Discussion: Risk and Conservation Provisions of the 1985 Farm Bill

by

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Introduction

Boggess and Reichelderfer have authored stimulating and thoughtful papers concerning risk considerations within the Conservation Reserve Program. The Conservation Reserve Program (CRP) is probably the most innovative component of the precedent breaking 1985 Farm Bill. It also provides fertile ground for researchers interested in agricultural policy and risk.

My discussion will be primarily directed to the farmer decision problem as treated in the paper by Boggess. This emphasis is chosen in part because of our past research experience which provided some empirical results on this question for a case study area in southeastern Washington state (Hoag, Taylor and Young, 1984; Hoag and Young, 1985a; Hoag and Young, 1985b).

I will divide my remarks into discussions of the deterministic break-even bid model proposed by Boggess, the potential risks facing CRP bidders, risk modeling considerations, and finally some limited remarks on the government decision process discussed by Reichelderfer.

Deterministic BreakEven Bid Model

Boggess identifies two approaches to calculating breakeven CRP rental rates. The first is based on the investment opportunity return if the erodible land were to be sold. The second is based on the net present "use" value of the erodible land assuming it remains in the farm. Boggess' choice of the latter alternative is appropriate for most regions. The fragmented nature of erodible parcels within the farm often limits their marketability as separate units. The division of the decision problem into the CRP bidding period, the CRP reserve period, and the post-CRP period is an important contribution which has been overlooked in most static breakeven bid models used for extension education purposes. The incentives for erodible land retirement will become considerably stronger when the conservation compliance provisions of the legislation become fully effective in 1990. The present value of these incentives should be considered in the bid calculation as suggested by Boggess.

A major simplification within the net present value equations specified by Boggess occurs in the treatment of the farm average yield term, Y_{it}. As specified in this general formulation, yield varies only by crop (index i)

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and year (index t). However, farm average yield will be influenced by the magnitude and nature of participation in the Conservation Reserve Program. This will occur whenever the retired erodible land varies in average productivity from the remaining land in the farm. For example, if the erodible land is relatively less productive, farm average yields will rise when large acreages are entered into the conservation reserve. This would make Y_{it} endogenous in an optimizing model where the acreages allocated to retirement are choice variables. In a simulation model, Y_{it} will vary by participation option.

Boggess acknowledges the potential importance of productivity differences among land classes in his general discussion. This consideration could be incorporated into the net present value equations by disaggregating the farm acreage into land classes and triple-subscripting the yield term to include a land class index.

Our case study results on required breakeven rental payments in the Palouse region of southeastern Washington were extremely sensitive to varying land class compositions and differing relative productivities of erodible land in different subregions. Table 1, which summarizes some of these results, shows that breakeven rental payments for retirement of all Class 4 and 6 erodible land varied from $4 to $63 per acre over subregions (assuming no commodity programs). Regions with relatively productive and profitable qualifying erodible land required much higher rental payments than regions with marginally profitable erodible land.

Boggess' model identifies the important linkage between CRP breakeven rental rates and the nature and magnitude of future farm commodity programs. Stated simply, the existence of farm commodity programs has strengthened the profitability of farming erodible land in the past and will continue to do so in the future if commodity programs are not reduced or eliminated (Hoag and Young, 1984 and 1985a). Table 1 provides some empirical estimates for the eastern Washington Palouse region on the impact of historical commodity programs on breakeven CRP rental rates. Historical commodity programs increased breakeven rents by up to $32 per acre and in some regions they were responsible for the lion's share of the total rent required to motivate breakeven retirement of erodible land.

Readers should remember, however, that the results in Table 1 are based on simulations of <u>historical</u> commodity programs. Future changes in commodity programs, as initiated in the 1985 Farm Bill, could substantially alter results. Nonetheless, my view is that farm program considerations are likely to continue to loom large in the participation rate and cost of the Conservation Reserve Program. This point is illustrated by an interesting piece of anecdotal evidence provided by a farmer at a recent CRP educational meeting in Washington state. After having listened through an extended and complicated breakeven bid calculation procedure, the farmer observed that he had a much easier calculation approach. He stated that he needed only to divide the 379 qualifying erodible acres on his farm into $50,000--which happens to equal the total payment limitation on farm program benefits--to come up with his breakeven rental rate bid of $132 per acre. This farmer, for whom the $50,000 payment limitation was an effective constraint, was looking ahead to the 1990 conservation compliance deadline when he must protect his erodible acres or lose farm program benefits.

Table 1. Breakeven CRP Rental Payments Under Alternative Policy Scenarios in Three Eastern Washington Palouse Subregions, 1974-84 Simulation Results.

Yield Subregion	Land Classes Retired	Retired Land ÷ Total	Breakeven Rents ($/ac) With and Without Commodity Programs	
			No. Commod. or Cons. Programs	Historical Commod. Programs
Low	6	.08	6	29
	4+6	.16	29	35
Intermediate	6	.13	4	11
	4+6	.28	4	36
High	6	.04	52	53
	4+6	.20	63	68

SOURCE: Adpated from Hoag and Young (1985)b.

Potential Risks Facing CRP Bidders

Boggess classifies the sources of risks among those attributable to stochastic variables, uncertain variables, and unknown variables. Stochastic variables include crop yields and prices for which presumably relevant historical probability distributions can be constructed. The uncertain and unknown variables relate to policy considerations such as future commodity program provisions, potential Gramm-Rudman budgetary reductions, and potential changes in conservation compliance provisions. This classification is similar to what Dillon characterized as Knight's "hard-to-kill" distinction between "risk" and "uncertainty." Knight believed probabilities could be attached to risk but not to uncertainty. However, complete obedience to Knight's distinction would imply that decision makers could do no better than apply a uniform probability distribution to all "uncertainty" variables. However, this is unlikely to be a fruitful approach for addressing the policy uncertainties related to the CRP. Subjectively, not all possible future policy states of nature are likely to be viewed as equally likely by decision makers. As a practical research approach, subjective probability distributions from policy analysts or others might be elicited on the "uncertain" and "unknown" variables. History and policy analysis are likely to suggest that some future courses of policy action are much more likely than others. Policy uncertainties are likely to be more important, albeit more difficult to model, than traditional price and yield uncertainties in arriving at conservation reserve participation decisions. Consequently, subjective probability elicitation approaches for exploring these policy risks would appear to be a fruitful area for future research.

Boggess poses the interesting question of whether risk preferences are likely to count in the conservation reserve participation decision. Will risk, traditionally defined as variability, be less with land retirement? Our case study results from the Palouse of eastern Washington, based on historical weather and government programs, indicated that it generally would be, but not by very much. Our results showed standard deviations of net returns over 11 years were reduced by 0 to 18 percent with land retirement (Hoag and Young, 1985b). Results varied considerably depending upon the region and program scenario. However, reductions in income variability were generally overshadowed by changes in expected returns. As shown in the base run results in Table 2, continuing to farm Class 4 and 6 erodible land always was first degree stochastic dominant over retiring it in the absence of both commodity and conservation programs. Similar results held when historical commodity programs were introduced. In other words, only positive marginal utility for expected income, as opposed to risk aversion, was necessary to determine participation. Similarly, when the benefits of the Conservation Reserve Program, as reflected in the proposed Soil Conservation Act of 1983 (SCA), were added, preference for this program over historical commodity programs without land retirement incentives was based solely on first degree stochastic dominance. Again, readers are reminded that these results are based on a specific study region. Furthermore, they are based on historical variation in commodity programs. They fail to include variations in future commodity programs outside of this range and also exclude the important perceived policy risk concerning future conservation reserve provisions and funding availability.

Table 2. Stochastic Dominance Results for Land Retirement in the Palouse.

		(Dominating/Dominated) Action or Program [a]			
		Conventional/ Conservation			
Yield Subregion	Land Classes Retired	Base Run	Historical	SCA	SCA Program/ Historical Program
Low	None	--	--	--	NE
	6	ND	FSD	ND	FSD
	4+6	FSD	FSD	ND	FSD
Intermediate	None	--	--	--	NE
	6	ND	SSD	ND	FSD
	4+6	FSD	FSD	ND	FSD
High	None	--	--	--	NE
	6	FSD	FSD	ND	FSD
	4+6	FSD	FSD	ND	FSD

[a] FSD and SSD mean the appropriate action or program is dominated by the first or second degree stochastic dominance criterion, respectively, and ND means the action or program is not dominated. NE is "no effect" from Soil Conservation Act of 1983 (SCA)(HR 3457). Base run includes no commodity or conservation programs. Historical run includes commodity programs only. SCA includes both commodity programs and the stronger erosion of the CRP included in the proposed SCA.

Source: Hoag and Young, 1985b

Risk Modeling Considerations

The proposed "expected utility maximizing CRP bid model" described by Boggess could be operationalized by using the present value equations to generate via simulation probability distributions for different participation actions. These could then be ranked by risk efficiency criteria as in Kramer and Pope. The difficult task will be in specifying probability distributions for the uncertain and unknown policy variables from which a stochastic simulation model could draw.

The model also might be operationalized within the context of a traditional optimizing risk programming model in the tradition of Freund or Hazell. However, a large amount of work would be required to design an operational risk programming model. Exactly which variables will be endogenously determined? How will land class specific yields be modeled? How will covariance matrices among all stochastic variables be estimated? Will risk be considered in input constraints as well as in objective function coefficients? These questions constitute a formidable modeling challenge.

Questions also remain as to how the expected utility maximizing risk programming model would be interfaced with the game theory approaches discussed by Boggess. Game theory models do not always imply the same objective function as expected utility maximization.

Personally, I find the "early adopter" theory and its underlying assumptions as outlined by Boggess quite plausible. However, I can contemplate an equally plausible argument for an initial "high bid" strategy. This strategy is based on recognition that participants will be allowed to "play more than one round" in the bidding game. A "minimax regrets" game theory objective function would motivate a farmer to submit a high bid in the first round to avoid getting locked into a lower rental rate than his neighbors. I suspect a significant number of growers will submit a bid with a comfortable margin during the first round. This will permit them to learn more about the "bids market" before submitting bids in potential later rounds. The results of the first round of bids for Whitman County, Washington, just released last week, ranged from $45 to $360 per acre (Palouse Empire News, March 19, 1986). These results, compared to the breakeven bids in Table 1, would seem to indicate a high bid strategy by many farmers.

Government Decision Process

Neither space nor expertise permit me to provide a thorough review of the government decision model outlined by Reichelderfer; however, it offers an interesting and innovative way of considering the government decision making process for a new policy initiative. As a general observation, the model seems to portray a more adversarial relationship between the government and its citizens than history reflects. Government bureaucrats, especially in clientele group oriented agencies like USDA, are not insulated from the clientele groups their policies influence. Farmers, through their Congressmen and directly, can influence bureaucrats and the rule making process. These "political pressures" alluded to by Reichelderfer could substantially influence the program in the long term. History indicates that farmers have come out better vis a vis government programs than the

"Las Vegas gambler" who starts with the odds stacked against him. Cautious new directions within the 1985 Farm Bill indicate that this historically comfortable relationship between farmers and the government may be changing; however, current Congressional momentum to modify and limit the impact of the farm program benefit cuts suggest that these changes may not come quickly.

Concluding Comments

Finally, it is important to note that there are many fertile areas for research concerning the Conservation Reserve Program not explicitly related to risk. First there are important distributional and equity considerations raised by the program. The competitive bid process within state wide or subregion "bidding pools" favors farmers with relatively less profitable erodible land. In some cases, this discriminates against the conservationist farmer who has already retired all his marginally productive and erodible land. Neighbors who have continued to farm their erodible land will get paid potentially handsome rental rates for doing what the conservationist has done on his own. Will equity factors such as this influence the long-run structure or survival of the CRP? Also, how will different regional maximum rental rates and erodible land classification criteria influence the location and composition of production throughout the nation? What are the efficiency implications of these regional shifts?

There are also important cost effectiveness questions. The "erosion reduction" criterion, measured in tons per acre, often correlates poorly with soil conservation benefits. This lack of correlation is attributable to different sediment delivery ratios, varying per acre crop values, different remaining topsoil depths, and other differences across regions. The conservation reserve legislation specifies that bid allocations will consider relative erosion rates and conservation benefits, but it may be difficult to achieve this in practice.

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