounds per person (retail weight). This is 5.5 percent above the 1986 level. Per capita meat consumption declines to 210 pounds in 1997, with beef and pork consumption leading the decline due primarily to price increases.

Beef

Cow-calf operators continue building the beef herd in response to higher feeder and market cattle prices. But the buildup of the beef herd is slower and more gradual than predicted earlier (FAPRI Report #4-87). Apparently, high feeder cattle prices lead to heifers being sent to the feedlot instead of being retained as breeding stock. The abundance of competing meat supplies, and the uncertain feed grain price outlook provide a mood of caution in heifer retention decisions.

The beef herd is expected to build to more than 35 million head by 1991 from 33.6 million head in 1986. After 1991, lower prices and returns reduce retentions and increase culling, which result in a smaller herd. The reduced beef-cow herd becomes apparent after 1993 when beef production declines. After 1993, the beef-cow herd continues to decline with reduced profit levels.

Initially, beef production declines to 22.49 billion pounds in 1989 (8.4 percent below the 1986 figure). But, the decline in beef production does not result in substantial producer price increases. Potential for price increases and profits are diminished by the expanding production of pork through 1990, and the continued expansion of poultry production. The peak beef production is 23.46 billion pounds in 1993. After that, beef production declines to 22.17 billion pounds in 1997, more than 9 percent below the 1986 production level.

Omaha prices for choice 900-to-1000 pound steers rise 18 percent to $68.03 in 1989 from $57.75 in 1986. Subsequently, steer prices are forced lower by 18 percent to $55.81 in 1993 with expanded beef production. From this low, Omaha steer prices climb to a peak of $69.58 in 1997. Feeder cattle prices (Kansas City 600-to-700 pounds) rise to $76.23 in 1989. Increases in production after 1990 push feeder cattle prices below $63.00 in 1993. Feeder cattle prices edge upward after 1993, and surpass their 1989 peak by 1997.

TABLE 4 BEEF, PORK, AND BROILER SUPPLY AND UTILIZATION

Variable	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BEEF											
Production (bil. lbs.)	23.59	22.74	22.49	22.92	23.12	23.30	23.46	22.92	22.55	22.51	22.79
Per Capita Consumption Retail Wt. (lbs.)	76.00	73.07	71.59	72.18	72.10	72.04	71.79	69.70	68.03	66.76	66.00
Prices											
Omaha Steers ($/cwt)	64.65	66.81	68.03	63.57	60.06	57.43	55.81	61.34	65.60	68.58	69.58
K.C. Feeder ($/cwt)	74.33	75.54	76.23	71.66	68.27	64.56	62.93	68.46	73.21	76.12	77.36
Beef Retail ($/lb.)	2.44	2.53	2.57	2.49	2.46	2.41	2.39	2.51	2.60	2.66	2.72
PORK											
Production (bil. lbs.)	14.38	15.23	16.22	16.54	15.52	15.11	14.55	14.26	14.61	14.88	15.24
Per Capita Consumption Retail Wt. (lbs.)	59.26	61.52	65.29	65.70	61.22	58.53	56.49	54.92	56.18	57.66	58.65
Prices											
Barrow & Gilt ($/cwt)	51.71	44.64	37.41	35.00	39.78	41.47	44.94	51.02	46.94	45.06	43.12
Retail Pork ($/lb.)	1.86	1.71	1.61	1.56	1.66	1.70	1.78	1.86	1.79	1.75	1.68
BROILERS											
Production (bil. lbs.)	15.49	16.14	16.29	16.59	16.98	17.34	17.70	18.11	18.34	18.54	18.74
Per Capita Consumption Retail Wt. (lbs.)	59.66	61.66	61.67	62.27	63.16	64.01	64.80	65.80	66.11	66.33	66.76
12-City Wholesale Price (¢/lb.)	47.50	46.04	45.91	46.90	47.62	47.55	48.44	49.96	50.64	51.78	50.74

Pork

Pork production expands from 1988 to 1990. As with the beef breeding herd expansion, pork production expansion is more gradual and less pronounced than previously predicted. Even with higher feed costs, efficient producers can remain profitable through 1988, and possibly into early 1989. This 4-year production expansion with continued profits is unprecedented in the pork industry. The continued expansion suggests a move to a longer production cycle.

Pork production peaks in 1990 at 16.5 billion pounds (more than 18 percent above the 1986 level). After 1990, the combined effect of lower hog prices and increased feed costs will reduce production through 1994. Production bottoms in 1994 at 14.3 billion pounds, still nearly 2 percent above 1986. In 1997 production is 15.8 billion pounds, slightly more than the expected 1988 production figure.

Barrow and gilt prices decline, but not as dramatically as predicted earlier. The slower production expansion reduces the downward pressure on prices. Barrow and gilt prices are expected to average $44.64 in 1988. Prices move lower after than to a low of $35 in 1990. From 1991 to 1994 barrow and gilt prices are expected to move upward, and then steadily decline through 1997 as production begins another expansion.

Per capita pork consumption moves upward in 1987 to 1990, and peaks in 1990 at 68.8 pounds. Retail prices move inversely. After 1990, per capita consumption declines and retail prices move upward. Increases in retail prices are tempered by the increased supply of beef and poultry, but on average prices move with the rate of inflation. Retail pork prices peak in 1994 at $1.86 per pound.

Broilers

Broiler production expansion is expected to continue. Higher feed costs, particularly soymeal, reduce the rate of expansion in 1989. Nevertheless, the production capacities of the poultry sector are expected to continue to grow unabated. By 1997 production is expected to be at 18.7 billion pounds, 31 percent above the 1986 production level.

The advances in poultry production are conditioned on the industry's ability to reassure consumers of the cleanliness of the poultry slaughter process. With the continued drop in prices relative to beef and pork, chicken production and consumption should continue on an upward path.

Per capita consumption increases throughout the decade, although per capita consumption increases are slight in 1989 due to the production slow down. Per capita consumption begins to stagnate toward the end of the evaluation period. Per capita broiler consumption surpasses pork consumption in 1992. By the end of the decade, per capita chicken consumption rivals beef consumption.

Retail and wholesale broiler prices display modest increases throughout the decade. Retail prices mimic the movements in wholesale prices. Wholesale prices move slowly upward with some slight declines expected. From 1987 to 1988, wholesale prices are expected to drop by more than 3 percent, to $.46 per pound. The decline in wholesale prices continues in 1989. After that prices generally edge upward, but increase at a rate well below the rate of inflation.

Government Program Costs

In the first two fiscal years after the signing of FSA, the annual cost of government farm programs averaged more than $24 billion. However, program outlays are projected to fall dramatically in fiscal 1988 to about $15 billion, and further declines are likely over the next decade (Table 5).

Government program costs are projected to decline steadily between fiscal 1988 and fiscal 1996, from $15 billion to $5 billion. Continued increases in market prices and reductions in target prices will reduce deficiency payments in two ways:

1. the smaller the gap between target and market prices, the smaller the deficiency payment rate, and

2. the smaller the deficiency payment rate, all else equal, fewer farmers choose to participate in government programs.

In addition, paid diversion programs will become unnecessary, and further reductions in government grain stocks will be possible. The only major program with increasing costs will be the CRP.

Farm Income

Net income received by U.S. farmers is projected to fall from a record high (in nominal dollars) of $45 billion in 1987 to about $40 billion in 1988 (Table 5). Higher 1988 crop receipts are more than offset by lower livestock receipts, smaller government payments, and higher production expenses. Additional declines are projected before net farm income stabilizes at approximately $30 billion per year. In real terms, net farm income is projected to fall by more than 45 percent between 1987 and 1996.

Cash Receipts

Cash receipts to crop producers are expected to increase by $4 billion in 1988 as prices increase for nearly every commodity. Annual increases in crop receipts occur throughout the evaluation period, due largely to higher prices and production levels for feed grains and wheat. However, crop receipts do not reach the record level of 1985 until 1993. Cash receipts from crops are projected to reach $85 billion by 1996, a 46 percent increase over 1987 levels.

In contrast to the crops sector, livestock receipts are projected to fall by almost $4 billion in 1988. Between 1988 and 1993, livestock receipts vary in a narrow range, between $67 and $70 billion per year. By the mid-1990s livestock receipts finally recover to the 1987 level of $74 billion. Although total livestock receipts are similar in 1987 and 1996, cattle receipts fall and poultry receipts increase.

Government Payments

Direct government payments are subsidies for all commodity programs reached a record $17 billion in 1987, and accounted for 37 percent of net farm income. Government payments are expected to steadily decline during the evaluation period by 80 percent between 1987 and 1996. The decline in government payments

TABLE 5   NET FARM INCOME AND GOVERNMENT COSTS

Variable	1987	1988	1898	1990	1991	1992	1993	1994	1995	1996
					(Million Dollars)					
Cash Receipts from Marketings	132,096	132,300	134,425	134,592	137,462	140,276	143,021	149,425	153,949	159,230
Government Payments	16,740	13,956	12,078	9,890	8,850	8,092	6,956	6,069	4,680	3,328
Other Cash Receipts	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Total Cash Receipts	153,836	151,256	151,503	149,482	151,312	153,368	154,977	160,494	163,629	167,558
Non-Cash and Other	10,061	8,699	8,856	8,802	8,786	8,858	9,003	9,230	9,496	9,840
Total Receipts before Inv. Change	163,898	159,995	160,359	158,283	160,097	162,226	163,980	169,724	173,124	177,398
Production Expenses	117,723	119,544	125,550	126,115	128,052	130,545	133,556	138,379	143,003	148,200
Net Income before Inv. Change	46,174	40,410	34,809	32,168	32,045	31,681	30,423	31,346	30,121	29,198
Value of Inventory Change	(1,242)	(200)	862	(723)	185	3	356	464	695	53
Net Farm Income (Nominal $'s)	44,932	40,210	35,671	31,445	32,230	31,684	30,779	31,812	30,816	29,251
Net Farm Income (1967 $'s)	14,607	12,581	10,796	9,265	9,226	8,893	8,430	8,483	7,979	7,318
Government Costs Net CCC Outlays	22,408	15,362	13,797	11,385	10,255	9,588	9,111	8,361	6,966	5,212

is due to a number of factors, including reductions in target prices and increases in market prices.

Farm Production Expenses

In 1988, production expenses are projected to increase by about $2 billion, approximately equal to the increase in feed costs. Further increases in production costs are projected after 1988, reversing the trend of the past three years. Production costs in 1996 are projected to total $148 billion, 26 percent above the 1987 level, but only 4 percent above the 1984 level. Several factors contribute to the projected increase in production costs:

1. Higher feed grain and soybean meal prices increase crop receipts, but they also increase feed costs to the livestock sector.

2. Increases in planted acreage result in increased expenditures on seed, fertilizer, and machinery purchase and repair.

3. Petroleum prices are projected to increase, which will raise fertilizer and fuel prices.

4. Added machinery purchases and higher wages will increase machinery prices from current depressed levels.

5. Stable to rising interest rates and land prices will stop or reverse recent declines in interest and rental payments.

Net Farm Income

Between 1987 and 1990, projected net farm income falls from $45 billion to $33 billion. During the same period, government payments fall by almost $7 billion, and production costs increase by more than $7 billion, thus offsetting a $2 billion increase in total cash receipts. After 1990, projected net farm income varies from $29 to $32 billion as higher cash receipts are almost exactly offset by lower government payments and higher production expenses.

Net farm income is probably the most uncertain of the projections included in this report. Because net farm income is small relative to cash receipts and production expenses, minor errors in estimating receipts or expenses may have a major impact on net farm income. To illustrate the point, USDA revised upward its estimate of 1986 net farm income by $8.5 billion, or 29 percent, between the May and September 1987 editions of "Agricultural Outlook". The change resulted primarily from a $6.9 billion, or 5 percent, downward revision in estimated production costs.

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