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ARPA Subsidies, Unit Choice, and Reform of the U.S. Crop Insurance Program

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Abstract

The Agricultural Risk Protection Act (ARPA) has largely met its objectives of inducing farmers to increase their use of the crop insurance program. Both insured acreage and coverage levels have increased dramatically in response to ARPA's large increase in premium subsidies. An unintended consequence of the larger subsidies is a dramatic increase in the incentive for farmers to insure their crops under optional units, that is, insurance at the field level rather than at the farm or crop level. The expected rate of return to farmers who choose to invest additional premium dollars to move to optional unit coverage ranges from a low of 61 percent at the 85 percent coverage level to 144 percent at the 65 percent coverage level. This explains why the majority of farmers choose optional unit coverage even though the alternative unit structures provide identical insurance guarantees at a substantially lower cost. We consider two policy options to eliminate the unintended consequences of ARPA subsidies. The first would simply eliminate the ability of farmers to insure their crops under optional units. This change would save taxpayers more than \$300 million (if 90 percent of current acreage is insured under optional units) and would not decrease the insurance guarantee of any farmer. However, transfers to farmers, crop insurance companies, and crop insurance agents would all fall under this policy option, decreasing its political attractiveness. The second alternative would decouple per-acre premium subsidies from a farmer's choice of unit coverage. Farmers would benefit from the ability to capture all the premium savings that would occur as they move to other unit structures. It is likely that there is a level of decoupled subsidy that would make both farm groups and taxpayers better off. Splitting farm groups off the blocking coalition increases the likelihood of acceptance of this proposal. Program integrity would be increased by dramatically increasing the incremental cost of farmers insuring their crops under optional units.

Keywords

Agricultural Risk Protection Act (ARPA), crop insurance, optional units

Disciplines

Agricultural and Resource Economics | Agricultural Economics | Economic Policy | Economics

ARPA Subsidies, Unit Choice, and Reform of the U.S. Crop Insurance Program

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Executive Summary

The Agricultural Risk Protection Act (ARPA) has largely met its objectives of inducing farmers to increase their use of the crop insurance program. Both insured acreage and coverage levels have increased dramatically in response to ARPA's large increase in premium subsidies. An unintended consequence of the larger subsidies is a dramatic increase in the incentive for farmers to insure their crops under optional units, that is, insurance at the field level rather than at the farm or crop level. The expected rate of return to farmers who choose to invest additional premium dollars to move to optional unit coverage ranges from a low of 61 percent at the 85 percent coverage level to 144 percent at the 65 percent coverage level. This explains why the majority of farmers choose optional unit coverage even though the alternative unit structures provide identical insurance guarantees at a substantially lower cost. We consider two policy options to eliminate the unintended consequences of ARPA subsidies. The first would simply eliminate the ability of farmers to insure their crops under optional units. This change would save taxpayers more than \$300 million (if 90 percent of current acreage is insured under optional units) and would not decrease the insurance guarantee of any farmer. However, transfers to farmers, crop insurance companies, and crop insurance agents would all fall under this policy option, decreasing its political attractiveness. The second alternative would decouple per-acre premium subsidies from a farmer's choice of unit coverage. Farmers would benefit from the ability to capture all the premium savings that would occur as they move to other unit structures. It is likely that there is a level of decoupled subsidy that would make both farm groups and taxpayers better off. Splitting farm groups off the blocking coalition increases the likelihood of acceptance of this proposal. Program integrity would be increased by dramatically increasing the incremental cost of farmers insuring their crops under optional units.

Keywords: Agricultural Risk Protection Act (ARPA), crop insurance, optional units.

ARPA SUBSIDIES, UNIT CHOICE, AND REFORM OF THE U.S. CROP INSURANCE PROGRAM

The U.S. crop insurance program has grown dramatically in response to program changes included in the Agricultural Risk Protection Act (ARPA) of 2000. One primary objective of ARPA was to induce farmers to increase the amount of insurance they purchase with the hope that greater use of crop insurance would reduce pressure on Congress to pass regular ad hoc disaster assistance programs.¹ The goal of ARPA was to increase both the number of insured acres and to increase the average level of insurance coverage. The tool used to induce farmers to increase insured acreage and coverage was an end to the rule that largely decoupled crop insurance subsidies from farmers' selected coverage levels.

Before ARPA, the USDA's Risk Management Agency (RMA) kept the dollar amount of premium subsidies constant for all coverage levels between 65 percent and 85 percent, with per-acre subsidies dropping for coverage levels below 65 percent. This constant subsidy was accomplished by making the ratio of subsidy rates at different coverage levels inversely proportional to the associated premium rates. In other words, crop insurance subsidies were decoupled from a farmer's choice of coverage over this range.² Congress accomplished subsidy coupling in ARPA by making subsidy rates fall less slowly than premium rates. Farmers now receive a 59 percent premium subsidy if they purchase 65 percent and 70 percent coverage; a 55 percent premium subsidy for 75 percent coverage; a 48 percent subsidy for 80 percent coverage; and a 38 percent subsidy for 85 percent coverage.

The impact of this change can be seen in Figure 1, which shows how the producer cost of yield insurance has changed for a corn farmer in McLean County, Illinois. As shown, the new subsidy structure has greatly decreased the incremental cost of coverage. Before ARPA, farmers were asked to pay 100 percent of the change in the fair value of

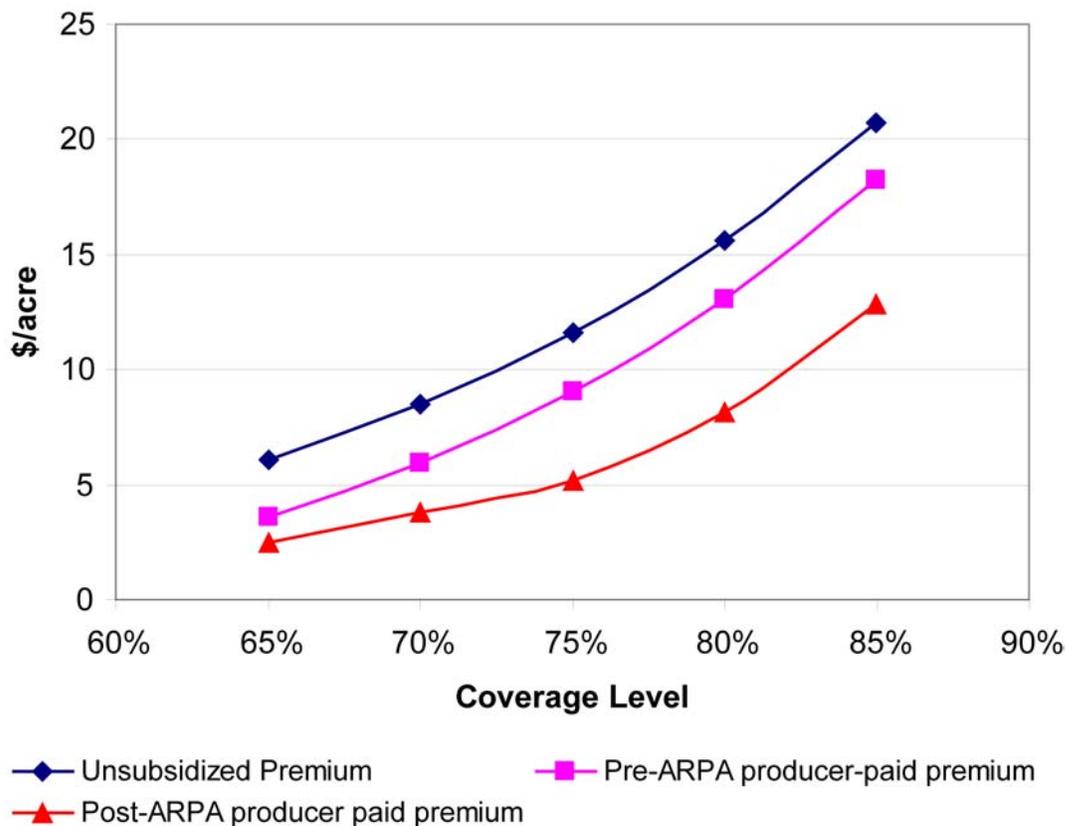


FIGURE 1. Impact of ARPA on premiums for yield insurance on corn in McLean County, Illinois

the insurance above the 65 percent coverage level. The response of corn farmers in McLean County to the subsidy change was to increase the number of acres enrolled in the program by 25 percent and to increase their level of coverage, as shown in Figure 2.

Insuring more acres at a higher coverage level is a common response to ARPA across states and crops, which means that ARPA met at least one of its policy objectives. But there have also been some unintended consequences from the new ARPA premium subsidies. One of these unintended results is that the ARPA subsidies have greatly increased the incentive for farmers to buy the least efficient type of insurance coverage that is available. In this paper we explain the different types of insurance coverage available, why farmers have an incentive to choose the least efficient type of coverage, and how a simple reform of the crop insurance program could significantly reduce the cost of the crop insurance program without affecting the amount of coverage available to farmers.

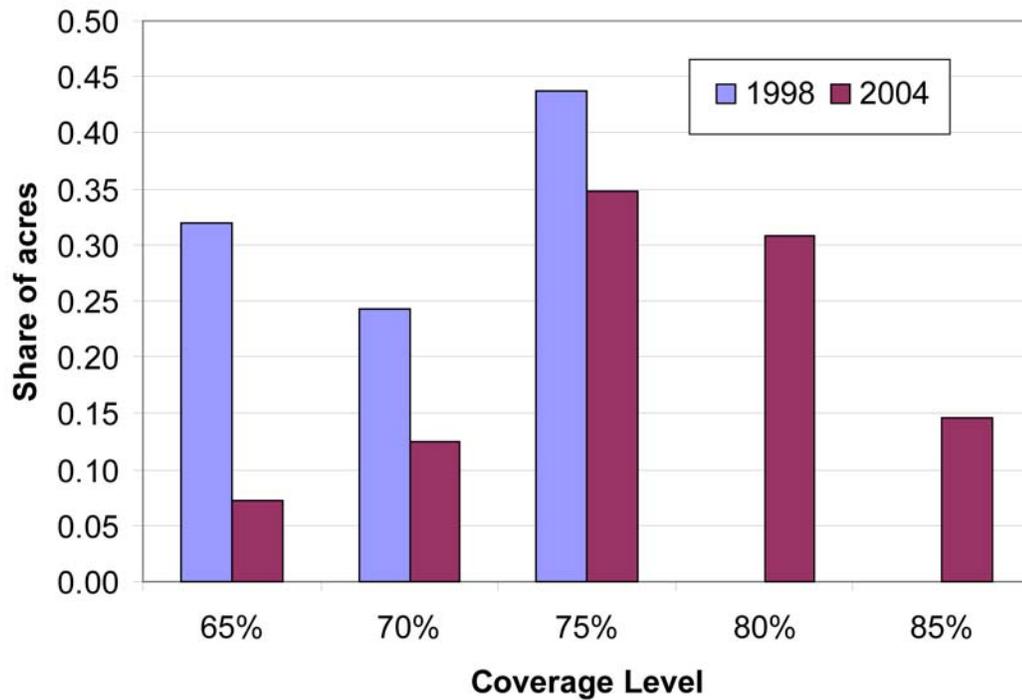


FIGURE 2. Share of insured acres of corn at each coverage level in 1998 and 2004 in McLean County, Illinois

Farmers have more flexibility than ever before in choosing the type of crop insurance that best meets their needs. Most field crop producers can choose between yield and revenue insurance. The yield and revenue insurance can be based on either yield outcomes or county-average yield outcomes and market prices. Farmers can also choose which coverage level to purchase, with most farmers being able to choose up to 85 percent coverage for individual insurance and up to 90 percent coverage for area insurance. Most farmers choose insurance coverage based on individual yields and market prices. For these producers, the final choice is the unit structure that they will use to insure their crops. It is this last choice that we are concerned with in this paper.

Unit Structure in Crop Insurance

The choice of the insurance unit is a topic that has not received widespread attention outside of a few academic journals. But the flexibility that the crop insurance program gives farmers with respect to how they structure their land into separate insurance units deserves much more attention because of its impact on program costs and integrity. A

better understanding of what unit structures are available to farmers and how they are used will show how the efficiency of the program is compromised by this flexibility.

Most commercial farmers can choose from among four types of insurance units. In order of non-decreasing size of insurance unit, we have optional units, basic units, enterprise units, and whole-farm units. We will use a hypothetical farm shown in Figure 3 to illustrate each of these units. We will assume that our farmer selects Revenue Assurance (RA) as his crop insurance product.

This farm has 960 acres of cropland divided equally between corn and soybeans. The farm's six fields are identified with the letters A through F in Figure 3. The crop is identified by c (for corn) or s (for soybeans). Assume that the farmer's expected yield for the three corn fields equals 150 bu/ac. Expected soybean yields are 40 bu/ac. Projected harvest prices are \$2.50/bu for corn and \$5.00/bu for soybeans. Also assume that the farmer purchases 75 percent RA coverage.

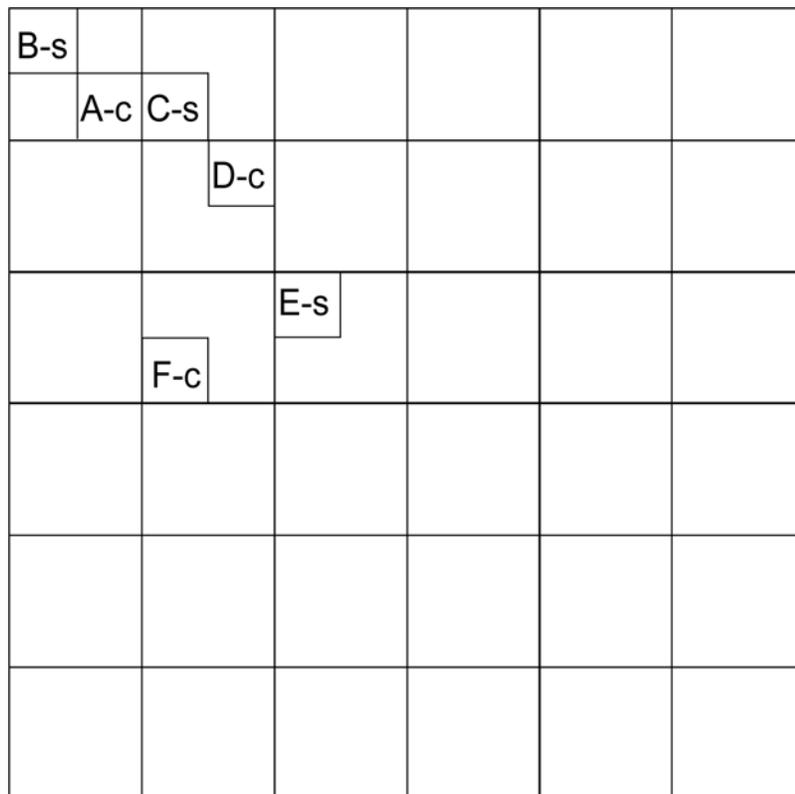


FIGURE 3. Location of a hypothetical farm within a township

To completely characterize the choices facing this hypothetical farmer, we need to know whether the farmer owns, cash rents, or share crops each of the fields. And if the farmer share crops, we need to know whether the shares vary across the fields. Assume that the farmer owns fields A, B, and C, cash rents field D, and has a 50-50 crop share arrangement on fields E and F.

A *whole-farm unit* consists of all cropland being placed into a single insurance unit. Thus, this farm would insure all 960 acres of cropland together; the corn and soybeans are insured together in the whole-farm unit. The total insurance guarantee for the farm is found by multiplying the sum of expected revenues from each field by the 75 percent coverage level. Each field's expected revenue is multiplied by the farmer's share before the sum is taken. The sum of expected revenue equals \$230,000, which implies a total revenue guarantee of \$172,500. If the value of harvested production is less than \$172,500 then the farmer will receive a crop insurance indemnity to make up the difference. No indemnity will be paid if total revenue is greater than \$172,500.

An enterprise unit consists of all cropland of a single crop being placed into a single insurance unit. Our hypothetical farmer could form two enterprise units: one for corn and one for soybeans. The insurance guarantee for the corn enterprise unit equals the sum of expected revenues across the three corn fields multiplied by 0.75, or \$112,500 (accounting for the 50-50 crop share arrangement on field F). Similarly, the insurance guarantee on the soybean enterprise unit is \$60,000. Notice that the amount of insurance under enterprise units is identical to the amount of insurance under the whole-farm unit: \$172,500. However, now each enterprise unit stands alone when it comes time to determine whether an indemnity will be paid. If the value of harvested corn is less than \$112,500, then an insurance indemnity will make up the difference, regardless of the value the soybean crop generates. For example, suppose the value of the corn crop is \$100,000 and the value of the soybean crop is \$90,000. The farmer would receive a \$12,500 indemnity for the corn crop, even though the total farm revenue of \$190,000 exceeds the total insurance guarantee on the farm.

Clearly our farmer should expect to receive, on average, more indemnities under enterprise unit coverage than under whole-farm coverage because the losses from one crop

cannot be made up by gains on another crop. And indeed whole-farm insurance premiums are significantly lower than enterprise unit premiums to reflect the lower magnitude of loss.

Continuing with the choices that a farmer has, a *basic unit* consists of all cropland of a single crop that is either owned or cash rented, or that is under a single crop share arrangement. Thus, our farmer has two basic units of corn and two basic units of soybeans. The first corn basic unit consists of fields A and D. The other basic unit consists of corn on field F. The first soybean basic unit consists of fields B and C. The second basic unit consists of field E. Each basic unit has its own insurance guarantee. The corn basic units have insurance guarantees of \$90,000 and \$22,500. The two soybean basic units have insurance guarantees of \$48,000 and \$12,000. Again, the total insurance guarantee on the farm remains constant at \$172,500 under basic unit coverage.

Just as a reduction in the pooling of gains and losses increases the chances of receiving an insurance indemnity as the farmer moves from whole-farm units to enterprise units, the move to basic units from enterprise units will also increase the frequency with which indemnities are received. This increase in indemnities also causes insurance premiums to be higher for basic units than for enterprise units.

Basic units can be further divided into *optional units* if field-specific records are kept and the fields are separated by a section line. In this case, our farmer could have six optional units: three for corn and three for soybeans. An insurance guarantee is assigned to each optional unit and each unit would stand alone when determining indemnities. The insurance guarantees for the corn units would be \$45,000, \$45,000, and \$22,500. The insurance guarantees on the soybean optional units would be \$24,000, \$24,000, and \$12,000. Again, the total guarantee for the farm remains at \$172,500 under optional unit coverage. To reflect the additional indemnities that will be paid under optional units from the further reduction in pooling, premiums under optional units are 11.1 percent higher than premiums under basic units.

Before turning to a discussion about why the crop insurance program offers farmers so many choices, it will be fruitful to examine how the different unit structures differ in terms of efficient delivery of crop insurance benefits. The first step in this examination is to determine how the benefits of crop insurance should be measured.

Efficiency of Insurance Coverage

Crop insurance offers farmers and their lenders cash flow assurance because a revenue insurance guarantee greatly reduces the risk that gross revenue from crop production will fall below the insurance guarantee. Of course, revenue insurance does not reduce the risk of cash flow problems caused by unforeseen cost increases or crop quality problems not covered by the crop insurance program. But the two most uncertain components of determining profitability in farming are yields and prices, and crop insurance greatly reduces yield and price risk.

Therefore the most important benefit of the crop insurance program is a reduction in the chances that crop revenue will fall below a target level. Because the four unit structures all provide the same insurance guarantee, all reduce the chances that crop revenue will fall below the insurance guarantee by the same amount. If we take the insurance guarantee as the farmer's target level of revenue, then all four provide the same benefit.³

The efficiency with which the four unit structures provide this benefit can be measured in terms of cost. If farmers were asked to pay the actuarially fair value of the insurance (the long-run break-even cost of the insurance), then from a farmer's perspective, efficiency decreases with premium. From this measure, the most efficient unit structure is the whole-farm unit, followed by enterprise units, basic units, and optional units. But farmers are not asked to pay actuarially fair premiums (since the federal government provides premium subsidies), so their preferences may not reflect this ranking. And farmers may be looking for benefits from crop insurance other than a reduction in the probability that crop revenue will fall below a target level. Thus, we might want to measure efficiency from a taxpayer's perspective.

Currently, taxpayer support for the crop insurance program consists of four components: the overhead costs of running the RMA, the underwriting gains of crop insurance companies, premium subsidies for farmers, and administrative and operating (A&O) expense reimbursement for crop insurance companies. The first expense item is largely a fixed cost from a taxpayer's perspective. The next three costs generally rise and fall directly with insurance premiums. Thus, if the social goal of the crop insurance program is to reduce the probability that crop revenue falls below a certain level, then the cost of achieving this social goal can be met at least cost with whole-farm units, followed by

enterprise units and then basic units. Optional units are the most expensive means of meeting this social goal.

The majority of farmers insure their crops in optional units. The first implication of this fact is that the social objective of risk reduction for farmers is not being efficiently met. Before turning to policy alternatives that can be used to increase program efficiency, an additional impact of unit structure on program cost needs to be explored. This second measure is how unit structure affects the integrity with which the crop insurance program is run.

Impacts of Unit Structure on Adverse Selection and Moral Hazard

The amount of insurance that a farmer can purchase and the price of that insurance both depend on the farmer's past yields. Having higher past yields translates directly into the ability to buy more insurance today at a lower price. This creates an economic incentive for farmers to overstate their past production. But there is an offsetting effect in that there is also an incentive for understating production because insurance indemnities reflect harvested yields. Understatement of production then can increase current payoffs. Crop insurance regulators may hope that the two incentives cancel each other and that farmers truthfully report yields. This offsetting effect is likely in force for farmers who consistently farm the same ground and who have very few insurance units.

But consider a farmer who has 10 optional units and who cash rents a large proportion of ground. This farmer has the opportunity to switch production from one unit to another, building up the yield history on one unit and receiving insurance claims on the other. Although this would hurt the yield history on the unit that receives the indemnities, if the land is cash rented, all the farmer has to do in the future is to quit renting the land and find another piece of land to rent. Optional units allow a farmer to build up history on one piece of ground while not suffering the future consequences of allowing the yield history on another unit to decrease.

The optional-units structure increases the opportunity for moral hazard in the crop insurance program by making it easier for a farmer to claim an insurance indemnity when, in fact, none is due. The farmer would not have to understate total production to accomplish this so there would be little chance of being caught.

The optional-units structure also increases the chance of adverse selection with respect to coverage level. Consider the farmer who has artificially built up a yield history on one unit at the expense of the yield history on another unit that the farmer no longer rents. Current program rules allow the farmer to extend the established yield history to newly rented land. If the built-up yield history overstates the expected yield on both the existing unit and the newly rented land, then this creates an incentive for the farmer to buy as much coverage as possible with the full expectation that an indemnity will be forthcoming. This is a form of adverse selection in that the farmer participates in the program because the farmer knows that the chances of an insurance payment are higher than the odds assumed by the insurance company.

It is more difficult to misstate production with enterprise and whole-farm units. Farmers who want to misstate production will have to misstate aggregate production rather than just production from one field. Thus, with respect to program integrity, optional units create the best atmosphere for mischief, followed by basic units, enterprise units, and finally whole-farm units.

The unit structure that provides the lowest efficiency in providing farmers an income safety net is also the unit structure that creates the greatest opportunity for moral hazard and adverse selection. If optional units are the worst unit structure from both perspectives, why then do the majority of farmers choose optional units? The answer is provided by looking at some straightforward rate-of-return calculations for farmers and by looking at the economic interests of two influential groups: crop insurance companies and crop insurance agents.

Economic Incentives for Purchasing Optional Units

We first explore the economic incentives for farmers to choose optional units. We do this by examining some representative corn farms in Minnesota, Illinois, Kansas, and Texas. To keep things simple, we assume that each of these farms has 1,000 acres of owned farmland. Table 1 provides the crop acreage for each of the farms. Table 2 reports the average crop yield in each county from 1994 to 2003. This average yield is taken to be the proven yields (APH yields) for each farm. Expected prices are set at \$2.40/bu for corn, \$5.80/bu for soybeans, \$3.00/bu for wheat, \$0.50/lb for cotton, and \$2.20/bu for

TABLE 1. Acres and crops for representative farms

County, State	Acres in Each Crop				
	Corn	Soybeans	Sorghum	Cotton	Spring Wheat
Lac Qui Parle, MN	333.3	333.3	0	0	333.3
McLean, IL	500	500	0	0	0
Lamb, TX	500	0	0	500	0
Butler, KS	500	0	500	0	0

TABLE 2. Crop yields for representative farms

County, State	Acres in Each Crop				
	Corn (bu/ac)	Soybeans (bu/ac)	Sorghum (bu/ac)	Cotton (lb/ac)	Spring Wheat (bu/ac)
Lac Qui Parle, MN	128	36			45
McLean, IL	153	47			
Lamb, TX	156			637	
Butler, KS	153		67.7		

grain sorghum. We assume that each farmer buys RA with the harvest price option.

Premiums for each farm are calculated from a prototype RA premium calculator that was developed for the purpose of extending RA to all states.

Table 3 reports unsubsidized per-acre corn premiums for optional unit coverage and enterprise unit coverage. Enterprise unit premiums are based on an acreage-based discount estimated from a regression of historical loss experience on unit size.

As shown, premiums for enterprise units are significantly less than are premiums for optional units. The ratio of enterprise unit to optional unit premiums ranges from 0.56 at the 65 percent coverage level to 0.72 at the 85 percent level. This increasing ratio reflects the decreased impact of pooling that occurs as the coverage level approaches the mean revenue level. It is puzzling to some why more farmers do not choose enterprise unit coverage. After all, the insurance guarantee is the same, and enterprise unit coverage costs so much less on both a percentage basis and a dollar-per-acre basis.

The first answer to this question is provided by Table 4, which reports producer-paid premiums. Per-acre premium subsidies under ARPA are proportionate to per-acre unsubsidized premiums, so the percentage decrease in the premium when moving to enterprise

TABLE 3. Unsubsidized per-acre Revenue Assurance (harvest price option) premiums for corn under optional and enterprise units

Per-Acre Corn Premiums	Coverage Level				
	65%	70%	75%	80%	85%
Optional Units			\$/acre		
Lac Qui Parle, MN	13.02	17.12	22.22	28.45	35.85
McLean, IL	9.28	13.20	18.37	25.10	33.47
Lamb, TX	22.96	28.91	35.87	43.93	53.10
Butler, KS	25.93	32.14	39.31	47.54	56.89
Enterprise Units					
Lac Qui Parle, MN	7.79	10.90	14.93	20.08	26.50
McLean, IL	5.04	7.81	11.76	17.18	24.35
Lamb, TX	13.09	17.56	23.05	29.71	37.62
Butler, KS	14.11	18.66	24.26	31.05	39.08

TABLE 4. Producer-paid per-acre Revenue Assurance (harvest price option) premiums for corn under optional and enterprise units

Per-Acre Corn Premiums	Coverage Level				
	65%	70%	75%	80%	85%
Optional Units			\$/acre		
Lac Qui Parle, MN	5.34	7.02	10.00	13.66	22.23
McLean, IL	3.80	5.41	8.27	13.05	20.75
Lamb, TX	9.41	11.85	16.14	22.85	32.92
Butler, KS	10.63	13.18	17.69	24.72	35.27
Enterprise Units					
Lac Qui Parle, MN	3.19	4.47	6.72	10.44	16.43
McLean, IL	2.07	3.20	5.29	8.93	15.10
Lamb, TX	5.37	7.20	10.37	15.45	23.32
Butler, KS	5.79	7.65	10.92	16.15	24.23

units does not change. However, because the per-acre subsidy is so much greater on optional units, the per-acre amount that a farmer would save by moving to enterprise units is reduced. For example, the reduction in unsubsidized premium for the Butler County farmer at 75 percent coverage is \$15.05/acre. But the actual amount of money the farmer would save is \$6.77 per-acre. This indicates that we need to look at the producer premium when calculating the incentives to choose one unit structure over another.

The difference between unsubsidized and subsidized premiums is, of course, the per-acre subsidies. If we assume that the unsubsidized premiums are actuarially fair, then

they represent the expected indemnity that a farmer would receive from crop insurance. Under this assumption the per-acre subsidy is the change in expected profit that can be obtained from the crop insurance program.

Figure 4 shows the per-acre subsidies for the corn farmers in Lac Qui Parle and Butler Counties for optional units (“ou” in the legend) and enterprise units (“eu” in the legend). The first thing to note is that, because the subsidy is proportionate to the premium, the subsidy available will always be greater for optional unit coverage than for enterprise unit coverage. Furthermore, the subsidy available to the Butler County farmer is significantly higher than the subsidy available to the farmer in Lac Qui Parle County. The second thing to note is that the subsidy is generally maximized at the 80 percent coverage level.

Figure 4 shows that if farmers want to maximize profit, then they would do so by purchasing 80 percent RA coverage with optional units. But the evidence suggests that farmers consider more than the per-acre subsidy in choosing their unit structure and

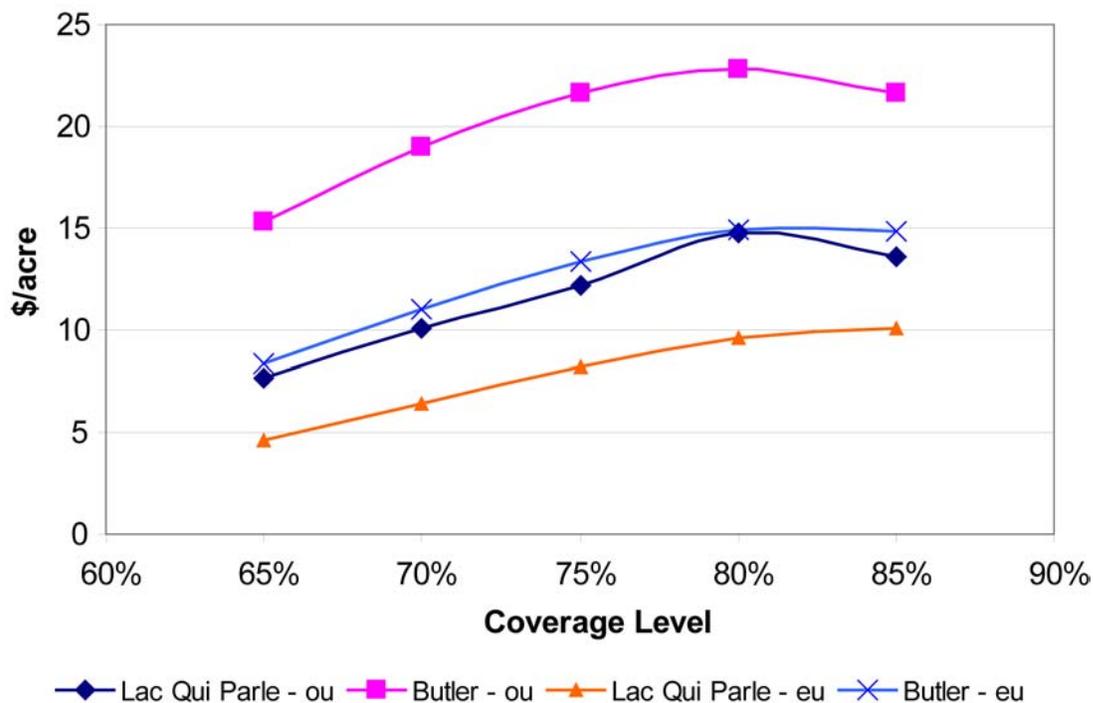


FIGURE 4. Per-acre subsidies available to the Butler and Lac Qui Parle County corn farmer

coverage levels. Figure 5 shows the coverage levels purchased by corn farmers in three counties. As shown, the greatest share of corn was insured at the 65 percent coverage level in Butler County and at the 70 percent coverage level in Lac Qui Parle. So it seems that farmers consider more than profit maximization when they make their decisions. Only in McLean County does it seem that profit-maximization is consistent with the chosen coverage level.

One factor might be the expected rate of return on the coverage level decision. We can calculate the expected rate of return by dividing the expected net return that can be obtained from changing coverage level by the producer cost of the change. The expected return of an increase in coverage is the expected increase in indemnities to be received from the new level minus the change in producer premium. The expected rate of return is the expected return divided by the change in cost.

Figure 6 shows the expected rates of return to 5 percent increments in the coverage level for Butler, Lac Qui Parle, and McLean Counties. (Lamb County is not shown because RA is not currently available there.) The expected rate of return on the increased producer premium of moving from 65 percent coverage to 70 percent coverage is more than 140 percent. That is, for each dollar invested in additional premiums, farmers should expect to receive back \$1.40 in addition to the \$1.00 initial investment. The expected

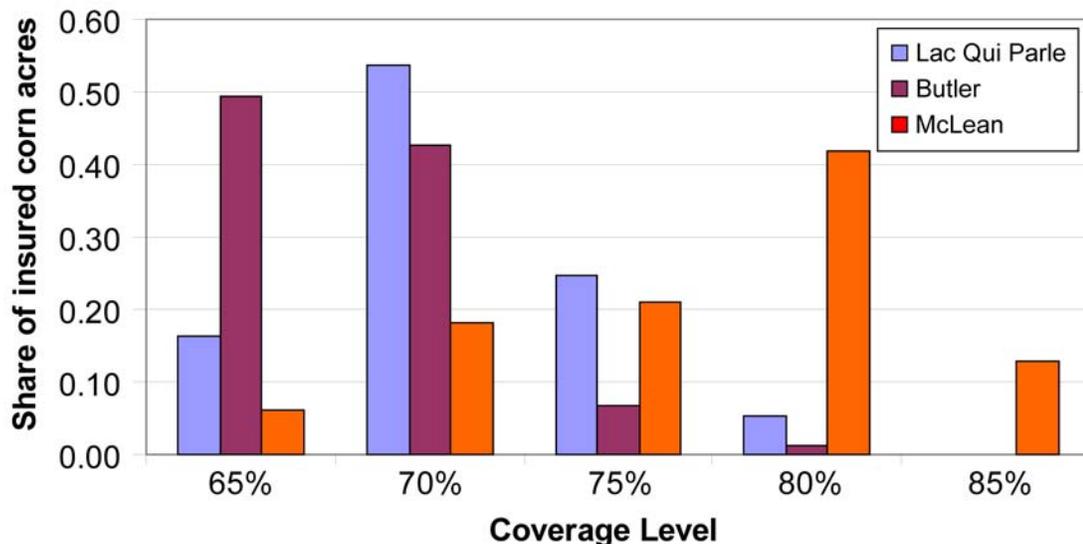


FIGURE 5. Share of corn acres insured at each coverage level in 2004

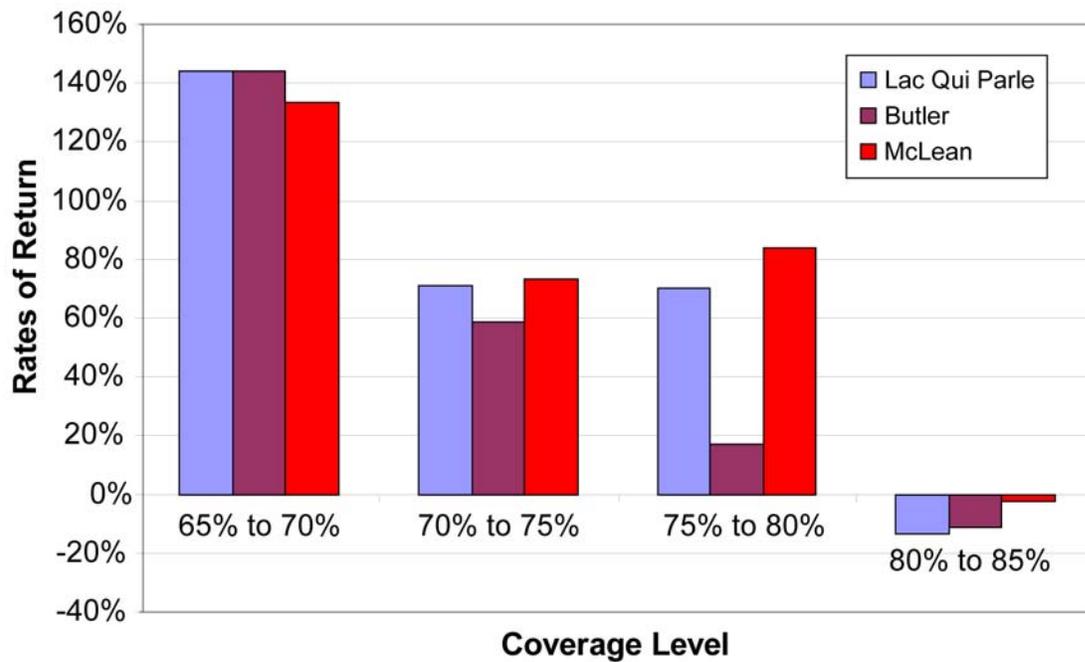


FIGURE 6. Expected rates of return to increasing coverage levels with optional units

rates of return drop significantly for higher coverage levels, but McLean and Lac Qui Parle corn farmers can still achieve more than 60 percent expected rates of return for coverage levels up to 80 percent. Figure 6 suggests that corn farmers should not purchase 85 percent coverage because of negative rates of returns.

The data in Figure 5 is roughly consistent with the rate of return calculations with the exception that we would expect more Butler County farmers to choose the 70 percent level than the 65 percent level. Perhaps the reason for this discrepancy is that many Butler County farmers have better information about their distribution of crop yields than is reflected in the premiums. The higher rates of return to 80 percent for McLean County farmers are consistent with their choice of the 80 percent coverage level. A comparison of Figures 4 and 5 seem to support the hypothesis that farmers consider rates of return when making crop insurance decisions.

We now turn to calculating the rates of return from moving from enterprise units to optional units. We continue to assume that the change in unsubsidized premium is an accurate assessment of the change in expected indemnities. This calculation is straightforward because for each coverage level, the rate of return is completely determined by

the corresponding coverage level. For each dollar of additional expected indemnities received, the producer will pay one minus the subsidy rate at each coverage level. So the rate of return is simply the subsidy rate divided by one minus the subsidy rate. At 65 percent and 70 percent coverage, the rate of return equals $0.59/0.41 \times 100 = 144\%$. At 75 percent coverage, the rate of return is 122 percent. At 80 percent the rate of return is 108 percent, and at 85 percent the rate of return for moving to optional units from enterprise units is 61 percent.

These rates of return rival the rates of return that can be obtained from moving to higher levels of coverage. Thus we can conclude that from strictly a financial perspective, farmers have every reason to move away from enterprise unit coverage to optional unit coverage and to purchase 80 percent coverage. Again, this conclusion rests on the assumption that the change in crop insurance premiums as one changes unit structure and coverage level are actuarially fair. Farmers' own rates-of-return calculations may differ from these if they have different beliefs about the actuarial fairness of premiums.

The high rates of return that can be obtained by moving from enterprise unit coverage to optional unit coverage also measure the rates of return that can be obtained by moving from whole-farm units to enterprise units; from enterprise units to basic units; and from basic units to optional units. Given these high rates of return, it is no surprise that the overwhelming unit structure that farmers choose is optional unit coverage.

Impact of Subsidizing Optional Units on Program Costs

To see how the large inducement to move to optional units increases the cost of the crop insurance program, Table 5 presents premiums for each unit structure for the representative farms presented in Tables 1 and 2. As shown, subsidizing the move to optional units dramatically increases program costs. The reason for this cost increase is that cost is roughly proportionate to unsubsidized premiums, and unsubsidized premiums are highest under optional units.

Table 6 shows the reduction in taxpayer support for each of the representative farms if they were to move away from optional units to another unit structure. Moving to basic units would reduce costs by 9.1 percent. Moving to enterprise units would save between 35 percent and 40 percent. The largest savings would occur with the move to whole-farm

TABLE 5. Premiums, subsidies, A&O expenses, expected underwriting gains, and total taxpayer costs of alternative unit structures at the 75 percent coverage level

	Unit Structure			
	Optional	Basic	Enterprise	Whole-farm
	Unsubsidized Premium (\$)			
Lac Qui Parle, MN	15,872	14,429	10,369	6,588
McLean, IL	15,747	14,315	9,915	8,750
Lamb, TX	39,657	36,055	24,580	15,500
Butler, KS	29,695	26,995	18,050	15,150
	Premium Subsidy (\$)			
Lac Qui Parle, MN	8,730	7,936	5,703	3,623
McLean, IL	8,661	7,873	5,453	4,813
Lamb, TX	21,811	19,830	13,519	8,525
Butler, KS	16,332	14,847	9,928	8,333
	A&O Expense (\$)			
Lac Qui Parle, MN	3,492	3,174	2,281	1,449
McLean, IL	3,464	3,149	2,181	1,925
Lamb, TX	8,725	7,932	5,408	3,410
Butler, KS	6,533	5,939	3,971	3,333
	Underwriting Gains (\$)			
Lac Qui Parle, MN	1,587	1,443	1,037	659
McLean, IL	1,575	1,432	9,92	875
Lamb, TX	3,966	3,606	2,458	1,550
Butler, KS	2,970	2,700	1,805	1,515
	Total Taxpayer Cost (\$)			
Lac Qui Parle, MN	13,809	12,553	9,021	5,731
McLean, IL	13,700	12,454	8,626	7,613
Lamb, TX	34,502	31,368	21,385	13,485
Butler, KS	25,835	23,486	15,704	13,181

TABLE 6. Percent reduction in taxpayer cost obtained by moving away from optional units

	From Optional Units To:		
	Basic Units	Enterprise Units	Whole-Farm Units
Lac Qui Parle, MN	9.1%	34.7%	58.5%
McLean, IL	9.1%	37.0%	44.4%
Lamb, TX	9.1%	38.0%	60.9%
Butler, KS	9.1%	39.2%	49.0%

units, with an average savings of approximately 53 percent. With taxpayer support of the crop insurance program approaching \$4 billion, savings of these magnitudes are significant.

Political Economy of Coupled Unit Structure

If programs were designed and operated with an objective of efficiently meeting social objectives, then the crop insurance program would not induce farmers to purchase optional unit coverage. Figure 7 shows the distribution of per-acre revenue less variable production costs and the costs of insurance for a corn and soybean farm under the four unit structures. As can be readily seen, the choice of unit structure does not affect the program’s ability to meet its stated goal of protecting farmers from the financial consequences of low crop income levels because the total farm guarantee under each unit structure is identical.

However, it is evident from the distributions shown in Figure 7 that farmers would prefer optional units over enterprise and whole-farm units. This preference can be seen by

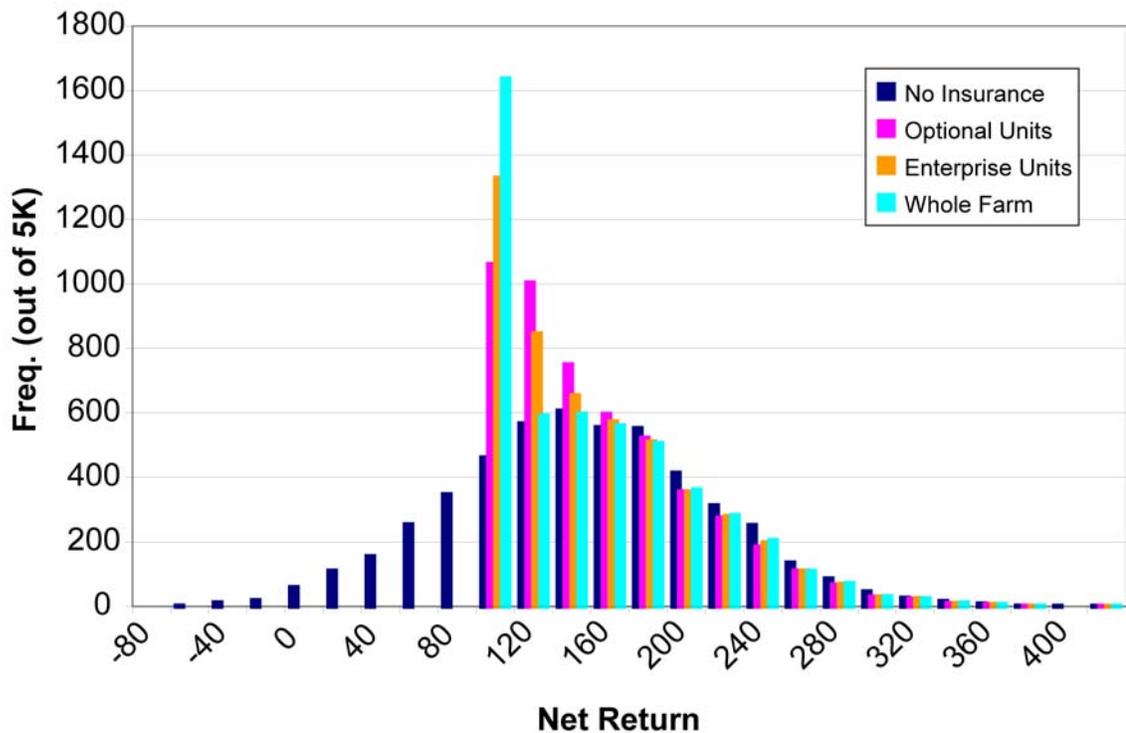


FIGURE 7. Distributions of per-acre net returns for a corn-soybean farm under alternative unit structures

the height of the histogram bars at net revenue outcomes just below \$160/acre. The height of the optional unit bar is the lowest at \$100 and the highest at \$120 and \$140 when compared with the other unit structures. This means that under optional units, farmers have a lower probability of \$100 net returns and a higher probability of having net returns of \$120 and \$140. This increased probability results from receiving indemnity payments even though total farm revenue did not fall below the guarantee level.

Figure 7 illustrates one reason why farmers prefer the current policy that subsidizes their optional unit coverage. And, while not stated, another reason why farmers might prefer optional unit coverage is the increased opportunity that optional units create to “game” the program in terms of building up and then strategically applying yield histories to fields.

But if program integrity would be increased by moving away from optional units, one might think that the USDA and Congress would favor such a policy move. A look at the Table 5 calculations gives insight into why the other interest groups affected by the crop insurance program also prefer optional units.

In addition to farmers, there are two other important interest groups affected by the crop insurance program: crop insurance agents and crop insurance companies. The financial interests of agents can be represented by the level of A&O reimbursement. Most agents are paid commissions based on a percentage of the unsubsidized premium that they bring in because crop insurance companies receive reimbursement based on a percentage of the total premium. Agents have a direct incentive to sell farmers more coverage and more expensive insurance. Thus agents’ interests are aligned with farmers’ interests in seeing that farmers move to optional unit coverage. Agent commissions would drop by perhaps 10 percent if only basic units were allowed and by up to 40 percent if only enterprise units were allowed. Clearly, the USDA and Congress would have to bear some political costs of making such a move.

The interests of crop insurance companies are a bit more complicated. On the one hand, they are interested in controlling abuse of the program because they have to pay indemnities. Optional units increase the opportunities for abuse so one might expect the companies to favor basic units or enterprise units. On the other hand, the companies

receive A&O reimbursement and underwriting gains that are proportionate to unsubsidized premiums, so they too have a financial incentive to favor optional units.

These two forces might be expected to make companies largely neutral with respect to optional units. However, crop insurance companies have a reinsurance agreement with the government that allows them to cede their highest risk policies to the government. This ability ameliorates at least some of the financial risk to the companies from optional units. Thus, all three interest groups—farmers, agents, and crop insurance companies—should be expected to work against any proposal that would either eliminate optional units or even to reduce the financial incentives that drive farmers to purchase optional units.

When the financial interests of groups are all aligned on the same side of a policy debate and the only interest aligned on the other side are people interested in efficient provision of government services, then history tells us that the groups with the direct financial interests will prevent any policy change that will negatively affect their interests. The only hope for those on the side of efficient government is that they can somehow persuade one or more of the groups on the other side to switch sides. An exploration of the impact of alternative crop insurance subsidy policies shows that the highest potential is for farmers to switch their preferences.

Two Policy Alternatives

We consider two policy alternatives designed to improve the efficiency of the crop insurance program. The two alternatives are the elimination of optional units and the decoupling of premium subsidies from the choice of unit structure. Under both alternatives we maintain the ARPA subsidy levels for each of the coverage levels. We measure the impacts of the two alternatives in terms of their impact on producers, crop insurance agents, crop insurance companies, and taxpayers.

Elimination of Optional Units

Perhaps the most straightforward way of increasing program efficiency would be to eliminate optional units. Most farmers who currently choose optional-unit coverage would move to basic-unit coverage. They would not move to enterprise-unit coverage without any other program change because of the high rates of return on the additional cost of basic-unit coverage relative to enterprise-unit coverage. With an expected

program cost of \$4 billion, if 90 percent of current acreage is insured with optional units, the taxpayer savings from this policy move would be 9.1 percent of \$3.6 billion, or approximately \$327 million. Producer premium subsidies, agent commissions, and underwriting gains would all decline by this same proportion. Program integrity would be somewhat enhanced by a decline in the opportunities for fraud, moral hazard, and adverse selection. The ability of the program to deliver risk management protection to farmers would not be adversely affected.

However, it is likely that this alternative would have no effective political support because, as discussed above, farmers, agents, and companies would all be against such a policy change. The next policy alternative would result in improved program efficiency while potentially splitting the unified coalition against program reform.

Decoupling Subsidies from Unit Choice

Suppose a farmer's per-acre premium subsidy did not vary across unit structure. This could be accomplished by fixing the per-acre subsidy at some level and then calculating the producer-paid premium as the difference between unsubsidized premium and this fixed subsidy level. Such a move would mean that the expected rate of return that could be obtained from moving from one unit structure to another would be zero (assuming of course that the change in unsubsidized premium rates accurately reflects the change in expected indemnities to be received). That is, decoupled subsidy payments would eliminate the government inducement to move to optional units.⁴

Under such a scheme, farmers would choose the unit structure that best balanced their individual risk management needs with the actual cost of providing the unit coverage selected. Farmers who determined that their needs would be adequately met by enterprise unit coverage would capture the full benefit of the premium reduction. With reference to Table 5, under current rules, if the Lamb County farmer chooses to move from optional units to enterprise units, his producer premium drops by \$6,785. But the farmer's expected indemnity (given by the change in unsubsidized premium) drops by \$15,077. What producer would trade \$15,077 for \$6,785? If subsidies were decoupled from unit structure, then the farmer who moves from optional unit coverage to enterprise unit coverage would capture the full \$15,077 in reduced premium. And similarly, the farmer who moves from enterprise unit coverage to optional unit cover-

age would have to pay \$15,077 for the additional coverage if subsidies were decoupled from unit structure, which is \$8,292 more than the farmer pays now. This example illustrates the extreme bias of the current coupled subsidy scheme and why a move toward decoupled payments would greatly increase the proportion of farmers who would purchase basic, enterprise, or whole-farm units.

What would induce farmers to back such a move? Clearly, farmers would support the move if the level of decoupled subsidy were fixed at the per-acre level available under current optional units. No farmer would be worse off, and all farmers who decide to insure under a different unit structure would be better off. If 10 percent of farmers currently do not choose optional units, then the total amount of premium subsidy would increase. Taxpayer costs would not necessarily increase, however, because there would likely be some cost reduction in A&O and underwriting gains because a significant proportion of farmers would move to enterprise and whole-farm coverage.

It is likely that setting the fixed per-acre subsidy at some level less than that available under optional units would still be favorably backed by farmers because they would be able to reap the efficiency gains of selecting the unit structure that best meets their needs. Agents and crop insurance companies would likely continue to oppose such a move because farmers would move to lower-cost unit structures that would result in lower agent commissions, lower A&O reimbursement, and lower underwriting gains. However, teaming farmers up with efficient government advocates might prove to be an effective coalition.

Endnotes

1. Use of insurance can be measured by the proportion of planted acres that is insured and by the level of insurance deductible in farmers' insurance policies. Crop insurance is sold in terms of coverage level rather than deductible. So a 65 percent insurance coverage level is equivalent to a 35 percent deductible policy.
2. It would not be accurate to claim that the entire crop insurance program was decoupled because farmers had to participate in the program and they had to buy at least 65 percent coverage to obtain the fixed amount of premium subsidy.
3. If other important sources of risk exist, then the increased frequency of indemnities from lower levels of aggregation will infer some additional benefit in terms of meeting a target level of returns.
4. To meet the congressional goal of inducing farmers to purchase higher levels of coverage, we assume that this decoupling would not be extended to a farmer's choice of coverage level. Rather, the percent premium subsidy levels are held fixed at their current levels.