The Budgetary and Resource Allocation Effects of Revenue Assurance: Summary of Results

David A. Hennessy, Bruce A. Babcock, and Dermot J. Hayes

Center for Agricultural and Rural Development
Iowa State University
Ames, Iowa 50011-1070
www.card.iastate.edu

Questions or comments about the contents of this paper should be directed to Bruce Babcock, 578 Heady Hall, Iowa State University, Ames, Iowa 50011-1070; Ph: (515) 294-6785; Fax: (515) 294-6336; E-mail: babcock@iastate.edu.

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One of the more intriguing alternatives under consideration for the 1995 Farm Bill is the "Iowa Plan." This idea originated with a group of Iowa's farm and commodity organizations. It is receiving increased attention from national farm organizations, academics, and politicians.[1] The basic premise is very simple. Rather than the current mixture of target prices, disaster payments, set-aside provisions and crop insurance, the government would underwrite a program that guarantees producers a certain percentage of recent revenues. The idea has much intuitive appeal because farmers (and their bankers) would be assured of a certain revenue figure regardless of what happens to prices or yields.

Because current programs often result in large deficiency payments when yields are also high, and low deficiency payments in drought years, there is a sense that money arrives when it is not needed and fails to arrive when it is needed. Consequently, it appears possible that with revenue assurance the government might cut its costs while improving the welfare of farmers.

With these ideas in mind, the Center for Agricultural and Rural Development (CARD) has recently begun an in-depth analysis of the Iowa Plan. The first part of this project has been completed and is now available. The paper is CARD Working Paper 95-WP 130, "The Budgetary and Resource Allocation Effects of Revenue Assurance," by David A. Hennessy, Bruce A. Babcock, and Dermot J. Hayes. Please refer to that paper for more details of the analysis. Here we summarize some of its more important findings.

The Importance of Contract Details

Before evaluating the impact of revenue assurance, detail is required on how exactly the program would be implemented. However, before policymakers can agree on the details, they need to know more about the likely impact of the proposal itself. In an attempt to get around this "catch-22" situation, our first look at the program is to examine how a representative Iowa corn-soybean farmer would respond to various contract specifications. One advantage of this farm-level focus is that we have excellent information on how yields and prices have moved over time as well as on how rotations influence yields and costs. Thus, we can match up details about the representative farm with details about the revenue assurance program. A second advantage of this farm-level approach is that we can get an accurate idea of what alternative revenue assurance programs will cost and the magnitude of the associated program benefits.

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[1] The idea itself is not particularly new. It has been suggested by authors of previous farm bills, and is a similar concept to Canada's Guaranteed Revenue Insurance Program. What is new about the Iowa plan is its timing and the grassroots support it has among producer groups.

Contract Details

a. Should revenue assurance be offered on a whole farm level, or should it be offered on a crop-by-crop basis? We can make good intuitive arguments for either approach and both are compared here.

b. Should county average yields or farm-specific yields be used when calculating revenue? There is a trade-off between the accuracy of the program and the amount of bureaucracy required to run it. We compare the government costs and benefits to producers of both programs.

c. What percentage of expected revenue should the program assure? The answer depends in part on how much the government can spend and the level of expected benefits at the different assurance levels. We ran the numbers for 70, 80, 90, and 100 percent revenue assurance but report only on the 80 and 100 percent options.

d. Should revenues be calculated according to what the farmer actually plants or on what has been grown historically? Here the answer is less straightforward. Using actual plantings would cause some producers to adopt high-risk crops and cropping practices, and consequently the program itself would distort the market. Our sense is that revenue assurance was proposed to remove market disruptions and, consequently, we used historical plantings to calculate revenues. Note, however, that we do use actual (simulated) yields and prices to calculate per acre revenues.

e. How should producer benefits be measured?

Revenue assurance and deficiency payment schemes are put in place to reduce the amount of risk associated with farming. If risk were not an issue, the government could simplify things greatly and merely write checks. The way we incorporate the effect of risk is: We calculate the amount of money a typical producer would accept for *certain* in exchange for the *risky* outcome they might otherwise face. For example, suppose a farmer expects to make an average of $50,000 per year raising hogs, but would be just as happy making $45,000 per year raising hogs if all the revenue uncertainty associated with raising hogs were eliminated. Then we can say that the certainty equivalent of a $50,000 per year hog operation is $45,000. Here $50,000 is the "expected revenue" and $45,000 is the "certainty equivalent" returns.

The Representative Farm

We chose a 500-acre corn-soybean farm in Sioux County. Results are presented for two producers who vary according to the level of risk they wish to face. The less risk averse producer is more willing to trade increased risk for increased expected returns than the more risk averse producer. This trade-off is accomplished by moving away from the benefits of a corn-soybean rotation towards a rotation that emphasizes the program crop, corn. At first glance it would seem that corn is actually less risky than soybeans because of government subsidies, but corn yields and corn prices are more variable than soybean yields and prices, and crop diversification leads to substantial decreases in the variability of farm returns.

The farm is enrolled in the target price program and both types of producers are assumed to purchase federal crop insurance. Expected harvest time sales prices are $2.21 per bushel for corn and $6.17 per bushel for

soybeans. Base yield is 112.1 bushels per acre. Expected yield this year is 137.6 bushels per acre when corn follows beans and 124.5 bushels per acre in continuous corn. We used production costs estimated by Iowa State University farm management extension.

Results

Table 1 presents estimates of the effects of moving from the present program to a free market and to revenue assurance. The basic assumption behind these results is that the producer chooses acreage to maximize certainty equivalent returns. Under the current program the proportion of acreage devoted to corn depends on the assumed level of risk aversion. The less risk averse producer plants significantly more corn than soybeans and the more risk averse producer essentially plants under a corn-soybean rotation. Only farm-level revenue assurance results are presented in Table 1. Revenue assurance results based on county average revenue are provided in the full study.

Under the free market option and all the revenue assurance options, the producer finds that a corn-soybean rotation is optimal. Thus, the first result is that for this farm, revenue assurance results in the same acreage allocation as would occur under the free market scenario. That is, there are no distortionary effects of revenue assurance.

There are two distortionary effects of the current program. First, productive land is idled: 22 acres for the less risk averse producer and 17 acres for the more risk averse producer (who has less corn base). Second, for the less risk averse producer, corn deficiency payments induce more corn production. That is, this farmer finds it optimal to "farm the program" by increasing land planted to corn.

Expected government costs of revenue assurance are substantially less than under the current program. For example, government costs under 80 percent crop-specific assurance are reduced by 92 percent for the less risk averse producer and by 90 percent for the more risk averse producer. Under 100 percent crop-specific assurance, costs are 55 percent less than the current program for the less risk averse producer and are 44 percent less for the more risk averse producer. The cost reduction is even greater under whole farm assurance.

Producer certainty equivalent returns also fall under revenue assurance, but by a lesser amount than the drop in government costs. This suggests that the efficiency of government payments increases. For example, the current program raises the certainty equivalent returns of the less risk averse producer by about $14,000 over the free market level at a cost of more than $25,000. That is, it costs about $1.80 for each one dollar rise in certainty equivalent returns. In contrast, under 100 percent whole farm revenue assurance, certainty equivalent returns of the less risk averse producer increase by $10,757 at a cost of $9,498, which implies that each dollar transferred to producers increases certainty equivalent returns by $1.13.

The efficiency increase with revenue assurance is even more pronounced for the more risk averse producer. The current program increases certainty equivalent returns by about one dollar for each dollar transferred. But under revenue assurance, each dollar transferred raises certainty equivalent returns by $1.69 under 100 percent crop-specific revenue assurance, by $1.97 under 100 percent whole farm revenue assurance, by $2.61 under 80 percent crop-specific revenue assurance, and by $5.19 under 80 percent whole farm revenue

assurance. The reason why the efficiency of government payments is so much higher under revenue assurance relative to the current program is that revenue assurance only pays when revenue is low, which implies that the benefit of the payment is high. In contrast, the current program may make large deficiency payments when revenue from the market is also high.

A Note on Moral Hazard

Much debate has gone into the issue of whether a revenue assurance program would cause farmers to change their behavior to take advantage of the program. (Would the program be a hazard for the morals of farmers?) The more we looked at this issue the less important it became. For example, if we use county-level yields and fix the base acreage then there is nothing that producers can do to cheat even if they want to. If we use individual yields, then it is possible but highly unlikely that farmers would "farm the program." Farmers might be tempted to cut fertilizer costs in years when prices are so low that they fully expect a payment on revenue assurance. However, as we discovered in the results discussed here, the chances of this occurring are very small. Also, we know from other research that it almost always pays to choose the correct amount of fertilizer. Please refer to CARD Working Paper 94-WP 127, "Input Demand Under Revenue Assurance," by Bruce A. Babcock and David A. Hennessy, for more details about these results.

There are program details that would raise moral hazard issues. For example, a 100 percent revenue assurance program, based on farm-specific yields and current (rather than historic) planting patterns, would tempt some farmers to behave irresponsibly. These problems, however, can be eliminated by using common sense in the program design. We do not anticipate any real moral hazard problems with revenue assurance so long as the proportion assured remains below about 85 percent, and so long as historic rather than current acreage patterns are used.

Concluding Remarks

Revenue assurance would allow for much lower levels of government spending on agriculture, would remove the distortions associated with existing programs, and would dramatically improve the efficiency with which government agricultural programs are run. Producer welfare, on the other hand, would decline under revenue assurance when compared with the existing program, except at a 100 percent coverage level. At a 100 percent coverage level certainty equivalent returns are only slightly below the level under current programs but the corresponding government costs are cut approximately in half. If current proposals to reduce government spending on agriculture by decreasing deficiency payments were to pass, then revenue assurance would become an attractive alternative to current programs operated at a reduced support level.

Table 1. Planting decisions, certainty equivalent returns, and expected government costs under alternative government programs

Program	Corn Acreage	Soybean Acreage	CER[a]	Government Costs
Less Risk Averse Producer				
Current Program	311	167	$76,461	$25,141
Free Market	250	250	$62,490	$0
Revenue Assurance				
100% Crop Specific	250	250	$74,813	$11,178
100% Whole Farm	250	250	$73,247	$9,498
80% Crop Specific	250	250	$65,001	$2,024
80% Whole Farm	250	250	$63,618	$850
More Risk Averse Producer				
Current Program	239	244	$70,668	$15,728
Free Market	250	250	$55,199	$0
Revenue Assurance				
100% Crop Specific	250	250	$70,038	$8,768
100% Whole Farm	250	250	$67,378	$6,188
80% Crop Specific	250	250	$59,584	$1,679
80% Whole Farm	250	250	$56,440	$239

[a] Certainty equivalent returns.