Analysis of Risk Management Proposals

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At the request of several members of the Committee on Agriculture, Nutrition, and Forestry of the Senate, FAPRI has continued to analyze the impacts of two alternative risk management proposals. The proposals are the Farmers' Risk Management Act of 1999 (S. 1666) and the Risk Management for the 21st Century Act (S. 1580). Our earlier analysis, as reported in FAPRI Policy Working Paper #04-99, had concentrated on the aggregate net farm income and government outlay impacts. With this analysis, we consider a number of additional factors that may shed light on the differential impacts of the two plans:

1. Farm-level income impacts under alternative weather scenarios;
2. Additional indirect impacts, such as a change in ability to obtain financing;
3. Implications of within-year price shocks;
4. Benefits from changes to the Non-Insured Assistance Program;
5. Development of specialty crop insurance products; and
6. Administrative and producer costs of S. 1666.

Conditioning Assumptions

Representative farm-level analysis is conducted for several types of farms including both irrigated and non-irrigated cotton farms in Tom Green County, Texas; dryland wheat farms in Morton County, North Dakota and Sumner County, Kansas; and a corn farm in Webster County, Iowa. The premium subsidy structure that would exist without adoption of S. 1580 is the same as was in place in 1998. The (unsubsidized) premium rate structure in place for the 2000 crop year is maintained under both S. 1580 and the baseline program. Yield risk is reflected in the distributions we employ. Farmers optimize their crop insurance choice by examining the marginal benefits and costs of each insurance product and coverage level. Additional detail on the farm-level analysis can be obtained by contacting the authors.

Farm-Level Income Impacts

Table 1 compares the maximum expected revenues less producer-paid premiums for the five representative farms under the baseline, S. 1580, and S. 1666. Expected revenue is found by computer simulation using the specified yield distributions. Revenue equals price times simulated yield. If the yield is below the yield guarantee an indemnity is added to the revenue. Expected revenue equals the average revenue over 5,000 simulated yields. Crop insurance coverage levels are set to maximize net revenues in each case. In all of the representative farm cases, some level of crop insurance coverage is optimal. However, in looking at crop insurance participation, we see many producers who do not participate. There are several reasons for this. The risk profile of the farms may be different than those shown below, making crop insurance less attractive. Some producers may have tried crop insurance in the past and found their expectations were not met. Other producers avoid enrollment in any government programs. Even in the deficiency payment and AMTA programs, there was not 100 percent participation. The increased premium subsidy structure of S. 1580 will make crop insurance more attractive to some of these producers. In our earlier aggregate analysis, we showed crop insurance

participation in the 2001 crop year rising from 68.9 percent in the baseline to 74.6 percent under S. 1580.

In our analysis, both policies increase revenues for all of the farms by at least 50 cents an acre from baseline levels. For the irrigated cotton farmer, per acre revenues rise by over five dollars under both programs. Revenues are highest for four of the five farms under S. 1666. Only the dryland cotton farmer receives higher revenues from S. 1580. But the differences in revenues between the two proposals are less than $1.50 in all cases (less than 1.5 percent of baseline revenues).

Table 1. Maximum Expected Revenues less Producer Premiums

	Baseline		S. 1580		S. 1666	
Farm	Coverage Level (percent)	Revenue-Premium ($/acre)	Coverage Level (percent)	Revenue-Premium ($/acre)	Coverage Level (percent)	Revenue-Premium ($/acre)
Irrigated Cotton	65	374.73	75	379.83	65	381.20
Dryland Cotton	65	161.27	65	163.57	65	163.51
ND Wheat	65	54.86	65	55.43	65	56.19
Corn	75	283.97	80	287.38	75	288.73
KS Wheat	65	91.71	75	93.16	65	93.33

Farm-Level Income Impacts Under Various Weather Scenarios

Table 2 compares the net payments (risk management payments and indemnities less producer-paid premium) that would be received under the two proposals under two weather scenarios for each of the representative farms. Yield insurance is assumed for both programs. The coverage levels used in Table 2 for S. 1666 are 65% for the cotton and wheat farms and 70% for the corn farm. For S. 1580, coverage levels are 75% for the cotton and wheat farms and 80% for the corn farm. The coverage levels for both programs are based on optimization of marginal benefits and historical average coverage levels. The weather scenarios were chosen from historical events within each county. Also, the weather scenarios were chosen so that indemnities would be received under both programs in one year and no indemnities would be received in the other. Clearly, there are scenarios where S. 1580 would result in an indemnity payment and S. 1666 would not. The yield levels in the weather scenarios were set to the county average yield in the selected year.

The risk management payments are determined by multiplying the actual production history yield, the price level, and an allocation factor. For these cases, the actual production history yield is estimated by the average county yield for the 1990-98 period. The price is determined using the average price level determined by the Federal Crop Insurance Corporation for the 1997-99 period. Based on recent historical data for the value of production of insurable crops, the allocation factor is set at 1.5%. Under S. 1666, the irrigated cotton producer receives a risk management payment of $6.47/acre. The dryland cotton producer receives $2.24/acre. Risk management payments for the North Dakota and Kansas wheat producers are $1.33/acre and

$1.62/acre, respectively. For the Iowa corn producer, risk management payments equal $4.76/acre.

Table 2. Comparison of Outcomes for Specific Weather Years

Farm	Year	Yield	Cumulative Probability* (percent)	Risk Payment S. 1666 ($/acre)	Indemnity S. 1580 ($/acre)	Indemnity S. 1666 ($/acre)	Net Payment S. 1580 ($/acre)	Net Payment S. 1666 ($/acre)	Difference ($/acre)
Irrigated	1975	326	26	6.47	74.57	38.57	46.14	24.17	21.97
Cotton	1990	863	73	6.47	0.00	0.00	-28.43	-14.40	-14.03
Dryland	1998	68	22	2.24	76.20	60.60	53.67	46.35	7.32
Cotton	1990	428	78	2.24	0.00	0.00	-22.53	-14.25	-8.28
ND Wheat	1988	2	12	1.33	32.25	27.15	26.83	24.50	2.33
	1992	32	88	1.33	0.00	0.00	-5.42	-2.65	-2.77
Corn	1993	79	10	4.76	66.00	38.00	58.08	37.70	20.38
	1994	169	73	4.76	0.00	0.00	-7.92	-0.31	-7.61
KS Wheat	1996	10	6	1.62	37.50	28.50	33.42	27.70	5.72
	1997	50	95	1.62	0.00	0.00	-4.08	-0.80	-3.28

*Probability that yield will be equal to or less than the yield used in the calculations shown in the adjacent column. The probabilities are based on the yield distributions.

Table 2 shows that the farm income consequences of crop insurance and the two plans can change tremendously under different weather scenarios. In a low-yield year, such as 1993 for Iowa corn, more money would flow to farmers under S. 1580 because of increased coverage levels. But in a good crop year, S. 1666 results in higher producer income due to the risk management payments and lower producer premiums. Producer premiums are lower under S. 1666 because the additional subsidy under S. 1580 does not completely offset the increase in premium rates from the higher coverage level.

For the irrigated cotton farm, the increase in coverage level to 75% means an extra $36/acre in coverage. The net cost of this additional coverage (the additional premium required to move from 65 to 75 percent coverage) is $7.56/acre. In a low-yield year, the irrigated cotton farmer has a net benefit of $21.97/acre under S. 1580. When a yield loss does not occur, S. 1666 yields a net benefit of $14.03 per acre; this is comprised of a reduction in producer-paid premiums (due to lower coverage) of $7.56/acre and risk management payments of $6.47/acre.

Somewhat surprisingly, S. 1580 benefits the lower risk farms more than the higher risk farms. The difference in per-acre benefits from S. 1580 when a loss occurs is $7.32 for the dryland cotton farm and $2.33 for the North Dakota wheat farm, whereas the Iowa corn farm benefits by $20.38. The reason for this is higher coverage levels under S. 1580 translate into a higher dollar amount of coverage for the higher-yielding, low risk farms.

Additional Indirect Impacts

With regards to indirect impacts, if farmers' crop insurance decisions regarding coverage levels and the type of products that they purchase are held constant, then the only difference between the two plans is that farmers receive greater premium subsidies under S. 1580 and they receive fixed payments under S. 1666. However, the increased premium subsidies of S. 1580 will likely lead to many farmers increasing the amount of insurance they purchase and/or switching to revenue insurance products. The increased coverage would lead to increased indemnity payments when losses occur, an increased ability to secure production financing, and possibly, a decreased reliance on disaster payments when crop yields are low. The switch to the revenue insurance products could increase farmers' use of forward contracts and an increased ability to withstand within-year price shocks.

The extent to which these additional benefits accrue depends critically on whether farmers will increase their coverage and change their product choice in response to the increased subsidies under S. 1580. If farmers do not change their decisions, then the increased premium subsidies act as a direct transfer to producers with no "slippage" of funds going to crop insurance companies. If farmers do change their crop insurance decisions, "slippage" to crop insurance companies would occur through changes in delivery expense reimbursement (roughly 24 percent of the change in total premiums) and underwriting costs (highly variable).

Crop insurance helps producers manage financial risks in several ways. Financial losses can be offset by insurance indemnities rather than reducing the producer's equity. The ability to assign indemnity payments to lenders can make loans easier to obtain. Indemnity payments support producers in maintaining their cash flow requirements. Abundant evidence suggests linkages among crop insurance, forward marketing, and agricultural lending. We have selected several recent quotes (shown below, with references) that outline the effects of crop insurance on these issues.

> "North Carolina bankers insist on crop insurance for tobacco before they will loan a farmer operating money."
> -- Chris Stancill, North Carolina farmer, in "Surviving Floyd", posted on the Internet at http://www.act.fcic.usda.gov/news/1999/11/survivefloyd.html

> "They (crop insurance and sound marketing plans) help farmers use credit more wisely and they reduce the bank's risk as well."
> -- Kim Fanning, McCook National Bank, for an article in *Farm Progress*, also posted on the Internet in "Risk Management: Looking for Linkages at the Local Level" by Jan Eliassen at http://www.ag-risk.org/NCISPUBS/LAIPPUB/Artic17.htm

> "CRC (Crop Revenue Coverage) gives us the safety net to market more bushels at ease without the risk that normally goes through your mind."
> -- Ken Heidzig, Nebraska farmer, in "Managing for Profit: How One Farm Family Succeeds" by Laurence M. Crane, posted on the Internet at http://www.ag-risk.org/NCISPUBS/LAIPPUB/Artic20.htm

The representative farm analysis suggests that producers will be more likely to participate in crop insurance under S. 1580 and that they will likely buy higher levels of coverage. Thus the total amount of ancillary benefits from the crop insurance program will be higher under S. 1580 than S. 1666. Estimation of the ancillary benefits of higher coverage is difficult, if not impossible to quantify because they are farm and operator specific. For example, a farm operation that has a solid balance sheet will find that the ability to obtain additional financing does not depend on the amount of crop insurance purchased. And it goes without saying that "peace of mind" benefits are not straightforward to estimate. Hence, while these benefits exist, we cannot place a dollar value on these additional benefits.

Effect on Demand for Revenue Insurance Products

The baseline scenario and S. 1666 limit the amount of subsidy available to revenue insurance products to the amount that would be available had the farmer purchased APH insurance. This provision means that the percentage subsidy for revenue insurance is lower than for APH insurance when revenue insurance costs more than APH insurance, even though the dollar amount of subsidy is the same. S. 1580 eliminates this provision and applies the premium subsidy percentages directly to revenue insurance premiums. Thus the producer premium for the revenue insurance products that cost more than yield insurance (APH) would be significantly lower under S. 1580 than under S. 1666. This would tend to increase the demand for the revenue insurance products that include Crop Revenue Coverage (CRC) and Revenue Assurance (RA) with its optional harvest price option. Additional representative farm-level analysis showed that there would be an increased incentive for farmers to switch from APH to RA or CRC.

Non-insured Crop Disaster Assistance Program Changes

The Non-insured Crop Disaster Assistance Program (NAP) provides yield loss protection for non-insurable crops. Under S. 1580, the major changes to the program are the removal of the area loss trigger and the addition of a service fee paid by producers for enrollment in the program. Producers will be required to pay a service fee equivalent to the fee for catastrophic crop insurance coverage (currently $60 per crop per county). These changes will have (partially) offsetting effects on the program. The removal of the area loss trigger will increase the likelihood of a payment under NAP. This should also encourage producer participation in the program. However, the requirement of a service fee for enrollment in the program will likely decrease NAP participation. If participation patterns follow those of current insurable specialty crops, then roughly 50 percent of the NAP eligible acres would be enrolled in the program.

Specialty Crop Insurance Projections

For our analysis of the impact of S. 1580 on specialty crop insurance, we define specialty crops as any crop except barley, corn, oats, rice, sorghum, soybeans, upland cotton, and wheat. Under S. 1580, insured specialty crop acreage increases by 1.1 million acres from baseline levels. Producer-paid premiums, total premiums, and total indemnities also increase substantially. The average additional net benefit (indemnities less producer-paid premiums) to specialty crop producers from crop insurance under S. 1580 (in comparison to the baseline) is just over $1

billion. Roughly 27 percent of the additional net benefits under S. 1580 are captured by specialty crop producers.

Administrative and Producer Costs of S. 1666

As with any program, there will be administrative costs associated with verification of eligibility and distribution of payments. In addition, there will be costs associated with the development of the rules and regulations for the new program. In order to get an estimate of these costs, inquiries have been made of USDA staff regarding the costs of distributing past programs such as disaster assistance. However, USDA was not able to provide an estimate in time to be included in this report.

For a producer to be eligible for risk management payments under S. 1666, they must engage in two of eight approved risk management practices. The eight practices include such things as purchasing crop insurance, using futures and/or options, forward cash contracting, attending a marketing/risk management seminar, using the payments to pay-down debt, and diversifying production. Some producers will qualify for the payments based on their current activities. For example, approximately 70% of eligible acreage is currently enrolled in the crop insurance program, effectively meeting one of the two requirements. A portion of producers will also satisfy one of the requirements through their existing use of futures and forward contracting. Recent surveys of producers have found substantially different results regarding the use of marketing tools. A survey of farmers in Texas, Nebraska, Indiana, and Mississippi found a range of 14 percent to 50 percent used some type of forward contracting. A 1997 survey of 800 grain producers in southern Minnesota suggested that 74 percent of respondents used forward contracting.

There will be producers who must change their current management practices in order to qualify for the Lugar payments. Depending on the options picked, there may or may not be significant costs associated with these changes. For example, if a producer chooses to attend a marketing seminar, there are those offered by private consulting services that may cost in the neighborhood of $500 to attend. However, there are less costly options such as seminars/courses provided through University extension. In most cases, the courses are free or have a minimal cost. If a producer chooses to use a futures/options contract, there may also be a charge. For a futures or option contract, the producer will incur a commission charge. However, those can vary greatly depending on whether the trade is through a full-service broker or over the Internet. If the producer uses a forward cash contract, there should be no direct charge. Finally, if a producer uses the money to reduce debt levels, the result will be a savings in interest charges.