NCCC-134
APPLIED COMMODITY PRICE ANALYSIS, FORECASTING AND MARKET RISK MANAGEMENT

Implications of a Two-Tier Price Support Program for the U.S. Wheat Industry

by

Abner W. Womack, Jon A. Brandt, and Joseph Trujillo

Suggested citation format:

Womack, A. W., J. A. Brandt, and J. Trujillo. 1988. "Implications of a Two-Tier Price Support Program for the U.S. Wheat Industry." Proceedings of the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management. St. Louis, MO. [http://www.farmdoc.uiuc.edu/nccc134].

Implications of a Two-Tier Price Support Program for the U.S. Wheat Industry

Abner W. Womack, Jon A. Brandt and Joseph Trujillo

Introduction

The Food Security Act of 1985 (FSA85) has serveral important features. A market focus with less government involvement over time is reflected in reduced supports via loan rates and target prices. The secretary has broad discretion in program management and has placed high priority on stock reduction, increasing exports, expanding domestic consumption and reducing excessive capacity.

The combination of low market prices and government supports plus a more favorable environment from the general economy has resulted in relatively high net farm income. Exports have increased breaking a longer run down trend, livestock expansion is underway and food prices have remained fairly stable. A major limitation of this farm act has been the cost of operating the program. Total government cost for operating the FSA85 during FY86 was $25.8 billion, $22.4 billion in FY87 and projected at $15.4 billion (FAPRI 1-88) in FY88. These costs substantially exceed the $17 billion annual budget estimate used at the time the FSA-85 legislation was enacted.

Alternative management strategies have been considered because of the high government costs. The options ranged from mandatory programs to considerably less government involvement. Some strategies maintain the thrust of the FSA85 but lowers target supports substantially. Others move rapidly in the free market direction and separate government payments from commodity production (decoupling).

A two-tier price support strategy for wheat producers was suggested by Senator Kent Conrad from North Dakota. Motivation for this option was to cut government costs but maintain net farm income at least at the FSA85 level. His office requested analysis of this option by FAPRI in the summer of 1987. The primary objective of this report is to compare the performance of the FSA85 for wheat with this option.

Womack and Brandt are professors and members of the Food and Agricultural Policy Research Institute (FAPRI). Trujillo is Program Director/Data Services of FAPRI. All are in the Department of Agricultural Economics, University of Missouri-Columbia.

Table 1. Major Program Assumptions for FSA85 and the Two-Tier Certificate Wheat Program

Policy Instrument	FSA85	Two-Tier Certificate
Target Price	Modest decline as specified in the FSA85.	Domestic target of $4.90 charged to millers. Export target of $4.40 charged to exporters.
Loan Rate	Modest declines following rules specified in the FSA85.	Marketing loan floor set at $2.25.
Deficiency Payment	Difference between target price and the higher of the loan rate and market price.	Difference between the export target and the higher of the marketing loan floor and market price - export subsidy.
Paid Diversions	Not relevant.	7.5 percent in 88/89 and 89/90 only.

Alternative Management Strategy for Wheat

The two management strategies for wheat are termed, base and two-tier option. Base management presumes a continuation of the FSA85 (FAPRI Staff Report 1-88). The two-tier management option is based on a certificate system assigned to farmers that covers approximately 85 percent of the farmer's historical base. Certificates are necessary for marketing wheat for food consumption and for export sales. A predetermined percentage of certificates are assigned for milling and for exports. Miller certificates are valued at $4.90 per bushel. Therefore any domestic wheat for milling implies a miller price of $4.90. The miller must buy a certificate at face value from the farmer.

Export certificates with a targeted support level of $4.40 per bushel are extracted from the export trading firm for each bushel moving through the terminal. The government pays the exporter a deficiency payment equivalent to the difference between the prevailing market price and the $4.40 target.

Farmers may be required to set aside up to thirty percent of base acreage to receive supports. Necessary acreage reductions exceeding this level would occur through paid diversion program but at rates significantly below current levels of support (Table A.1).

Farmers would have the option of selling any additional wheat at the prevailing market price. Therefore, two price levels are in effect. Millers pay a higher price for all domestic wheat for milling purposes and are restricted to buy exclusively from domestic producers. All additional wheat moves through the market at the prevailing farm price. The government picks up the differential price between the market and the export terminal price of $4.40 as long as the market price is between $4.40 and the market loan floor of $2.25. This program was assumed to be implemented beginning with the 1988/89 marketing year.

Base Management

The current management strategy of the FSA85 for wheat seems to be motivated by excess capacity problems and deteriorating U.S. export markets. The FSA85 gradually reduces target prices (Table A.1) through the end of the farm act, guaranteeing that gross receipts for wheat and net income would remain at nominal levels compared to that achieved on average during the 1981 farm act.

Low loan rates, high acreage reduction programs (ARP) rates, paid diversion rates and heavy use of certificates characterize the base strategy. The resulting market price remains at or below the loan rates until high stock levels are brought into a historically more consistent alignment with U.S. and world consumption. The resulting lower market price tends to increase the size of the total export market and competitive sales of U.S. commodities in export markets. The increase in export volume occurs mainly in the centrally planned and developing economies. The developed economies have domestic agricultural policies that insulate their producers and consumers from world market prices. Since the base management strategies raise the actual and opportunity costs of these policies, an implicit objective of the base is to cause other developed countries to modify their policies.

Since the major source of growth in the export markets under the base strategy is in the developing and centrally planned countries, the export volumes are highly dependent on projected rates of economic growth. Using assumptions of moderate macroeconomic growth and continuation of competing country policies, U.S. exports continue to increase but at moderate rates as export enhancement programs are reduced and market prices increase (Table A.3).

Domestic Certificate and Export Marketing
Loan Program for Wheat (Two-Tier)

The two-tier strategy is characterized by three significant variables. A marketing loan floor (Table A.1) establishes minimum payment protection. Certificates are issued to producers on approximately 85 percent of base production. Two certificates for marketing wheat are issued. An estimated portion consistent with the percent of food wheat utilized in the U.S. receives a certificate of $4.90 per bushel - domestic target price. Millers must pay the face value of the certificate and buy exclusively from domestic producers. A second certificate is issued reflecting the proportion of U.S. wheat entering the export market - marketing loan rate of $4.40. Exporters pay the face value of the certificates but are reimbursed by the government for the differential

with the market price. Therefore, all wheat moving through the system sells at market price except for mill consumption.

Farmers are also required to set aside up to 30 percent of their land in order to be eligible for payments. Additional set aside requires paid diversion payments.

Major objectives of this program is to ensure net returns to wheat producers at about the same level as under the FSA85, maintain a similar export position but substantially reduce government costs. A motivation for shifting part of this burden to the U.S. miller is the economics associated with the relatively low food demand elasticity for wheat (Table 9) and the small percentage that wheat price make up of the final product for baked goods and other cereals.

Results

Results of the two alternative management approaches for wheat are summarized for net returns, government costs, planted acreage, ending stocks, exports and farm prices. More detailed information on the outcomes is provided in the appendix tables. This summary contrasts performance variables across management strategies and briefly indicates reasons for differences obtained.

The same macroeconomic conditions are assumed for both strategies: slightly higher projected rates of economic growth and inflation than are presently being experienced by the developed and developing countries. The macroeconomic scenario for the evaluation was provided by Wharton Econometrics and is based on their Spring 1987 long-term forecast. The analysis was conducted in the spring of 1987. The base scenario is reported in the FAPRI Staff Report 4-87.

Net Returns

Average net returns are similar under both programs. Set aside acreage is similar for both strategies. But under the FSA85, producers receive a target price on total base production at or near $4.00 per bushel over the five year period.

Table 2. Estimated Net Returns Per Acre for Program Participants

Strategy	1988-82 Average	% Difference
FSA85	$56.77	
Two-Tier	$51.40	-9%

Source: Appendix Tables A.2 and A.3.

A higher price is received for a large portion of production, under the two-tier option, food and export use, however about one fourth of the

crop is sold at market price - substantially below the higher supports.

Several intentions were examined to achieve this particular solution, since a predetermined criterion was to achieve about the same net returns but to cut government costs.

Government Cost

The total government cost for the FSA85 wheat program was estimated to average $2.8 billion per year. The majority of this cost is associated with heavy program participation and corresponding deficiency payments.

Table 3. Estimated Government Cost by Strategy ($ billion)

Strategy	FY89-FY92 Average	% Difference
FSA85	2.8	
Two-Tier	1.8	-56%

Source: Appendix Tables A.2 and A.3.

Additional costs are associated with certificates, government reserve programs, long term conservation reserves and export enhancement.

Approximately $1 billion per year would be saved under the two-tier strategy. Since government costs are primarily associated with deficiency payments in export volumes, considerable less government exposure is involved.

Other costs also reflect the reserves, export enhancement and conservation costs. Obviously, considerable savings are possible if this management strategy can successfully place the price burden on the domestic milling industry.

Planted Acreage

Large declines in planted acreage are unlikely since 85 percent of historical production is protected at the certificate price. Lower unregulated prices would probably discourage production since estimated returns per acre average about $25 above variable production cost.

Table 4. Estimated Planted Acreage by Strategy (million acres)

Strategy	1988-92 Average	% Difference
FSA85	65.3	
Two-Tier	64.1	-2%

Source: Appendix Tables A.2 and A.3.

Ending Stocks

Participation rates are likely to exceed levels associated with the FSA-85. Supports are constant at $4.40 and $4.90 per bushel under the two-tier strategy, however target prices began to decline under FSA85. Higher levels of participation and low market prices holds planted area slightly below the base line estimates, averaging about 1 million acres less per year.

Table 5. Estimated Ending Stocks by Strategy (million acre equivalent)

Strategy	1988-92 Average	% Difference
FSA85	32.3	
Two-Tier	30.2	-7%

Source: Appendix Tables A.2 and A.3.

With yields averaging about 39 bushels per acre the two-tier option reflects a more rapid decline in total supplies and therefore ending stocks. In acre equivalent total ending stocks average about 2.1 million acres lower than the base solution for the five year period.

Exports

Both strategies reflect similar export projections. Current specifications place the export elasticity (Table 9), measured at 1987 values, at about -.51. Farm prices remain near the same level and export enhancement programs were maintained under both strategies.

Table 6. Estimated U.S. Exports by Strategy (million bushels)

Strategy	1988-92 Average	% Difference
FSA85	1,362	
Two-Tier	1,351	-1%

Source: Appendix Tables A.2 and A.3.

Farm Prices

The two-tier option will likely result in a more rapid decline in ending stocks. Modest market price strength of eight percent is estimated relative to the base line. This path may be significantly different should market prices begin to escalate.

Table 7. Estimated U.S. Farm Price by Strategy ($/bushel)

Strategy	1988-92 Average	% Difference
FSA85	2.53	
Two-Tier	2.73	8%

Source: Appendix Tables A.2 and A.3.

Program participation will likely remain high under both options, however stronger incentive exists for area expansion under the two-tier option in this environment. Farmers are allowed to plant without constraint, whereas the FSA85 provides benefits only if base area is maintained.

Food Demand

Given that food demand elasticity is extremely low at about -.01 (measured at 1987 values), it is likely that little appreciable difference will be observed under initial stages of implementation.

Table 8. Estimated Wheat Food Use by Strategy (million bushels)

Strategy	1988-92 Average	% Difference
FSA85	736	
Two-Tier	727	-1%

Source: Appendix Tables A.2 and A.3.

However, equation estimates may be misleading over the longer term since cross substitution and special blends are very likely to occur. Current food demand regression equations do not contain cross substitution impacts, hence this influence is very likely underestimated in the model.

Although the projected path of only one percent difference is likely an understatement, total charges over the longer term are not likely to be significantly different. If it is possible to restrict domestic millers to purchase certificates, flour products will continue to be in demand. Output prices of flour products are marginally influenced by wheat prices.

Obviously millers could be expected to pursue economic incentives to circumvent these prices. An obvious quick fix would be to change blends. This may be possible, however combinations of wheat flour with feed grain flour involves new products requiring time to influence consumer tastes and habits.

Model

The models used to evaluate this set of options are based on annual historical data from the period 1961-1985. An overview can be obtained in a briefing on FAPRI/CARD models. The crops sectors contain acreage response and aggregate demand equations. All models are interactive with compatible variables reflecting crop substitution and a direct interface with the U.S. livestock industry. The supply side of the crops models contain equations that endogenize participation rates based on expected participant and non-participant net returns. Reduction in planted area is also assumed to affect yield. As area decreases, expected yields increase above trend estimates.

Table 9. FAPRI Crop Elasticities, 1987

	Feed	Food	Exports	Stock	Total	Acreage Response
Corn	-.17	-.16	-.32	-.72	-.38	.12
Wheat	-.51	-.01	-.51	-.79	-.51	.15
Soybean	-.67		-.51	-.16	-.56	.19
Soymeal	-.09		-1.30		-.41	

The demand side of the model reflects five components: food, feed, seed, exports and stock demand. These specifications incorporate general economic information, changes in livestock cycles, international trade and government program activities such as export enhancement, PL-480 and farmer owned and CCC stock activity.

Summary

It is very likely that a two-tier program option that forces millers to purchase wheat at significantly higher prices would generate about the same net returns to wheat producers, substantially reduce government payments yet maintain a similar export path as projected under the FSA85. If this criterion alone is used in selecting a strategy to reduce government cost, then the two-tier scheme merits consideration.

Several concerns enter the picture. These include the possibility that increased costs to the milling industry would very likely exceed government cost savings. In fact, the differential in millers' cost averages about $1.7 billion higher while average government savings averaged about $1 billion per year. The milling industry is not likely to be an enthusiastic supporter. Also, blending and substitution will very likely occur over the longer term that could change the total food grain mix.

Finally, a clearing house similar to CCC activity for domestic certificates may be necessary for export and domestic certificates. A control center will be required to ensure that only certified wheat enters the market. Exporters and millers would be required to match actual volume with corresponding certificates.

Other problems would involve policing all internal phases of the production-marketing cycle. Strong incentives would exist by wheat farmers to make up for a short crop by purchasing on the market at lower prices and market through the certificate route. Also millers would have an equally strong incentive to circumvent higher prices perhaps with grain purchases from Canadian farmers.

References

FAPRI Staff Report. "Ten-year International Agricultural Outlook". Food and Agricultural Policy Research Institute, Department of Agricultural Economics, FAPRI 4-87, University of Missouri-Columbia, Iowa State University, Ames, Iowa, July 1987.

FAPRI Staff Report. "Domestic Certificates and Export Marketing Loan Programs." Food and Agricultural Policy Research Institute, Department of Agricultural Economics, University of Missouri-Columbia, Iowa State University, Ames, Iowa, July 1987.

FAPRI Staff Report. "Ten-year International Agricultural Outlook." Food and Agricultural Policy Research Institute, Department of Agricultural Economics, FAPRI 1-88, University of Missouri-Columbia, Iowa State University, Ames, Iowa, March 1988.

CARD/FAPRI Staff Report. "CARD/FAPRI Models A Brief Description." Food and Agricultural Policy Research Institute, Department of Agricultural Economics, University of Missouri-Columbia, Iowa State University, Ames, February 1988.

FAPRI Staff Report. "General Model Overview and Description." Iowa, Food and Agricultural Policy Research Institute, Department of Agricultural Economics, University of Missouri-Columbia, Iowa State University, Ames, July 1987.

Appendix

Table A.1. Major Program Assumptions Under the Baseline (Base) and the Two Tier (2-T) Price Strategy for U.S. Wheat

Variable/Crop Year	87/88	88/89	89/90	90/91	91/92	92/93
2-Tier Program						
MKT Loan Floor ($/bu)	2.28	2.25	2.25	2.25	2.25	2.25
MKT Loan Rate ($/bu)	-	4.40	4.40	4.40	4.40	4.40
Domestic Target ($/bu)	4.38	4.90	4.90	4.90	4.90	4.90
Div. Pay. Rate ($/bu)	4.45	2.28	2.28	2.28	2.28	2.28
ARP Rate (%)	27.5	27.5	27.5	27.5	20.0	17.5
Diversion Rate (%)	0.0	7.5	7.5	0.0	0.0	0.0
FSA85						
Loan Rate ($/bu)	2.28	2.17	2.06	1.95	1.86	2.21
Target Price ($/bu)	4.38	4.29	4.16	3.95	3.95	3.95
ARP Rate (%)	27.5	30.0	25.0	25.0	20.0	15.0

Appendix Table A.2. Wheat Two Tier Certificate Program

Variable/Crop Year	87/88	88/89	89/90	90/91	91/92	92/93
			(Million Acres)			
Base Acreage	89.6	86.4	84.1	82.8	82.9	83.6
LTCR Acreage	4.5	9.0	12.0	14.0	14.0	14.0
Set Aside %	27.5%	27.5%	27.5%	27.5%	20.0%	17.5%
Paid Diversion %	0.0%	7.5%	7.5%	0.0%	0.0%	0.0%
Set Aside Acres	20.5	27.2	26.5	17.0	14.9	11.0
Diversion Acres	0.0	11.2	13.4	10.5	14.0	11.4
Partic. Rate %	83.4%	90.0%	90.0%	90.0%	90.0%	90.0%
Planted Area	65.1	61.4	59.0	62.3	68.0	70.0
Harvested Area	57.0	53.7	51.5	54.5	59.4	61.2
Yield	37.1	38.8	39.2	39.8	39.9	40.1
Base Yield	34.0	34.0	34.0	34.0	34.0	34.0
SUPPLY			(Million Bushels)			
Beg Stocks	1,848	1,820	1,569	1,242	1,052	1,054
Production	2,116	2,083	2,017	2,168	2,375	2,455
Imports	8	5	5	5	5	5
TOTAL SUPPLY	3,972	3,508	3,591	3,414	3,432	3,514
DOMESTIC DEMAND						
Feed	183	233	214	199	203	214
Food	708	706	217	726	738	748
Seed	80	74	71	75	82	84
TOTAL	971	1,013	1,002	1,000	1,023	1,046
TOTAL EXPORTS	1,181	1,326	1,348	1,363	1,355	1,362
TOTAL DEMAND	2,152	2,339	2,350	2,363	2,378	2,408
ENDING STOCKS	1,820	1,569	1,242	1,052	1,054	1,106
Farmer Held	590	510	420	330	330	300
CCC Owned	915	835	755	675	505	500
Under Loan	164	0	0	0	0	0
"Free Stocks"	151	224	67	47	219	306
PRICES:						
Farm Price	$2.44	$2.16	$2.59	$2.89	$2.96	$3.04
Mkt Loan Rate	-	$4.40	$4.40	$4.40	$4.40	$4.40
Mkt Loan Floor	$2.28	$2.25	$2.25	$2.25	$2.25	$2.25
Target prices	$4.38	$4.90	$4.90	$4.90	$4.90	$4.90
Entry Loan	$2.28	$2.40	$2.40	$2.40	$2.40	$2.40
Div. Pay. Rate	$4.45	$2.28	$2.28	$2.28	$2.28	$2.28

Appendix Table A.3 U.S. Wheat Supply and Utilization (Baseline) Spring 87 10-Year

Variable/Crop Year	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93
				(Million Acres)				
Base Acreage	93.3	91.3	89.6	84.1	84.1	82.8	82.9	83.6
LTCR Acres	0.0	0.6	4.5	9.0	12.0	14.0	14.0	14.0
Set Aside %	20.0%	22.5%	27.5%	30.0%	25.0%	25.0%	20.0%	15.0%
Paid Diversion %	10.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Set Aside Acres	12.2	17.3	20.5	20.8	17.1	16.2	13.1	10.0
Diversion Acres	6.8	5.4	0.0	0.0	0.0	0.0	0.0	0.0
Partic. Rate %	73.0%	84.0%	83.4%	80.4%	81.5%	78.3%	79.2%	79.6%
Planted Area	75.6	72.0	65.1	62.8	63.9	62.7	66.7	70.4
Harvested Area	64.7	60.7	57.0	55.0	55.9	54.9	58.3	61.6
Yield	37.5	34.4	37.1	38.8	39.1	39.8	39.9	40.1
Base Yield	36.3	35.0	34.0	34.0	34.0	34.0	34.0	34.0
SUPPLY				(Million Bushels)				
Beg. Stocks	1,425	1,905	1,848	1,820	1,634	1,439	1,191	1,077
Production	2,425	2,087	2,116	2,131	2,187	2,183	2,329	2,469
Imports	14	15	8	5	5	5	5	5
TOTAL SUPPLY	3,865	4,007	3,972	3,955	3,826	3,628	3,525	3,550
DOMESTIC DEMAND								
Feed	274	350	182	217	223	228	232	234
Food	678	700	708	718	727	735	746	755
Seed	93	84	80	82	80	85	90	91
TOTAL	1,045	1,134	971	1,016	1,031	1,048	1,068	1,080
TOTAL EXPORTS	915	1,025	1,181	1,305	1,356	1,389	1,381	1,380
TOTAL DEMAND	1,960	2,159	2,152	2,322	2,387	2,436	2,449	2,460
ENDING STOCKS	1,905	1,848	1,820	1,634	1,439	1,191	1,077	1,091
Farmer Held	596	640	590	500	420	340	270	250
CCC Owned	602	925	915	865	785	575	400	360
Under Loan	678	200	164	151	116	93	76	68
"Free" Stocks	29	83	151	118	118	183	331	413
PRICES:								
Farm Price	$3.16	$2.40	$2.44	$2.39	$2.45	$2.51	$2.59	$2.69
Loan Rate	$3.30	$2.40	$2.28	$2.17	$2.06	$1.95	$1.86	$2.21
Target Price	$4.38	$4.38	$4.38	$4.29	$4.16	$3.95	$3.95	$3.95
Cost per Acre	$62.98	$59.68	$61.16	$64.57	$68.49	$72.26	$75.22	$78.83
Cost per Bushel	$1.68	$1.73	$1.65	$1.67	$1.75	$1.82	$1.88	$1.97
Part. Return/Acre	$73.75	$59.57	$63.65	$58.85	$59.07	$52.38	$55.53	$58.00
Non-Part. Returns	$55.48	$22.88	$29.42	$28.05	$27.29	$27.54	$28.17	$28.92