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Farm-Level Analysis of Risk Management Proposals

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Abstract
This paper presents a detailed report of the representative farm analysis, which analyzed the impacts of two alternative risk management proposals, the Farmers' Risk Management Act of 1999 (S. 1666) and the Risk Management for the 21st Century Act (S. 1580). The representative farm analysis is conducted for several types of farms, including both irrigated and non-irrigated cotton farms, dryland wheat farms, and a corn farm. The authors look at several factors that may shed light on the differential impacts of the two plans, including farm-level income impacts under alternative weather scenarios; additional indirect impacts, such as a change in ability to obtain financing; and the implications of within-year price shocks. The study shows increased crop insurance participation under S. 1580 and increased coverage levels for both yield and revenue insurance buy-up coverage.

Keywords
crop insurance, farm analysis, representative farm analysis, revenue

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Abstract

This paper presents a detailed report of the representative farm analysis (summarized in FAPRI Policy Working Paper #01-00). At the request of several members of the Committee on Agriculture, Nutrition, and Forestry of the U.S. Senate, we have continued to analyze the impacts of the Farmers' Risk Management Act of 1999 (S. 1666) and the Risk Management for the 21st Century Act (S. 1580). Earlier analysis reported in FAPRI Policy Working Paper #04-99 concentrated on the aggregate net farm income and government outlay impacts. The representative farm 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. We consider 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.

Our results indicate that farmers who buy crop insurance will increase their coverage levels under S. 1580. Farmers with high yield risk find that the 65 percent coverage level maximizes expected returns, but some who feel that they obtain other benefits from higher coverage will find that the S. 1580 subsidy schedule significantly lowers the cost of obtaining the additional coverage. Farmers with lower yield risk find that the increased indemnities from additional coverage will more than offset the increase in producer premium. In addition, because S. 1580 extends its increased premium subsidy percentages to revenue insurance products, farmers will have an increased incentive to buy revenue insurance.

Differences in the ancillary benefits from crop insurance under the baseline and S. 1580 would be driven by the increase in insurance participation and buy-up. Given the same levels of insurance participation and buy-up, the ancillary benefits under the two scenarios would be the same.

Key words: crop insurance, farm analysis, representative farm analysis, and revenue.

FARM-LEVEL ANALYSIS OF RISK MANAGEMENT PROPOSALS

At the request of several members of the Committee on Agriculture, Nutrition, and Forestry of the U.S. 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).

Earlier analysis reported in FAPRI Policy Working Paper #04-99 concentrated on the aggregate net farm income and government outlay impacts. This paper presents a detailed report of the representative farm analysis (FAPRI Policy Working Paper #01-00). In this report, 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.

Distinctions between the Proposed Plans

With regard to indirect impacts, if farmers' crop insurance decisions on coverage levels and the choice of products 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 their coverage 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. A switch to the revenue insurance products could increase farmers' use of forward contracts and improve their ability to withstand within-year price shocks.

The extent to which these additional benefits accrue depends critically on whether farmers increase their coverage and change 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).

The first task of this report is to estimate the impacts of S. 1580 on farmers' coverage level decisions and to discuss the resulting benefits of any increased coverage. Because the impacts of S. 1580 vary widely by region and by crop, the 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 effects of S. 1580 on the choice of product (yield vs. revenue insurance) are examined for the Iowa corn farm. The second task is to discuss how the impacts of S. 1580 on coverage level and product choice will lead to greater ancillary benefits from the crop insurance program.

Conditioning Assumptions of the Analysis

Without adoption of S. 1580, the premium subsidy structure is the same as in 1998. That is, the $400 million made available for increased premium subsidies for 1999 and 2000 crops is not part of the baseline policy. An implication of this assumption is that coverage levels under S. 1666 would be the same as under the baseline program because S. 1666 maintains the 1998 premium subsidy schedule. The (unsubsidized) premium rate structure in place for the 2000 crop year is maintained under both S. 1580 and the baseline program. This is a critical assumption because of the link between premium subsidies and the rate structure.

The Link between Premium Rates and Premium Subsidies

Crop insurance rates (dollars of premium per dollar of liability) increase as a farmer increases the amount of insurance purchased. The increase in the premium rate reflects an increase in the likelihood of a loss as the coverage level increases. In determining the amount by which rates increase as coverage increases, one would want to estimate the increase in the likelihood of a loss. At an increased coverage level, a farmer with a greater likelihood of experiencing a loss should be expected to pay a greater percentage increase in premium rate.

However, the change in crop insurance rates as coverage increases is driven solely by the program's method of holding constant the dollar-per-acre amount of premium subsidy. The United States Department of Agriculture's (USDA) Risk Management Agency (RMA) has adopted the following procedure to accomplish this. The change in insurance rates as coverage level increases from say, 65 percent to 70 percent, is set equal to the ratio of the premium subsidy rate at 65 percent (0.417), to the premium subsidy rate at 70 percent (0.319), multiplied by the ratio of coverage levels (0.65/0.70). To see this, note that premium subsidy at 65 percent coverage level is given by

$premsub_{65} = 0.417*0.65*Acres*APHprice*APHyield*rate_{65}$;

and the premium subsidy at 70 percent coverage is given by

$premsub_{70} = 0.319*0.70*Acres*APHprice*APHyield*rate_{70}$.

Equating premium subsidies results in: $\frac{rate_{70}}{rate_{65}} = \frac{0.417}{0.319}\frac{0.65}{0.70} = 1.21$. The "rate relativity" is said to be 1.21. Thus, for all farmers in the crop insurance program, increasing coverage to 70 percent from 65 percent results in a 21 percent increase in the premium rate. The effects of the many rounding rules used in the crop insurance program could mean a slightly different rate increase across yield spans, crops, and counties.

As shown in Table 1, S. 1580 changes the premium subsidy percentages such that increasing coverage from 65 percent to 70 percent or 75 percent changes the dollar per acre premium subsidy that would be available to a farmer. Further increases in coverage to 80 percent and 85 percent would not result in an increase in the dollar per acre premium subsidy. Our conditioning assumption for this analysis is that unsubsidized crop insurance rates available in 2000 will continue to exist under S. 1580, even though the rationale for the current rate structure would no

longer exists. Sections 102 and 104 of S. 1580 outline a rerating of crop insurance premiums. Given the complex economic and political environment with which RMA sets premiums, it would be difficult to estimate the effects of this rerating requirement. Hence, we have not incorporated any premium rate changes into this analysis. As we show, existing rate relativities are a major determinant of the amount of insurance that farmers purchase.

Table 1. Premium subsidy percentages under S. 1580 and the 1998 program

Coverage Level	S. 1580	1998 Program
65	50	41.7
70	50	31.9
75	55	23.5
80	43	17.3
85	31	13.0

Quantifying Yield Risk

To fully understand the financial effects of alternative crop insurance proposals, we need to quantify the risks that a farmer faces. The crop insurance rate at the 65 percent coverage level gives one measure of these risks because it reflects the loss history in a county. This rate can be combined with additional information about yield risks in a county to derive a reasonable estimate of the distribution of crop yields for a representative farm in a county. Figures 1 to 5 show estimated density functions of crop yields for, respectively, an irrigated and a non-irrigated cotton farm in Tom Green County, Texas; a dryland wheat farm in Morton County, North Dakota; a dryland corn farm in Webster County, Iowa; and a dryland wheat farm in Sumner County, Kansas.

These density functions can be used to show the range of possible yields under all possible weather scenarios for the representative farm and to calculate the probability that yields will fall below a certain level. For example, for the dryland cotton farm illustrated in Figure 2, there is a 10 percent chance that yield will be zero, and a 26 percent chance that yields will fall below 169 lb/acre, which is the amount of coverage offered under a 65 percent crop insurance policy. For the North Dakota dryland wheat farm illustrated in Figure 3, there is a 35 percent chance that yields will fall below the 65 percent coverage level of 11 bu/ac. For all of the representative farms, the Actual Production History (APH) yield is based on historical county yields.

Estimating the Risk Management Payments

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 percent. Table 2 shows the estimates of the risk management payments under S. 1666 for each farm.

Table 2. Estimated risk management payments under S. 1666

Farm	**Risk Management Payment ($/acre)**
Irrigated Cotton	6.47
Dryland Cotton	2.24
North Dakota Wheat	1.33
Corn	4.76
Kansas Wheat	1.62

Selecting the Optimal Amount of Insurance Coverage

Once a farmer chooses to participate in the crop insurance program, he or she must then decide on a coverage level. In this analysis, we assume a minimum of 65 percent coverage. We estimate the effect of S. 1580 on a farmer's decision whether to buy additional coverage.

In all 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 profiles 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. In counties with large variations in yield risk (i.e. some farms have low yield risk, while others in the county have higher yield risk), premiums based on average results in the county would tend to overprice insurance for the low-risk producer and underprice it for the high-risk producer. This would lead to low-risk producers leaving the program and high-risk producers staying, which would exacerbate the problem. Other producers simply avoid enrollment in any government program. Even in the deficiency payment and Agricultural Market Transition Act (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 (FAPRI Policy Working Paper #04-99), 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.

The decisions that farmers make on coverage levels are influenced by many factors. But an optimizing farmer will compare the incremental cost of higher coverage with the incremental benefits. If the incremental costs are less than the incremental benefits, then the producer will buy the additional coverage. The incremental cost of higher coverage is the additional producer premium that will be paid for the higher coverage.

Given the subsidy schedules shown in Table 1, S. 1580 (with its higher subsidy levels) reduces the incremental cost of higher coverage at the 70 percent and 75 percent coverage levels relative to the baseline program. The incremental cost of moving from 75 percent to 80 percent and 80 percent to 85 percent are approximately the same under the two programs, even though the producer premium under S. 1580 is lower. This is due to the fact that the premium subsidies are held approximately constant (in dollars) at the higher coverage levels.

There are two sources of incremental benefits of higher insurance coverage. The first is the increase in average net revenue levels because indemnity payments increase as insurance coverage increases. Average net revenue is defined as market revenue and indemnity received less producer premium, where the average is taken across all possible weather scenarios. The second is the ancillary benefits that may accrue to the farmer from increased coverage levels. Examples include:

1) ability to obtain additional financing for production expenses;
2) ability to withstand additional risk in other revenue-generating operations; and
3) additional peace-of-mind that comes with knowing that if a crop disaster occurs, then additional indemnity payments will be forthcoming.

Notice that all three examples are listed as being incremental in nature. This is because the additional ancillary benefits under S. 1580 occur only if the farmer purchases additional coverage. The baseline program already provides significant amounts of these ancillary benefits.

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.

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 estimating peace-of-mind benefits is not straightforward. 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

In our analysis, the benefits of additional coverage are constant across the two programs for a given farm. The only thing that differs is the cost of achieving the higher coverage level. Thus, our approach is to estimate the change in average net revenue levels for our representative farms under the two programs to determine whether the decision to purchase additional coverage is significantly altered by S. 1580.

Figures 6 to 10 show the average (expected) net revenue levels that would be achieved under the baseline program, under S. 1580, and under S. 1666 at different coverage levels (including no insurance). Average returns under S. 1666 equal average returns under the baseline scenario plus

the risk management payments. The insurance purchased is yield insurance (APH). Average market revenue equals APH yield times expected price. APH yields for the five farms are shown in Figures 1 to 5. Risk management payments from S. 1666 are given in Table 2. Expected prices were set at $0.60/lb for cotton, $3.00/bu for wheat, and $2.00/bu for corn. The average (across all weather scenarios) indemnity changes with the coverage level and was calculated using the representative yield distributions shown in Figures 1 to 5. Figures 11 to 15 show the percentage change in average revenue as coverage increases from 65 percent.

Figure 6 shows that expected revenue for the cotton farmer in irrigated areas with no insurance is about $15/acre less than if the farmer buys 65 percent coverage under the baseline policy. This $15/acre represents the per-acre premium subsidy available under the baseline policy. The subsidy increases to $18/acre under S. 1580.

The results in Figure 6 clearly illustrate the attractiveness of the 65 percent coverage level under the baseline policy relative to no insurance and to insurance at higher coverage levels. Average revenue decreases substantially at higher coverage levels. This is not to say that no cotton farmer who irrigates would purchase higher coverage levels under the baseline policy. However, it is clear that such a decision would result in significantly lower average revenues, even after the higher indemnity payments are accounted for. This result is consistent with the observation that very few cotton farmers currently buy more than 65 percent coverage. In 1998, the average buy-up coverage level for participating Texas cotton producers was roughly 65 percent.

In contrast, under S. 1580, average revenue increases as coverage increases. This reflects the difference in the premium subsidy schedules shown in Table 1. Thus, even if potential ancillary benefits were not accounted for, a farmer would have an incentive to increase coverage levels to 75 percent under S. 1580 because the increase in producer premium is less than the increase in expected indemnity. The percentage increase in returns is shown in Figure 11.

Figures 7 and 12 show that the dryland cotton farmer faces a different situation. Average revenue decreases as coverage increases under both programs. However, the decrease is much less under S. 1580 than under the baseline program. This smaller decrease implies that the cost of obtaining possible ancillary benefits from higher coverage levels is significantly less (average revenue declines by a lesser amount) under S. 1580 than under the baseline program. Farmers

who place value on these benefits will find them obtainable at relatively low cost. Thus, we can conclude it likely that a significant portion of Tom Green County cotton farmers would move to higher coverage levels under S. 1580. Cotton farmers in irrigated areas would find that 75 percent coverage maximizes their expected income, and cotton farmers in dryland areas who need additional coverage would find that the cost, in terms of forgone profit, is quite low.

Figures 8 and 13 show that the Morton County wheat farmer faces a similar situation to that of the Tom Green County dryland cotton farmer. Under both programs, the 65 percent coverage level maximizes expected returns. The substantial decrease in returns under the baseline policy as coverage increases creates a cost disincentive for the producer to increase coverage. This result is consistent with the observation that few wheat farmers in this part of North Dakota choose to purchase any insurance in excess of 65 percent. (In 1998, the average buy-up coverage level for participating North Dakota wheat producers was roughly 65 percent.) This disincentive to move to 75 percent coverage practically disappears under S. 1580. However, moving beyond 75 percent coverage reduces average returns sharply under both programs. Thus, one would expect many wheat farmers in Morton County to purchase coverage up to the 75 percent level.

Figures 9 and 14 show that the Webster County corn farmer's situation is much different. First, relative to expected market revenue, the two programs are fairly similar. At the 80 percent coverage level, the difference in expected revenue between the baseline and S. 1580 is at a maximum, but it is only $3.57/acre (1.26 percent of expected market revenue). Second, under the baseline policy, the 75 percent coverage level maximizes expected revenue, rather than the 65 percent coverage level for the other farms. This result is consistent with the observation that many Iowa farmers commonly buy crop insurance at the 70 percent and 75 percent coverage levels. (The average buy-up coverage level for participating Iowa corn producers was approximately 68 percent in 1998.) The third difference is that under S. 1580, the 80 percent coverage level maximizes expected revenue. Thus, one can conclude from these results that Iowa farmers are most likely to increase their coverage level to 75 percent or 80 percent under S. 1580.

A word should be said about what is driving these results. Recall that the change in expected indemnities from increased coverage is taken from the estimated density functions presented in Figures 1 to 5. These density functions are consistent with the crop insurance rates

at the 65 percent coverage level for the specific crop in each county in that the expected indemnities at the 65 percent coverage levels under each density function would be equal to that implied by the 65 percent rate. However, they are not, in general, consistent at higher coverage levels. That is, for the Morton County wheat farmer, the 75 percent rate implied by the estimated density is significantly less than the rate that would actually be charged to the producer. The reason for this is that crop insurance rates for higher coverage levels are not determined by estimating the increased probability that a loss will occur, as would normally be done. Rather, as explained above, they are predetermined by the need to hold the dollar-per-acre amount of subsidy constant. The result is that in high-risk counties, the increase in actual crop insurance rates will be greater than the increase in indemnities received as coverage levels increase. In low-risk counties, the increase in rates charged is about equal to the increase in expected indemnities to be received. This is why the change in expected revenue as coverage increases is quite small for the Iowa corn farmer.

The Kansas wheat farmer faces less yield risk than the dryland cotton farmer and more yield risk than the Iowa corn farmer. Figures 10 and 15 show that under the baseline plan the 65 percent and the 70 percent coverage levels result in about the same level of expected income, with a slight edge to the 65 percent coverage level. Under S. 1580, the 75 percent coverage level clearly maximizes expected returns. Thus, many Kansas wheat farmers would find it in their interest to increase their insurance coverage from 65 percent or 70 percent to 75 percent.

Effect on Demand for Revenue Insurance Products

Both 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 shown in Table 1 directly to revenue insurance premiums. Thus, the producer premium for the revenue insurance products that cost more than APH would be significantly lower under S. 1580 than under S. 1666. This would increase the demand for the

revenue insurance products such as Crop Revenue Coverage (CRC) and Revenue Assurance (RA) with the harvest price option.

Figure 16 extends the earlier results shown in Figure 9 by including the average revenue levels that would be obtained if the Webster County corn farmer buys RA with the harvest price option under S. 1580. Because of the increased subsidy, average revenue is maximized under RA at the 75 percent and 80 percent coverage levels. This clearly shows that there is increased incentive for farmers to switch from APH to RA or CRC. Similar results hold for the other three farms considered in this analysis, with the exception that only CRC is available to Texas cotton producers and Kansas wheat producers.

Farm-Level Income Impacts under Various Weather Scenarios

The analysis presented above compares the plans under all possible weather scenarios with appropriate weights given by the density function. The advantage of this approach is that it is consistent with the way that farmers must buy crop insurance in that the purchase decision is made before any information about growing conditions is known. One drawback of the approach—the effects of the alternative plans under a specific set of growing conditions cannot be discerned.

Table 3 compares the net payments (risk management payments and indemnities less producer premium) that would be received under the two proposals under two weather scenarios for each of the representative farms. The coverage levels used in Table 3 for S. 1666 are 65 percent for the cotton and wheat farms and 70 percent for the corn farm. For S. 1580, coverage levels are 75 percent for the cotton and wheat farms and 80 percent for the corn farm. 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.

Table 3 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 percent 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.

Table 3. Comparison of outcomes for specific weather years

			Cumulative probability*	**Risk payment**	**Indemnity**		**Net payment**		**Difference**
				S. 1666	**S. 1580**	**S. 1666**	**S. 1580**	**S. 1666**	
Farm	Year	Yield	(percent)	($/acre)	($/acre)		($/acre)		($/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.

For the irrigated cotton farm, the increase in coverage level to 75 percent 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 $32.97/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 that higher coverage levels under S. 1580 translate into a higher dollar amount of coverage for the higher-yielding low-risk farms.

Summary of Findings

Our results indicate that farmers who buy crop insurance will increase their coverage levels under S. 1580. The high-risk dryland cotton farmer in Tom Green County and the high-risk continuous wheat farmer in Morton County will still find that the 65 percent coverage level maximizes expected returns. However, some who feel that they obtain other benefits from higher coverage will find that the S. 1580 subsidy schedule significantly lowers the cost of obtaining the additional coverage.

Somewhat surprisingly, the results suggest that the greatest change in buy-up coverage is likely to be by the lower-risk farmers who find that the increased indemnities from additional coverage will more than offset the increase in product premium. The Webster County corn farmer will find that 80 percent coverage maximizes expected returns, whereas the cotton farmer who uses irrigation in Tom Green County finds that 75 percent coverage maximizes returns. In addition, because S. 1580 extends its increased premium subsidy percentages to revenue insurance products, farmers will have an increased incentive to buy revenue insurance.

Differences in the ancillary benefits from crop insurance under the baseline and S. 1580 would be driven by the increase in insurance participation and buy-up. Given the same levels of insurance participation and buy-up, the ancillary benefits under the two scenarios would be the same.

These results are also consistent with our earlier analysis. In the aggregate analysis, we showed that crop insurance participation increases under S. 1580, and that the average coverage level for buy-up coverage for both yield and revenue insurance also increases.

Figure 1. Distribution of Irrigated Cotton Yield in Tom Green County (APH Yield = 600, APH Rate = .153)

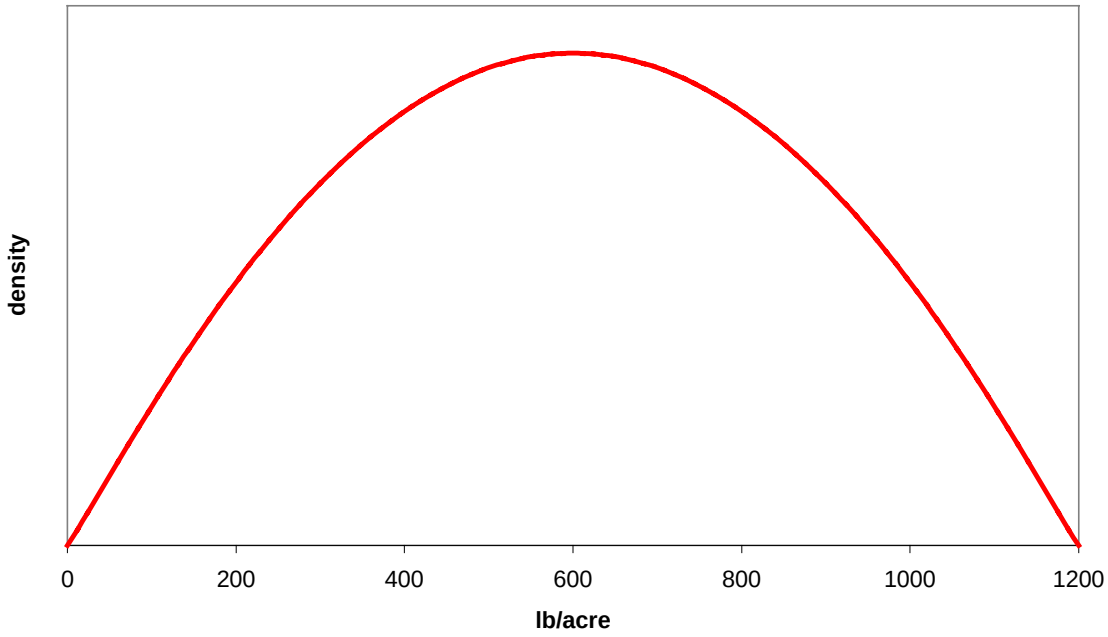

Figure 2. Distribution of Dryland Cotton Yield in Tom Green County (APH Yield = 260, APH Rate = .279)

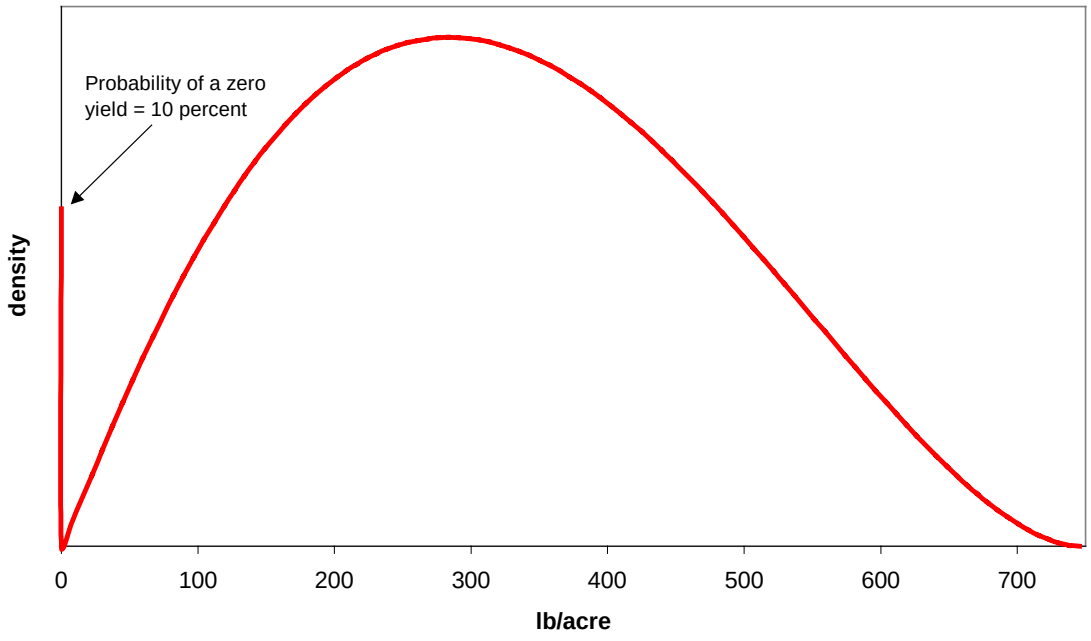

Figure 3. Distribution of Dryland Wheat Yield in Morton County (APH Yield = 17, APH Rate = .206)

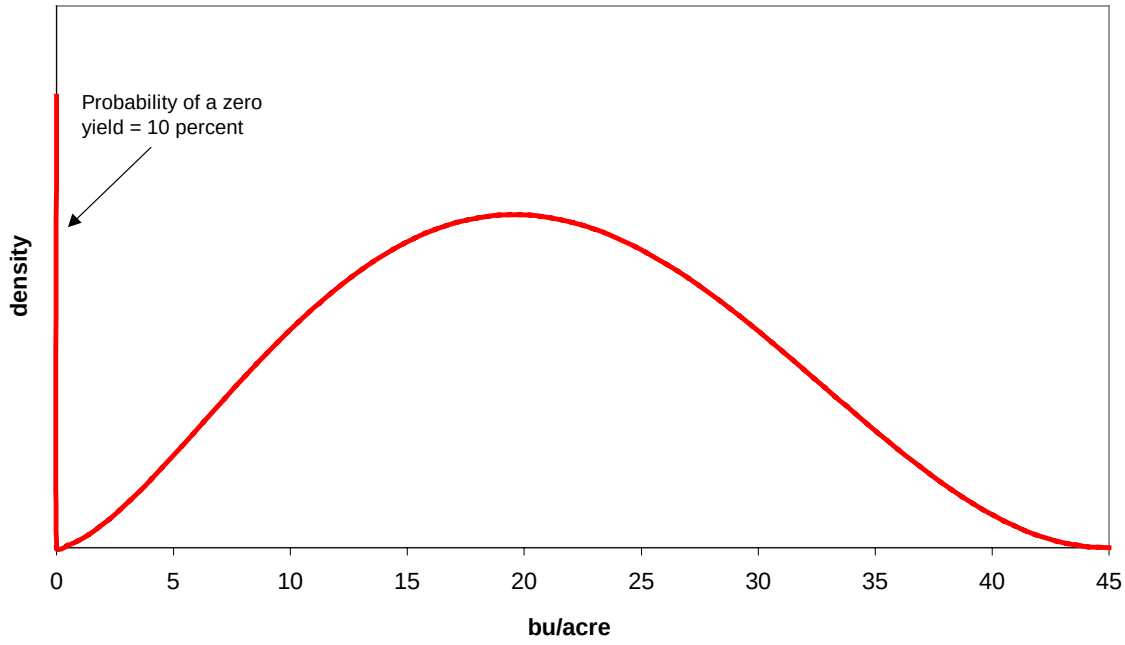

Figure 4. Distribution of Corn Yield in Webster County (APH Yield = 140, APH Rate = .033)

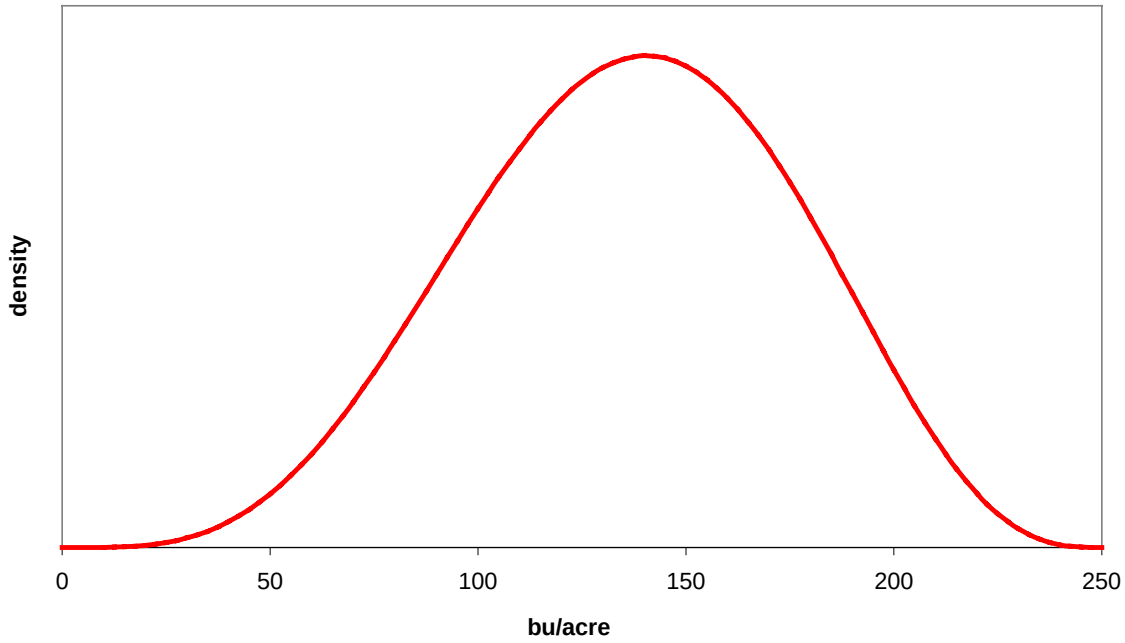

Figure 5. Distribution of Wheat Yield in Sumner County (APH Yield = 30, APH Rate = .071)

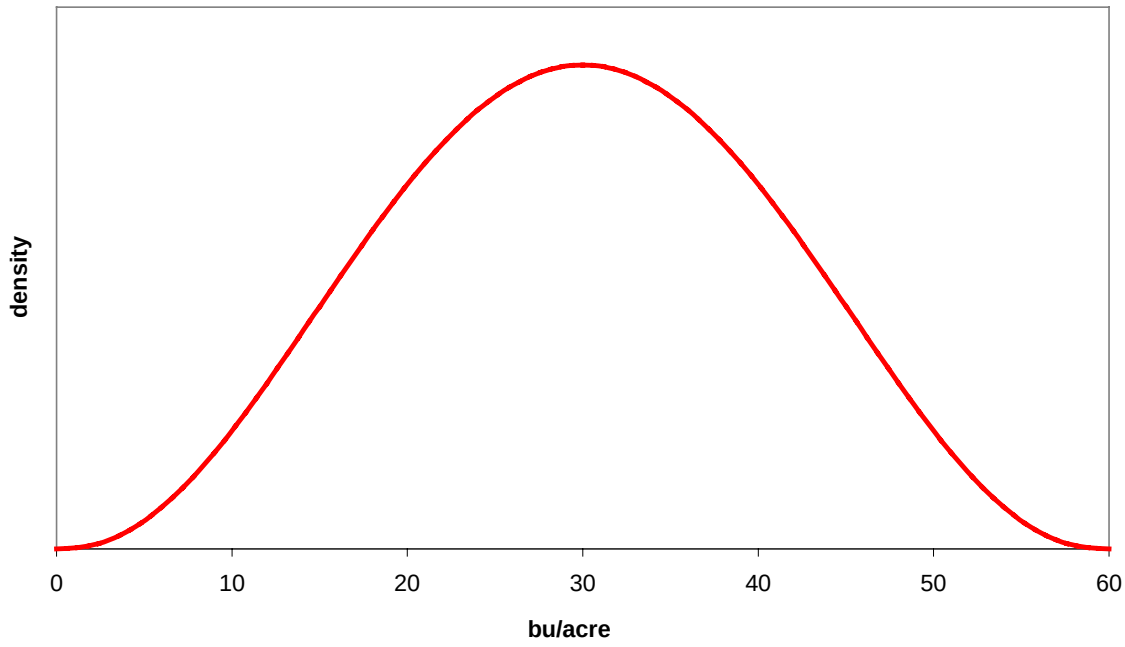

Figure 6. Expected Revenue Less Producer Premium for Tom Green Irrigated Cotton Producer

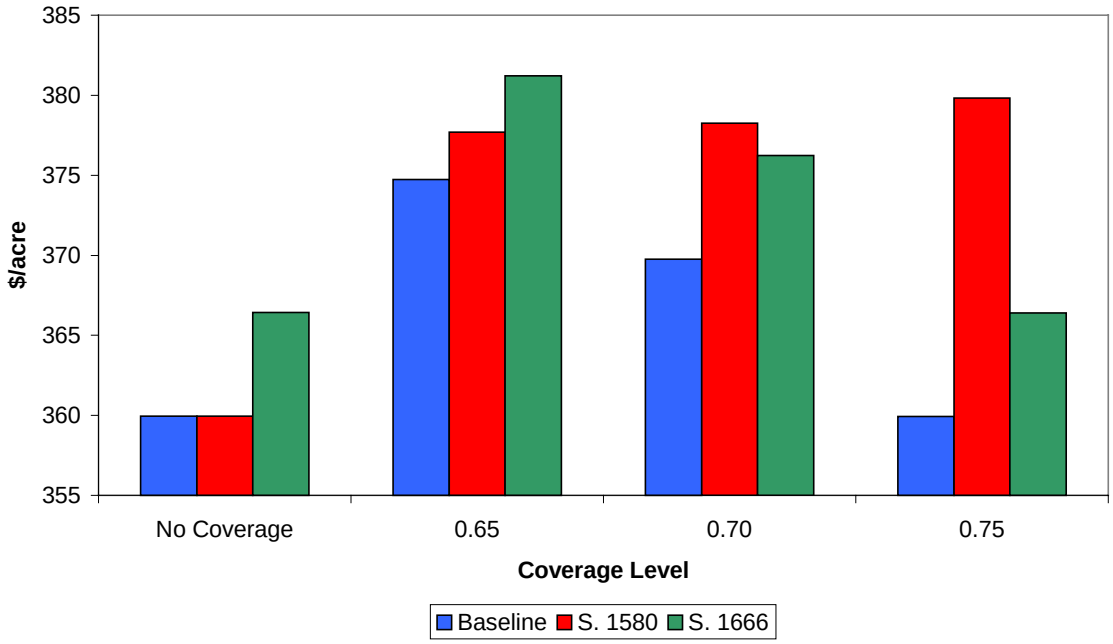

Figure 7. Expected Revenue Less Producer Premium for Tom Green Dryland Cotton Producer

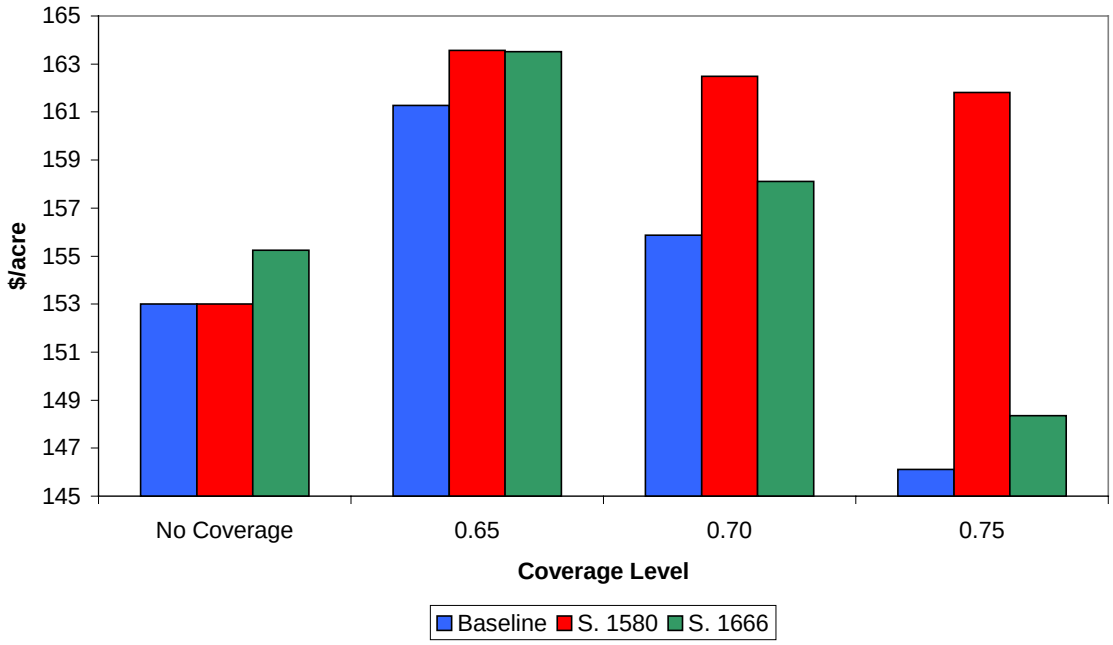

Figure 8. Expected Revenue Less Producer Premium for Morton County Wheat Producer

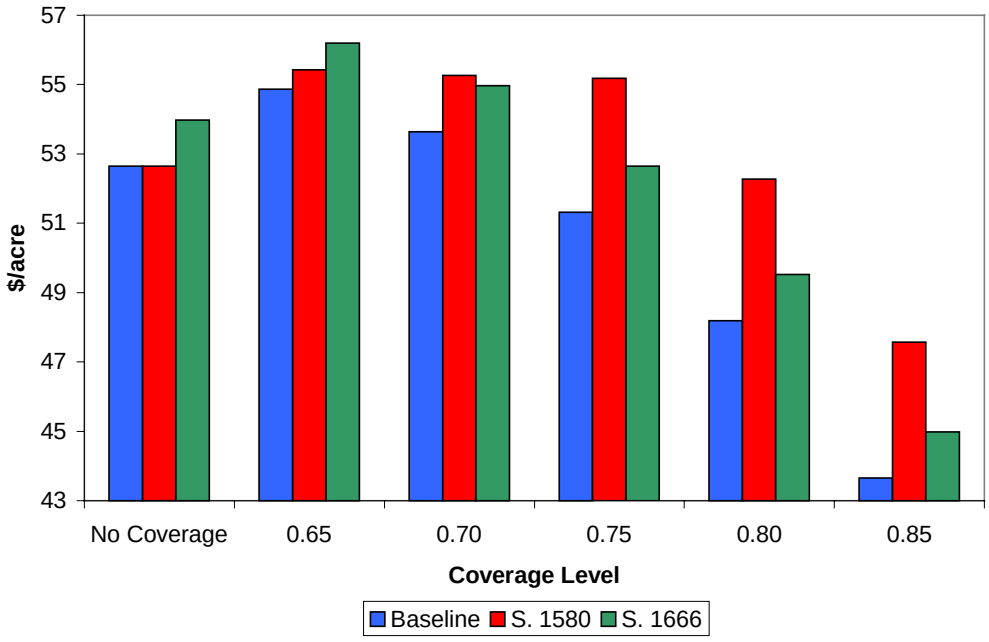

Figure 9. Expected Revenue Less Producer Premium for Webster County Corn Producer

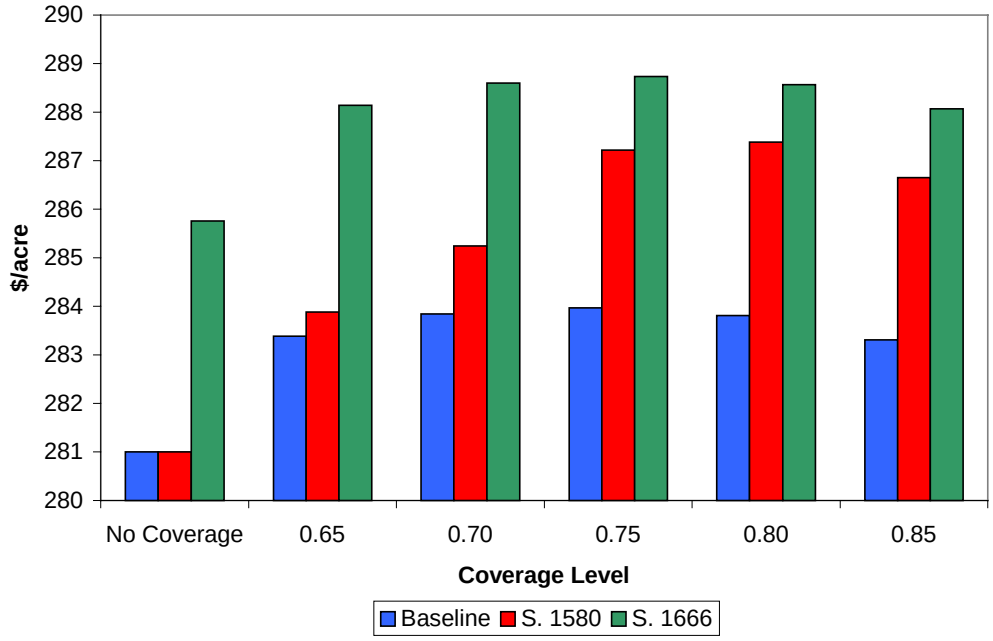

Figure 10. Expected Revenue Less Producer Premium for Sumner County Wheat Producer

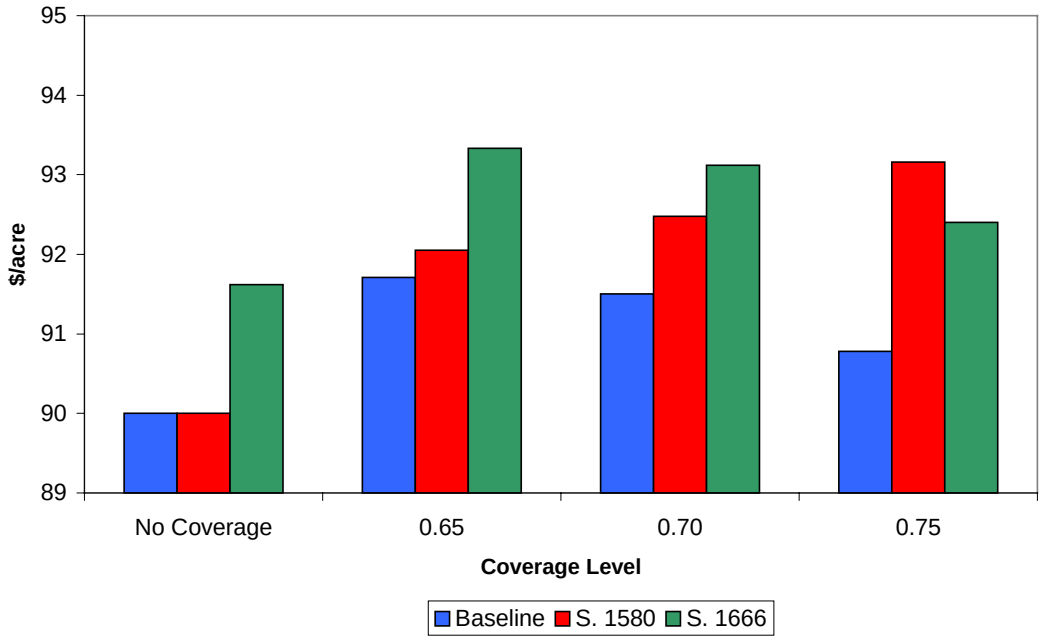

Figure 11. Percent Change in Expected Revenue Less Producer Premium for Tom Green County Irrigated Cotton Producer

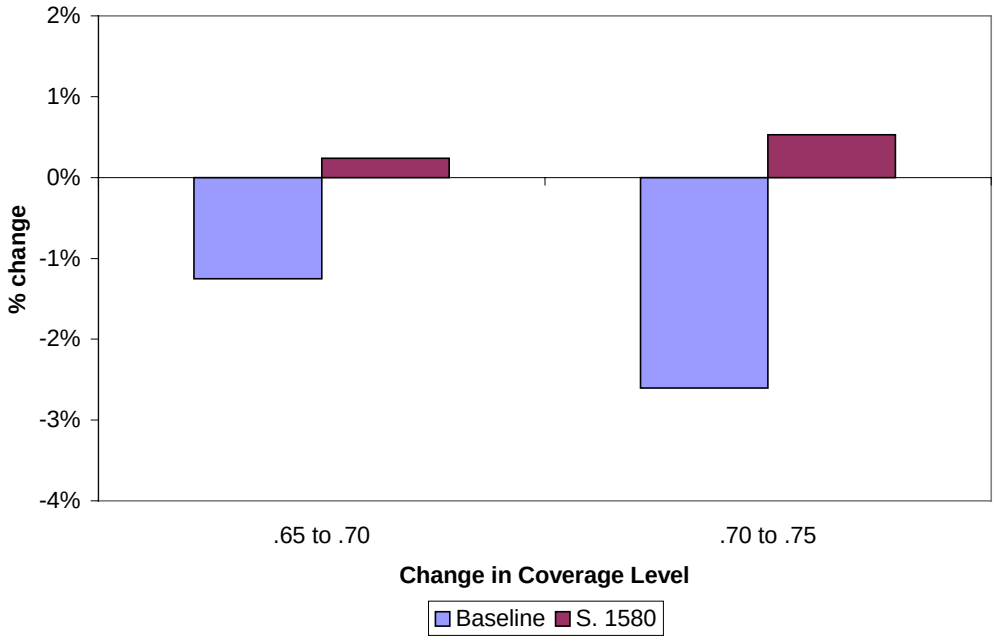

Figure 12. Percent Change in Expected Revenue Less Producer Premium for Tom Green County Dryland Cotton Producer

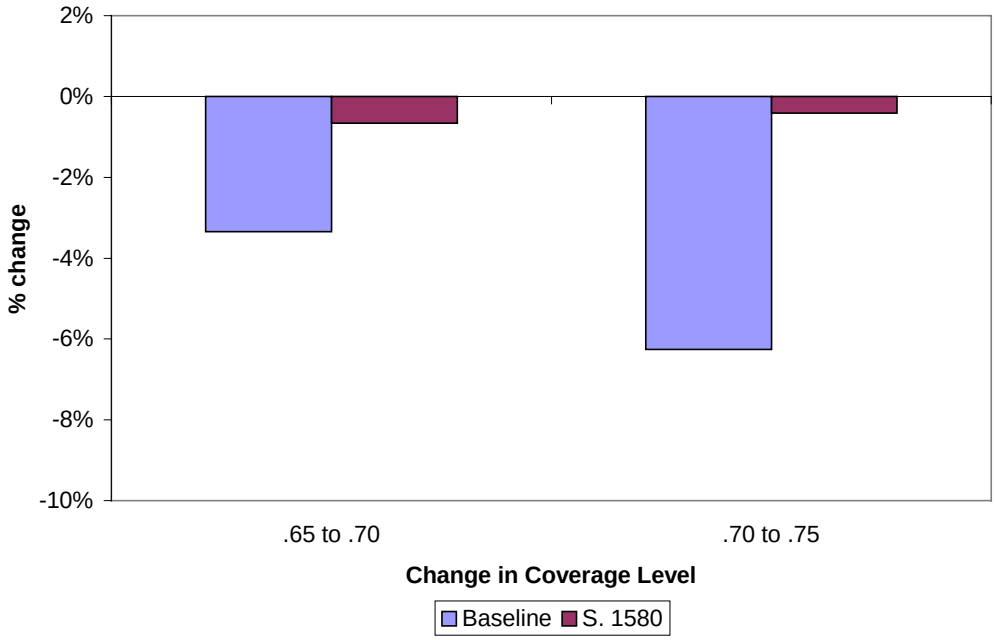

Figure 13. Percent Change in Expected Revenue Less Producer Premium for Morton County Wheat Producer

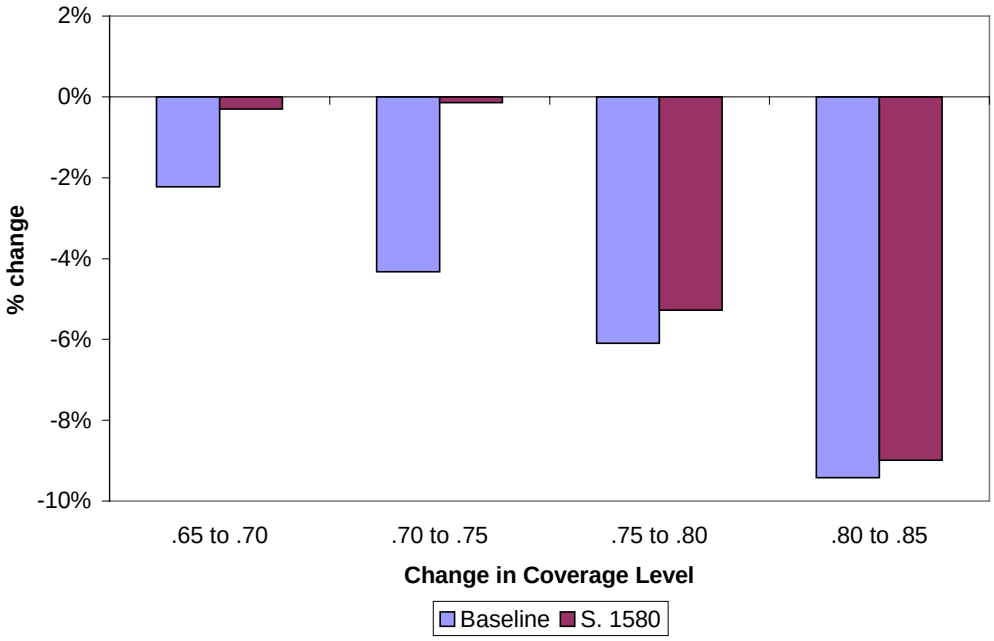

Figure 14. Percent Change in Expected Revenue Less Producer Premium for Webster County Corn Producer

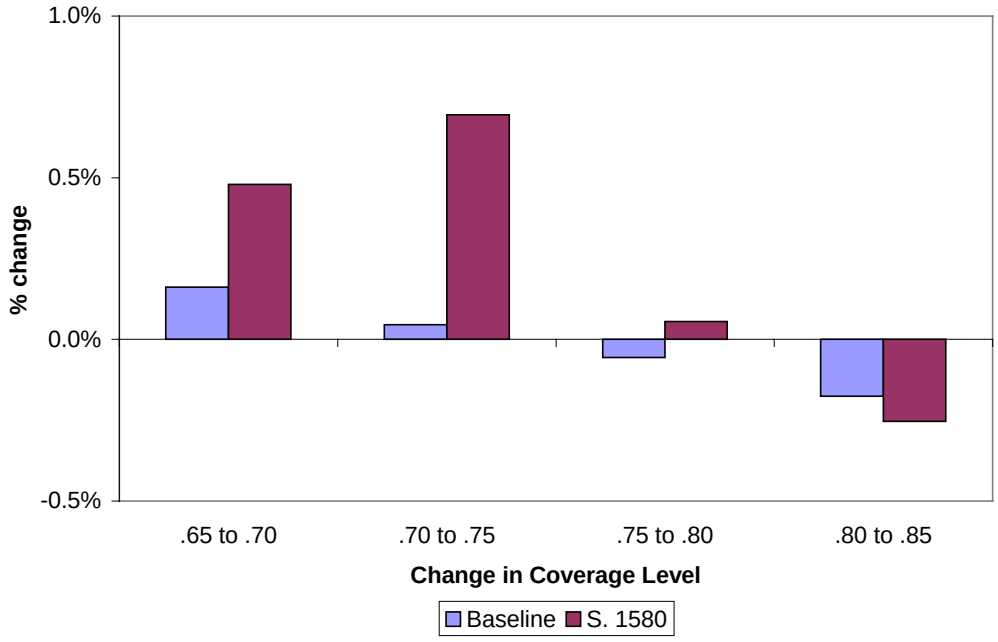

Figure 15. Percent Change in Expected Revenue Less Producer Premium for Sumner County Wheat Producer

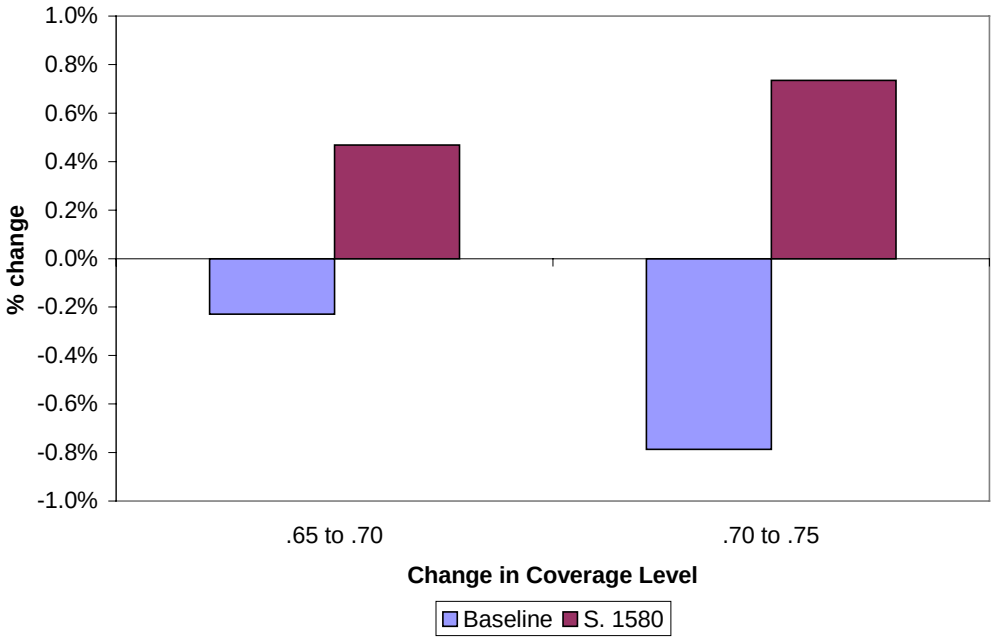

Figure 16. Expected Revenue Less Producer Premium for Webster County Corn Producer