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# Risk-Adjusted Comparison of Conservation Reserve Program Payments Versus Production Payments for a Corn–Soybean Farmer

**Gregory Ibendahl**

Conservation reserve program (CRP) payments amount to several billion dollars annually. Payments are allocated to both remove land from production and to help farmers pay for conservation improvements. However, research examining whether farmers increase their utility with CRPs is limited. This paper uses simulation analysis and certainty equivalents to compare farming income to payments under the CRP. Farming income is a combination of crop production and government payments as specified in the 2002 Farm Bill. This analysis focuses on farms in three different counties in Kentucky. Results indicate that CRPs are good choices for many farmers.

*Key Words:* certainty equivalents, conservation, CRP, government payments, risk, simulation

**JEL Classifications:** Q15, Q18, Q16, C15

The 2002 Farm Bill presented farmers with many choices. Most discussion and analysis focused on which Farm Service Agency (FSA) option farmers should choose. FSA offered farmers five basic options with one of the options having three suboptions. The choice of an FSA option helps determine government payments over the life of the Farm Bill. However, just focusing on the five FSA options implies that farmers will keep farming their land.

The 2002 Farm Bill also allocated money to Conservation Reserve Programs (CRP). For many farmers, the first decision should actually be between continuing to farm or putting the land into a conservation program. Only if continuing to farm is the best option should farmers then decide among the various FSA

options. However, to choose between farming and CRP payments, producers need to estimate their returns from continuing to farm.

The choices are difficult to compare because they are so different. Farmers are comparing a sure payment every year with CRP to one that will vary from year to year by continuing to farm. The farming option has variability not only from yields and prices, but also from government payments. This farming option is also complicated by the FSA option choice. Farmers need to find their optimal FSA option, estimate the payments, and then combine the government payments with the variable production income.

The objective of this study is to compare the utility from CRP payments to the utility from picking an optimal FSA option and continuing to farm. These comparisons are analyzed in three Kentucky counties.

The utility from the CRP choice is a

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straightforward calculation. Farmers know how much they will receive ahead of time, provided their offer is accepted. Therefore, farmers can plan for at least 10 years of payments. These payments do not vary, so there is no risk. The only downside is what happens after 10 years. There is some probability that land may not be rolled over into a new CRP contract. In addition, land that has been in CRP for 10 years may require some maintenance work before it can be used as cropland again.

The utility calculation for continuing to farm is much more complicated. From the production side, farmers face three major areas that contribute to net income variability. First is yield variability. Weather obviously is a major contributor to yields each year. However, despite this variability, yields have trended upward as new seed varieties continue to push the yield envelope. Yield histories exist in all counties so it is fairly easy to estimate the trend for yield and to calculate a yield variance.

Expense variability also contributes to income variability. Expenses may or may not exhibit a yearly trend. Some expenses like labor clearly show an increase from year to year. For other expenses, a simple mean may be a good predictor of next year's expense. Like the yields, data exist for historical expenses so any expense trends, means, and variances can be calculated.

Grain prices are the most difficult calculation in the production estimation of income variability. Prices probably do not follow a trend, but is the mean a good estimate of future prices? Another complicating factor is how farm bills influence prices. Since 1996, farmers have more freedom to plant what they want. Therefore, prices probably respond differently now than before 1996. However, the price variability can be easily estimated and used in part with future price predictions.

Prices are further complicated by the use of national and local prices. To determine local farmer income, local or area prices are needed. However, many of the farm bill payments are based on a national price. Therefore, local and national prices must be estimated together, and

there is certainly correlation between the national and local price.

Government payments contribute to the difficulty in calculating the utility from continuing to farm. Most likely, government payments decrease net farm income variability, but trying to model them into net farm income is fairly complicated. The main difficulty with government payments is that some payments are dependent upon what happens with the estimation of prices and yields. Also, to estimate government payments, information about historical yield and acreage bases is needed.

The last complicating factor with government payments is the length of the 2002 Farm Bill. The 2002 Farm Bill will expire before the CRP contracts run out. Thus, comparing CRP to farming on a year-by-year basis may not be completely accurate. This discrepancy is mitigated somewhat because farm bill expiration will not occur until 6 years into the future and there most likely will be some type of farm bill when the 2002 bill expires.

Finally, to calculate the utility from continuing to farm, the yield, price, and expense variables must be factored into a model that calculates net farm income with government payments. Simulation analysis is probably the best way to estimate the utility from farming. Another point to consider with the decision is how to address fixed expenses. Does CRP land reduce fixed expenses? Given that machinery and equipment costs are not linear but follow a step function, a small acreage change to CRP might not reduce farmland enough to justify modifying a farm's equipment base.

## **Background**

The 2002 Farm Bill provides three types of payments. The direct payment is guaranteed each year and does not vary. This payment is independent of the crop grown. The countercyclical payment and loan deficiency payments (LDP) are based on the national and county price, respectively. Farmers do not know ahead of time whether they will receive a countercyclical payment or LDP. The countercyclical payment is based on farmer historical acres and yields, and thus the payment

does not depend upon current production, only national marketing price for the current year. LDP are based on current production as well as the current county price (USDA).

The direct payment is the product of multiplying together the number of base acres, the yield per acre, and a set rate per bushel. The rate per bushel is specified in the farm bill and cannot be changed. The yield per acre for direct payments is also fixed and is a carryover from the 1996 Farm Bill. The only way farmers can change their direct payment is by the choice of an FSA option that affects the acreage base.

The acreage base is determined by choosing between two alternatives. The first alternative is to start with the 1996 Farm Bill acreage base and then use one of the suboptions to add soybean acres. Soybeans are part of the 2002 Farm Bill, but not the 1996 Farm Bill. Farmers cannot have a bigger base than their acreage history, so soybean base acres could be limited for some farmers unless another crop base is reduced. The other major alternative for acreage base is to use the average 1998 to 2001 acreage history for each crop. This alternative does not even consider the 1996 acreage base.

Countercyclical payments are like direct payments because the base acres, yields per acre, and rate per bushel are multiplied together to determine the payment. The same base acres used for direct payments are also used for countercyclical payments. Again, the choice of an FSA option determines the base acres. On the other hand, the rate per bushel is determined from the national market price and can vary from zero to a specified cap. The biggest difference with countercyclical payments, though, is that farmers can update their yield base to reflect more recent yields. However, to update countercyclical yields, farmers must also pick the FSA option that updates acres.

FSA options 1, 2, 3, and 5 all start with the 1996 acreage and yield bases. The main difference among these options is how soybeans are added to the mix. FSA option 4 is the most different. This option has three suboptions for countercyclical yields. Option 4a

just uses the 1996 yield base. Option 4b starts with the 1996 yield base and adds 70% of the yield difference between the 1996 yield base and the 1998 to 2001 yield average. Option 4c uses 93.5% of the 1998 to 2001 yield average. For those farmers choosing option 4, 4a or 4b will be chosen as long as yields have improved. Option 4c is preferred whenever yields have increased by more than 28%.

Established by the Food Security Act of 1985, the CRP is designed to help producers protect marginal and fragile farmland by paying them yearly payments to take the land out of production for 10 to 15 years. Participation in the program is voluntary. In addition to the rental payments, producers receive a \$5-per-year incentive payment for certain management practices.

The CRP offers farmers two types of signups: general and continuous (FSAa). General CRP signup is only offered at certain times. Producers offer land at up to a maximum rate per acre. The offers are ranked according to an Environmental Benefits Index (EBI). Those offers with the highest scores are accepted. The EBI cutoff score for accepting offers is determined from the number of offers made and the United States Department of Agriculture (USDA) goal for additional CRP acres. The total acreage cap for all CRP acres is currently 39.2 million acres. Continuous signup acres can be enrolled anytime and are not subject to competitive bidding. Because these lands are frequently used as buffer areas and waterways, CRP continuous signup acres are not part of this analysis.

Land offered for CRP signup must meet criteria for both land eligibility and producer requirements. Producers must have operated the land for 12 months before the CRP signup close unless there were special circumstances involved. FSA is basically trying to prevent owners from acquiring land just to place it in CRP. Crop land eligibility requires that land be planted in an agricultural commodity in 4 of the previous 6 years and be physically capable of being planted in a normal manner with an agricultural commodity. In addition, the land must have an Erodibility Index (EI) of at least 8, be from expiring CRP acreage,

or located in a CRP conservation priority area (FSAb).

The EBI score, which is used to rank competing CRP offers, consists of six parts: wildlife factors, water quality, erosion factors, enduring benefits, air quality, and cost. Wildlife factors are worth up to 100 points and are determined by habitat cover, wildlife enhancement, and whether the area is in a wildlife priority area. The water and air quality factors are based on whether putting the land into CRP can improve these factors. Water quality is worth up to 100 points and air quality is worth up to 45 points. The erosion factor is scored up to 100 points and is based on the EI index. The higher the EI, the more EBI points a potential CRP property scores. The enduring benefit is an evaluation of how likely certain practices will remain in place after the CR contract ends. The cost is an evaluation of the cost of environmental benefits per dollar expended (FSAc).

Farmers have several options to make their CRP offer more competitive. The choice of a cover crop or practice is probably the best way to improve an EBI score. Another option is to subdivide land and only offer the most sensitive areas or areas with the highest EI scores. Finally, producers can offer to accept lower payment rates per acre. The maximum payment rate is the local dry land cash rental rate. Producers can increase their EBI scores by up to 15 points by making CRP offers up to \$15 per acre below the maximum rental rate.

The CRP signup 26 that ran from May 5 to June 13, 2003, was the first general CRP signup since the 2002 Farm Bill was enacted. The last general signup was in early 2000. CRP offers with an EBI score of 269 or greater were accepted, except in those counties facing cropland limitations. Because less land was available for this signup, fewer offers were accepted and those lands accepted had an EI rating of 17. Many producers (36%) submitted CRP offers with a rental rate below the maximum acceptable rental rate. The average payment rate for signup 26 was \$56.53 compared to \$52.76 for signup 20 (FSAd).

Putting land into CRP requires giving up government program base acres (Tanner, per-

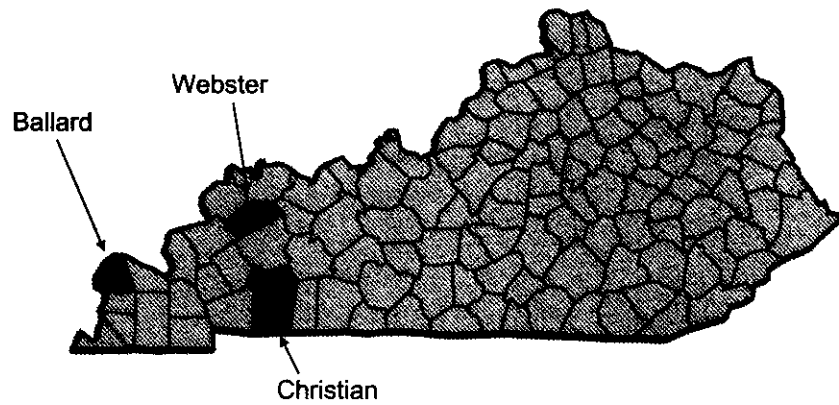
sonal communication). For a farm with all its acres enrolled in government programs, every new CRP acre requires giving up 1 acre of base. Farmers are free, though, to choose which base acres to reduce. For most farmers in Kentucky, soybean base acres are nearly always less valuable than corn or wheat base acres.

## **Model**

Simulation analysis is used to estimate the net returns per acre for the continue-to-farm option. Separate multivariate empirical (MVE) distributions are estimated for yields, prices, and selected expenses. For the analysis, yields back to 1972, prices back to 1996, and expenses back to 1992 are used. Because farm bills before 1996 influenced prices differently, older prices are not used.

Parameters for the MVE distribution are estimated using Simetar, following procedures detailed in Richardson. The deterministic component and the error term of each random variable are first calculated. The deterministic component of yields and expenses is a trend line, whereas the deterministic component of prices is the mean. The sorted and unsorted fractional residuals are then calculated for each variable. Next, probabilities are assigned to the sorted fractional residuals and the correlation matrix is calculated using the unsorted residuals.

The final step is to simulate the stochastic component of each variable. For the yields, the simulated value is added back to the yield trend. Crop prices and expenses are more complicated. For crop prices, the national market year price is needed to calculate government payments. The state November price is used to calculate LDP and the state January price is used to determine how much farmers receive when selling their grain. The price simulation calculates a price wedge between the national price and the local or state November and January prices. These price wedges are simulated and are added back to the 2003 FAPRI (Food and Agricultural Policy Research Institute at the University of Mis-



**Figure 1.** The Three Kentucky Test Counties

souri) projected national prices to give a November and January local farmer grain price.

The simulation of selected expenses is really a simulation of the USDA cost index for fertilizer, nitrogen, seed, fuel, and labor. As with the yields, the simulation value of the expense error term is added back to the trend line for that expense item. Because these are just indices, the index must be converted to a dollar amount per acre. In this model, 2001 expenses are the baseline and the baseline is adjusted by a ratio of the simulated expense index divided by the 2001 index. The nitrogen index only applies to corn acres, whereas the fertilizer index is only for soybean acres.

#### Data

Data for CRP payments comes from the FSA website. Information about the 26th CRP signup is used to determine the CRP payments per county. The 26th signup ran from May 5, 2003 to June 13, 2003. Over 71,000 offers for about 4.1 million acres were received, with 38,000 offers covering 2.0 million acres accepted.

At the FSA website (FSAA), information about the signup is available down to the county level. For the analysis here, the Kentucky counties of Ballard, Christian, and Webster are used. Figure 1 shows the physical relation of the three counties in Kentucky. Ballard County had 42 offers received and 36 accepted. There were 1,171 acres accepted at a cost of \$57.57 per acre. Christian county had

41 of 140 offers accepted. These 2,044 accepted acres cost \$88.21 per acre. Webster County received 92 offers and accepted 57 offers totaling 1,613 acres. The cost per acre was \$87.10. The state average CRP cost per acre was \$69.43 (FSAe).

The Kentucky Agricultural Statistics Service website lists some of the agricultural production statistics from each county. In 2002, Ballard County harvested 24,000 corn acres and 41,000 soybean acres. The average yields for corn were 96 bushels per acre and 27 bushels per acre for soybeans. This ranked Ballard County 17th in corn production and 14th in soybean production. In 2002, Christian County harvested 73,000 acres of corn with a yield of 104 bushels per acre. This corn production ranked first in the state. Christian County had 59,000 acres of soybeans with a yield of 39 bushels per acre. This soybean production ranked them third in 2002. Webster County harvested 31,000 corn acres and 42,000 soybean acres. Their corn and soybean yields of 92 bushels per acre and 31 bushels per acre produced a total that ranked Webster County 13th in the state for both crops.

Most of the data for this study came from farms in the Kentucky Farm Business Management (KFBM) program, specifically farms in Western Kentucky. There are 104 farms from the KFBM program that provide data for land prices, cash rents, and direct crop expenses. According to KFBM farm management specialists, the typical crop rotation is

**Table 1.** Regression Results for Direct Expense Items

	Corn			Soybeans		
	Intercept	Slope	R <sup>2</sup>	Intercept	Slope	R <sup>2</sup>
Fertilizer	1,048	22.10	0.88	645	20.61	0.91
Nitrogen	-1,153	44.52	0.98	—	—	—
Pesticides	-1,142	35.61	0.95	928	23.84	0.89
Seed	149	30.64	0.98	-709	30.26	0.95
Machine Hire	645	5.29	0.33	649	7.41	0.27
Drying	-388	4.68	0.61	19	0.11	0.04
Storage	142	0.11	0.01	179	0.04	<0.01

55% corn and 45% soybeans. Wheat is grown in some of the counties but it was not included in this analysis. However, the wheat base is included for government payment calculations.

Regression analysis from these 104 farms is used to provide the intercept and slope terms for the direct and indirect corn and soybean expenses. The regression results allowed the model to be run with different farm sizes. The slope term adjusts the results to a given farm size and the intercept term allows for returns to scale. In effect, crop expenses should be reasonably accurate as long as the modeled farm is within the farm sizes from the 104 examined. In this paper, a test farm size of 2,000 acres is used. Each direct crop expense is regressed against the acres grown for that crop. Each indirect expense is regressed against total crop acres. Data limitations prevented all expenses from being analyzed on a

crop-by-crop basis (the direct expenses). The results are checked for heteroskedasticity by examining the residuals and with the Goldfeld-Quandt test. Results of the regressions are shown in Tables 1 and 2.

Historical price information is taken from the USDA National Agricultural Statistics Service (NASS). The prices for grain sold are the average January price received by farmers in Kentucky. January is used as the local price month since more grain is sold in January than in the other months. To calculate the LDP, the November or harvest price is used. Because prices tend to be lower at harvest, most farmers will probably take an LDP at this point if it is available. The national yearly corn and soybean prices from NASS are also needed in the simulations both to calculate a countercyclical payment and to calculate the price wedges.

Historical yields are from NASS data in each of the three counties. Yields back to 1972 are used and then the variance of the county yields is increased by 10%. This adjustment is used so that county yields more closely resemble individual farmer yields.

The last set of data is used to calculate government payments. Here, Extension's work with farmers throughout Kentucky provided a database of farm bill government payments (Ibendahl). Over 59% of the crop acres in Ballard County were examined to test the various farm bill options at different price levels. Christian County tested 37% of the crop acres and Webster County tested 23%. Choosing the optimal farm bill option in Ballard County results in a farm acreage base that has 48% corn

**Table 2.** Regression Results for Indirect Expense Items

	All Crop Acres		
	Intercept	Slope	R <sup>2</sup>
Machine Repair	7,264	16.54	0.47
Fuel	391	12.16	0.66
Building Repair	2,032	1.77	0.09
Labor	2,888	26.71	0.29
Utilities	3,439	2.26	0.08
Insurance	2,683	6.92	0.42
Miscellaneous	2,147	2.14	0.22
Depreciation	5,932	26.28	0.49
Machine Loan Interest	-133	5.01	0.19

and 52% soybeans. For Christian County, the optimal government payment base is 58% corn and 42% soybeans. The crop acreage base in Webster County is 63% corn and 37% soybeans. These crop acreage bases are based on choosing the optimal FSA farm bill option and past production history.

The optimal FSA farm bill option is in part determined by past farm bill acreage bases and also the 1998 to 2001 planting history. For both Ballard and Christian Counties, the optimal farm bill option is to update acres and yields using the 93.5% yield choice (FSA option 4c). This option is optimal for nearly 70% of the farmers. Updating the acres and yields only applies to the countercyclical payments, as direct payments are still based on the old base. For Webster County, the optimal farm bill option is to not update and just carry over the old farm bill bases, but with soybeans added (FSA option 2). In Webster County, this option is optimal for around 55% of the farmers. By not updating, the direct payment yields and the countercyclical yields are the same.

The direct payment yields are the averages of Extension's work with helping farmers choose an optimal FSA option. For corn, the direct payment yields are 87.4, 96.8, and 97.6 bushels per acre in Ballard, Christian, and Webster Counties, respectively. The soybean direct payment yields are based on 78% of the average 1998 to 2001 yields in the county. Since soybeans are new to government programs, they could be proved even with the nonupdate options. Soybean direct payments yields are 24.0, 20.9, and 27.7 bushels per acre in Ballard, Christian, and Webster Counties, respectively. These soybean yields are calculated from county level data from 1998 to 2001.

Countercyclical payment yields are based on 93.5% of the county yield average from 1998 to 2001 for Ballard and Christian Counties. Since Webster County is assumed to not update, the countercyclical yields are the same as the direct payment yields. Corn countercyclical payment yields are 117.6, 117.6, and 97.6 bushels per acre in Ballard, Christian, and Webster Counties, respectively. Soybean countercyclical payment yields are 28.8, 25.0,

and 27.7 bushels per acre in Ballard, Christian, and Webster Counties, respectively.

The expenses are modified as discussed in the model section. First, the regression results are used to calculate the expenses for a 2,000 acre farm that has 1,100 acres planted in corn and 900 acres planted in soybeans. Next, the 2001 expenses are brought up to date by using the USDA cost index for all the expenses. The 2001 index value is divided by the simulated index for 2003. This ratio is multiplied by the calculated expenses for a 2,000 acre farm to get the expense item cost in 2003.

## Methods

The simulation of net farm income starts by simulating the three county yields of corn and soybeans, the national corn and soybean prices, the January and November prices wedges, and the expense indices. These simulations eventually give a 2003 corn and soybean yield per county, a national corn and soybean price for the marketing year, a state level corn and soybean price for both November and January, and all the crop expenses. Crop sales are calculated by taking the January state price multiplied by the simulated crop production. Government payments are calculated on the basis of yield and acreage bases, actual production, and the simulated prices. Direct payments are paid no matter what happens in the simulation, on the basis of yield and acreage bases and the direct payment rates. Countercyclical payments are also based on yield and acreage bases and do not depend upon current production. However, the national market price drives the payment rate. The LDP is based on current production and the local November price. When combined, the simulated grain production, grain prices, expenses, and government payments determine net farm income. A 500-iteration simulation in each of the three counties provides the data used to calculate the expected net farm income in 2003. A negative exponential function is used to convert the variable net farm income into a certainty equivalent.



**Table 3.** Comparison of CRP vs. Continue to Farm

	County		
	Ballard	Christian	Webster
Continue to Farm (mean)	\$63.69	\$70.09	\$76.33
Standard Deviation	47.21	54.47	41.86
CRP	\$57.57	\$88.21	\$87.10
Probability Farm < CRP	39.2%	60.6%	60.5%

Note: CRP is Conservation Reserve Program.

## Results

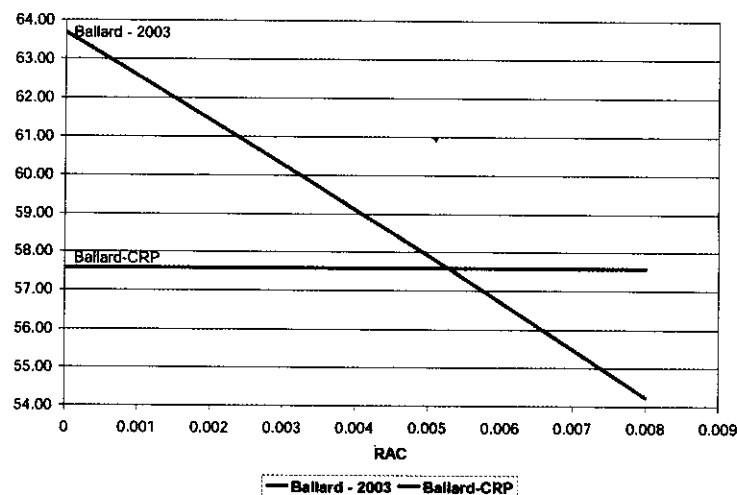
Table 3 shows the basic results in all three counties of the CRP decision versus the continue-to-farm option. The mean return to farming in Ballard County is expected to be \$63.69 per acre in 2003 with a standard deviation of \$47.21. The CRP payment in Ballard County is \$57.57, and there is a 39.2% probability that the continue-to-farm option could have a return lower than the CRP payment.

Ballard County presents the strongest case for choosing the continue-to-farm option. In Christian and Webster Counties, the CRP payment is clearly superior. The mean return from continuing to farm in 2003 is \$70.09 in Christian County and \$76.33 in Webster County. The CRP payments in these two counties are \$88.21 and \$87.10, respectively. The proba-

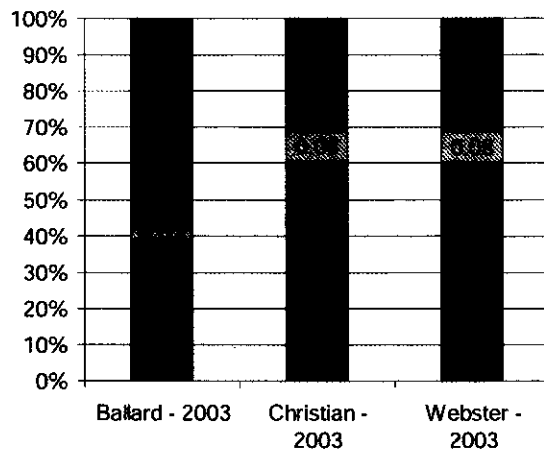
bility that the continue-to-farm payoff will be below the CRP payment is 60% for both counties.

Ballard County is the only county among the three where a risk-averse producer might choose the continue-to-farm option. As shown in Figure 2, the continue-to-farm option is superior as long as the risk aversion coefficient for the negative exponential utility function is less than 0.005. For producers who are more risk-averse than this, the sure CRP payment each year becomes optimal. Because the other two counties have a continue-to-farm mean below the CRP payment, risk-averse producers will not choose the continue-to-farm option unless there are other considerations not modeled here.

The Cumulative Distribution Function (CDF) of the three continue-to-farm options



**Figure 2.** Ballard County Certainty Equivalents—Conservation Reserve Program versus Farming Decision at Different Risk Aversion Coefficients



**Figure 3.** Stoplight Graph Showing the Probability of Achieving Conservation Reserve Program (CRP) Payment, CRP Payment with a 10% Premium, and Not Meeting CRP Payment

indicates that Webster and Christian Counties have much better returns from farming than Ballard County. The means in Table 3 also indicate this. However, the average CRP payments are much higher in Christian and Webster Counties as compared to Ballard County. Thus, the extra CRP payments in Christian and Webster Counties outweigh the extra income from continuing to farm.

Figure 3 shows a stoplight graph that gives a better breakout of how the continue-to-farm option compares to the CRP payment in each county. The bottom section represents the probability that the farming option will be less than the CRP payment. The top section shows the probability that the return to farming will be 10% above the CRP payment. The middle section is the probability that continuing to farm will be between the CRP payment and 10% above the CRP payment.

Figure 3 might provide some clues to why farmers might not pick the CRP option, especially for Webster and Christian Counties. In both of these counties, there is still a 31% probability that farming income will be 10% above the CRP payment. In Ballard County, this top area is 58%.

## Conclusions

This study seems to indicate that CRP payments provide a very competitive return relative to farming. Although this is probably true, there are other factors at work that may not be correctly modeled. The county level data is most likely hiding some things. In Christian and Webster Counties, especially, there are clear differences in soils. Christian County has very good soils in the southern two-thirds of the county, whereas the northern one-third is hillier and not as productive (Riggins, personal communication). Webster County is also like this but there is not as clear a dividing line across the soil types.

For those counties with obvious soil productivity differences, CRP should work especially well. Producers can receive a payment near the average county cash rental rate but on less productive land. This average county rate could even be higher than the actual rental rate for those soil types in the county. In those counties with more similar soils, such as Ballard County, there are likely to be greater differences in certainty equivalents between CRP and farming.

Counties with varied soil types also make the certainty equivalent for farming lower than it should be on the good soils. The higher productivity soils will have better yields than the county level data used in this analysis. Higher yields for the same level of expenses will only improve the certainty equivalent on those good soils.

Another factor in favor of putting land into CRP is the ability to modify government payment farm base. As mentioned in the background section, farmers with a full acreage base must give up an equal base for land going into CRP. However, farmers can choose which acres to reduce. This is a big advantage, as most farmers in Kentucky can show that an acre of soybean base is clearly inferior to wheat and corn base. The end result is that those acres not put into CRP become even more valuable.

Choosing which bases to reduce is even more important for those farm units where the government base acres are greater than the ac-

tual physical acres. This situation can occur when there is a history of double crop soybeans. Farmers in these areas only have to give up one base acre for one CRP acre. The net effect is the ratio of base acres to actual acres increases whenever a farm unit with double cropping history puts some of the land into CRP.

The final consideration in the CRP decision is the 10-year commitment required of CRP. This long-term obligation to CRP could actually favor the decision to continue farming. Because CRP signups occur every couple of years, farmers who do not choose CRP still have that option at the next CRP signup. Thus, the certainty equivalent from continuing to farm should have an option value that includes the availability of CRP conversion in the future.

There are many other issues with CRP that could be interesting research topics. These include examining the choice of a cover crop, what price to choose when offering acres, and how many acres of a particular farm unit to offer. The choice of a cover crop is especially complicated because the tree options will eventually provide some income, but the trees will not be mature at the end of the CRP contract.

This paper has shown that CRP programs should be considered by many farmers. Although the certainty equivalents of CRP compared to farming may not always be as close as this paper illustrates, clearly there are some counties where these results are accurate. However, in those counties with varied soils, CRP should be a strong option on those less productive soils.

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