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INTRODUCTION

The 1985 Farm Bill is currently being debated as the U.S. agricultural sector is experiencing very adverse conditions. Production expenses are rising and farm output prices are falling. As farm asset values fall, debt to asset ratios are rising and financial stress is wide spread. The political debate is diverse ranging from market oriented farm bill proposals to parity pricing with mandatory marketing quotas. The outcome of this public policy debate will certainly affect many individuals as early as 1986 and will clearly determine the structure and direction of american agricultural policy well into the next decade.

The objectives of this paper are two fold. The first is to introduce readers to an analytical system which allows us to estimate and predict the major elements of Minnesota's farm economy from year to year based upon a comprehensive economic and statistical model of total U.S. agriculture. The second objective is to employ this system to project the behavior of Minnesota's agriculture under several possible policy regimes which might emerge from the current political process as the 1985 Farm Bill.

As general background to the specific analysis and projections, some comments about the political process surrounding agricultural legislation are presented. Then we look at the major farm bill proposals now under more or less serious consideration. Next we examine the models employed in the analyses, and finally we present specific projections for the Minnesota farm economy as it might respond to various types of national agricultural policy.

THE 1985 FARM BILL DEBATE

The 1985 Farm Bill is currently being debated as part of the quadrennial farm and food stamp omnibus legislation. Congress has enacted farm legislation every four years since 1973 in the year following the presidential elections. The 1985 Farm Bill is being debated under conditions of high real interest rates, an extremely strong dollar overseas, high debt to asset ratios and low farm prices. In addition, the current debate is strongly influenced by the following:

- a) general economic policies, including the large federal deficit,
- b) sagging foreign trade, including a large current trade deficit, and
- c) the Congressional Budget Act of 1974.

The U.S. agricultural sector is not isolated from the general and world economies. As the money supply tightened and the federal deficit grew, the effects of higher interest rates and a strong dollar created new and serious problems for the agricultural sector -- production costs rose and export demand fell. The immediate impact of high interest rates and reduced export demand has been lower cash receipts from farm marketings, lower net farm income, and a large and uneven debt burden that is threatening insolvency for many farmers.

The other driving force in the current farm bill debate is the budget act of 1974 (P.L. 94-344) and the growing federal deficit. This measure was enacted by Congress to constrain federal spending by using budget targets. The act works through two budget **resolutions**; one in the House and one in the Senate. The budget resolutions set targets for revenues, spending, and the deficit. When a budget resolution is passed, the House and Senate agriculture committees meet to decide how to change existing

farm legislation so that it conforms with the new budget limits. Once the agricultural committees reconcile their differences and agree upon the changes, the recommendations are then passed on to the budget committee which consolidates all of the changes into one farm bill. Then it goes back to the House and Senate for a final vote.

A bill must pass both the House and Senate in identical form before it can be sent to the President. If signed by the President, it becomes law. However, if the cost of the legislation exceeds the budget limits set forth in the budget resolution or if the provisions of the bill are unsuitable to the President, he may veto it.

The budget process will have a very strong influence on the outcome of the 1985 farm bill as the agriculture committees, on the one hand, attempt to pass farm bill legislation that will help assist their agricultural constituents and the budget committees, on the other, attempt to curtail rising government expenditures.

FARM BILL PROPOSALS

Since the opening of the 99th Congress, twelve or more farm bills have been introduced to replace the 1981 Farm Bill by suspending or rescinding permanent legislation. If a farm bill is not signed into law by the President this year, then the farm program will revert back to the permanent legislation of the 1940s. This legislation authorizes farm prices to be set at 75-90% of historic parity and exhibits little ability to control output. Most farm legislation in the recent past has suspended rather than rescinded (repealed) permanent legislation. However, the Reagan administration's proposal calls for rescinding permanent legislation and replacing it with a 15 year program. Most other proposals call for suspending permanent legislation from 4 to 8 years.

The farm bills introduced in the 99th Congress are all distinct from one another, but most reflect a radical departure from the 1977 and 1981 Farm Acts whereby formulas for loan rates specified minimums, and target prices were set for the duration of the act. A majority of the recently proposed bills tie price and income support levels to market prices. This provides the Administration with more year to year program flexibility for responding to excess supply conditions. It also reduces the kind of uncertain budget exposure which previous farm legislation has displayed.

A detailed presentation of each of the proposals is beyond the scope of this report. However, a brief description of the major proposals follows.

Administration Bill

The Reagan Administration's farm bill, the Agricultural Adjustment Act of 1985 (AAA85) (H.R. 1420-S.501), is an attempt by the Administration to

reduce significantly the role of the federal government in commodity markets. It provides a relatively rapid transition to a market determined set of loan rates and deficiency payments. The AAA85 sets the loan rate for wheat, feed grains, and soybeans at 75 percent of the national average farm price of the three immediately preceeding crop years, with no minimum specified. Loans would accrue interest at a rate set by the Secretary and are to be repayed within nine months after the loan application date. Target prices for the previously mentioned crops would be set at a declining percent of the 3-year moving national average farm price that the loan rate is based on. They would be 100% of the national average in 1986/87, and would decline 5 percent thereafter to 75 percent in 1991/92. Deficiency payments would be based on the difference between the target price and the actual annual average farm price, rather than the average price of the first five months of the marketing year as in the 1981 Farm Bill. The USDA has estimated loan rates under the AAA85 proposal for 1986/87 to be about ^{\$2.15}~~\$3.12~~ per bushel for corn, \$2.55 for wheat, and \$4.85 for soybeans. Likewise, USDA has estimated target prices under the AAA85 proposal for 1986/87 to be approximately \$3.40 per bushel for wheat and \$2.83 for corn.

The AAA85 includes a voluntary acreage reduction provision (ARP) whereby farmers would be required to set aside a fixed percent of their base for conservation use in order to be eligible for program benefits. Producers would not receive diversion payments on acres set aside. The ARP would be 15% in 1986, 10% in 1987, 5% in 1988, with no supply controls thereafter. The acreage base would be determined by the average of actual plannings for the previous three years.

The AAA85 would set dairy price supports at \$11.60 per cwt for 1986, and would allow the Secretary to reduce the price support \$.50 per cwt if Government purchases are greater than 5 billion pounds on April 1, 1986, and January 1, 1987. After Oct. 1, 1987, the dairy program would employ a direct payment program based on market forces.

Finally, the AAA85 also contains a provision for a 15 year program that would rescind (repeal) permanent legislation. This would in effect do away with the possibility of farm programs reverting back to the permanent legislation of the 30's and 40's.

Marketing Loan Program

An alternative to the Administration's proposal is the marketing loan program, or variable loan repayment proposal (Congressional Record, Vol. 131, No. 18, S1840, S877). A common theme in most of these proposals involves loans to farmers at predetermined rates which can be repaid at the free market price or the loan price, whichever is lower. The marketing loan program would provide agriculture with a more gradual transition to the free market than would the administration bill, and would allow market prices to float at world levels, thereby stimulating exports.

The marketing loan program also would discontinue government removals through CCC acquisitions and the farmer held reserve by discontinuing the use of non-recourse loans (farmers would have to pay back the loan in cash only; they cannot forfeit their grain) and by lowering release prices to loan rate levels. The market loan program would hold net farm income constant by freezing loan rates, target prices, and reserve entry loan rates at predetermined levels. The acreage base would continue to be determined as with the 1981 Farm Bill. Excess capacity would be managed by the use of acreage set-asides.

Farm Bureau Bill

The Farm Bureau proposal (H.R. 1965)(S.908) is similar to the AAA85 proposal in that it ties the loan rate to market forces. Loan rates for wheat and feed grains would be nonrecourse in nature (grain could be forfeited to the CCC as payment in full) and would be equal to 75% of a 5-year moving average national farm price. To compute this average, one would take the national prices from the previous five years, drop the highest and lowest value, take the simple average of the remaining three years and then take 75% of it. There would be no minimum loan rates, but the maximum adjustment up or down would be limited to 10% in any one year. The USDA has estimated that loan rates in 1986/87 under this proposal would be \$2.97 per bushel for wheat, and \$2.30 for corn.

The Farm Bureau bill would set target prices for 1986/87 at \$4.38 per bushel for wheat and \$3.03 for corn. Target prices in 1987/88 would be equal to 110% of the average price used to calculate the loan rate and changes from the previous year could not exceed 5%.

Acreage reductions would be set by the Secretary when wheat or feed grain carryover is greater than 4% of world demand. Producers would also be paid to divert land, receiving 50% of their diversion payments at signup.

The Farm Bureau proposal also would tie dairy price supports to market prices as well. The support price would be set at 90% of a 3-year moving average of the all-milk farm price, with adjustments made based on billions of pounds of net CCC removals (i.e., the greater the CCC removals, the greater the adjustment downward). Starting on April 1, 1986, the Secretary could adjust the dairy support price by no more than 3% for any 6-month period under this proposal.

Boschwitz/Boren Bill

The Boschwitz/Boren bill, or the Family Farm Protection and Full Production Act (S.1041), is an eight year farm bill that would establish a direct payment system to protect farm income while the U.S. regains its competitive position in world markets. This bill has three main goals:

- a) to protect farm income during the several difficult years ahead,
- b) to promote full production and to let farmers make production decisions based on economic signals, not on government programs, and
- c) to make U.S. products competitive abroad.

Under the Boschwitz/Boren bill, loan rates would be reduced dramatically beginning in 1986/87 to offset the appreciation of the U.S. dollar since 1981. This would allow our exports to be more competitive overseas (a stronger U.S. dollar increases the price that overseas countries must pay in their currency to import U.S. products). Loan rates would be set at \$2.20 per bushel for wheat and \$1.90 for corn. In 1987, the Secretary may lower loan rates 10% if the market price of the previous year is within 5% of the loan rate. This reduction is required of the Secretary if the market price of the previous 2 years is within 5% of the loan rate and if the loan rate was not adjusted downward in the previous year. The Secretary would be allowed to raise the loan rate up to 5% if market conditions over the 2 preceding years warranted it and if such an increase would not jeopardize the competitive position of U.S. agriculture in world markets.

In conjunction with lower loan rates the proposal uses **transition payments** to provide farmers with an adequate cash flow and to protect farm

income. The transition payment is formulated to guarantee farmers at least as much income above variable costs as they received in 1985. The payment rate for 1986/87 would be \$1.42 per bushel for wheat, and \$0.94 on corn. Therefore, the loan rate and transition payment together would guarantee participating farmers \$3.62 per bushel for wheat, and \$2.84 for corn in 1986/87. This compares with target price protection under, say, the Farm Bureau proposal of \$4.38 per bushel for wheat and \$3.03 for corn. The transition payments operate on a sliding scale to target assistance to family-sized farm operations; transition payments would be gradually reduced over time as the farm economy moves more closely to a free market environment. There would be no annual diversions or set-asides. Transition payments would be made on the farmer's entire crop base, whether he planted or not.

In addition to the income protection provisions, the bill would establish an export promotion program that would

a) Establish a "Green Dollar" scheme to increase exports using CCC stocks as a bonus to exporters, and

b) Mandate a 20 percent reduction in CCC stocks each year via donations or programs that provide U.S. commodities to Third World countries.

The transition payment concept also is extended to a proposed dairy program. Under this provision, transition payments would be made quarterly at the rate of \$1.50 per hundred weight (cwt). The dairy support price, or CCC purchase price, would be set at \$10.60 per cwt, for a total payment of \$12.10 per cwt. The transition payment would be made at 100 percent of the calculated amount (\$1.50 per cwt) in 1986. Then it would be no lower than 92 percent in 1987, 80 percent in 1988, 65 percent in 1989, and 50 percent

in 1990. After 1990, the Secretary would have the authority to implement further income support payments.

Harkin/Alexander Bill

The Harkin/Alexander Bill, otherwise known as the Farm Policy Reform Act, is a proposed bill aimed at immediately boosting net farm income while cutting farm-program costs. According to Senator Tom Harkin (D-Iowa), the bill has five major goals:

- 1) to immediately increase net farm income,
- 2) to strengthen existing conservation efforts,
- 3) to align a restricted supply with demand,
- 4) to allow farmers to determine, via a referendum, whether or not to have a mandatory supply management program, and
- 5) to enhance our role as a reliable partner in international trade.

The program would require that, subject to a producer referendum, mandatory production quotas be imposed. These quotas would be established so as to reduce output sufficiently that high, parity-based farm prices would prevail in the market. Producers would be required to set aside 15% of their base acreage, with larger operators setting aside a progressively larger amount of their base in years of excess supplies. Farmers' base acreage would be equal to any acreage planted to wheat, soybeans and feed grains in the last four years.

Target prices and related deficiency payments would be eliminated under this bill and would be replaced with higher parity-based loan rates. The elimination of deficiency and diversion payments would drastically reduce farm program costs from current levels. The proposed loan rates would provide a "parity price floor" and would insure farmers higher cash

receipts from the market. Loan rates for 1986 would be equal to \$5.21 per bushel for wheat, \$3.71 for corn, and \$9.10 for soybeans. The loan rates would be increased two parity index points per year until the eleventh year of the program, when price support loan rates would reach 90 percent of parity.

This bill assumes that enough acreage can be diverted from production so that production will equal demand at the higher support prices. However, if resulting production is not reduced sufficiently and market prices fall below the support price, the cost of the program will rise substantially as farmers forfeit their grain to the Commodity Credit Corporation.

The bill would also authorize the Secretary to establish a 30 million acre conservation reserve by entering into contracts of 5 years or more with specific producers in order to remove highly erodable land from production.

The Harkin/Alexander bill would attempt to eliminate the possibility of increased grain imports by instructing the Secretary to utilize existing laws to the maximum extent practicable. This bill would not be workable if the market was flooded with foreign imports attracted by the higher market prices. Under this scenario, imports would flood the market, market prices would fall and farmers would forfeit on their loans. The bill would also attempt to expand exports by utilizing a \$500 million annual intermediate credit program, increase P.L. 480 funding and related food aid requirements for needy nations.

**ECONOMIC ANALYSIS OF POLICY ALTERNATIVES
FOR MINNESOTA**

Statistical analysis of the effects of various possible farm programs on Minnesota agriculture was conducted, for this paper, by means of a new, linked system of equations which tie the behavior of Minnesota's farm economy to factors affecting the national farm sector.

The foundation of these calculations is a large, comprehensive national model of the U.S. farm economy, which is maintained and managed in the Food and Agricultural Policy Research Institute (FAPRI) located at the University of Missouri and Iowa State University. This model is capable of providing commodity-by-commodity estimates of the major price and quantity elements in the national farm sector under a variety of possible farm policies. As an adjunct to this national model, we have developed an additional series of equations which link the behavior of this national model specifically to Minnesota's agricultural sector. Hence, we can trace and project the effects of various policies upon the national farm economy, and then follow those effects into Minnesota.

The FAPRI Policy Model

The FAPRI annual agricultural policy model has components for each of the major commodities. These include the crops component (wheat, feed grains, soybeans, cotton and rice) and the livestock component (beef, pork, and poultry). Each of the commodity components consists of **behavioral equations** for production, stocks, exports, imports, final consumption and, if appropriate, consumption of the commodities as intermediate products (i.e. corn as feed). These behavioral equations are mathematical relations reflecting the use of economics, statistics, and past data to describe the

behavior of producers and consumers in the agricultural sector. Sometimes these equation systems are called **econometric models**.

Figure 1 illustrates the general scheme of the FAPRI Model. It is a simultaneous economic model, meaning the commodity components are solved together for prices and quantities reflecting the interactions or linkages that exist between certain commodities. For example, livestock prices affect the demand for feed grains, while feed grain prices influence investment and production decisions in the livestock sector, which then affects livestock prices. These linkages across and between commodity markets are especially important in evaluating the full impact of alternative agricultural policies. For example, agricultural policies have a direct impact on the crops market and an indirect impact on livestock markets. Similarly, both domestic and export markets are affected.

The FAPRI model includes variables and information about the general U.S. and world economies, and how they affect the U.S. agricultural sector. These variables are termed **exogenous** to the system, which means they are not solved for by the model but are rather assumed. Likewise, there are various **non-economic** exogenous variables which affect the model's solution and must therefore be assumed. Farm policy legislation is a non-economic force that impacts greatly on the agricultural economy and must be accounted for in the model. Since FAPRI does not have the capability of forecasting general U.S. and World economic variables and predicting the outcome of the 1985 farm bill, the model is solved for alternative levels of these exogenous variables. Therefore, when projections are calculated for the FAPRI model, predictions about the U.S. general economy are provided by Wharton Forecasting Associates, and the model is solved for a given set of policy variables. Given the current uncertainty regarding the

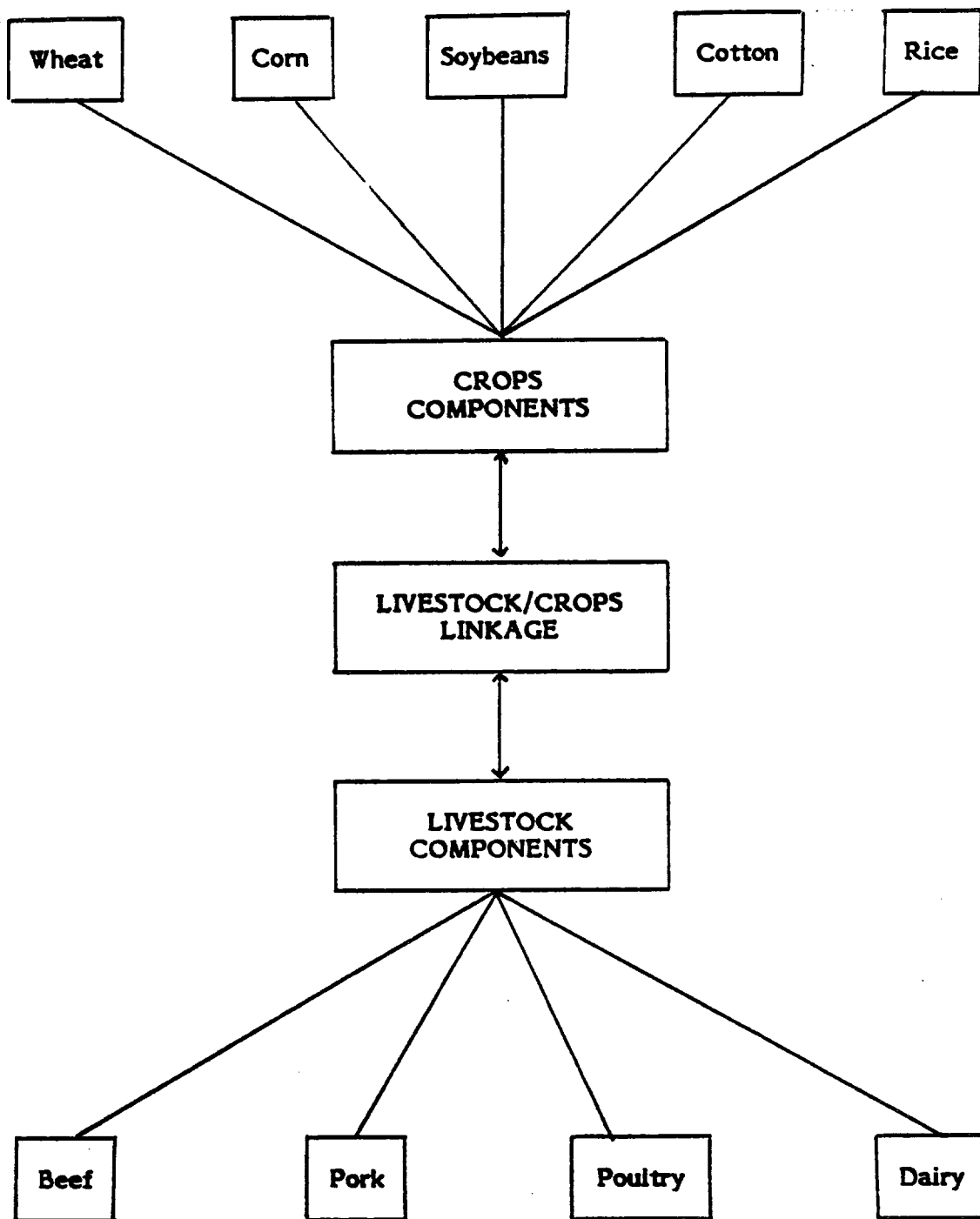


Figure 1. Linkages Among Commodity Components in the FAPRI Policy Modeling System.

1985 Farm Bill, the FAPRI model in this study was solved under various policy regimes.

For more details on the FAPRI policy model, see FAPRI Staff Report #1-85.

Minnesota Agricultural Model

The Minnesota Agricultural model (MNAG model) consists of crop and livestock components which reflect the major markets in Minnesota's farm economy. The crops component consists of corn, soybeans and wheat; the livestock component consists of beef, hogs and dairy.

For each major crop, there are four equations which provide the Minnesota link to the FAPRI model. These involve acreage planted, acreage harvested, per acre yield, and season average farm price. For each livestock product, there are two equations providing the link. These involve marketings and average farm prices for beef and hogs plus production and wholesale farm prices for milk.

Since these six commodities account for about 85% of Minnesota's farm marketing cash receipts, it was relatively easy to construct a state net farm income component in the MNAG model. This part of the model estimates Minnesota's farm income via linkages to Minnesota's commodity markets, U.S. direct government payments, and the general U.S. economy. The Minnesota farm income component produces estimates of cash receipts from farm marketings, direct government payment, other and non-money farm income, farm production expenses, and the resulting realized gross and net farm income. In these computations, realized net farm income does not include the value of net inventory changes. The latter income measure is usually called total net farm income.

Figure 2 illustrates the components of the MNAG model and how it is linked to the larger FAPRI model. Figure 2 also indicates that the components of the MNAG model provide a means for estimating Minnesota farm income using information about general economic conditions and agricultural market behavior.

FAPRI MODEL

MINNESOTA AGRICULTURAL MODEL

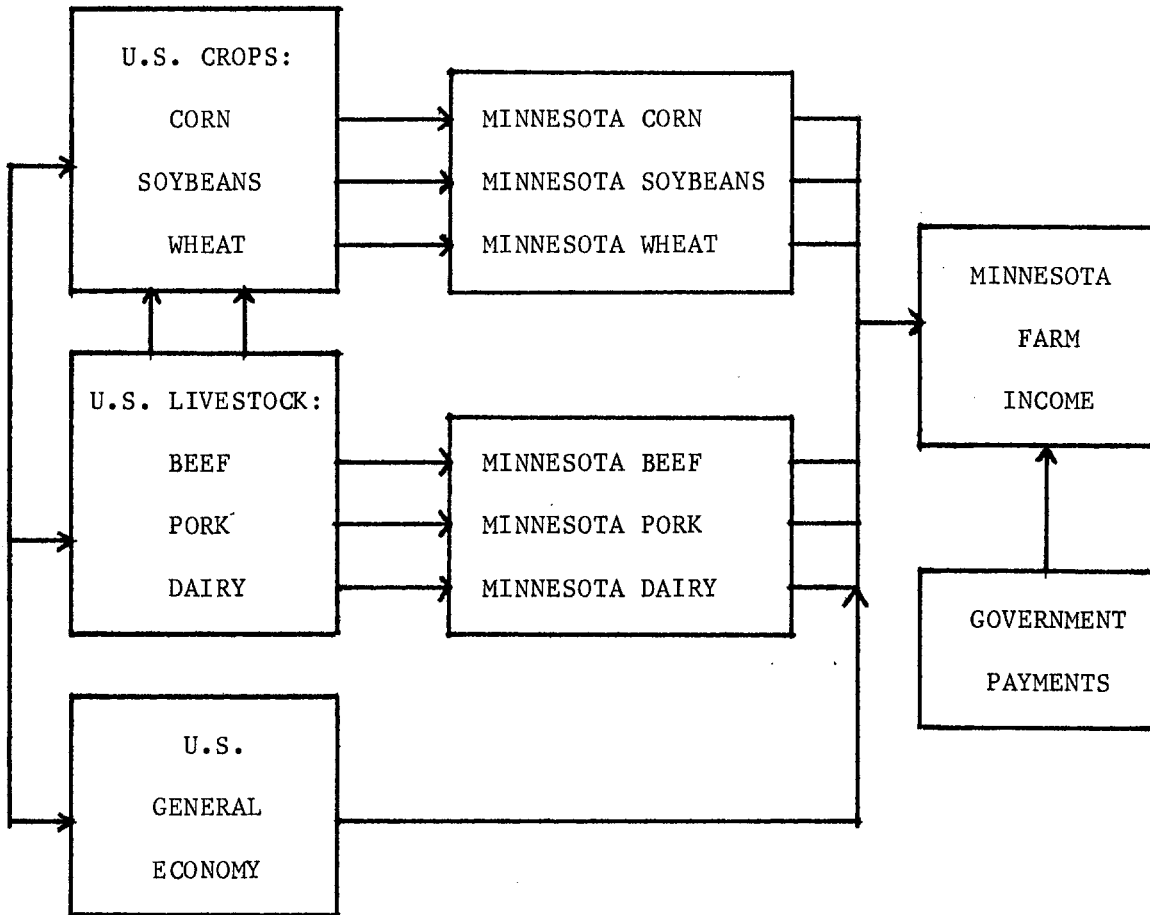


Figure 2. The Minnesota Agricultural Model and Linkages to the FAPRI Policy Model

POLICY IMPACTS ON MINNESOTA AGRICULTURE

In this section two sets of policy options are discussed, and their impact on the U.S. and Minnesota farm economy are presented. These policy options were first incorporated into the FAPRI model which projected national supply, demand, farm prices and income for major agricultural commodities out into the future (see FAPRI Staff Report #'s 1-85, 5-85 and 7-85). Then these projections were then entered into the MNAG model which in turn provided a detailed projection of Minnesota's farm economy under each policy option. The first set of four options called "the Market and Parity Options" are not actual farm bill proposals. They are stylized or generic options which reflect a range of the general types of farm policies and future scenarios that characterize much of the recent debate in Congress and elsewhere. The second set reflect more closely two specific proposals. The proposals are directly comparable within each set, but not across the two sets because somewhat different basic assumptions about general economic conditions were made by FAPRI analysts for each set.

The Market to Parity Options (Set 1)

The farm policy options selected here by FAPRI were intended to reflect the common themes that were found in the numerous bills proposed for the 1985 Farm Bill. These policy options are not actual farm bill proposals, but **stylized** versions constructed after reviewing alternative proposals and sorting them by essential features.

The policy options to be evaluated here are termed 1) the Baseline, 2) the Market Option, 3) the Expanded Export Baseline, and 4) the 80 Percent of Parity Option. A brief description of these stylized policy options are as follows:

- The "Baseline": 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.
- The "80 Percent of Parity Option": Farm prices set at 80 percent of parity, production controls through a mandatory quota system to set retail prices consistent with farm price parity levels, and moderate to positive conditions for U.S. and world economies.

Summary of Estimated U.S. Impacts

Under a continuation of the 1981 farm program (Baseline) through 1990, U.S. annual net farm income is expected to fluctuate between \$20 billion and over \$25 billion (see table 1). Cash receipts from farm marketings are expected to rise gradually as farm prices rise above fixed loan rates and moderate to strong acreage control provisions constrain acreage planted. With these acreage control provisions, government direct payments are expected to fall from \$5.73 billion in 1986 to \$3.29 billion in 1989, and then rise up to \$4.28 billion in 1990.

A continuation of the 1981 farm program under a more expanded export scenario (Export) adds little to net farm income due to only mild increases in farm cash receipts and smaller direct government payments. Cash receipts from farm marketings are slightly larger than in the Baseline scenario since any increases in market prices due to expanded exports are moderated by large carryover stocks. Direct government payments are less under the Export scenario than under the Baseline scenario because less costly paid diversion provisions are required since the stronger export growth takes up

Table 1

FAPRI POLICY PROJECTIONS, FARM INCOME AND GOVERNMENT COST: THE 1981
 FARM PROGRAM CONTINUATION (BASELINE), THE MARKET OPTION (MARKET), THE EXPANDED EXPORTS
 OPTION WITH BASELINE PARAMETERS (EXPORT), AND 80 PERCENT PARITY PRICES WITH
 MARKETING QUOTAS (PARITY)

Year	Program Option	1983	1984	1985	1986	1987	1988	1989	1990
Total Farm Cash Receipts	Baseline	138.72	143.13	150.75	156.08	159.42	165.07	169.42	175.10
	Market	--	--	--	155.56	156.40	159.78	164.25	171.93
	Export Parity	--	--	--	156.72	160.57	166.25	171.18	177.76
Direct Government Payments	Baseline	9.29	8.70	5.12	5.73	4.76	3.34	3.29	4.28
	Market	--	--	--	0.00	0.00	0.00	0.00	0.00
	Export Parity	--	--	--	5.37	3.80	3.18	2.31	3.67
Realized Gross Farm Income	Baseline	163.16	167.93	172.74	179.58	182.61	187.68	192.88	200.51
	Market	--	--	--	173.36	175.02	179.24	184.63	193.16
	Export Parity	--	--	--	179.86	182.84	188.74	193.78	202.72
Net Farm Income	Baseline	16.10	31.81	25.73	25.64	24.58	20.04	22.39	25.66
	Market	--	--	--	18.08	16.81	14.67	16.60	15.63
	Export Parity	--	--	--	26.02	24.90	21.01	22.75	26.97
Net Farm Income (1972\$)	Baseline	7.48	14.25	11.03	10.41	9.57	7.44	7.89	8.54
	Market	--	--	--	7.34	6.54	5.44	5.85	5.20
	Export Parity	--	--	--	10.57	9.69	7.80	8.02	8.98
		--	--	--	18.61	28.82	27.58	26.54	27.02

Source: S. R. Johnson, Abner W. Womack, William H. Meyers, Robert E. Young II, and Jon Brandt, "Options for the 1985 Farm Bill: An Analysis and Evaluation," FAPRI Staff Report #1-85, Iowa State University.

some of the excess supply capacity.

The free market option (Market) eliminates all acreage reduction and paid diversion programs as well as target price protection, and lowers the loan rate to free market levels. The impact of such a scenario is to substantially reduce net farm income because of lower farm cash receipts in response to depressed farm prices and the elimination of direct government payments. An exports expansion under this scenario depends substantially on the strength of the U.S. dollar; a strong U.S. dollar translates low U.S. farm prices into high commodity prices overseas, reducing our competitiveness.

The 80% of parity option (Parity) would raise U.S. net farm income from \$25.73 billion in 1985 to \$81.15 billion in 1990 by raising farm prices to 80% of parity through mandatory marketing quotas. The results show that such an option would effectively stifle U.S. exports and would make U.S. agriculture much more domestically oriented. The analysis also reveals that consumer expenditures on food would increase 25 percent over the baseline scenario and the idling of 120 to 125 million acres of cropland under the mandatory marketing quota would reduce input use by \$10 to \$15 billion.

Summary of Estimated Impacts in Minnesota

The economic impact of the baseline, market, export and parity policy options on Minnesota's farm economy are presented in this section (see tables 2-6). Since the data that went into the MNAG model to produce the Minnesota farm income projections under these four policy options came from a FAPRI staff report released in January of 1985, the Minnesota projections appeared to be overly optimistic. This is because U.S. export conditions have deteriorated somewhat for corn and wheat since January. Therefore, we

Table 2. MNAG Policy Projections for Minnesota Corn: The 1981 Farm Program Continuation (B), the Market Option (M), the Expanded Export Option with Baseline Parameters (E), and 80 Percent Parity Prices with a Marketing Quota (P).

Variable/Year	Program Option	USDA				MNAG PROJECTION			
		1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	
Planted Acres (1,000 acres)	B	5,100	7,250	7,013	7,022	6,679	6,585	6,534	
	M	--	--	--	7,005	6,996	6,979	6,962	
	E	--	--	--	7,022	7,073	6,714	6,996	
	P	--	--	--	4,881	4,881	4,907	4,967	
Acreage Harvested (1,000 acres)	B	4,370	6,440	6,137	6,116	5,883	5,830	5,810	
	M	--	--	--	6,104	6,114	6,118	6,122	
	E	--	--	--	6,116	6,170	5,924	6,148	
	P	--	--	--	4,552	4,569	4,604	4,665	
Yield (bushels)	All	84.00	107.00	110.00	107.05	108.86	110.67	112.48	
Production (million bushels)	B	367.08	689.08	675.09	654.72	640.37	645.25	653.46	
	M	--	--	--	653.39	665.57	677.10	688.65	
	E	--	--	--	654.72	671.70	655.63	691.46	
	P	--	--	--	487.27	497.33	509.52	524.66	
Farm Price (dollars per bu)	B	3.05	2.50	2.41	2.48	2.71	2.74	2.75	
	M	--	--	--	2.39	2.35	2.28	2.51	
	E	--	--	--	2.52	2.70	2.77	2.78	
	P	--	--	--	4.44	4.63	4.79	4.93	

Table 3. MNAG Policy Projections for Minnesota Soybeans: The 1981 Farm Program Continuation (B), the Market Option (M), the Expanded Export Option with Baseline Parameters (E), and 80 Percent Parity Prices with a Marketing Quota (P).

Variable/Year	Program Option	USDA				MNAG PROJECTION			
		1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	
Planted Acres (1,000 acres)	B	4,650	5,300	4,457	4,580	4,652	4,706	4,945	
	M	--	--	--	4,571	4,666	4,812	4,977	
	E	--	--	--	4,580	4,615	4,902	4,952	
	P	--	--	--	3,215	3,314	3,341	3,343	
Acreage Harvested (1,000 acres)	B	4,600	5,240	4,390	4,511	4,582	4,635	4,871	
	M	--	--	--	4,502	4,595	4,739	4,902	
	E	--	--	--	4,511	4,545	4,828	4,878	
	P	--	--	--	3,166	3,264	3,291	3,293	
Yield (bushels)	All	33.00	33.00	34.00	35.55	36.21	36.87	37.53	
Production (million bushels)	B	151.80	172.92	149.26	160.39	165.93	170.90	182.81	
	M	--	--	--	160.06	166.41	174.75	183.97	
	E	--	--	--	160.39	164.60	178.01	183.06	
	P	--	--	--	112.57	118.21	121.33	123.58	
Farm Price (dollars per bu)	B	7.64	5.65	5.41	6.06	6.56	6.89	6.74	
	M	--	--	--	5.97	6.10	6.15	6.44	
	E	--	--	--	6.13	6.66	7.34	7.37	
	P	--	--	--	11.30	11.80	12.21	12.58	

Table 4. MNAG Policy Projections for Minnesota Wheat: The 1981 Farm Program Continuation (B), the Market Option (M), the Expanded Export Option with Baseline Parameters (E), and 80 Percent Parity Prices with a Marketing Quota (P).

Variable/Year	Program Option	USDA				MNAG PROJECTION			
		1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	
Planted Acres (1,000 acres)	B	2,340	2,635	3,338	3,686	3,784	3,905	4,032	
	M	--	--	--	3,843	3,947	4,062	4,172	
	E	--	--	--	3,686	3,778	4,138	4,131	
	P	--	--	--	1,850	1,506	1,441	1,504	
Acreage Harvested (1,000 acres)	B	2,140	2,553	3,202	3,535	3,629	3,746	3,867	
	M	--	--	--	3,686	3,785	3,896	4,001	
	E	--	--	--	3,535	3,624	3,968	3,962	
	P	--	--	--	1,774	1,444	1,382	1,443	
Yield (bushels)	All	36.90	47.30	46.50	40.82	41.47	42.13	42.78	
Production (million bushels)	B	78.96	120.71	148.88	144.30	150.51	157.78	165.45	
	M	--	--	--	150.45	156.99	164.12	171.17	
	E	--	--	--	144.30	150.28	167.18	169.50	
	P	--	--	--	72.41	59.90	58.23	61.72	
Farm Price (dollars per bu)	B	3.82	3.43	3.53	3.67	3.89	3.89	3.95	
	M	--	--	--	3.41	3.45	3.53	3.70	
	E	--	--	--	3.71	3.94	3.87	4.05	
	P	--	--	--	6.92	7.24	7.51	7.73	

Table 5. MNAG Policy Projections for Minnesota Livestock: The 1981 Farm Program Continuation (B), the Market Option (M), the Expanded Export Option with Baseline Parameters (E), and 80 Percent Parity Prices with a Marketing Quota (P).

Variable/Year	Program Option	USDA				MNAG PROJECTION			
		1983	1984	1985	1986	1987	1988	1989	
<u>Cattle & Calves</u>									
Marketings (million lbs)	B	1,747	1,770	1,857	1,833	1,835	1,851	1,856	
	M	--	--	--	1,848	1,892	1,927	1,888	
	E	--	--	--	1,827	1,837	1,846	1,853	
	P	--	--	--	1,668	1,749	1,777	1,790	
Annual Ave. Price (Dollars per cwt)	B	47.60	48.60	55.83	58.19	56.17	54.95	54.15	
	M	--	--	--	"	56.57	56.17	"	
	E	--	--	--	"	56.17	54.95	"	
	P	--	--	--	60.89	72.30	75.34	77.75	
<u>Hogs</u>									
Marketings (million lbs)	B	1,564	1,511	1,536	1,247	1,304	1,342	1,392	
	M	--	--	--	"	1,326	1,352	1,391	
	E	--	--	--	"	1,304	1,342	1,392	
	P	--	--	--	1,255	1,392	1,509	1,622	
Annual Ave. Price (Dollars per cwt)	B	46.90	47.50	51.57	47.86	43.51	47.38	49.31	
	M	--	--	--	"	41.10	44.48	45.93	
	E	--	--	--	"	43.51	47.38	49.31	
	P	--	--	--	54.45	77.80	81.06	83.66	
<u>Milk</u>									
Production (million lbs)	B	10,913	10,331	10,216	9,851	9,672	9,493	9,316	
	M	--	--	--	"	"	"	"	
	E	--	--	--	"	"	"	"	
	P	--	--	--	8,553	8,425	8,297	8,170	
Annual Ave. Price (Dollars per cwt)	B	12.94	12.82	12.19	11.89	12.48	13.08	13.72	
	M	--	--	--	"	"	"	"	
	E	--	--	--	"	"	"	"	
	P	--	--	--	19.25	19.86	20.48	21.13	

Table 6. MNAG Policy Projections for Minnesota Farm Income: The 1981 Farm Program Continuation (B), the Market Option (M), the Expanded Exports Option with Baseline Parameters (E), and 80 Percent Parity Prices with Marketing Quotas(P).

-- Million Dollars --

Variable/Year	Program Option	USDA		MNAG PROJECTION					
		1983	1984	1985	1986	1987	1988	1989	
Total Farm Cash Receipts	B	6,277.40	6,343.57	6,511.47	6,246.68	6,385.32	6,624.80	6,826.99	
	M	--	--	--	6,195.58	6,222.25	6,436.08	6,686.70	
	E	--	--	--	6,268.05	6,449.12	6,762.74	7,004.38	
	P	--	--	--	7,581.66	8,763.19	9,291.48	9,796.10	
Direct Government Payments	B	610.90	420.52	315.39	301.25	250.32	175.62	172.68	
	M	--	--	--	0.00	0.00	0.00	0.00	
	E	--	--	--	282.64	199.85	167.32	121.22	
	P	--	--	--	0.00	0.00	0.00	0.00	
Non-money Income	All	546.80	618.99	632.52	654.16	678.77	730.97	779.92	
Other Farm Income	B	57.40	72.87	72.82	76.53	78.23	83.40	89.08	
	M	--	--	--	76.98	79.95	85.69	91.18	
	E	--	--	--	76.53	79.45	85.34	91.07	
	P	--	--	--	57.83	59.28	64.12	69.14	
Realized Gross Farm Income	B	7,492.50	7,455.96	7,532.21	7,278.61	7,392.63	7,614.78	7,868.67	
	M	--	--	--	6,926.72	6,980.97	7,252.74	7,557.80	
	E	--	--	--	7,281.38	7,407.20	7,746.36	7,996.59	
	P	--	--	--	8,293.64	9,501.24	10,086.60	10,645.20	

(continued)

Table 6 (continued)

-- Million Dollars --

Variable/Year	Program Option	USDA		MNAG PROJECTION				
		1983	1984	1985	1986	1987	1988	1989
Farm Production Expenses	B	6,117.70	6,606.16	6,695.62	6,961.99	7,183.16	7,703.16	8,218.09
	M	--	--	--	6,976.83	7,239.34	7,778.00	8,286.36
	E	--	--	--	6,961.99	7,223.13	7,766.58	8,282.82
	P	--	--	--	6,353.14	6,566.17	7,075.56	7,568.85
Realized Net Farm Income	B	1,347.80	849.80	836.58	316.62	209.47	-88.37	-349.42
	M	--	--	--	-50.12	-258.37	-525.25	-728.56
	E	--	--	--	319.39	184.06	-20.22	-286.23
	P	--	--	--	1,940.50	2,935.06	3,011.01	3,076.31

recommend that comparisons be confined mainly to relative changes across policy options and time, rather than on actual levels of projected prices and incomes.

Under the continuation of the 1981 farm program (B), realized net farm income (which does not include the value of net changes in commodity inventories) deteriorates substantially as it falls below farm production expenses in 1988 and 1989. This drop in realized net farm income is due to farm production expenses growing 18% from 1986 to 1989 and gross farm income growing at a slower rate of only 8.1%.

Under the expanded export scenario, the 1981 farm program is extended under more optimistic export conditions. The results indicate that farm income is only slightly better than under the baseline option. Cash receipts from farm marketings increasingly rises above the baseline option by only 0.34% in 1986 to 2.60% in 1989. This negligible increase in farm cash receipts was a result of only mild increases in corn and wheat prices with corresponding results for acreage planted. Direct government payments to Minnesota farmers were less under the export option as no paid diversion was needed in 1987/88 and 1989/90 for corn and 1988/89 for wheat since carryover stocks were reduced by the expanded exports.

The market option (M) produced drastic results for Minnesota as gross farm income dropped increasingly below production expenses from 1986 to 1989. Cash receipts from farm marketing averaged below baseline levels due principally to falling farm prices and negligible increases in production. Direct government payments are zero over the 1986 to 1989 period as loan rates, target price protection, and paid diversions are eliminated. Farm production expenses are expected to be slightly larger than the baseline

estimates since more acreage is planted under the market option as set asides and paid diversions are eliminated. Hence, a less than one percent projected increase in gross farm income between 1983 and 1989 coupled with a 35.45% increase in farm production expenses over the same period yields the worst of the four scenarios for Minnesota farmers.

The last of the farm policy options, the 80 percent of parity pricing with a mandatory marketing quota (P), projects a healthy 262% increase in realized net farm income for Minnesota from 1984 to 1989. Cash receipts from farm marketings account for most of this income boost as parity pricing substantially increases the value of commodities going to market even though production is reduced substantially. Direct government payments to Minnesota farmers under this scenario would be zero as a very highly regulated market would equate a significantly reduced supply with domestic demand (plus a quickly declining export market) to yield parity prices. Supply would be reduced by law and a mandatory policing mechanism, not by a voluntary diversion program with payments. Other farm income, the value of income from custom work, machine hire and recreation, would be reduced substantially under the parity scenario as the reductions in acreage planted to the major crops would reduce custom hiring opportunities by approximately 23% per year over the projected period.

Farm production expenses for the parity option are projected to fall (on average) approximately 8.3% below production expenses under the baseline policy option. This is to be expected as the results indicate that on average 5,397,500 acres per year will be taken out of corn, soybean and wheat production in Minnesota between 1986 and 1989 when compared to 1984 planted acreage levels (15,185,000 acres).

Hence, it should be noted that the parity program depicted here would have to be enacted at the **federal level** with mandatory marketing quotas for all. Program costs involve mainly the implementing and regulating of the program. The benefit to Minnesota would be the parity income that farmers would receive; the disadvantage would be the loss of input use resulting from reducing major crop acreage approximately 35.5% per year from 1984 levels, with similar reductions in livestock production.

A similar program also has been considered for Minnesota in the form of a minimum pricing scheme. Let us consider the implications of such a program implemented at the state level if a federal version of a parity program were not enacted in the 1985 Farm Bill. Parity pricing legislation could be implemented at the state level in one of two ways: a) Minnesota farm prices would be set at high parity levels by law if a number of states producing the majority of U.S. farm commodities would pass similar legislation, or b) Minnesota farmers could be subsidized by the state treasury in the amount of the difference between parity prices and the higher of federal price supports or market prices on all production.

In a) above, such a scenario would be possible under proposed legislation only if enough states enact similar legislation bringing the majority of U.S. commodity production under minimum price protection. If only a few states holding a minority of U.S. commodity production passed parity legislation, then the non-parity states would market their production first leaving the parity states "holding the bag." In b) above, the Minnesota treasury would subsidize farmers in amounts that probably would be prohibitive, table 7. Imagine that the 1981 farm program is extended in 1986 and the Minnesota Legislature passes an 80% parity minimum pricing law whereby

Table 7. Minnesota 80% Parity Pricing Program with Manditory Set-Asides for 1986*

Commodity	Diversion Rate**	Parity Rate	Direct Program Cost
Corn	30%	\$1.41/bu	\$687,049,290
Soybeans	39%	\$5.24/bu	\$589,872,040
Wheat	45%	\$2.54/bu	\$183,934,100
Cattle and Calves	10%	\$58.19/cwt	\$970,871,055
Hogs	18%	\$47.86/cwt	\$600,643,000
Milk	16%	\$11.89/cwt	\$1,016,951,700
Total Cost			\$4,049,321,185

* Program assumes continuation of the 1981 Farm Bill at the federal level. Diversion rate set on 1985 production and marketing levels. Payment rate set at the difference between parity prices and the higher of federal target prices or market prices. Minnesota farmers eligible for parity pricing if they join the federal farm program.

** Diversion rate on production for crops and milk; on marketings for cattle and calves and hogs.

farmers would be subsidized by the state if they agreed to a preset minimum average diversion rate which would include any diversion provisions in the 1985 Farm Bill. From the data provided in table 7, one can see that the cost of such a state program could be over \$4.05 billion. Such a program may not be considered by the state because of its prohibitive costs, but such scenarios can be run with the MNAG model for discussion.

The Administration Proposal and the Market Repayment Option (Set 2)

The next set of policy options to be evaluated was the Reagan Administration's Agricultural Adjustment Act of 1985 (AAA85), and its alternative, the market loan or variable loan repayment proposal (VLRP). According to a FAPRI Staff Report (April 1985, p.ii), "The essential difference between the AAA85 and VLRP options for the Farm Bill is that the VLRP provides a more cushioned transition to a free market for U.S. agriculture." This comparison also holds for Minnesota's projected farm income behavior.

Other essential differences between the AAA85 and the VLRP are:

- 1) Loan rates under the AAA85 are 75% of a 3 year moving average of national farm prices; the VLRP freezes loan rates at fixed levels.
- 2) Loan rates under the AAA85 are non-recourse in nature (farmers can forfeit grain to the CCC in full payment for the loan); loan rates under the VLRP must be paid back at the loan rate or the market price, whichever is lower. Thus, under the VLRP, government removals to support farm prices through CCC acquisitions or the farmer held reserve are eliminated.
- 3) Target prices under the AAA85 decline from 100% of a 3-year moving average of national farm prices for 1986/87, to 75% for each year after 1991; the VLRP freezes loan rates at fixed levels.

4) Acreage reductions with no paid diversions are mandatory under the AAA85; acreage reductions as well as paid diversions are used under the VLRP whenever excess capacity needs to be managed.

5) The acreage base under the AAA85 program is adjusted using a three year moving average of actual plantings; the acreage base under the VLRP is determined as under the 1981 Farm Bill.

Summary of Estimated U.S. Impacts

The FAPRI evaluation of the AAA85 and the VLRP proposals indicates that price paths under the two programs for wheat, corn and soybeans are similar but higher for the VLRP due to its stronger paid diversion incentives. Prices under both options fall below 1985/86 levels because both programs essentially remove the loan rate floor. Prices then rebound in 1988/89 and 1989/90 in response to increased feed grain use for livestock and a stronger export demand.

The government cost figures reveal that the VLRP is more costly than the AAA85 option, but results in a stronger farm income situation which is held constant near an estimated 1985 level (see table 8). Direct government payments under the VLRP ranged from \$6.1 billion in 1986 to \$5.8 billion in 1990, with farm income falling from a high of \$27.3 billion in 1987 to a low of \$21.6 billion in 1990. On the other hand, direct government payments under the AAA85 program declined from \$4.75 billion in 1986 to zero in 1989, with net farm income fluctuating between \$13.50 and \$21.13 billion between 1986 and 1990.

In general, the VLRP option produced higher and more stable farm income levels at higher government costs than did the AAA85 or free market proposal. However, because this FAPRI report was released in April of

Table 8. FAPRI Policy Projections of Farm Income and Government Payments Under the Administration Proposal (AAA85) and the Variable Loan Repayment Program (VLRP)

Variable/Year	Program Option	1983	1984	1985	1986	1987	1988	1989	1990
-- Billions of Dollars --									
Total Farm Cash Receipts	VLRP	138.72	143.13	146.52	153.54	150.87	154.33	161.69	166.89
	AAA85	--	--	--	152.33	150.96	152.79	157.81	164.41
Direct Government Payments	VLRP	9.29	8.70	5.12	7.60	7.02	6.18	4.87	4.00
	AAA85	--	--	--	4.75	3.26	0.47	0	0
Realized Gross Farm Income	VLRP	163.16	167.93	168.51	178.94	176.51	179.97	186.94	192.12
	AAA85	--	--	--	174.96	172.84	159.77	178.19	185.64
Net Farm Income	VLRP	16.10	31.81	24.63	26.04	21.17	20.74	24.53	22.73
	AAA85	--	--	--	21.13	16.50	13.50	15.78	16.25
Net Farm Income (1972\$)	VLRP	7.48	14.23	10.62	10.76	8.43	7.92	9.36	7.92
	AAA85	--	--	--	8.74	6.56	5.15	5.78	5.67

Source: S.R. Johnson, Robert E. Young II, William H. Meyers and Abner W. Womack, "Preliminary Results on a Variable Loan Repayment Option for the 1985 Farm Bill," FAPRI Staff Report #5-85.

1985, we would expect the disparity between the two programs (in terms of farm prices and net farm income) to be even greater if the same analysis was conducted under current market conditions. The export situation has deteriorated substantially since April, and one could expect farm prices and income to fall under the relatively less protected AAA85 proposal from VLRP levels.

Summary of Estimated Impacts in Minnesota

The economic impact of the AAA85 and VLRP proposals on Minnesota's farm economy are discussed and presented in this section. As mentioned earlier, the MNAG model uses national projections from the FAPRI policy model as input into the modeling activity. Minnesota estimates for the 1985 crop and calendar year were based on an August 12, 1985 USDA release for estimated Minnesota corn, soybeans, and wheat yields, and the July 1985 FAPRI Staff Report #7-85. Projections for Minnesota's farm economy under the VLRP and AAA85 proposals from 1986 to 1989 were based on the March and April 1985 FAPRI Staff Reports #3-85 and #5-85, respectively.

Our analysis with the MNAG model reveals that crop prices for the 1985 marketing year are estimated to be \$2.41, \$5.41, and \$3.53 per bushel for corn, soybeans and wheat, respectively (see tables 9, 10 and 11). Crop prices under both the AAA85 and VLRP scenarios are expected to drop in 1986/87 and rise in 1989/90 and beyond in response to stronger livestock feed and export demand.

FAPRI has estimated livestock prices to be the same under the VLRP and AAA85 proposals. Cattle prices rise from \$55.83 per c.w.t. in 1985 to \$57.08 in 1986, and then fall to \$53.30 in 1989. Pork prices decline from \$51.57 per c.w.t. to \$38.75 in 1987 (in response to lower feed prices), and

Table 9. MNAG Policy Projections for Minnesota Corn: The Variable Loan Repayment Program (VLRP) and the Administration Proposal (AAA85) for the 1985 Farm Bill

Variable/Year	Program	USDA		MNAG PROJECTION						
		1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90		
Planted Acred (1,000 acres)	VLRP	5,100	7,250	7,013	6,876	6,816	6,799	6,791		
	AAA85	--	--	--	6,945	6,859	6,816	6,825		
Acreage Harvested (1,000 acres)	VLRP	4,370	6,440	6,137	6,010	5,983	5,987	5,997		
	AAA85	--	--	--	6,060	6,014	5,999	6,022		
Yield (bushels)	VLRP & AAA85	84.00	107.00	110.00	107.05	108.86	110.67	112.48		
Production (million bushels)	VLRP	367.08	689.08	675.09	643.34	651.27	662.56	674.57		
	AAA85	--	--	--	648.70	654.67	663.94	677.39		
Farm Price (dollars per bu)	VLRP	3.05	2.50	2.41	2.18	2.10	2.27	2.44		
	AAA85	--	--	--	2.06	2.09	2.06	2.30		

Table 10. MNAG Policy Projections for Minnesota Soybeans: the Variable Loan Repayment Program (VLRP) and the Administration Proposal (AAA85) for the 1985 Farm Bill

Variable/Year	Program Option	USDA		MNAG PROJECTION					
		1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	
Planted Acred (1,000 acres)	VLRP	4,650	5,300	4,457	4,531	4,635	4,631	4,708	
	AAA85	--	--	--	4,563	4,634	4,709	4,671	
Acreage Harvested (1,000 acres)	VLRP	4,600	5,240	4,390	4,463	4,565	4,562	4,637	
	AAA85	--	--	--	4,494	4,564	4,638	4,600	
Yield (bushels)	VLRP & AAA85	33.00	33.00	34.00	35.55	36.21	36.87	37.53	
	VLRP (million bushels)	151.80	172.92	149.26	158.66	165.31	168.20	174.02	
Farm Price (dollars per bu)	VLRP	7.64	5.65	5.41	5.50	5.13	5.65	6.18	
	AAA85	--	--	--	5.26	5.02	5.08	5.73	

Table 11. MNAG Policy Projections for Minnesota Wheat: the Variable Loan Repayment Program (VLRP) and the Administration Proposal (AAA85) for the 1985 Farm Bill

Variable/Year	Program Option	MNAG PROJECTION							
		USDA							
		1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	
Planted Acred (1,000 acres)	VLRP	2,340	2,635	3,338	3,732	3,883	3,975	4,108	
	AAA85	--	--	--	3,663	3,749	3,853	4,044	
Acreage Harvested (1,000 acres)	VLRP	2,140	2,553	3,202	3,580	3,724	3,812	3,940	
	AAA85	--	--	--	3,513	3,596	3,695	3,878	
Yield (bushels)	VLRP &	36.90	47.30	46.50	40.82	41.47	42.13	42.78	
	AAA85	--	--	--	--	--	--	--	
Production (million bushels)	VLRP	78.96	120.71	148.88	146.12	154.44	160.60	168.55	
	AAA85	--	--	--	143.39	149.13	155.67	165.92	
Farm Price (dollars per bu)	VLRP	3.82	3.43	3.53	3.48	3.38	3.50	3.52	
	AAA85	--	--	--	3.37	3.28	3.32	3.50	

Table 12. MNAG Policy Projections for Minnesota Livestock: The Variable Loan Repayment Program and the Administration Proposal for the 1985 Farm Bill

Variable/Year	USDA					MNAG PROJECTION			
	1983	1984	1985	1986	1987	1988	1989		
<u>Cattle & Calves</u>									
Marketings (million lbs)	1,747	1,770	1,857	1,879	1,933	1,926	1,892		
Annual Av. Price (dollars per cwt)	47.60	48.60	55.83	57.08	55.89	55.83	53.30		
<u>Hogs</u>									
Marketings (million lbs)	1,564	1,511	1,536	1,703	1,725	1,657	1,603		
Annual Av. Price (dollars per cwt)	46.90	47.50	51.57	45.64	38.75	41.52	43.36		
<u>Milk</u>									
Production (million lbs)	10,913	10,331	10,216	9,851	9,672	9,493	9,316		
Annual Av. Price (dollars per cwt)	12.94	12.82	12.19	11.89	12.48	13.08	13.72		

Table 13. MNAG Policy Projections for Minnesota Farm Income: The Variable Loan Repayment Program (VLRP) and the Administration Proposal (AAA85) for the 1985 Farm Bill

-- Million Dollars --

Variable/Year	Program Option	MNAG PROJECTION						
		USDA		MNAG PROJECTION				
		1983	1984	1985	1986	1987	1988	1989
Total Farm Cash Receipts	VLRP AAA85	6,277.40	6,343.57	6,511.47	6,310.01	6,179.48	6,441.38	6,601.24
	AAA85	--	--	--	6,250.05	6,148.52	6,302.83	6,497.38
Direct Government Payments	VLRP AAA85	610.90	420.52	315.39	399.71	369.22	325.12	255.89
	AAA85	--	--	--	240.64	37.90	0.00	0.00
Non-money Income	VLRP & AAA85	546.80	618.99	632.52	654.16	678.77	730.97	779.92
Other Farm Income	VLRP AAA85	57.40	72.87	72.82	76.01	78.99	84.13	89.41
	AAA85	--	--	--	76.11	78.67	84.03	89.18
Realized Gross Farm Income	VLRP AAA85	7,492.50	7,455.96	7,532.21	7,439.88	7,306.46	7,581.60	7,726.46
	AAA85	--	--	--	7,220.96	6,943.85	7,117.83	7,366.48
Farm Production Expenses	VLRP AAA85	6,117.70	6,606.16	6,695.62	6,945.06	7,208.03	7,727.00	8,228.88
	AAA85	--	--	--	6,948.53	7,197.54	7,723.93	8,221.28
Realized Net Farm Income	VLRP AAA85	1,374.80	849.80	836.58	494.81	98.43	-145.40	-502.42
	AAA85	--	--	--	272.43	-253.69	-606.11	-854.80

then pull up to \$43.36 in 1989. Beef has a longer production cycle than do hogs, and prices over the projection period are determined more by the beef cycle than by changes in input prices. Dairy prices under these two scenarios rise from a low of \$11.89 per c.w.t. in 1986 to \$13.72 in 1989.

The USDA has estimated Minnesota's cash receipts from farm marketings to be \$6.08 billion for 1984. However, the MNAG model has projected \$6.34 billion for 1984 with a corresponding \$7.46 billion in gross farm income and \$849.80 million in realized net farm income. In 1985, projected realized net farm income is expected to drop 1.6% from 1984 to \$836.6 million. In an earlier analysis, projected realized net farm income for 1985 was calculated to be \$749.14 million. However, a rise in expected corn and wheat yields to 110 and 46.5 bushels per acre, respectively has contributed significantly to a projected \$6.5 billion in cash receipts, which represents a 2.65% rise from 1984 levels.

Looking at the projected period 1986 to 1989, realized net farm income is expected to drop from \$836.58 million in 1985 to a negative \$502.42 million in 1989 under the VLRP option, as production expenses overtake realized gross by 1988. Likewise, realized net farm income is expected to decline even more sharply to a negative \$854.80 million under the AAA85 option, as farm production expenses overtake realized gross as early as 1987.

Cash receipts from farm marketings over the projected period 1986 to 1989 are generally greater under the VLRP option than under the AAA85 option. Stronger control provisions and resulting higher prices would allow Minnesota farmers to realize a greater market return for their products under the VLRP than under the AAA85 proposal. Direct government payments under the VLRP option are significantly greater than under the AAA85 option.

Government payments decline from \$399.71 million to \$255.89 million between 1986 and 1989 under the VLRP option, but rapidly decline to zero in 1988 under the AAA85 option. In general, farm income for Minnesota is greater under the VLRP option than under the AAA85 option, but it is certainly not more stable as was true with the FAPRI analysis at the national level.

SUMMARY AND CONCLUSIONS

Two sets of policy options were analyzed by the MNAG model for Minnesota's farm economy using FAPRI Staff Report releases. Under the first set, four stylized policy options were described and analyzed by the MNAG model. They were: the baseline (B), or continuation of the 1981 Farm Bill, the market option (M), the expanded export baseline (E), and the 80 percent of parity option (P). The results generally indicated that realized net farm income under options B, M and E are expected to fall rather dramatically in response to falling commodity prices and rising production expenses. The 80 percent of parity option is the only scenario that shows an increasing realized net farm income over the projected period. In fact, realized net farm income is projected to increase 262% from 1984 to 1989 with the mandatory marketing quota requiring strict output reductions. However, all is not rosy with the parity option as custom hiring opportunities are projected to be reduced by 23% a year, and an average of 5.4 million acres per year will be taken out of crop production in Minnesota over the projected period.

In the second set of policy options analyzed by the MNAG model, the Reagan Administration's proposal (AAA85) was compared to the market loan option, or variable loan repayment program (VLRP). Farm prices under the VLRP option were found to be stronger than under the AAA85 option due to

greater paid diversion incentives which help to manage excess supply conditions. These greater supply control provisions in the VLRP option also accounted for continued income support in the form of direct government payments and reduced production expenses. The results for Minnesota indicate a higher realized net farm income under the VLRP program than under the AAA85. However, even with direct government payments declining from \$400 to \$256 million under the VLRP option from 1986 to 1989, realized net farm income for Minnesota still declines to a negative \$502 million in 1989 as realized gross farm income drops below production expenses in 1988 and 1989.

In conclusion, the outcome of the 1985 farm bill debate will affect Minnesota farmers well into the next decade. The major farm bill proposals discussed in this paper all claim in one way or another to a) maintain or raise net farm income, and b) lower government farm program costs. Given the FAPRI and MNAG analyses, the major proposals can be evaluated in terms of winners and losers in Minnesota's farm economy. Some of the major elements in this analysis are: farmers, grain handlers and input dealers, the federal budget deficit, and consumers.

The Administration's proposal claims to take government out of agriculture and return the sector to a free market. According to our analysis, Minnesota farmers would clearly lose under this option as farm prices and incomes are projected to fall. This would force many more farmers out of business. The winners under this option would be the federal budget deficit and consumers. A transition to a free market would help reduce the future size of the federal deficit, and would continue to provide relatively cheap food to American consumers and foreign buyers.

At the other extreme, the Farm Policy Reform Act, or parity bill, would require farmers after a referendum to subject themselves to strict marketing

quotas for which they would receive in return parity loan rates. Such a proposal would certainly benefit farmers by assuring quota holders stable farm prices and a parity return on their farm marketings. The federal deficit would be lowered under a well managed quota system (meaning supply sufficiently reduced from current levels). This is because budgetary exposure would be significantly reduced with the elimination of target price deficiency payments and paid acreage diversions. The losers under this option would be grain handlers, input dealers, and consumers. Grain handlers, such as grain elevators and barge operators, would lose as the supply of grain available on the market is reduced. Input dealers, such as seed, fertilizer, machinery, and chemical dealers, would lose as acreage planted is reduced in response to marketing quotas. Consumers would also lose as higher food and feed grain prices would raise the cost of meat and other products.

We hope that the analysis provided in this paper will aid Minnesota policy makers by providing them, and the public, with objective, credible and reliable information useful in analyzing the possible policy options for the 1985 farm bill and beyond.

FOOTNOTES

1) The 1984 and 1985 estimations for Minnesota are based on an August 12, 1985 USDA release for estimated corn, soybean and wheat yields for Minnesota, and the July 1985 FAPRI Staff Report #7-85. The 1986 to 1989 Minnesota projection is based on the January 1985 FAPRI Staff Report #1-85.

REFERENCES

- Bailey, Kenneth W. "Minnesota Net Farm Income: Linkage Equations for the Crops and Livestock Sectors." Minnesota Agr. Expt. Staff Paper P85-25. University of Minnesota, St. Paul, June 1985.
- Johnson, S.R., A.W. Womack, W.H. Meyers, R.E. Young II, and J. Brandt. "Options for the 1985 Farm Bill: An Analysis and Evaluation." FAPRI Staff Report #1-85, January 1985.
- Johnson, S.R., W.H. Meyers, A.W. Womack, R.E. Young II, and R.W. Jolly. "The Administration Proposal for the 1985 Farm Bill: An Evaluation and Analysis." FAPRI Staff Report #3-85, March 1985.
- Johnson, S.R., R.E. Young II, W.H. Meyers, and A.W. Womack. "Preliminary Results on a Variable Loan Repayment Option for the 1985 Farm Bill." FAPRI Staff Report # 5-85, April 1985.
- _____. "An Analysis of the Variable Loan Repayment Option for the 1985 Farm Bill." FAPRI Staff Report #7-85, July 1985.
- Otto, D.M., M.D. Helmar, and W.H. Meyers. "Impact of Alternative Agricultural Policies on Iowa Agriculture." CTAP Staff Report No. 9. Iowa State University, Ames, Iowa, April 1985.
- U.S. Department of Agriculture. Agricultural Outlook. Economic Research Service, June 1985, pp. 20-42.
- _____. Minnesota Agriculture Statistics. Statistical Reporting Service, Minnesota Department of Agriculture. Several issues.

APPENDIX A

THE MINNESOTA AGRICULTURAL MODEL: A SUMMARY

THE MODEL

The following sections briefly describe and present the equations which were developed to link the national FAPRI model with the Minnesota agricultural sector. They encompass the crop and livestock enterprises that contribute the bulk of the state's farm income: corn, soybeans, wheat, cattle and calves, hogs, and dairy. In addition to the commodity linkage equations, we also present the relations which allow us to estimate gross and net farm income for Minnesota.

The technical presentation of the estimated equations include the R^2 statistic which indicates the proportion of total variation in the dependent (left hand) variable which is accounted for by systematic variation in the independent (right hand) variables, considered jointly. The numbers in parenthesis below the estimated equation coefficients are the computed t-ratios. These values indicate the relative strength of the coefficients in a statistical sense. All equations were estimated with crop year data from the 1961-1983 period.

CORN

The corn component of the Minnesota's Agricultural Model (MNAG model) consists of four equations estimating acreage planted and harvested, yield, and the season average farm price. In the first equation, Minnesota corn acreage planted (CRPTMN) was estimated as a function of U.S. corn acreage (CORSA). Considering that Minnesota acreage is measured in thousands and U.S. acreage is in millions, the coefficient on CORSA implies that Minnesota accounts for approximately 8.5% of all U.S. corn acreage planted, on average. In the second equation, Minnesota corn acreage harvested (CRHRMN) was estimated as a function of Minnesota corn acreage planted and yield (CRYDMN). It was assumed that as yields decrease, more acres are harvested for silage and less for grain. Likewise, as yields improve, less planted acres are abandoned from harvest. On average, Minnesota farmers harvest approximately 85% of their planted corn acreage.

The third equation estimates Minnesota corn yields (CRYDMN) with a linear trend variable (TREND). The coefficient on TREND suggests that corn yields in Minnesota increase at an average rate of 1.81 bushels per year. Any yields projected from this equation assume "normal" weather -- climatic conditions that neither improve nor worsen yields from their trend average). Finally, Minnesota's season average farm price for corn (CRPFMN) was estimated as a function of the U.S. season average farm price for corn (CORPF). The coefficient on CORPF suggests that Minnesota's corn price is on average 5.68% lower than the U.S. season average farm price.

The estimated corn model is as follows:

	<u>R²</u>
CRPTMN = 85.6 CORSA (110.2)	0.89
CRHRMN = 9.20 CRYDMN + 0.73 CRPTMN (4.1) (24.6)	0.96
CRYDMN = 59.97 + 1.81 TREND (11.2) (4.6)	0.50
CRPFMN = 0.94 CORPF (171.6)	0.99

Note: the numbers in brackets are the t-statistics.

SOYBEANS

The soybean component of Minnesota's crop sector is similar to the corn model and contains the same number of equations. In the first equation, Minnesota soybean acreage planted (SYPTMN) was estimated as a function of U.S. soybean acreage (SOYSA) and Minnesota corn acreage planted (CRPTMN). We assume here that if spring weather conditions interfere with normal corn planting, some farmers will switch to soybeans since soybeans require a shorter growing season than corn. In the second equation, Minnesota soybean acreage harvested (SYHRMN) was estimated as a function of Minnesota soybean acreage planted. The coefficient on SYPTMN indicates that Minnesota farmers harvest on average 98.5% of soybean acreage planted for harvest. Note that the harvested acres equation for soybeans does not contain the yield variable as in the corn equation. Soybean yield was statistically significant in these equations. This is not understandable because soybean farmers do not have the alternative that corn growers have to use the crop for silage.

Minnesota soybean yield (SYYDMN) was estimated in the third equation as a function of linear trend (TREND). Soybean yields increase on average 0.66 bushels per year.

In the last equation the season average farm price for Minnesota soybeans (SYPFMN) was estimated as a function of the U.S. season average farm price (SOYPF). The statistical results indicate that Minnesota beans sell at on average 1.12% discount to the U.S. season average farm price. The model is presented below:

	<u>R²</u>
SYPTMN = 1627.7 + 62.3 SOYSA - 0.17 CRPTMN (3.1) (10.1) (-1.6)	0.88
SYHRMN = 0.98 SYPTMN (462.5)	0.99
SYYDMN = 18.4 + 0.66 TREND (12.4) (6.1)	0.64
SYPFMN = 0.99 SOYPF (126.8)	0.99

WHEAT

Minnesota produces predominantly hard red spring wheat, with large amounts grown in the northwestern and west central districts of the state. Minnesota wheat acreage represents approximately 12% of the hard red spring wheat belt in the northcentral region of the United States and typically averages 3% of all wheat varieties grown in the United States.

The first equation in the wheat model estimates Minnesota wheat acreage planted (WHPTMN) as a function of a linear trend variable (TREND) and U.S. wheat acreage planted (WHESA). The trend variable was used to capture the increase in Minnesota's share of national wheat acreage that has occurred over the historical period. The next equation estimated Minnesota wheat acreage harvested (WHHRMN) to be 95.9% of Minnesota wheat acreage planted. No yield variable was used in this equation for wheat since no relatively high value alternatives are available for wheat not harvested for grain.

Minnesota wheat yield (WHYDMN) was estimated in the third equation as a function of a linear trend (TREND). The coefficient on the trend variable suggests that wheat yields increase an average of 0.65 bushels per year. The final equation estimates the Minnesota season average farm price for wheat (WHRMN) to be a function of the U.S. season average farm price (WHRPR). The statistical results indicate that Minnesota's wheat at the farm averages 6.2% above the national season average farm price. This result occurs because hard wheat sells at a premium to soft wheat varieties. The statistical results are as follows:

	<u>R²</u>
WHPTMN = -2457.2 + 57.2 TREND + 58.1 WHESA (-3.3) (2.1) (3.9)	0.84
WHHRMN = 0.96 WHPTMN (124.9)	0.99
WHYDMN = 23.8 + 0.65 TREND (15.9) (6.0)	0.63
WHPFMN = 1.06 WHEPF (103.3)	0.98

CATTLE AND CALVES

The cattle and calves component of the livestock subsector consists of two equations, a marketing and farm price equation. Statistical attempts to link Minnesota cattle and calf marketings to U.S. marketing and production have not succeeded. Minnesota's cattle market seems to move independently of the U.S. market primarily because of the influence of the dairy industry on marketings. Therefore, Minnesota cattle and calf marketings (CCMKMN) was linked to Minnesota production (CCPDMN), Minnesota cattle and calf numbers lagged one year (CCNUMS), and the ratio of the Omaha slaughter price of steers to the national season average farm price for corn (CCCR). Although the R^2 statistic is relatively low, the estimated coefficients have correct signs and high t-ratios, indicating that the model generally captures the proper direction of change but tends to underestimate its magnitude.

In the second equation, the Minnesota cattle and calf price (CCPFMN) was estimated to be at a 19.2% discount to the Omaha slaughter price (CTPFFD). The cattle model is as follows:

	<u>R²</u>
CCMKMN = -1030.0 + 1.06 CCPDMN + 0.26 CCNUMS(-1)	
(-1.8) (3.4) (2.6)	
+ 14.4 CCCR	0.60
(2.1)	
CCPFMN = 0.81 CTPFFD	0.98
(83.0)	

HOGS

The hog model consists of a marketing and a farm price equation. In the first equation, Minnesota hog marketings (PKMKMN) was estimated as a function of U.S. pork marketing (PKMKT) and the barrows and gilts price, seven city basis (BGPM7C). Trend and trend squared variables were also incorporated into the production equation to account for the apparent curvature in the production trend through time. In the second equation, the Minnesota season average farm price for pork (PKPFMN) was estimated as a function of the seven-city price of barrows and gilts (BGPM7C). The coefficient on BGPM7C indicates that Minnesota's farm price for pork averages 3.3% lower than the seven-city price.

The statistical results for these two equations are presented below:

		<u>R²</u>
PKMKMN	= -738.0 + 0.11 PKMKT + 12.3 BGPM7C (-2.1) (6.8) (2.5)	0.91
	- 66.9 TREND + 2.17 TRDSQR (-6.3) (5.7)	
PKPFMN	= 0.97 BGPM7C (280.4)	0.99

DAIRY

The dairy component of the MNAG model consists of a production and a farm price equation for milk. In the first equation, Minnesota milk production (MKPDMN) was estimated as a function of national milk production (MILAP), and a linear trend (TREND). State milk production followed national production fairly closely, particularly during the expansionary period of the latter 70's and early 80's, when the target price was rising rapidly in response to runaway inflation. The trend variable was utilized to capture the downward trend in Minnesota's milk production from the early sixties to 1975. The second equation estimated Minnesota's season average milk price (MKPFMN) as a function of the U.S. milk price (MILPF). Minnesota's milk price averaged 91.3% of the U.S. annual average milk price over the period of fit. The estimated coefficient on MILPF seems to suggest that Minnesota milk sells at a premium to the national average. However, a closer look will reveal that the model then reduces that figure \$1.05 per hundred weight, which properly measures Minnesota milk prices to be below the national average.

The estimated dairy equations are as follows:

	<u>R²</u>
MKPDMN = 728.2 + 81.6 MILAP - 70.0 TREND (0.64) (8.6) (-7.6)	0.83
MKPFMN = -1.05 + 1.03 MILPF (-21.9)(181.4)	0.99

MINNESOTA FARM INCOME

The farm income component of the Minnesota Agricultural Model consists of five estimated equations which are used in the calculation of realized net farm income. This model stops short of estimating total net farm income because it lacks an equation to compute net changes in farm inventories.

In the first equation, total cash receipts from farm marketings (CASHRM) was estimated as a function of (1) gross returns to corn, soybeans and wheat (GRCROP), and (2) gross returns to cattle and calf marketings, hog marketings, and fluid milk production (GRLIVS). For a more explicit definition of GRCROP and GRLIVS, see Appendix D. In the second equation, Minnesota's receipt of direct government farm payments (GOVTPY) was regressed onto total U.S. farm program payments (LACFPG). The third equation estimated the value of non-money farm income (NONMI) as a function of the consumer price index for non-durables less food (PCNDF). Non-money income represents the value of home consumption and housing.

Other farm income (OTHFI) was estimated in the fourth equation as a function of acreage planted to corn, soybeans and wheat (PTMN), and the consumer price index used in the previous equation. Other farm income represents income from custom work, machine hire, and recreation. It was assumed that as acreage planted to the major crops increased, custom hiring opportunities and income would rise. And finally, farm production expenses for Minnesota was estimated as a function of acreage planted to the major crops (PTMN) and the consumer price index. It was also assumed here that PTMN and production expenses are directly related.

The statistical results of the farm income model for Minnesota are presented below:

	<u>R²</u>
CASHRM = -248.8 + 0.66 GRCROP + 1.56 GRLIV (-1.7) (4.2) (7.4)	0.99
GOVTPY = 0.05 LACFPG (21.0)	0.89
NONMI = -113.4 + 270.5 PCNDF (-4.4) (16.6)	0.93
OTHFMI = -48.8 + 0.0035 PTMN + 25.3 PCNDF (-7.4) (4.1) (6.9)	0.94
FMPDEX = -2291.3 + 0.11 PTMN + 2646.6 PCNDF (-15.5) (6.0) (32.5)	0.99

The calculations of annual realized gross and net farm income are as follows:

$$\text{RGROFI} = \text{CASHRM} + \text{GOVTPY} + \text{NONMI} + \text{OTHFMI}$$

$$\text{RNETFI} = \text{RGROFI} - \text{FMPDEX}$$

APPENDIX B--EXOGENOUS DATA UTILIZED

IN THE POLICY PROJECTIONS

MINNESOTA AGRICULTURAL MODEL, SCENARIO: 1981 FARM PROGRAM CONTINUATION

EXOGENOUS DATA USED IN THE PROJECTIONS

TIME	1985	1986	1987	1988	1989
CORSA	81.9	82	78	76.9	76.3
CORPF	2.56	2.63	2.87	2.9	2.92
SOYSA	65	67	67.2	67.8	71.5
SOYPF	5.47	6.13	6.63	6.97	6.82
WHESA	75.1	80.1	80.8	81.9	83.1
WHEPF	3.32	3.46	3.66	3.66	3.72
CCPDMN	1441.5	1447.94	1447.94	1447.94	1447.94
CCNUMS	3,550	3,733	3,833	3,880	3,833
CTPFFD	69.08	72.00	69.50	68.00	67.00
PRAP77	14,334	15,904	16,899	16,296	15,859
BGPM7C	53.33	49.50	45.00	49.00	51.00
MILAP	137.8	134.19	132.848	131.519	130.204
MILPF	12.90	12.61	13.18	13.77	14.39
LACFPB	6,000	5,731	4,762	3,341	3,285
PCNDF	2.758	2.838	2.929	3.122	3.303

MINNESOTA AGRICULTURAL MODEL, SCENARIO: MARKET OPTION

EXOGENOUS DATA USED IN THE PROJECTIONS

TIME	1985	1986	1987	1988	1989
CORSA	81.9	81.8	81.7	81.5	81.3
CORPF	2.56	2.53	2.49	2.42	2.66
SOYSA	65	66.8	68.3	70.6	73.2
SOYPF	5.47	6.04	6.17	6.22	6.51
WHESA	75.1	82.8	83.6	84.6	85.5
WHEPF	3.32	3.21	3.25	3.32	3.48
CCPDMN	1441.5	1447.94	1447.94	1447.94	1447.94
CCNUMS	3,550	3,733	3,833	3,880	3,833
CTPFFD	69.08	72.00	70.00	69.50	67.00
PRAP77	14,334	15,904	16,899	16,296	15,859
BGPM7C	53.33	49.50	42.50	46.00	47.50
MILAP	137.8	134.19	132.848	131.519	130.204
MILPF	12.90	12.61	13.18	13.77	14.39
LACFPB	6,000	0	0	0	0
PCNDF	2.758	2.838	2.929	3.122	3.303

APPENDIX B (Continued)

MINNESOTA AGRICULTURAL MODEL, SCENARIO: EXPANDED EXPORT BASELINE

EXOGENOUS DATA USED IN THE PROJECTIONS

TIME	1985	1986	1987	1988	1989
CORSA	81.9	82	82.6	78.4	81.7
CORPF	2.56	2.67	2.86	2.94	2.95
SOYSA	65	67	67.7	71.3	72.9
SOYPF	5.47	6.2	6.74	7.42	7.45
WHESA	75.1	80.1	80.7	85.9	84.8
WHEPF	3.32	3.49	3.71	3.64	3.81
CCPDMN	1441.5	1447.94	1447.94	1447.94	1447.94
CCNUMS	3,550	3,733	3,833	3,880	3,833
CTPFFD	69.08	72.00	69.50	68.00	67.00
PRAP77	14,334	15,904	16,899	16,296	15,859
BGPM7C	53.33	49.50	45.00	49.00	51.00
MILAP	137.8	134.19	132.848	131.519	130.204
MILPF	12.90	12.61	13.18	13.77	14.39
LACFPB	6,000	5,377	3,802	3,183	2,306
PCNDF	2.758	2.838	2.929	3.122	3.303

MINNESOTA AGRICULTURAL MODEL, SCENARIO: 80 PERCENT OF PARITY

EXOGENOUS DATA USED IN THE PROJECTIONS

TIME	1985	1986	1987	1988	1989
CORSA	81.9	57	57	57.3	58
CORPF	2.56	4.71	4.91	5.08	5.23
SOYSA	65	39.1	40.7	41.2	41.4
SOYPF	5.47	11.43	11.93	12.35	12.72
WHESA	75.1	48.5	41.6	39.5	39.6
WHEPF	3.32	6.52	6.82	7.07	7.28
CCPDMN	1441.5	1447.94	1447.94	1447.94	1447.94
CCNUMS	3,550	3,733	3,833	3,880	3,833
CTPFFD	69.08	75.34	89.47	93.23	96.21
PRAP77	14,334	15,904	16,899	16,296	15,859
BGPM7C	53.33	56.31	80.46	83.83	86.52
MILAP	137.8	118.269	117.559	116.854	116.153
MILPF	12.90	19.78	20.37	20.98	21.61
LACFPB	6,000	0	0	0	0
PCNDF	2.758	2.838	2.929	3.122	3.303

APPENDIX B (Continued)

MINNESOTA AGRICULTURAL MODEL, SCENARIO: P VLRP

EXOGENOUS DATA USED IN THE PROJECTIONS

TIME	1985	1986	1987	1988	1989
CORSA	81.9	80.3	79.6	79.4	79.3
CORPF	2.56	2.31	2.23	2.41	2.59
SOYSA	65	65.8	67.3	67.2	68.4
SOYPF	5.47	5.56	5.19	5.71	6.25
WHESA	75.1	80.9	82.5	83.1	84.4
WHEPF	3.32	3.28	3.18	3.3	3.31
CCPDMN	1441.5	1447.94	1447.94	1447.94	1447.94
CCNUMS	3,550	3,733	3,833	3,880	3,833
CTPFFD	69.08	70.63	69.16	69.08	65.96
PRAP77	14,334	15,904	16,899	16,296	15,859
BGPM7C	53.33	47.20	40.07	42.94	44.84
MILAP	137.8	134.19	132.848	131.519	130.204
MILPF	12.90	12.61	13.18	13.77	14.39
LACFPB	6,000	7,604	7,024	6,185	4,868
PCNDF	2.758	2.838	2.929	3.122	3.303

MINNESOTA AGRICULTURAL MODEL, SCENARIO: AAA85

EXOGENOUS DATA USED IN THE PROJECTIONS

TIME	1985	1986	1987	1988	1989
CORSA	81.9	81.1	80.1	79.6	79.7
CORPF	2.56	2.18	2.22	2.18	2.44
SOYSA	65	66.5	67.4	68.5	67.9
SOYPF	5.47	5.32	5.08	5.14	5.8
WHESA	75.1	79.7	80.2	81	83.3
WHEPF	3.32	3.17	3.09	3.13	3.3
CCPDMN	1441.5	1447.94	1447.94	1447.94	1447.94
CCNUMS	3,550	3,733	3,833	3,880	3,833
CTPFFD	69.08	70.63	69.16	69.08	65.96
PRAP77	14,334	15,904	16,899	16,296	15,859
BGPM7C	53.33	47.20	40.07	42.94	44.84
MILAP	137.8	134.19	132.848	131.519	130.204
MILPF	12.90	12.61	13.18	13.77	14.39
LACFPB	6,000	4,578	721	0	0
PCNDF	2.758	2.838	2.929	3.122	3.303

APPENDIX C--IDENTITIES

$$CCCR = CTPFFD/CORPF$$

$$GRCROP = GRCORN + GRSOYB + CRWHT$$

$$\text{where } GRCORN = (CRHRMN * CRYDMN * CRPFMN)/1,000$$

$$GRSOYB = (SYHRMN * SYYDMN * SYPRMN)/1,000$$

$$GRWHT = (WHHRMN * WHYDMN * WHPFMN)/1,000$$

$$GRLIVS = GRMILK + GRPORK + GRCC$$

$$\text{where } GRMILK = (MKPDMN * MKPFMN)/100$$

$$GRPORK = (PKMKMN * PKPFMN)/100$$

$$GRCC = (CCMKMN * CCPFMN)/100$$

$$PTMN = CRPTMN + SYPTMN + WHPTMN$$

$$RGROFI = CASHRM + GOVTYPY + NONMI + OTHFMI$$

$$RNETFI = RGROFI - FMPDEX$$

$$TRDSQR = TREND * TREND$$

$$TREND = 1, 2, \dots, 29 \text{ for the time period } 1961-89$$

APPENDIX D--VARIABLE DESCRIPTION LIST

Exogenous Variables

BGPM7C: barrows and gilts, price, seven markets, \$/cwt
CORPF: corn, average farm price, Oct-Sept, U.S., \$/bu
CORSA: corn, acreage planted, Oct-Sept, U.S., mil acre
CCNUMS: cattle and calves, NUMBERS, Jan 1, MN, 1000 head
CCPDMN: cattle and calves, production, MN, mil lbs
CTPFFD: price of slaughter steers, Omaha, all w&g, \$/cwt
LACFPG: total government payments, mil \$
MILAP: milk, total production, U.S., bil lbs
MILPF: milk, all wholesale, ave farm price, U.S. \$/cwt
PCNDF: CPI, nondurables less food, index 1967=1.0
PKMKT: pork, marketings, carcass weight, U.S., mil lbs
SOYPF: soybeans, average farm price, Sept-Aug, U.S., \$/bu
SOYSA: soybeans, acreage planted, Sept-Aug, U.S. mil acre
WHEPF: wheat, average farm price, July-June, U.S. \$/bu

Endogenous Variables

CASHRM: cash receipts from farm marketings, MN, mil \$
CCMKMN: cattle and calves, marketings, MN, mil lbs
CCPFMN: cattle, average farm price, \$/cwt
CRHRMN: corn, acreage harvested, Oct-Sept, MN, 1,000 acres
CRPFMN: corn, average farm price, Oct-Sept, MN, \$/bu
CRPTMN: corn, acreage planted, Oct-Sept, MN, 1,000 acres
CRYDMN: corn, yield per harvested acre, Oct-Sept, MN, bushels
FMPDEX: farm production expenses, MN, mil \$
GOVTPY: government payments, MN, mil \$
MKPFMN: milk, all wholesale price, MN, \$/cwt
MKPDMN: milk, on farm production, MN, mil lbs
NONMI: non-money income, MN, mil \$
OTHFMI: other farm income, MN, mil \$
PKPFMN: hogs, average farm price, MN, \$/cwt
PKMKMN: hogs, marketings, MN, mil lbs
RGROFI: total realized gross farm income, MN, mil \$
RNETFI: realized net farm income, MN, mil \$
SYHRMN: soybeans, acreage harvested, Sept-Aug, MN, 1,000 acres
SYPFMN: soybeans, average farm price, Sept-Aug, MN, \$/bu
SYPTMN: soybeans, acreage planted, Sept-Aug, MN, 1,000 acres
SYYDMN: soybeans, yield per harvested acre, Sept-Aug, MN, bushels
WHHRMN: wheat, acreage harvested, July-June, MN, 1,000 acres
WHPFMN: wheat, average farm price, July-June, MN, \$/bu
WHPTMN: wheat, acreage planted, July-June, MN, 1,000 acres
WHYDMN: wheat, yield per harvested acre, July-June, MN, bushels