Review of Premium Reduction Plan Issues

Conducted by

AgRisk Management, LLC

For the United States Department of Agriculture
Federal Crop Insurance Corporation
Board of Directors

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Executive Summary

Premium reduction plans can serve two possible public purposes. First, by further lowering producer crop insurance premiums they should increase use of the crop insurance program as a risk management tool by U.S. farmers. This increased use is consistent with the policy objectives of ARPA. Our estimates of the extent to which use of the crop insurance program will increase if a premium reduction plan which reduces premiums by 3.5% of total premium becomes widely available to corn, soybean, and wheat farmers are as follows:

Estimates of the Change in Acreage from a 3.5% Premium Reduction Plan

	Increase in Insured Acres	Increase in Buyup Acres*	Increase in Acreage Above 65%
Corn	1,595,491	3,518,203	3,617,658
Soybeans	1,717,443	3,406,284	3,390,145
Wheat	793,777	2,507,397	2,212,704
3-crop Total	4,106,712	9,431,885	9,220,506

*Buyup acres are those insured at a 65% or greater coverage level.

Of course, the change in acreage will have increase taxpayer costs of the crop insurance program. We estimate the following taxpayer cost increases:

Changes in Total Premium, A&O Reimbursement, and Underwriting Gains

Crop	Change in Total Premium	Change in A&O Exp. Reimbursement	Change in Underwriting Gains
Corn	$88,310,597	$19,428,331	$8,831,060
Soybean	$65,190,814	$14,341,979	$6,519,081
Wheat	$27,668,572	$6,087,086	$2,766,857
3-Crop Total	$181,169,983	$39,857,396	$18,116,998

From these estimates we conclude that widespread use of premium reduction plans will reinforce the goals of ARPA, namely to increase use of the crop insurance program by U.S. farmers.

The second policy objective that premium reduction plans can meet is to determine whether significant reductions in A&O can be obtained without significantly impacting the ability of U.S. farmers to access the crop insurance program. Lower A&O reimbursements could result in taxpayer savings if the premium reduction plans were eventually rescinded.

Widespread use of premium reduction plans would have a far reaching impact on the distribution of benefits from the crop insurance program. Under current incentives, crop insurance agents and farmers are the two groups that benefit from the program. Because AIPs actively compete for agents' books of business, any excess profits they may accrue are effectively competed away. Agents earn excess profits under the current structure because agents cannot compete on price. Premium reduction plans will increase competition between agents because they will be able to compete for farmers' business by the ability to offer a lower price for crop insurance. This competition will reduce and then eliminate agents' excess profits, if RMA flexibly administers and approves premium reduction plans. This reduction in agent profits would mean that farmers would really be the only group that would benefit from the crop insurance program.

The transition from the current system to one where agents' excess profits are eliminated would follow the same steps that other industries went through when faced with increased competition. First, agents will attempt to forestall competition through political pressure or other means. Thus, agents will raise all sorts of issues about how premium reduction plans are not good for the industry. For example, concerns raised about small, minority and limited resource farmers can be viewed as an attempt by those with a vested interest in the current system to derail competition. Although there might well be a small negative impact of premium reduction plans on this group of farmers, the current system has such a large negative impact on this group, that it should be corrected first if this is really a concern. Second would be consolidation of agencies and a large reduction in the number of agents who sell crop insurance. This consolidation will increase the average level of knowledge and education of crop insurance agents. Farmers will have, on average, access to better advice and analysis of their crop insurance options. But this consolidation will also likely reduce the amount of personal time farmers spend with their agents. The agent force will have a higher opportunity cost of time and they will be more professional. Third, the bundle of services that agents provide will change. Agents will provide only those services that farmers truly value because only those agents that provide high value service at the lowest costs will be the only ones to survive the increase in competition. Agencies and AIPs that are not nimble in their response to this increased competition will go out of business.

RMA should refocus its application and approval process for premium reduction plans on the most important cost that AIPs face: namely agent commissions. The focus on efficiencies needed to be obtained from fixed costs are misplaced. If RMA wants to facilitate competition then it should allow AIPs to flexibly obtain cost reductions by plans that reduce agent commissions. AIPs already have a strong incentive to reduce other costs through the adoption of new information technologies. Their number one driver of costs is the competitive need to outcompete other AIPs for agents' books of business. And, of course, the only mechanism they have for this competition is agent commissions.

We recommend that if the Board wants to use premium reduction plans to further the goals of ARPA or if it wants to increase competition between agents and restructure the way that crop insurance is delivered to farmers, then RMA should be instructed to adopt a flexible application and approval process that focuses on agent commissions as the number one source of costs efficiencies needed to justify lower producer premiums. Furthermore, RMA should expect AIPs to apply for selective plans. Variability in plans reflects the desire for agents and AIPs to minimize the short-run impacts of competition and it reflects the underlying variability in competitive pressures. RMA should approve selective plans to the extent that they reflect true variations in profitability.

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The methods used to conduct this review include application of economic logic regarding the likely outcomes of the new price competition aspects of premium reduction plans and data collection and statistical analysis to determine the likely response of farmer use of the crop insurance program to premium reduction plans.

A General Discussion of the Economic Issues Raised by Premium Reduction Plans

Before we address the specific questions posed by the Board we need to provide an overview of the basic economic forces that motivate those who participate in the crop insurance business. This overview will help us explain what will be the likely economic impacts from widespread adoption of premium reduction plans. This overview will also help the Board understand how premium reduction plans will dramatically change where profits accrue in the crop insurance program. We will refer to this overview in the course of our responses to the numbered questions the Board asked us to address.

The Agent

First we look at the economic forces at work with crop insurance agents. For agents, the additional (or marginal) cost of providing insurance to one producer is very small compared to the fixed costs needed to be in a position to provide this insurance. For example, it probably costs the agent from $50 to $100 to renew a policy and perhaps two or three times this amount to add a new customer. The primary component of this cost is the opportunity cost of the agent's time. The costs per customer are approximately constant up to some point where the agent's time is constrained. At that point the agent can choose to either hire more help or not add any more clients. Agents (or the agencies that employ the agent) also have fixed costs. They must rent office space, perhaps maintain a vehicle fleet, pay office staff and perhaps even pay themselves regardless of how much business they have. [1] When these overhead (or fixed) costs are spread out over all customers in an agent's book of business they can easily exceed the marginal costs of each customer.

When deciding whether to invest in trying to attract a new customer, an agent compares only the marginal costs associated with that customer to the additional revenue that that will be generated from that customer from commissions. When they make this

[1] Fixed costs are those that do not increase when a new customer is added. Variable costs increase when a new customer is added. The increase in variable costs for one new client is the marginal cost of that client.

calculation the agent will logically ignore fixed costs because they will pay these costs whether they can attract this customer or not. In 2004, total premium on buy-up crop insurance was about $4 billion on 190 million acres. This works out to about $21 per acre. At a commission rate of 15%, this works out to about $3.15 in revenue per insured acre. At a cost per customer of $75, this means that the agent will view customers as profitable if they have more than 23 acres to insure. The average number of acres per policy was about 190 in 2004, which illustrates that agents have a strong incentive to find new customers and to maintain existing customers. With approximately constant costs, the more acreage a client has the more profitable a client is to an agent.

The current program shields agents from price competition in that the price of crop insurance is fixed. This means that agents really only compete with other agents in the quantity and quality of service that they provide. Given that an agent is providing satisfactory service, there really is no incentive for a client to switch agents. In an economic context, agents receive economic rent (revenue in excess of costs) from their clients, and the acreage a client has the larger the rent. There is no mechanism in the crop insurance program whereby competition will bid excess profits away so the rents are are sustainable. As will be shown next, the level of profit for agents is largely determined by the pre-commission profits of Approved Insurance Providers (AIPs).

The AIP

The same fundamental economic forces that drive agents are also at work for AIPs. These companies incur both variable and fixed costs. The variable cost of adding business includes agent commissions, reinsurance costs, indemnities, loss adjustment costs and some minor costs associated with interacting with agents to file applications and claims. The remaining costs include corporate salaries, office expenses, marketing systems and underwriting expenses which do not change if a new customer is added.

As can be seen from the data provided in the premium reduction plan applications, agent commissions and loss adjustment costs comprise almost all of the variable costs of these companies. **[Redacted Confidential Business Information].**

AIP's have two sources of revenue from the crop insurance program. A&O provides revenue that is proportionate to the total premium that they write. Underwriting gains depend on an AIP's ability to use the reinsurance pools (and private reinsurance) to successfully select against the government. Ignoring agent commissions for now, AIPs have a strong incentive to add new business because they realize that the revenue generated from the new business will generally more than cover the very small additional cost associated with offering this business.

In contrast to the situation of agents, however, AIPs face stiff competition for this new business. AIPs compete against each other for agents' books of business. The form of the competition is agent commissions. To see how this competition plays out suppose we have two AIPs competing for the book of business of one crop insurance agent. Assume that the expected underwriting gains from the agent's book are 10% of total premium. The A&O from the book is 22% and for simplicity assume that both AIPs have variable costs associated with the book of business that amounts to 8% of premium. Suppose one of the AIPs offers a 15% commission for this book of business. At this commission rate, the AIP's profits will be 9% (=10% + 22% - 8% - 15%). The other AIP looks at the numbers and decides that a commission offer of 20% would win the book of business and still leave a profit level of 4%. This type of competition will soon result in a winning bid of a commission rate of 24%. Of course at this winning bid, the winning AIP does not make any profit. This "zero-profit" result is what one would expect when there is sufficient competition.

An agent with a book of business that generates lower underwriting gains (or higher loss adjustment costs) should expect lower commissions. We see this exact pattern of variable commission rates in the submitted premium reduction plans whereby agents in high risk states obtain lower commissions. A result of this competition is that AIPs have passed most of the benefits associated with the crop insurance program to the agents. The competition has also forced AIPs to become more efficient. In this competitive environment, the only way for AIPs to make money is to have lower non-agent-commission costs than their competitors. These costs include data handling and analysis, loss adjustment costs, corporate salaries, and all other back-office tasks. Most of these remaining costs are fixed costs. So AIPs currently have had a strong incentive to lower their fixed costs.

In contrast, a lack of a means by which agents can compete in price, coupled with a lack of any entry barrier has attracted a surplus of agents, creating overcapacity, inefficiency and an abundance of small non-specialized agents and agencies. Of course, this setup means a higher level of customer service for clients because the only means by which agents can compete for customers is through customer service.

We are now in a position to examine in general the issues raised by premium reduction plans. We will then use this general examination to answer Board questions 2 – 7. Board question 1 will be addressed with data.

The Political Economy of Premium Reduction Plans

There are two related policy objectives of premium reduction plans. The first is to further decrease producer-paid premium to entice additional acreage into the crop insurance program and to entice producers to buy a higher level of coverage. The second is to explore whether the crop insurance delivery system can be made more efficient.

Approval of the first premium reduction plan was a landmark event because for the first time agents faced a competitive threat from price. The clients of non-participating agents (agents who did not participate in the premium reduction plan) could obtain the identical product from a participating agent for a lower price and non-participating agents were powerless to match their competitor's price. Because most agents receive commission income from their customers that greatly exceeds the marginal cost of servicing the customers' needs, agents who faced this new price threat would have been willing to lower their price to meet the threat. The lower "price" would have been accomplished through a lower commission. But non-participating agents could not lower the price of the insurance price so they faced a permanent loss of competitiveness.

The large number of applications from AIPs for premium reduction plans in 2004 is a direct result of this new competitive threat. This response shows that it is likely that the whole industry will eventually move to adopt premium reduction plans, if allowed to do so by RMA. Given enough time (and the incentive/ability to compete) competition between agents for customers will drive down the price of the insurance product to the point where agents' costs are just covered. And competition between AIPs for agents also means that AIPs' profits remain at the competitive level: i.e. zero.

This new aspect of competition between agents deserves a bit more explanation. Consider two hypothetical agents. One has an Iowa book of business with an expected underwriting gain of 18%. The other agent has a Texas book of business with an expected underwriting gain of 5%. For simplicity, assume that the average variable cost of customer service is 5% of written premium (although the previous discussion suggests that these costs are constant per customer and not proportionate to premium). Assume an A&O level of 22% and an AIP total cost (exclusive of commission) of 15%. With no price competition, the Texas agent should expect to receive a commission rate of 12% and the Iowa agent should expect a commission rate of 25%. (Commission = A&O + Underwriting gain – AIP costs.) Agent profit levels are therefore 20% for the Iowa agent and 10% for the Texas agent.

With price competition, competing agents have an incentive to have their AIP apply for a premium reduction plan. Given enough time and enough competition between agents, the premium reduction plans would differ across states and they would reduce farmer premiums by the full amount of the agent profit: 10% for Texas producers and 20% for Iowa producers.

This competition would fundamentally change who receives the benefits from the crop insurance program. Currently, producers benefit from subsidized premiums and delivery. Agents benefit from a lack of price competition. AIPs do not benefit. Price competition via premium reduction plans will result in a loss of economic rent to agents. The only group that will receive economic rent from the program will be farmers. The the amount of the additional benefit that farmers will receive is directly proportionate to the expected underwriting gains that their region generates under the terms of the SRA. So Iowa and Illinois farmers will gain the most. Texas and North Dakota farmers will gain the least.

This redistribution of wealth from agents to farmers is the primary reason why agents are so opposed to premium reduction plans. In the long-run, AIPs should be indifferent between the current system and one dominated by premium reduction plans to the extent that the fortunes of AIPs are independent of their agents' incomes.

This redistribution of income to farmers is consistent with the goals of ARPA: namely to enhance farmer participation in the crop insurance program by lowering the farm-paid premium. And this redistribution of income to farmers is consistent with a goal of demonstrating that the crop insurance program can get by on lower A&O. Competition will eventually determine how low A&O can go. However, taxpayer interests are not served by premium reduction plans unless the low A&O rates eventually are made permanent and the premium reductions are rescinded. The lower A&O rates then would show up as a taxpayer benefit.

General Comments about the Premium Reduction Plan Application Process

The current application and review process for premium reduction plans generate confusion among AIPs and RMA staff because they are not consistent with the economic incentives of AIPs and crop insurance agents. First, by accepting applications only from the AIPs, RMA implicitly assumes that the savings are to be made internally at the level of the AIP. But almost all the applied-for efficiencies are to be found in agent commissions. Second, RMA assumes that the efficiencies that are to be gained (and passed on to producers) arise from reductions in fixed costs[2]. That is why RMA asks for a detailed accounting statement that focuses on overhead costs, and not on marginal costs such as agent commissions and loss adjustment.

As stated earlier, both AIPs and crop insurance agents already have an incentive to minimize fixed costs. It is unrealistic to think that there are large amounts of cost savings to be made at this level, which implies that no premium reduction plan will be approved if cost efficiencies have to be documented from reductions in fixed costs. To achieve the goal of reducing farmer-paid premiums, the AIP application process should focus on the variable cost of most importance to AIPs: agent commissions.

The only time it makes sense for an AIP to pass on a cost reduction to an agent/producer is when the AIP experiences a reduction in the marginal cost of doing business. For an AIP, the marginal cost of doing business includes agent commissions, loss adjustment and costs of interacting with the agent when new business is generated. **[REDACTED CONFIDENTIAL BUSINESS INFORMATION]** This application was denied because,

"RMA is unable to determine that your application meets the requirements of:

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2 Detailed Accounting Statements

(3) Detailed accounting statements prepared in a manner that permits comparison with the Expense Exhibit that the AIP submits to RMA annually with its Plan of Operations. A certified public accountant must certify to the reasonableness, accuracy, and completeness of the statement. If the AIP employs an MGA and/or TPA, the statement must present the specified information for the AIP and as applicable, the MGA and/or TPA.

1. *Section 508(e)(3) of the Federal Crop Insurance Act regarding whether the applicant's costs associated with delivery of the crop insurance program are less than the amount of administrative and operating expense reimbursement paid by RMA before any efficiency is applied;"*

In other words RMA denied the application because it did not show reductions in fixed costs. The applicant had clearly stated that the reductions were to come from agent commissions but these costs were clearly not the costs that RMA had in mind.

Why is there such a difference between RMA's requirement and the reality of the marketplace? RMA is not trying to make the process more efficient, instead it is trying to ensure that AIPs remain solvent. To achieve this objective RMA needs to be sure that when the end of the year fixed cost allocation is complete, the AIP has enough revenue to cover all variable and fixed costs. Fixed costs have an enormous role to play when it comes to the viability, tax liability and net profit of the AIPs and it is therefore understandable that RMA (and company accountants) traditionally focuses on these costs. This focus has apparently caused RMA to implement the premium reduction plan process in a way that is fundamentally inconsistent with the reality of the market place (and with economic theory). It is therefore not surprising that the companies and the process have become confused.

The way to rectify this problem is to shift the focus in the application process to reductions in variable costs, i.e. agent commissions. This simple change would increase price competition, which will determine whether new ways of delivering crop insurance can increase efficiency. This change would move towards increased deregulation of the industry and would have all of the associated benefits and costs experienced in other deregulated industries. Many agents would exit the crop insurance business and in some small towns this would involve the net loss white collar jobs. In addition there would be a lot of confusion as the customers of these agents attempted to find new agents and as these customers discovered that the remaining agents were not as customer focused. This confusion naturally and inevitably follows any deregulation effort.

We now turn to directly answering questions 1-7.

Question 1: Estimation of the effects of producer use of insurance as a risk management tool

The large changes in the crop insurance program in the last six years provides an abundance of data that can be used to estimate how a reduction in producer premium will affect producer use of crop insurance as a risk management tool. We provide insight into three questions for corn, wheat, and soybeans. 1) How will a decrease in producer premium affect the percent of acreage insured? 2) How will a decrease in producer premium affect the percent of acreage insured at a coverage level of at least 65%? 3)

How will a decrease in producer premium affect the percent of insured acreage that is insured at coverage levels greater than 65%?

Analysis and Results

ARPA was an attempt by Congress to increase the proportion of U.S. crop risk that is borne by the crop insurance program. The primary inducement to increase participation was an increase in premium subsidies. At the 65% coverage level, the premium subsidy increased from 41.7% to 59% of total premium. To increase the proportion of business that was insured at greater than the 65% coverage level, ARPA ended the rule that largely decoupled crop insurance subsidies from farmers' selected coverage levels. Before ARPA, RMA kept the dollar amount of premium subsidies constant for all coverage levels between 65% and 85%, with per-acre subsidies dropping for coverage levels below 65%. 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, per-acre crop insurance subsidies did not vary with a farmer's choice of coverage over this range.

We use pre-ARPA data from 1998 and post-ARPA data from 2002 to estimate the effects of a reduction in producer premium on participation and coverage level. These two years were selected for a number of reasons. ARPA was passed in June of 2000. Its subsidy provisions went into effect immediately, but farmers had already made their decisions about which coverage level to purchase so there would be little or no impact from ARPA in 2000. We could have selected crop year 2001 data but experience with crop insurance provisions suggests that it takes time for the industry to learn about significant changes in policy. Insurance agents must be notified and trained, quoting software must be adjusted, and then farmers must be made aware of the impacts of change. Hence, the 2002 data should more fully reflect awareness of the ARPA policy changes and subsequent changes in coverage levels. We first address the impact of a change on premium subsidies on participation levels and estimate the effect of adoption of a premium reduction plans. We then address the question of how a further increase in premium subsidies would affect the proportion of acres that is insured at a coverage level of at least 65%. And finally, we address the question of the effects of an increase in premium subsidies on the proportion of acreage that is insured at a coverage level in excess of 65%.

Summary of Findings

Because the length of the documentation that we provide of our analysis used to estimated the change in use of the crop insurance program, we first provide a summary of our findings below. To measure the effects of an increase in premium subsidy on acreage in the crop insurance we first estimated the elasticity of acreage with respect to a change in subsidy levels. We estimated state elasticities for total insured acreage and acreage at the 65% coverage level or above ("buyup" acreage). National elasticities can be obtained from the state elasticities by taking a weighted average with weights given by planted acres.

National Elasticities of Acreage with Respect to Subsidies

	Insured Acres	Buyup Acres	Percent Acreage Insured Above 65%	
			APH	CRC
Corn	0.50	1.34	0.65	0.15
Soybeans	0.55	1.56	0.62	0.25
Wheat	0.32	1.25	0.46	0.21

The usefulness of these elasticities is that we can use them to estimate the percent change in total acreage, acreage insured at the 65% coverage level or above, and acreage insured at above 65% due to a change in premium subsidy by multiplying the elasticity by the percent change in subsidy. Using an aggregate estimate of 2% for the change in acreage insured at 65% or greater, we calculate the following changes in acreage for corn, soybeans, and wheat:

Estimates of the Change in Acreage from a 3.5% Premium Reduction Plan

	Increase in Insured Acres	Increase in Buyup Acres	Increase in Acreage Above 65%
Corn	1,595,491	3,518,203	3,617,658
Soybeans	1,717,443	3,406,284	3,390,145
Wheat	793,777	2,507,397	2,212,704
Three-crop Total	4,106,712	9,431,885	9,220,506

Premium reduction plans will increase total insured acreage, will move acreage to 65% and above, and will move acreage from 65% to above 65% coverage. Of course, the change in acreage will have increase taxpayer costs of the crop insurance program. We estimate the following taxpayer cost increases:

Changes in Total Premium, A&O Reimbursement, and Underwriting Gains

	Change in Total Premium	Change in A&O Exp. Reimbursement	Change in Underwriting Gains
Crop			
Corn	$88,310,597	$19,428,331	$8,831,060
Soybean	$65,190,814	$14,341,979	$6,519,081
Wheat	$27,668,572	$6,087,086	$2,766,857
3-Crop Total	$181,169,983	$39,857,396	$18,116,998

a. Effect of a decrease in producer premium on insured acreage

A premium reduction plan reduces the crop insurance premium paid by agricultural producers. In the plans the Risk Management Agency (RMA) is considering, a proportion of the total premium (before any premium subsidies are taken into account) is deducted from the premium that the farmer will pay. The farmer would pay the total premium less the premium subsidy less the premium reduction plan amount. For example, if the premium reduction plan proportion was 3.5 percent and the farmer chose 65 percent coverage, then the farmer would pay the total premium less the 59 percent premium subsidy less the 3.5 percent premium reduction plan amount. Without a premium reduction plan the farmer pays 41 percent of the total premium and with a premium reduction plan the farmer pays 37.5 percent of the total premium. Thus a premium reduction plan of this size works like an increase to the premium subsidy from 59 to 62.5 percent, roughly a 6 percent increase in the premium subsidy. To examine the impacts on crop insurance participation from a premium reduction plan, we analyzed the effects of the increased premium subsidies from the Agricultural Risk Protection Act (ARPA) of 2000. The effects of the ARPA subsidy increases provide estimates of not only the impacts on crop insurance participation, but also on the possible impacts on participation at higher levels of coverage.

To look at ARPA and its effects, we analyzed two years of crop insurance data (1998 and 2002). These years were chosen for several reasons. First, these years cover times before and after ARPA subsidies went into effect. Second, the years between these two years represent a transition period. In 1999 and 2000, Congress passed temporary premium subsidies, which may or may not have affected producers' decision (mainly due to the timing of the legislation). 2001 was the first year producers were exposed to the ARPA subsidies. Third, after 2002, RMA embarked on several premium changes across several commodities and insurance plans; the effect of these changes would be difficult to separate from the subsidy effect.

Figures 1, 3, and 5 show the percentages of planted acres for corn, soybean, and wheat, respectively covered by crop insurance in 1998. The number of insured acres was gathered from RMA Summary of Business reports. The number of planted acres was gathered from the National Agricultural Statistics Service (NASS) online database. For each of the crops, participation was the highest in the major production regions. In minor production regions, participation varied dramatically. Nationwide, 64 percent of the corn acres, 63 percent of the soybean acres, and 67 percent of the wheat acres were covered by crop insurance in 1998. Figures 2, 4, and 6 show the participation for 2002. Participation remained strong in the major production regions, while it strengthened in the minor

Figure 1. Participation in crop insurance in 1998 for corn (percentage of planted acres)

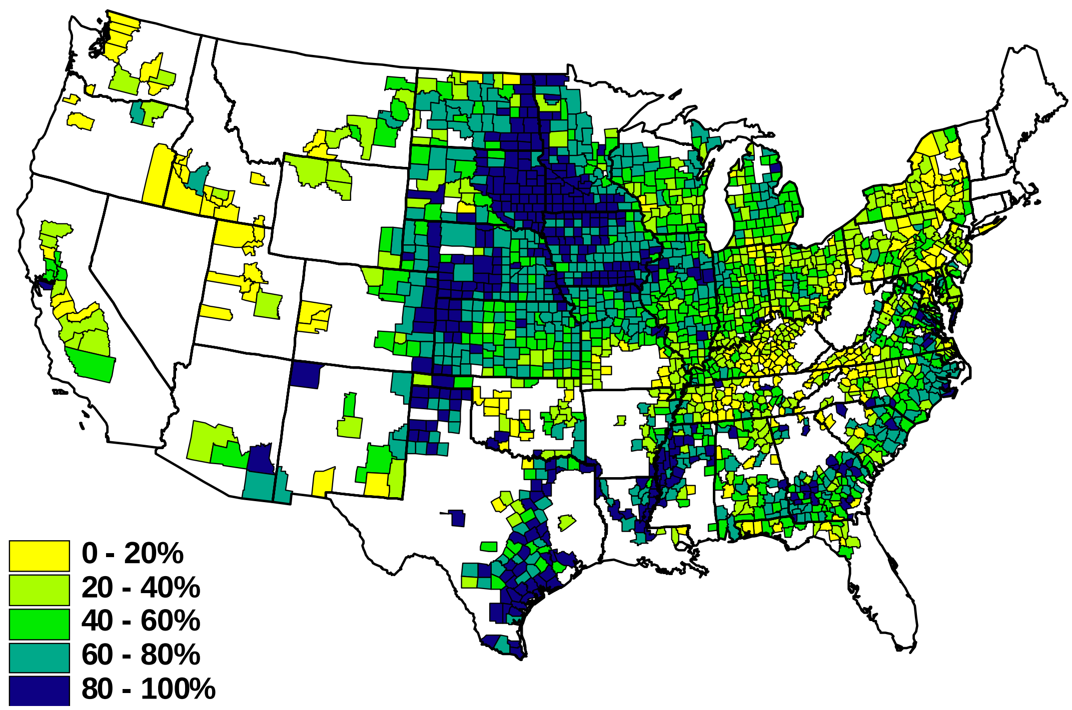


Figure 2. Participation in crop insurance in 2002 for corn (percentage of planted acres)

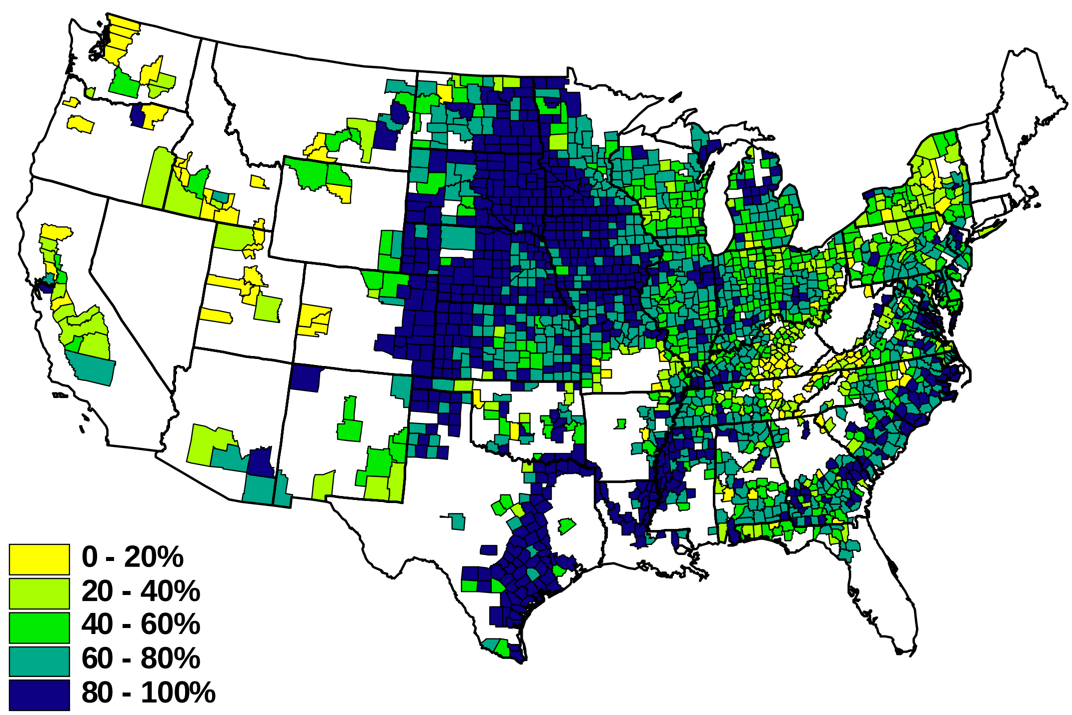


Figure 3. Participation in crop insurance in 1998 for soybean (percentage of planted acres)

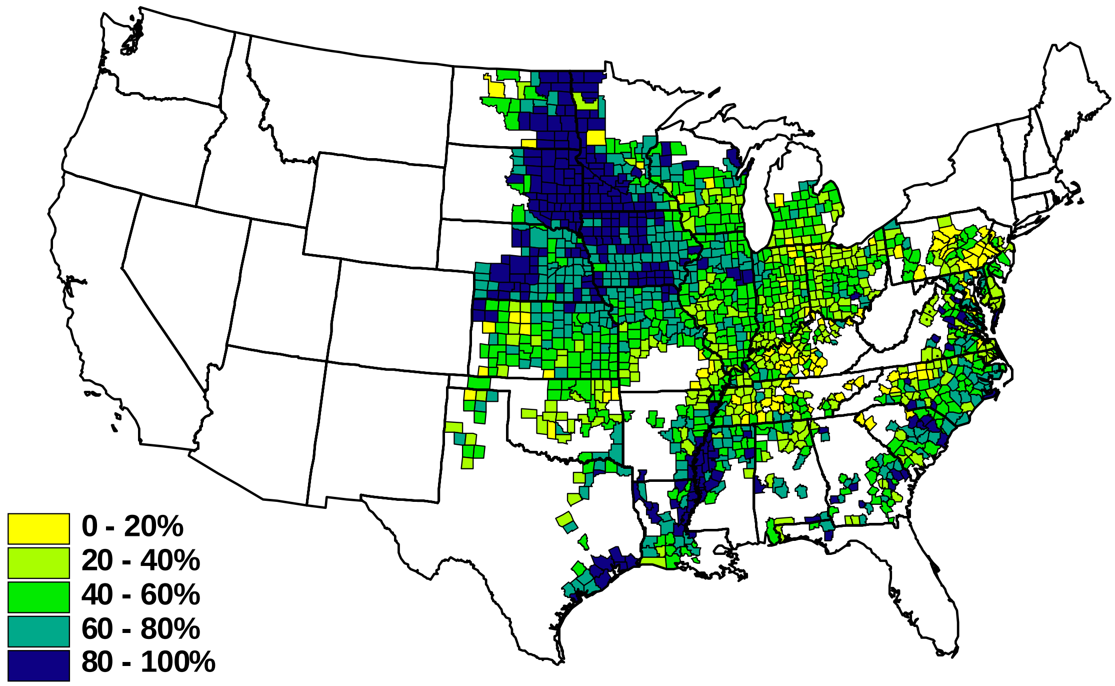


Figure 4. Participation in crop insurance in 2002 for soybean (percentage of planted acres)

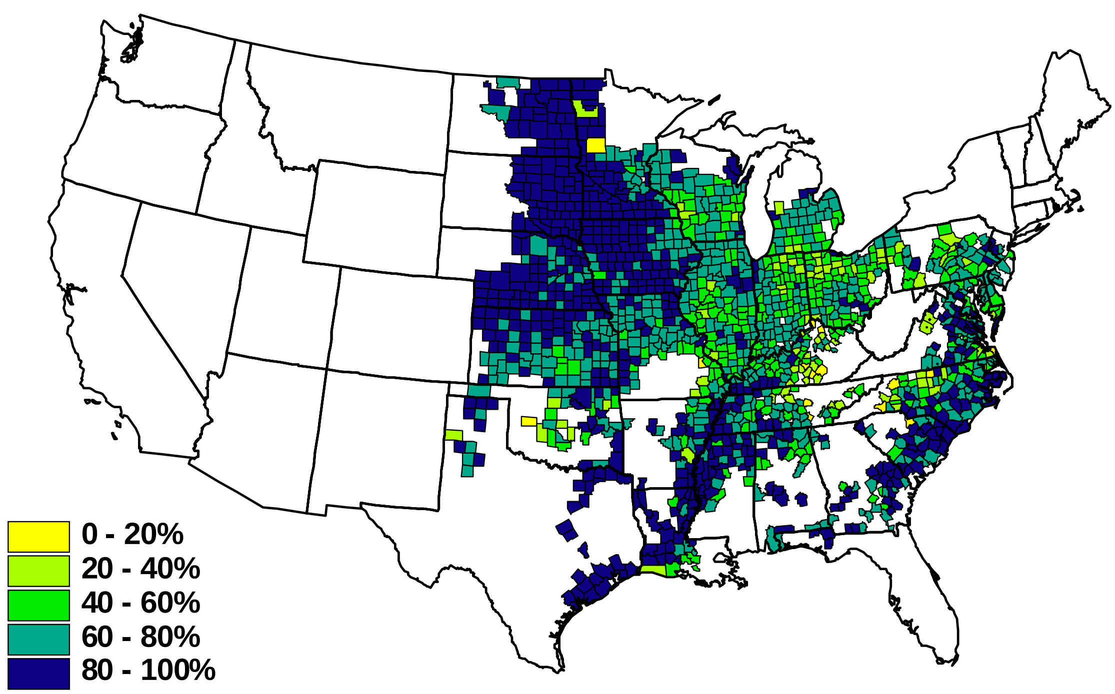


Figure 5. Participation in crop insurance in 1998 for wheat (percentage of planted acres)

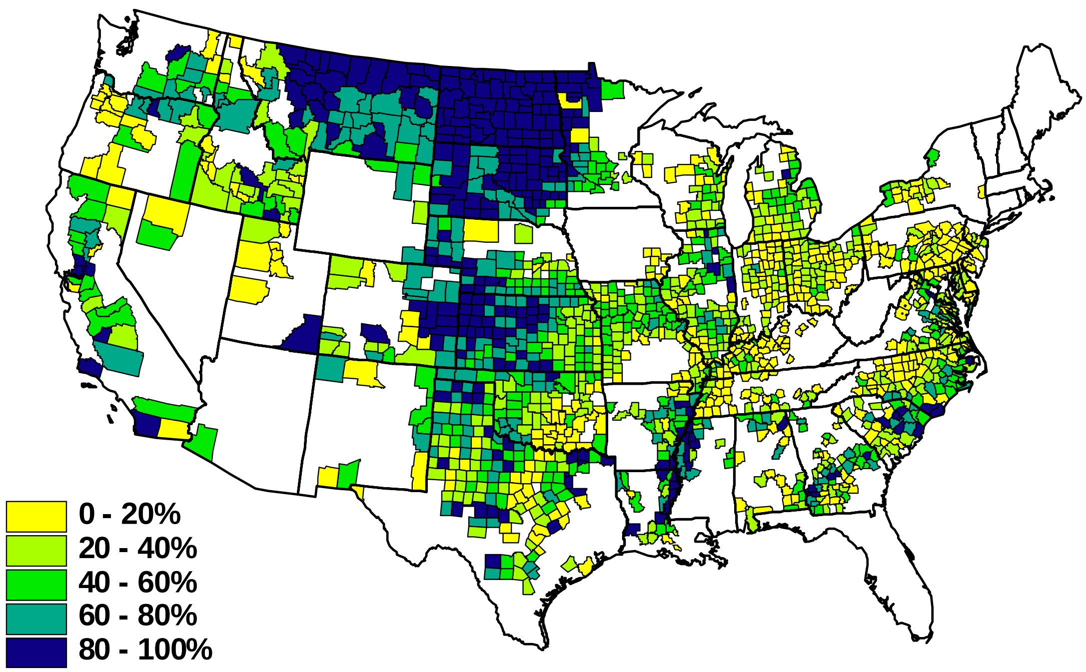
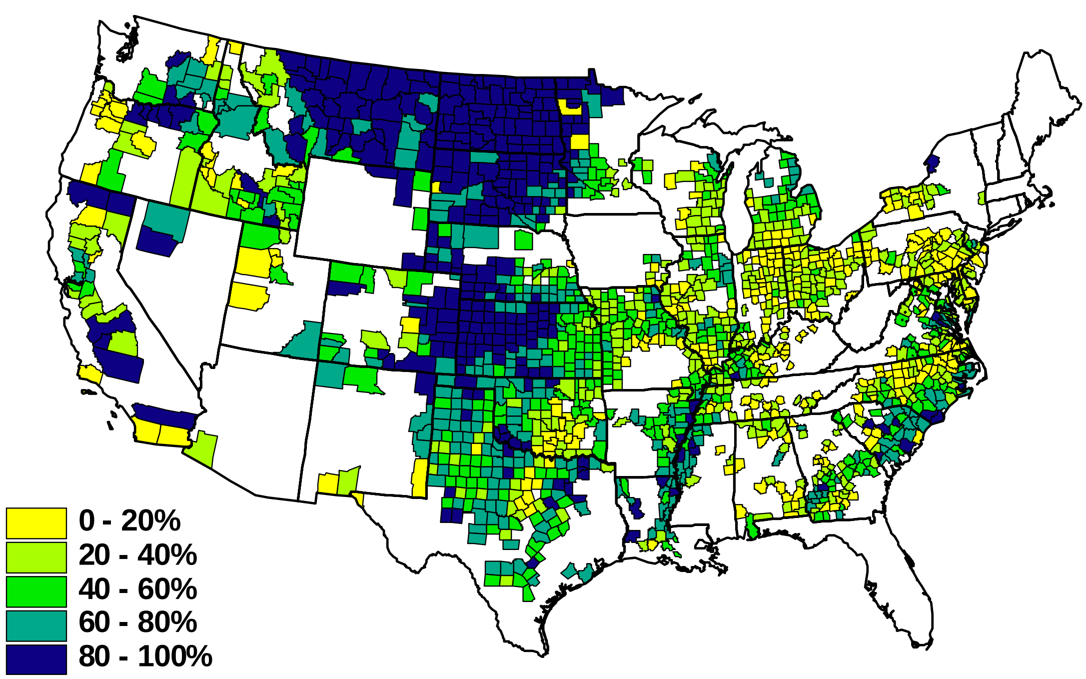


Figure 6. Participation in crop insurance in 2002 for wheat (percentage of planted acres)



production regions. Nationally, 75 percent of corn and wheat acres and 76 percent of soybean acres were covered by crop insurance. This represents an 11 percent increase in participation for wheat, 17 percent for corn, and 20 percent for soybean. The major change in crop insurance between the years was the passage and implementation of ARPA.

In determining the relationship between premium subsidies and crop insurance participation, we calculated elasticities between these two variables at the state-crop level. An elasticity measures the responsiveness of one variable to changes in another variable as the ratio of the percent changes of the two variables. In our case, we measured the responsiveness of crop insurance participation to changes in premium subsidy. If the elasticity is less than one, then the percent change in crop insurance participation is less than the percent change in premium subsidy. Such cases are referred as inelastic in that participation does not move as strongly as premium subsidies. If the elasticity is greater than one, then the percent change in crop insurance participation is greater than the percent change in premium subsidy. This would be an elastic relationship as participation changes by a greater percentage than the premium subsidies. For this analysis, we calculate arc elasticities. Arc elasticities use the average for each variable as the base for the percent change. Equation 1 defines the arc elasticities we employ.

(1) Participation Elasticity =

$$\frac{\left(\text{Participation\%}_{2002}\text{-Participation\%}_{1998}\right)}{\text{Average}\left(\text{Participation\%}_{2002},\text{Participation\%}_{1998}\right)} \Bigg/ \frac{\left(\text{Subsidy\%}_{2002}\text{-Subsidy\%}_{1998}\right)}{\text{Average}\left(\text{Subsidy\%}_{2002},\text{Subsidy\%}_{1998}\right)}$$

where Subsidy% is the subsidy level per dollar of coverage for Actual Production History (APH) insurance at the 65 percent level (This is equal to the product of the subsidy rate and base premium rate for APH insurance at the 65 percent level). To determine the base premium rate for APH at the state level, we weighted the county base premium rates by planted area for all counties in each state. The subsidy rate was 41.7 percent in 1998 and 59 percent in 2002.

Tables 1-3 show the subsidy and participation percentages for the two years, the percent changes among these variables, and the participation elasticities by state and crop. For corn, 27 of the states had elasticities between 0 and 1; 12 had elasticities greater than 1; and two (New Mexico and Oregon) had elasticities less than zero. Elasticities across the major production region for corn are all positive and less than one. This implies that a one percent increase in premium subsidy would be accompanied by a less than one percent increase in crop insurance participation for corn in its major production region. Also, states that already had significant participation in crop insurance before ARPA had

Table 1. Insurance Elasticities for Corn

	2002		1998		% Changes		
State	Sub. %	Part. %	Sub. %	Part. %	Sub. %	Part. %	Elasticity
Alabama	0.092	0.664	0.064	0.507	0.351	0.269	0.766
Arizona	0.037	0.613	0.026	0.453	0.346	0.300	0.866
Arkansas	0.099	0.758	0.070	0.543	0.348	0.331	0.951
California	0.025	0.306	0.018	0.255	0.332	0.181	0.547
Colorado	0.031	0.865	0.022	0.716	0.338	0.188	0.556
Delaware	0.029	0.561	0.021	0.319	0.337	0.549	1.630
Florida	0.077	0.495	0.055	0.325	0.334	0.415	1.241
Georgia	0.082	0.719	0.057	0.667	0.360	0.075	0.209
Idaho	0.028	0.178	0.020	0.097	0.353	0.589	1.668
Illinois	0.029	0.679	0.021	0.596	0.350	0.130	0.373
Indiana	0.031	0.617	0.022	0.451	0.341	0.311	0.910
Iowa	0.029	0.844	0.020	0.782	0.345	0.076	0.221
Kansas	0.036	0.814	0.024	0.707	0.396	0.141	0.357
Kentucky	0.063	0.610	0.045	0.317	0.329	0.633	1.923
Louisiana	0.083	0.958	0.058	0.857	0.360	0.111	0.307
Maryland	0.051	0.617	0.036	0.428	0.341	0.361	1.060
Michigan	0.058	0.609	0.042	0.485	0.332	0.227	0.685
Minnesota	0.038	0.855	0.028	0.815	0.319	0.047	0.149
Mississippi	0.100	0.850	0.071	0.758	0.337	0.114	0.338
Missouri	0.074	0.767	0.052	0.607	0.346	0.233	0.673
Montana	0.050	0.460	0.035	0.348	0.343	0.275	0.802
Nebraska	0.025	0.852	0.018	0.764	0.354	0.109	0.308
New Jersey	0.057	0.682	0.040	0.309	0.356	0.753	2.119
New Mexico	0.068	0.539	0.047	0.587	0.354	-0.085	-0.241
New York	0.060	0.404	0.042	0.244	0.351	0.496	1.415
North Carolina	0.078	0.750	0.054	0.547	0.356	0.313	0.882
North Dakota	0.063	0.907	0.044	0.858	0.360	0.055	0.154
Ohio	0.033	0.541	0.024	0.392	0.329	0.320	0.974
Oklahoma	0.062	0.697	0.042	0.511	0.388	0.309	0.795
Oregon	0.029	0.281	0.020	0.299	0.353	-0.061	-0.174
Pennsylvania	0.055	0.527	0.039	0.228	0.343	0.790	2.306
South Carolina	0.114	0.766	0.081	0.565	0.344	0.303	0.880
South Dakota	0.036	0.913	0.025	0.870	0.350	0.048	0.138
Tennessee	0.076	0.606	0.054	0.312	0.338	0.640	1.894
Texas	0.061	0.889	0.041	0.812	0.387	0.091	0.235
Utah	0.046	0.066	0.033	0.047	0.321	0.333	1.038
Virginia	0.073	0.623	0.052	0.431	0.341	0.365	1.070
Washington	0.025	0.311	0.018	0.194	0.348	0.463	1.331
West Virginia	0.075	0.588	0.053	0.436	0.347	0.297	0.854
Wisconsin	0.047	0.536	0.033	0.468	0.345	0.135	0.390
Wyoming	0.045	0.581	0.032	0.469	0.356	0.212	0.595

lower elasticities than states with low initial participation. For example, if we look the three "I-states," Illinois, Indiana, and Iowa, Iowa had the largest initial crop insurance participation (78 percent of corn planted acreage insured) and the lowest elasticity (0.221) of the three. Indiana had the smallest participation (45%) and the largest elasticity (0.91) of the three. These elasticities indicate that a one percent increase in premium subsidy would be accompanied by a 0.22 percent increase in Iowa corn participation and a 0.91 percent increase in Indiana corn participation.

For soybean, 20 states had inelastic relationships between premium subsidies and crop insurance participation and 9 states had elastic relationships. No state had a negative elasticity. As with corn, the elasticities in the major production region are less than one and states with higher initial participation rates had lower elasticities.

Table 2. Insurance Elasticities for Soybean

	2002		1998		% Changes		
State	Sub. %	Part. %	Sub. %	Part. %	Sub. %	Part. %	Elasticity
Alabama	0.103	0.757	0.073	0.478	0.341	0.451	1.322
Arkansas	0.114	0.737	0.081	0.592	0.344	0.219	0.636
Delaware	0.043	0.565	0.031	0.346	0.348	0.482	1.384
Florida	0.098	0.769	0.072	0.538	0.312	0.354	1.135
Georgia	0.121	0.759	0.085	0.606	0.341	0.225	0.660
Illinois	0.029	0.628	0.020	0.553	0.356	0.126	0.354
Indiana	0.030	0.590	0.021	0.444	0.349	0.283	0.811
Iowa	0.022	0.852	0.016	0.794	0.347	0.071	0.203
Kansas	0.062	0.784	0.045	0.575	0.322	0.308	0.956
Kentucky	0.073	0.676	0.052	0.374	0.344	0.577	1.679
Louisiana	0.132	0.867	0.092	0.735	0.354	0.165	0.467
Maryland	0.058	0.608	0.041	0.492	0.348	0.211	0.606
Michigan	0.054	0.614	0.038	0.445	0.350	0.320	0.914
Minnesota	0.039	0.914	0.027	0.854	0.387	0.068	0.176
Mississippi	0.095	0.896	0.067	0.833	0.344	0.073	0.212
Missouri	0.062	0.750	0.044	0.566	0.348	0.279	0.803
Nebraska	0.029	0.851	0.020	0.733	0.352	0.149	0.422
New Jersey	0.064	0.707	0.045	0.427	0.348	0.495	1.424
North Carolina	0.096	0.755	0.067	0.553	0.361	0.309	0.854
North Dakota	0.057	0.961	0.037	0.855	0.440	0.117	0.265
Ohio	0.034	0.536	0.024	0.379	0.355	0.342	0.964
Oklahoma	0.111	0.728	0.079	0.403	0.336	0.575	1.711
Pennsylvania	0.052	0.609	0.036	0.230	0.362	0.903	2.494
South Carolina	0.145	0.852	0.103	0.639	0.334	0.286	0.857
South Dakota	0.051	0.951	0.033	0.914	0.418	0.040	0.095
Tennessee	0.087	0.736	0.062	0.393	0.340	0.609	1.792
Texas	0.111	0.893	0.082	0.631	0.297	0.343	1.156
Virginia	0.057	0.707	0.040	0.549	0.345	0.252	0.730
Wisconsin	0.045	0.618	0.031	0.492	0.386	0.227	0.588

Table 3. Insurance Elasticities for Wheat

	2002		1998		% Changes		
State	Sub. %	Part. %	Sub. %	Part. %	Sub. %	Part. %	Elasticity
Alabama	0.078	0.199	0.055	0.363	0.349	-0.584	-1.673
Arizona	0.034	0.530	0.022	0.624	0.437	-0.162	-0.372
Arkansas	0.093	0.570	0.064	0.554	0.367	0.027	0.075
California	0.056	0.552	0.038	0.563	0.369	-0.020	-0.054
Colorado	0.066	0.821	0.045	0.735	0.385	0.111	0.288
Delaware	0.018	0.206	0.013	0.163	0.339	0.235	0.692
Georgia	0.056	0.435	0.040	0.510	0.330	-0.160	-0.485
Idaho	0.030	0.536	0.022	0.423	0.317	0.237	0.746
Illinois	0.066	0.353	0.046	0.359	0.361	-0.018	-0.051
Indiana	0.043	0.240	0.030	0.216	0.348	0.103	0.296
Iowa	0.092	0.315	0.067	0.169	0.321	0.606	1.884
Kansas	0.044	0.811	0.031	0.726	0.342	0.111	0.324
Kentucky	0.062	0.313	0.044	0.187	0.341	0.503	1.474
Louisiana	0.115	0.647	0.081	0.641	0.340	0.008	0.024
Maryland	0.022	0.297	0.016	0.231	0.337	0.248	0.735
Michigan	0.046	0.428	0.032	0.351	0.359	0.197	0.549
Minnesota	0.077	0.897	0.053	0.897	0.358	0.000	0.000
Mississippi	0.094	0.641	0.066	0.691	0.353	-0.075	-0.213
Missouri	0.082	0.457	0.057	0.389	0.351	0.161	0.459
Montana	0.050	0.944	0.036	0.874	0.328	0.077	0.235
Nebraska	0.040	0.842	0.029	0.757	0.322	0.107	0.331
Nevada	0.059	0.420	0.042	0.233	0.332	0.572	1.724
New Jersey	0.028	0.255	0.020	0.171	0.355	0.394	1.108
New Mexico	0.107	0.611	0.073	0.556	0.374	0.094	0.252
New York	0.045	0.216	0.032	0.222	0.343	-0.026	-0.076
North Carolina	0.056	0.475	0.039	0.424	0.353	0.114	0.322
North Dakota	0.050	0.975	0.035	0.951	0.346	0.025	0.073
Ohio	0.032	0.240	0.023	0.236	0.346	0.016	0.047
Oklahoma	0.063	0.652	0.045	0.536	0.342	0.197	0.576
Oregon	0.019	0.824	0.013	0.649	0.339	0.239	0.703
Pennsylvania	0.025	0.168	0.018	0.112	0.349	0.399	1.144
South Carolina	0.058	0.667	0.041	0.573	0.356	0.151	0.425
South Dakota	0.075	0.895	0.053	0.836	0.353	0.069	0.195
Tennessee	0.082	0.289	0.058	0.152	0.338	0.621	1.837
Texas	0.089	0.668	0.061	0.566	0.369	0.165	0.448
Utah	0.057	0.469	0.040	0.291	0.349	0.469	1.343
Virginia	0.045	0.424	0.031	0.370	0.370	0.136	0.369
Washington	0.016	0.666	0.012	0.607	0.336	0.092	0.275
West Virginia	0.049	0.258	0.036	0.278	0.322	-0.073	-0.227
Wisconsin	0.069	0.316	0.048	0.290	0.358	0.086	0.240
Wyoming	0.034	0.795	0.025	0.629	0.297	0.234	0.790

For wheat, 26 states had inelastic relationships between premium subsidies and crop insurance participation and 7 states had elastic relationships. Eight states had negative elasticities. The elasticities in the major production regions are less than one and states with higher initial participation rates had lower elasticities. The negative elasticities show where crop insurance participation declined even as premium subsidies were increased.

The maps and tables above show the impact changes in premium subsidy have on crop insurance participation. In general, crop insurance participation will move in the same direction as premium subsidy, but the percentage change will be less. This relationship varyies by state and crop. Major production regions and areas with higher initial crop insurance participation rates have more inelastic relationships than other production regions and areas with lower initial participation. As a premium reduction plan functions just like a premium subsidy to a producer, allowing premium reduction plans would increase crop insurance participation and that increase would depend on the size of the premium reduction.

To obtain an estimate of the change in acreage insured from a premium reduction plan, simply multiply the estimated elasticities in Tables 1, 2, or 3 by the percentage change in premium subsidy. This will give an estimate of the percentage change in acreage. For example, Illinois corn has an elasticity of 0.373. If the premium reduction plan increases premium subsidies by 10%, then we would expect a 3.73% increase in insured acreage. We present an analysis of the national effects of 3.5% premium reduction plan below for corn, soybeans, and wheat.

b. Effect of a decrease in producer premium on acreage insured at 65% or above coverage level

We employ a similar analysis to examine whether premium reduction plans would induce greater participation in crop insurance at higher levels of coverage. Figures 7, 9, and 11 show the percentages of planted acres for corn, soybean, and wheat, respectively covered by crop insurance at a minimum of 65 percent coverage in 1998. We will refer to crop insurance at the 65 percent coverage level and above as buy-up coverage. The number of buy-up coverage insured acres was gathered from RMA Summary of Business reports. The number of planted acres was gathered from the National Agricultural Statistics Service (NASS) online database. As was true for overall participation, buy-up coverage participation was the highest in the major production regions for each of the crops. Nationwide, 40 percent of the corn acres, 36 percent of the soybean acres, and 42 percent of the wheat acres were covered by crop insurance in 1998. Figures 8, 10, and 12 show the participation for 2002. Buy-up participation strengthened both in the major production regions and minor production regions. Nationally, 60 percent of corn acres, 62 percent of wheat acres, and 58 percent of soybean acres were covered by buy-up crop insurance. This represents a 47 percent increase in buy-up participation for wheat, 49 percent for corn, and 61 percent for soybean. So while overall participation grew by 10 to 20 percent, buy-up crop insurance coverage grew by 50 to 60 percent. In many counties, buy-up coverage now represents a majority of the crop insurance business.

Figure 7. Participation in crop insurance in 1998 for corn at coverage levels at or above 65 percent (percentage of planted acres)

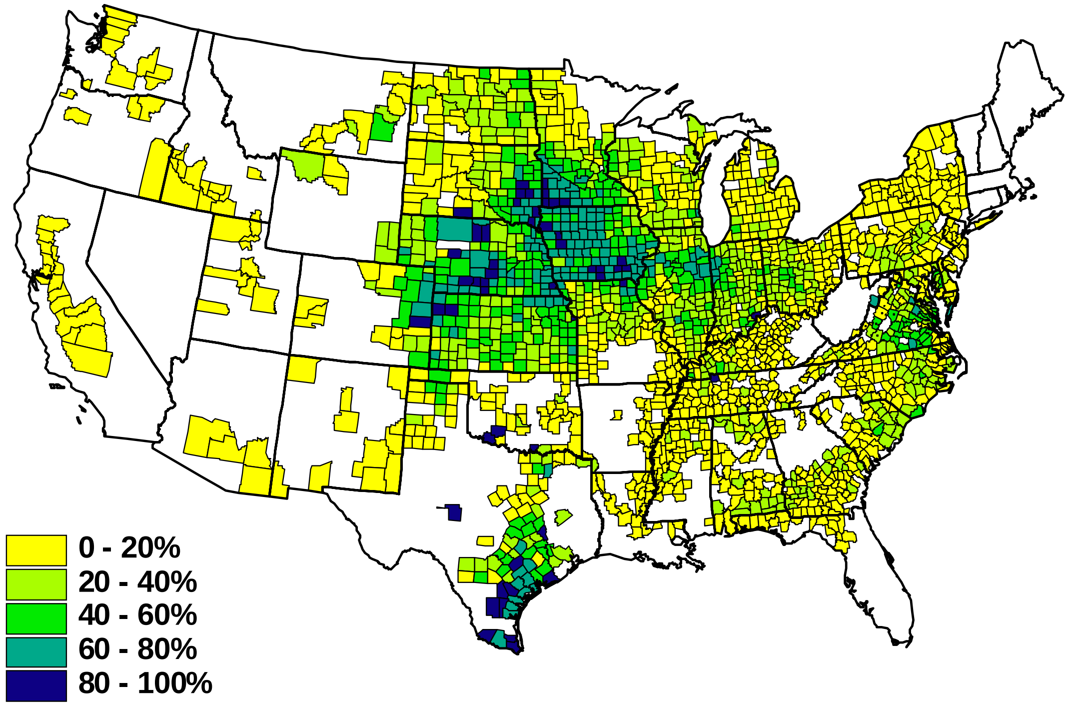


Figure 8. Participation in crop insurance in 2002 for corn at coverage levels at or above 65 percent (percentage of planted acres)

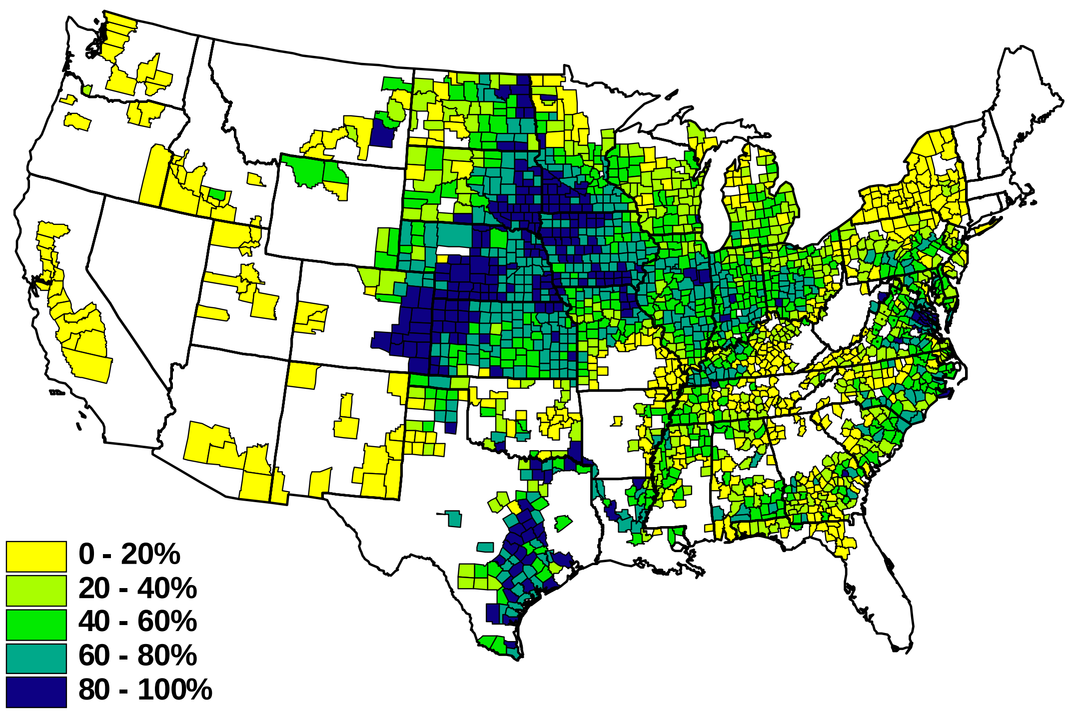


Figure 9. Participation in crop insurance in 1998 for soybean at coverage levels at or above 65 percent (percentage of planted acres)

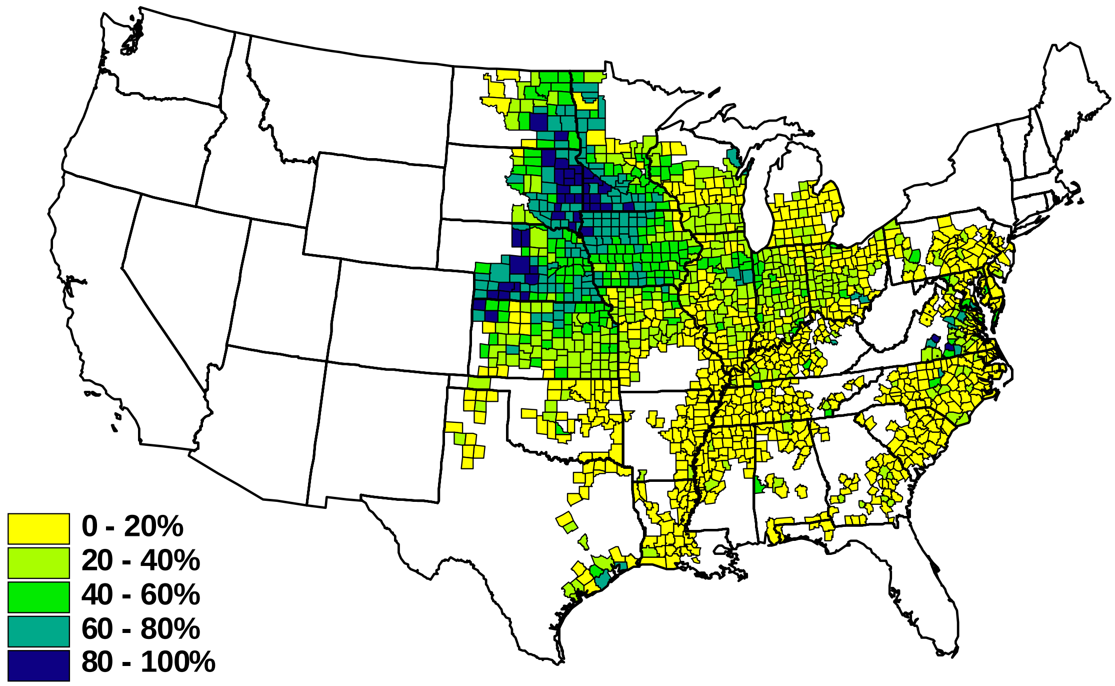


Figure 10. Participation in crop insurance in 2002 for soybean at coverage levels at or above 65 percent (percentage of planted acres)

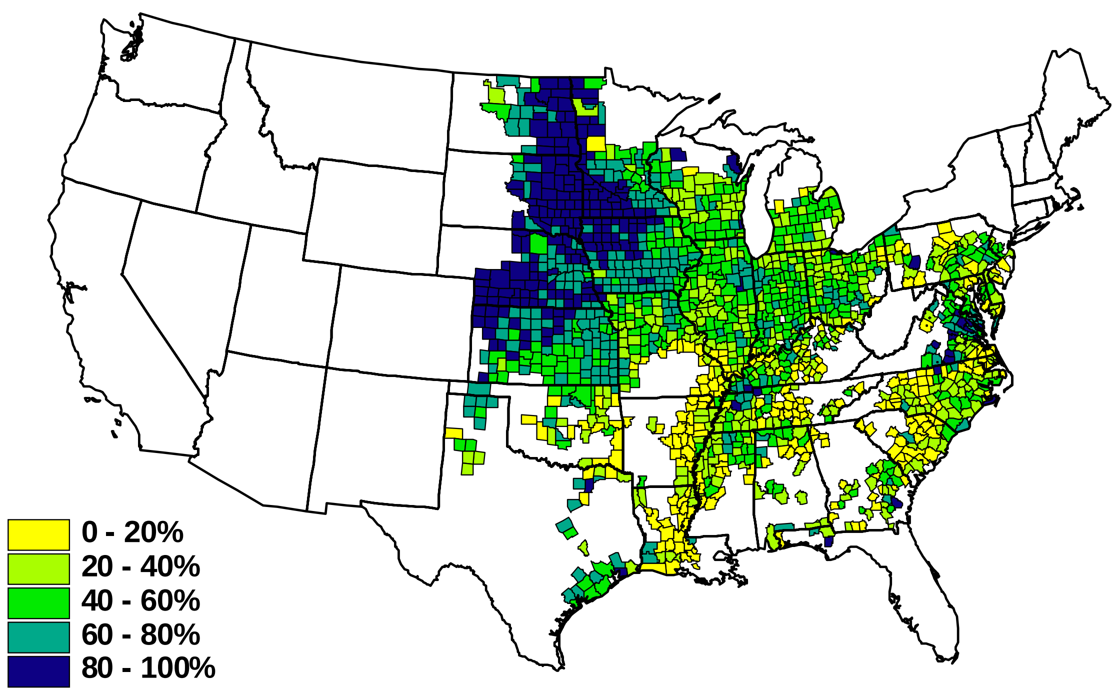


Figure 11. Participation in crop insurance in 1998 for wheat at coverage levels at or above 65 percent (percentage of planted acres)

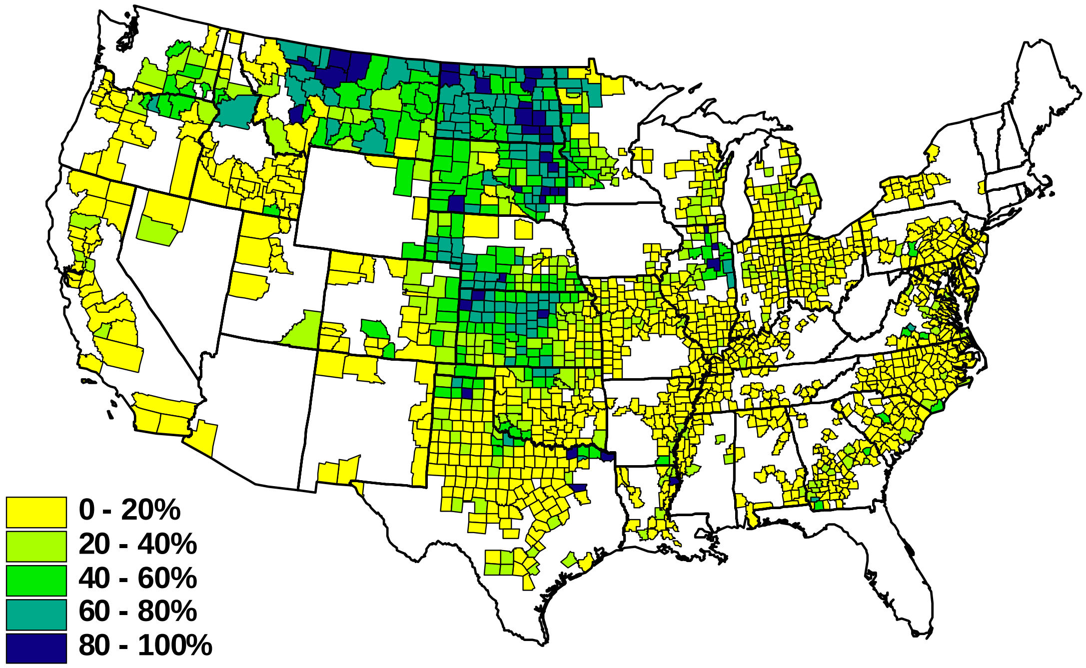
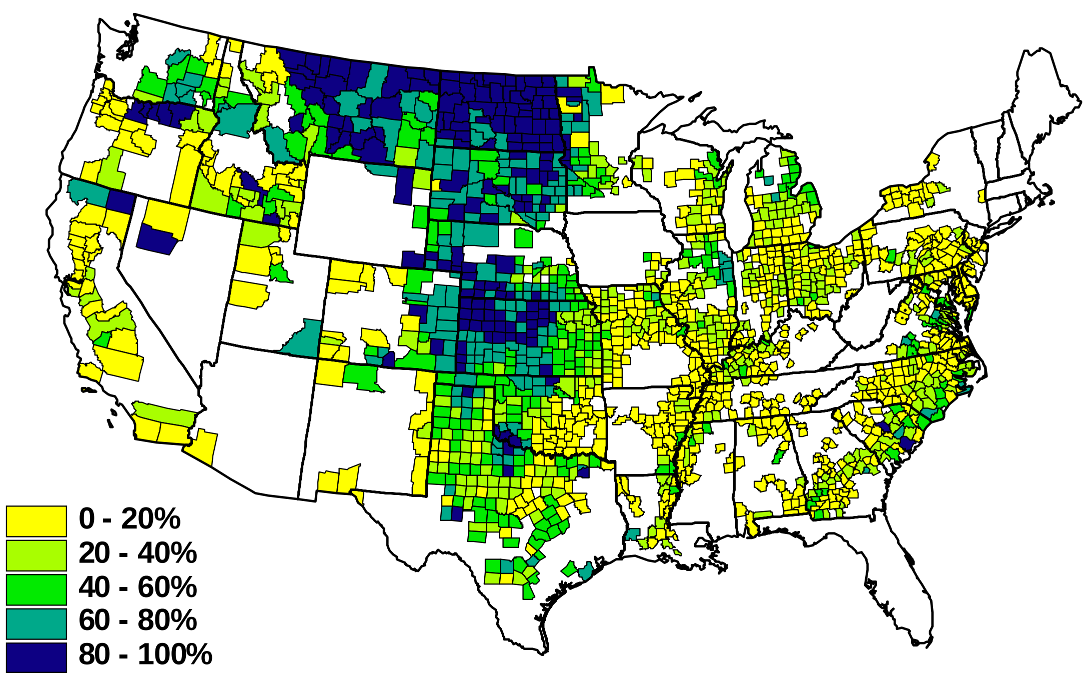


Figure 12. Participation in crop insurance in 2002 for wheat at coverage levels at or above 65 percent (percentage of planted acres)



In determining the relationship between premium subsidies and buy-up crop insurance participation, we calculated elasticities between these two variables at the state-crop level. Equation 2 defines the arc elasticities we employ.

(2) Buy-up Participation Elasticity =

$$\frac{\dfrac{\left(\text{Participation\%}_{2002}\text{-Participation\%}_{1998}\right)}{\text{Average}\left(\text{Participation\%}_{2002},\text{Participation\%}_{1998}\right)}}{\dfrac{\left(\text{Subsidy\%}_{2002}\text{-Subsidy\%}_{1998}\right)}{\text{Average}\left(\text{Subsidy\%}_{2002},\text{Subsidy\%}_{1998}\right)}}$$

where Participation% is the percentage of planted acres covered by buy-up crop insurance and Subsidy% is the subsidy level per dollar of coverage for Actual Production History (APH) insurance at the 65 percent level.

Tables 4-6 show the subsidy and buy-up participation percentages for the two years, the percent changes among these variables, and the buy-up participation elasticities by state and crop. For corn, 6 of the states had elasticities between 0 and 1 and 35 had elasticities greater than 1. Elasticities across the major production region for corn are all positive and most are greater than one. This implies that a one percent increase in premium subsidy would be accompanied by a more than one percent increase in buy-up crop insurance participation for corn in its major production region. Also, states that already had significant participation in buy-up crop insurance before ARPA had lower elasticities than states with low initial participation. For example, if we look the 3 “I-states,” Illinois, Indiana, and Iowa, Iowa had the largest initial crop insurance participation (62 percent of corn planted acreage insured) and the lowest elasticity (0.572) of the three. Indiana had the smallest participation (34%) and the largest elasticity (1.385) of the three. These elasticities indicate that a one percent increase in premium subsidy would be accompanied by a 0.57 percent increase in Iowa corn buy-up participation and a 1.385 percent increase in Indiana corn buy-up participation. Buy-up coverage has a much more elastic relationship with premium subsidies than overall crop insurance participation.

For soybean, 5 states had inelastic relationships between premium subsidies and buy-up crop insurance participation and 24 states had elastic relationships. As with corn, the elasticities in the major production region around one and states with higher initial participation rates had lower elasticities.

For wheat, 11 states had inelastic relationships between premium subsidies and crop insurance participation and 29 states had elastic relationships. Only one state (Alabama) had a negative elasticity. The elasticities in the major production regions are around one and states with higher initial participation rates had lower elasticities.

Table 4. Buy-up Insurance Elasticities for Corn

	2002		1998		% Changes		
State	Sub. %	Part. %	Sub. %	Part. %	Sub. %	Part. %	Elasticity
Alabama	0.092	0.400	0.064	0.177	0.351	0.770	2.195
Arizona	0.037	0.008	0.026	0.000	0.346	2.000	5.784
Arkansas	0.099	0.328	0.070	0.015	0.348	1.821	5.235
California	0.025	0.015	0.018	0.014	0.332	0.110	0.332
Colorado	0.031	0.777	0.022	0.491	0.338	0.452	1.336
Delaware	0.029	0.424	0.021	0.186	0.337	0.779	2.312
Florida	0.077	0.130	0.055	0.047	0.334	0.930	2.784
Georgia	0.082	0.316	0.057	0.144	0.360	0.748	2.080
Idaho	0.028	0.048	0.020	0.008	0.353	1.426	4.043
Illinois	0.029	0.570	0.021	0.377	0.350	0.409	1.169
Indiana	0.031	0.546	0.022	0.337	0.341	0.473	1.385
Iowa	0.029	0.760	0.020	0.624	0.345	0.197	0.572
Kansas	0.036	0.710	0.024	0.481	0.396	0.384	0.970
Kentucky	0.063	0.445	0.045	0.157	0.329	0.956	2.905
Louisiana	0.083	0.568	0.058	0.070	0.360	1.562	4.338
Maryland	0.051	0.459	0.036	0.235	0.341	0.645	1.894
Michigan	0.058	0.343	0.042	0.131	0.332	0.896	2.698
Minnesota	0.038	0.715	0.028	0.543	0.319	0.274	0.858
Mississippi	0.100	0.336	0.071	0.074	0.337	1.276	3.790
Missouri	0.074	0.492	0.052	0.271	0.346	0.579	1.673
Montana	0.050	0.229	0.035	0.128	0.343	0.561	1.637
Nebraska	0.025	0.785	0.018	0.587	0.354	0.289	0.815
New Jersey	0.057	0.280	0.040	0.033	0.356	1.580	4.441
New Mexico	0.068	0.055	0.047	0.033	0.354	0.501	1.412
New York	0.060	0.055	0.042	0.011	0.351	1.325	3.778
North Carolina	0.078	0.460	0.054	0.194	0.356	0.812	2.285
North Dakota	0.063	0.597	0.044	0.246	0.360	0.833	2.312
Ohio	0.033	0.464	0.024	0.257	0.329	0.572	1.740
Oklahoma	0.062	0.444	0.042	0.301	0.388	0.382	0.984
Oregon	0.029	0.015	0.020	0.007	0.353	0.741	2.098
Pennsylvania	0.055	0.360	0.039	0.101	0.343	1.120	3.269
South Carolina	0.114	0.426	0.081	0.178	0.344	0.821	2.388
South Dakota	0.036	0.771	0.025	0.541	0.350	0.351	1.002
Tennessee	0.076	0.331	0.054	0.089	0.338	1.152	3.410
Texas	0.061	0.593	0.041	0.354	0.387	0.503	1.301
Utah	0.046	0.010	0.033	0.000	0.321	2.000	6.239
Virginia	0.073	0.520	0.052	0.283	0.341	0.590	1.731
Washington	0.025	0.015	0.018	0.006	0.348	0.865	2.486
West Virginia	0.075	0.385	0.053	0.156	0.347	0.849	2.444
Wisconsin	0.047	0.368	0.033	0.236	0.345	0.439	1.273
Wyoming	0.045	0.421	0.032	0.234	0.356	0.572	1.605

Table 5. Buy-up Insurance Elasticities for Soybean

State	2002 Sub. %	2002 Part. %	1998 Sub. %	1998 Part. %	% Changes Sub. %	% Changes Part. %	Elasticity
Alabama	0.103	0.407	0.073	0.108	0.341	1.162	3.408
Arkansas	0.114	0.175	0.081	0.053	0.344	1.073	3.115
Delaware	0.043	0.359	0.031	0.168	0.348	0.724	2.080
Florida	0.098	0.274	0.072	0.063	0.312	1.249	4.009
Georgia	0.121	0.289	0.085	0.078	0.341	1.149	3.372
Illinois	0.029	0.444	0.020	0.268	0.356	0.494	1.387
Indiana	0.030	0.488	0.021	0.279	0.349	0.544	1.559
Iowa	0.022	0.736	0.016	0.567	0.347	0.259	0.745
Kansas	0.062	0.680	0.045	0.412	0.322	0.490	1.523
Kentucky	0.073	0.427	0.052	0.108	0.344	1.192	3.469
Louisiana	0.132	0.166	0.092	0.034	0.354	1.318	3.726
Maryland	0.058	0.348	0.041	0.193	0.348	0.575	1.653
Michigan	0.054	0.420	0.038	0.154	0.350	0.928	2.652
Minnesota	0.039	0.833	0.027	0.668	0.387	0.220	0.567
Mississippi	0.095	0.318	0.067	0.102	0.344	1.024	2.977
Missouri	0.062	0.417	0.044	0.199	0.348	0.709	2.040
Nebraska	0.029	0.804	0.020	0.598	0.352	0.293	0.833
New Jersey	0.064	0.223	0.045	0.069	0.348	1.057	3.043
North Carolina	0.096	0.347	0.067	0.108	0.361	1.050	2.904
North Dakota	0.057	0.892	0.037	0.632	0.440	0.341	0.775
Ohio	0.034	0.441	0.024	0.228	0.355	0.636	1.794
Oklahoma	0.111	0.377	0.079	0.115	0.336	1.066	3.171
Pennsylvania	0.052	0.383	0.036	0.083	0.362	1.288	3.555
South Carolina	0.145	0.215	0.103	0.023	0.334	1.609	4.810
South Dakota	0.051	0.896	0.033	0.762	0.418	0.162	0.387
Tennessee	0.087	0.399	0.062	0.051	0.340	1.544	4.546
Texas	0.111	0.521	0.082	0.160	0.297	1.062	3.579
Virginia	0.057	0.559	0.040	0.314	0.345	0.561	1.626
Wisconsin	0.045	0.447	0.031	0.238	0.386	0.612	1.585

The maps and tables above show the impact changes in premium subsidy have on buy-up crop insurance participation. In general, buy-up crop insurance participation will move in the same direction as premium subsidy, but the percentage change will be more. The relationship does vary by state and crop. Major production regions and areas with higher initial crop insurance participation rates have relatively more inelastic relationships than other production regions and areas with lower initial participation. As a premium reduction plan functions just like a premium subsidy to a producer, allowing premium reduction plans would increase buy-up crop insurance participation and that increase would depend on the size of the premium reduction.

Table 6. Buy-up Insurance Elasticities for Wheat

State	2002 Sub. %	2002 Part. %	1998 Sub. %	1998 Part. %	% Changes Sub. %	% Changes Part. %	Elasticity
Alabama	0.078	0.069	0.055	0.081	0.349	-0.170	-0.486
Arizona	0.034	0.169	0.022	0.153	0.437	0.098	0.225
Arkansas	0.093	0.122	0.064	0.068	0.367	0.566	1.543
California	0.056	0.190	0.038	0.098	0.369	0.639	1.729
Colorado	0.066	0.659	0.045	0.382	0.385	0.534	1.387
Delaware	0.018	0.088	0.013	0.035	0.339	0.858	2.533
Georgia	0.056	0.205	0.040	0.138	0.330	0.391	1.185
Idaho	0.030	0.367	0.022	0.169	0.317	0.741	2.334
Illinois	0.066	0.212	0.046	0.138	0.361	0.422	1.170
Indiana	0.043	0.162	0.030	0.119	0.348	0.304	0.872
Iowa	0.092	0.265	0.067	0.146	0.321	0.579	1.802
Kansas	0.044	0.734	0.031	0.519	0.342	0.342	0.999
Kentucky	0.062	0.163	0.044	0.040	0.341	1.206	3.531
Louisiana	0.115	0.221	0.081	0.147	0.340	0.402	1.183
Maryland	0.022	0.117	0.016	0.043	0.337	0.926	2.746
Michigan	0.046	0.282	0.032	0.160	0.359	0.555	1.544
Minnesota	0.077	0.717	0.053	0.547	0.358	0.268	0.748
Mississippi	0.094	0.144	0.066	0.128	0.353	0.114	0.324
Missouri	0.082	0.159	0.057	0.099	0.351	0.470	1.339
Montana	0.050	0.854	0.036	0.655	0.328	0.263	0.803
Nebraska	0.040	0.789	0.029	0.603	0.322	0.268	0.832
Nevada	0.059	0.188	0.042	0.135	0.332	0.333	1.004
New Jersey	0.028	0.025	0.020	0.008	0.355	1.024	2.881
New Mexico	0.107	0.177	0.073	0.073	0.374	0.831	2.219
New York	0.045	0.036	0.032	0.012	0.343	0.995	2.899
North Carolina	0.056	0.247	0.039	0.084	0.353	0.987	2.794
North Dakota	0.050	0.920	0.035	0.730	0.346	0.231	0.667
Ohio	0.032	0.191	0.023	0.142	0.346	0.296	0.854
Oklahoma	0.063	0.548	0.045	0.321	0.342	0.524	1.535
Oregon	0.019	0.760	0.013	0.410	0.339	0.599	1.765
Pennsylvania	0.025	0.108	0.018	0.034	0.349	1.041	2.985
South Carolina	0.058	0.264	0.041	0.069	0.356	1.169	3.279
South Dakota	0.075	0.730	0.053	0.514	0.353	0.348	0.986
Tennessee	0.082	0.078	0.058	0.009	0.338	1.581	4.680
Texas	0.089	0.480	0.061	0.238	0.369	0.674	1.825
Utah	0.057	0.373	0.040	0.099	0.349	1.160	3.320
Virginia	0.045	0.261	0.031	0.139	0.370	0.613	1.658
Washington	0.016	0.521	0.012	0.366	0.336	0.349	1.040
West Virginia	0.049	0.106	0.036	0.010	0.322	1.652	5.126
Wisconsin	0.069	0.222	0.048	0.160	0.358	0.323	0.902
Wyoming	0.034	0.729	0.025	0.446	0.297	0.481	1.622

Again to obtain an estimate of the change in acreage insured at the 65% or greater level, one simply multiples the estimated elasticity by the percentage change in premium subsidy. We present estimates of the national effects below.

c. Effect of a decrease in producer premium on the level of coverage

Most, if not all of the proposed premium reduction plans would reduce the producer premium by a fixed percentage of the total premium. The net effect of this reduction is shown in the following series of tables. First, the table below shows for a Jasper County, Iowa corn farmer who purchases APH how a 3.5% of net premium reduction plan would affect producer premium.

		Producer Premium ($/acre)		
Coverage Level	Total Premium ($/acre)	Pre-ARPA	ARPA	premium reduction plan
65%	7.28	4.24	2.98	2.73
75%	12.67	9.63	5.20	4.76
85%	21.02	17.98	13.03	12.29

As shown, the move to ARPA greatly reduced the producer premium at all coverage levels. The premium reduction plan further reduces the producer premium, with the greatest per-acre reduction at the highest coverage level. When deciding on what coverage level to purchase, farmers weigh the incremental costs and incremental benefits of higher coverage levels. The following table presents the incremental costs of moving from 65% to 75% coverage and from 75% to 85% coverage.

	Incremental Cost ($/acre)			
Change in Coverage	Total Premium	Pre-ARPA	ARPA	premium reduction plan
65% to 75%	5.39	5.39	2.22	2.03
75% to 85%	8.35	8.35	7.83	7.54

Two things are of significance here. First note that ARPA dramatically decreased the incremental cost of moving from 65% to 75% coverage but it did not dramatically decrease the incremental cost of moving from 75% to 85% coverage. This perhaps explains why the 75% coverage level is the most popular with many farmers. Second, the premium reduction plan works to further decrease the incremental cost of moving to coverage levels greater than 65%. Hence we should expect that measuring how subsidizing the incremental cost of moving to higher coverage levels should give us insight into how premium reduction plans might affect producers' coverage levels.

Incremental Net Benefits of Crop Insurance Coverage

One of the policy objectives of ARPA was to induce farmers to buy more insurance coverage where one measure of "more insurance" is the proportion of acres insured at some level greater than 65%. This measure is the one that we adopt.

The key factor in determining whether a farmer chooses to purchase more than the 65% coverage level is whether the benefits of higher coverage exceed the costs of higher coverage. Of course, costs and benefits will vary by the exact coverage level chosen, but given that premium costs and expected insurance indemnities at different coverage levels are highly correlated, a good indicator of incremental costs and benefits for higher coverage levels are those that occur at a single coverage level. For this analysis, we select the 75% coverage level for our measure of incremental costs and benefits.

Assuming that prices, expected yields, and costs are independent of the insurance coverage level, the change in expected profits is given by the difference in expected indemnities (I) and producer paid premiums (PP) at the 75% and 65% coverage levels

$$(3) \qquad \Delta\pi = E[I_{75}] - E[I_{65}] - PP_{75} + PP_{65} = \Delta I - \Delta PP.$$

If premiums are actuarially fair and unsubsidized, then $\Delta\pi = 0$. But premiums are subsidized and Babcock, Hart, and Hayes demonstrated that even if 65% premiums were actuarially fair in 1998 and 2002, 75% premiums are too high for most farmers. Thus we need to account for both subsidies and actuarial fairness in determining $\Delta\pi$.

Incremental costs of crop insurance coverage

To estimate ΔPP in equation (1) requires an accounting of the actual subsidies and premiums charged. ARPA changed the subsidy structure but not the premium structure, so we need to estimate ΔPP both before and after ARPA. Denoting 65% and 75% premium rates as $rate65$ and $rate75$, the premium subsidy rates at 65% and 75% as $psub65$ and $psub75$, a farmer's APH yield as Y, and the insurance price as p, the change in the producer premium for the APH plan of insurance is

$$(4) \qquad \Delta PP = (1 - psub75)*rate75*p*0.75*Y - (1 - psub65)*rate65*p*0.65*Y.$$

Both before and after ARPA, 75% premium rates (dollars of premium per dollar of liability) for the APH program for corn, soybeans and wheat equal the 65% premiums multiplied by the constant 1.538. Therefore,

$$(5) \qquad \Delta PP = p*Y*rate65*(1.538*0.75*(1- psub75) - 0.65*(1 - psub65)),$$

which under pre-ARPA conditions equals approximately $0.5*p*Y*rate65$. After ARPA, premium subsidy rates were increased from 41.7% to 59% for 65% coverage and from 23.5% to 55% for 75% coverage. Thus ΔPP^{post} is approximately $0.25*p*Y*rate65$, which demonstrates that ARPA cut the incremental cost of moving to 75% coverage in half for all U.S. corn, soybean, and wheat farmers.

The ARPA-induced reduction in incremental cost does not imply that all farmers found that expected profits immediately increased under ARPA when they purchased higher coverage levels. As pointed out in Babcock, Hart, and Hayes, crop insurance premium rates increase too rapidly with coverage level in most regions of the country. For those farmers that faced these high rates, the drop in incremental insurance cost from ARPA simply meant a closer balance between costs and benefits of higher coverage levels, not necessarily an increase in expected profits.

Incremental benefit of crop insurance coverage

To a risk-neutral producer the incremental benefit of crop insurance coverage is the change in expected indemnities, ΔI, that will be received. Clearly ΔI will be positive because for any given loss, the magnitude of the indemnity will grow as coverage increases and the frequency with which a claim will be made will, in general, be greater. For actuarially fair premium rates,

(6) $$\Delta I = p*Y*(0.75*rate75 - 0.65*rate65).$$

Coble, et al, in an unpublished empirical examination of the actuarial fairness of crop insurance rates, conclude that there is a strongly negative relationship between actuarially fair 65% rates and the ratio of actuarially fair 75% to 65% rates. Babcock, Hart, and Hayes demonstrate that such a negative relationship must exist if yields are generated by a well-behaved probability distribution. But, crop insurance rates for APH and CRC (Crop Revenue Coverage) were, until quite recently, based on constant rate relativities. That is, the premium rate for 75% coverage was set equal to a constant factor multiplied by the premium rate for 65% coverage. Clearly such an assumption will tend to over-estimate ΔI in high risk areas and perhaps underestimate ΔI in low risk areas.

Figure 13 shows the relationship between simulated ΔI, expressed as a percent change, and 65% premium rates. The simulations assume that yields follow a beta density. The relationship between the change in indemnities and 65% base rates illustrated in Figure 13 is quite robust across alternative functional forms for the yield distribution. Thus, we employ the Figure 1 relationship to estimate ΔI.

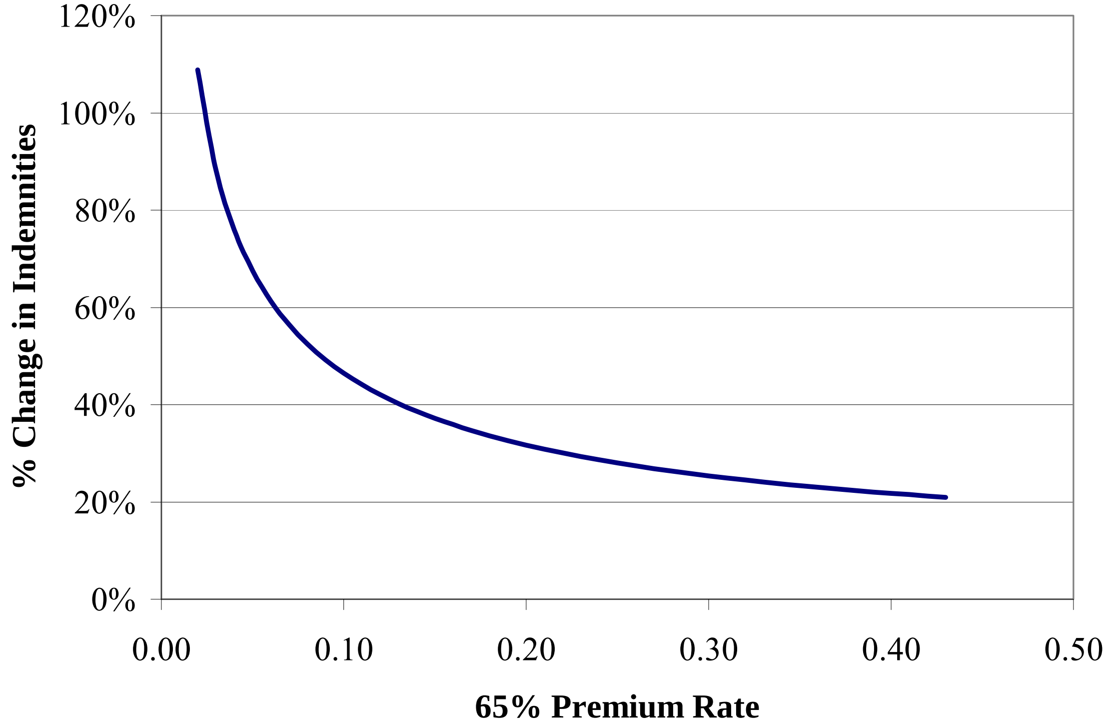


Figure 13. Increase in expected indemnities from moving to 75% from 65% coverage

Data

What we want to estimate is how farmers' coverage level purchase decisions are affected by the net benefits from higher coverage. The independent variable in the relationship is the percent change in expected profits obtained by moving to 75% insurance coverage. The dependent variable will be the number of acres insured at a coverage level greater than 65% divided by the number of acres insured at 65% or higher coverage levels. Throughout this paper, we will refer to crop insurance at or above the 65% coverage level as buy-up insurance.

The number of insured acres at each coverage level for all insurance products is available from RMA's Summary of Business reports. For this analysis, we obtained insured acres for corn, soybeans, and wheat for 1998 and 2002. These two years were selected for a number of reasons. ARPA was passed in June of 2000. Its subsidy provisions went into effect immediately, but farmers had already made their decisions about which coverage level to purchase so there would be little or no impact from ARPA in 2000. We could have selected crop year 2001 data but experience with crop insurance provisions suggest that it takes time for the industry to learn about significant changes in policy. Insurance agents must be notified and trained, quoting software must be adjusted, and then farmers must be made aware of the impacts of change. Hence, the 2002 data should more fully reflect awareness of the ARPA policy changes and subsequent changes in coverage levels.

Table 7 provides a summary of the acreage data for the two crop insurance programs with premium rates that were based on constant rate relativities in 1998 and 2002. As is readily apparent, the proportion of acres insured above 65% under the APH plan of insurance relative to all acres insured with buy-up insurance increased dramatically over this period. Of course, one would expect this type of response due to the 50% drop in the cost of incremental coverage. Also apparent is that there was a dramatic shift in acreage to CRC between 1998 and 2002. Part of this switch occurred because CRC was more widely known and available in 2002 than in 1998. But part of the reason is likely due to the change in CRC subsidies because of ARPA.

Table 7. Share of acres insured at different coverage levels

	APH		CRC	
Corn	1998	2002	1998	2002
< 65%	18,315,168	10,023,815	606,167	1,299,162
65%	16,968,857	4,743,560	7,359,291	4,308,534
> 65%	3,236,315	4,147,485	2,784,919	15,707,193
Share > 65%*	16%	47%	27%	78%
Soybeans				
< 65%	19,196,259	12,894,083	512,576	493,708
65%	13,139,644	6,731,213	6,361,680	1,787,981
> 65%	2,633,019	15,036,483	2,223,009	7,757,582
Share > 65%*	17%	69%	26%	81%
Wheat				
< 65%	16,080,981	6,489,865	396,641	1,353,613
65%	21,398,984	5,368,095	4,210,962	5,456,146
> 65%	1,917,366	4,592,073	310,259	11,859,205
Share > 65%*	8%	46%	7%	68%

*Acreage at greater than 65% divided by acreage at or greater than 65%.
Source: Summary of business reports from USDA RMA:
http://www3.rma.usda.gov/apps/sob/

Before ARPA, CRC premium subsidies were limited to the per-acre amounts available under APH. After ARPA, the same subsidy rates were applied to the full CRC premium. Because CRC premiums are proportionate to the 65% premium rates for APH and because CRC used the same APH rate relativities, ARPA decreased the incremental cost of moving from 65% to 75% CRC coverage by the same 50% proportion as the decline in APH. However, because CRC premiums are greater than APH premiums, the per-acre amount of subsidy available under CRC is now greater than under APH. This increased amount of subsidy may explain part of the large movement of business towards CRC.

The summary statistics in Table 7 suggest that we are likely to find that the decline in the incremental cost in moving to higher coverage levels due to ARPA resulted in an increase in the proportion of acres insured at higher coverage levels under APH and CRC. However, we do not rely solely on the change in subsidies under ARPA to estimate how coverage level decisions are affected by expected profits. We also exploit the tremendous cross-section variation in expected profits from higher coverage levels.

As shown in Figure 13, the percent change in expected indemnities as one moves from 65% to 75% coverage depends on the degree of risk, as represented by the 65% premium (expected indemnity). But the percent change in the premium charged for 75% coverage under APH and CRC is a constant, as can be easily verified by the expressions for ΔPP^{pre} and ΔPP^{post} above. This means that the percent change in expected profits obtained from 75% coverage is greatest for low risk farmers and is lowest for high risk farmers.

Figures 14 and 15 illustrate the tremendous variation in riskiness of corn and soybean production in the United States. Wheat shows a similar range. Therefore, we have the ability to use cross-sectional variation as well as two years of time variation in expected profits to estimate the role that expected profits play in determining coverage levels.

As discussed above our estimates of the change in expected profits depend on knowledge of the degree of yield risk. With both APH and CRC in 1998 and 2002, increases in yield risk result in proportionately lower benefits and proportionately constant costs. Thus, the proportionate change in expected profits from moving to 75% coverage is inversely related to yield risk.

Clearly there exists variation in yield risk between fields and between farmers within a county. One could use observations on individual farmer decisions about coverage level, modeling it as a 0-1 decision depending on whether they purchased 65% coverage or higher coverage. Such an analysis would be complicated by the sheer number of insured farmers. To reduce the number of observations would require a sampling procedure that would result in an adequate data set.

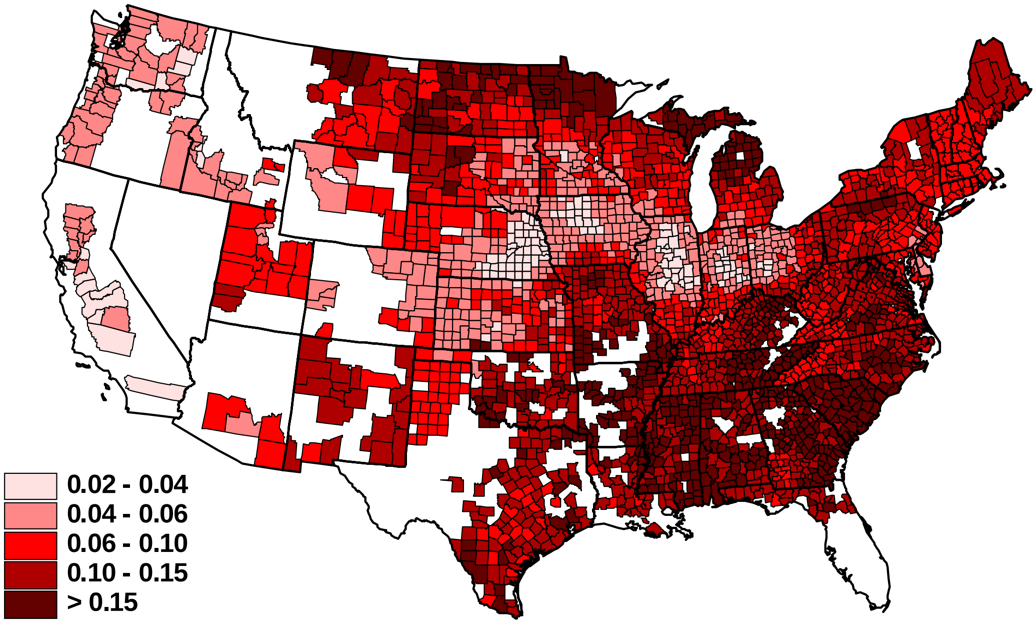


Figure 14. 65% APH premium rates for corn for the 2002 crop year

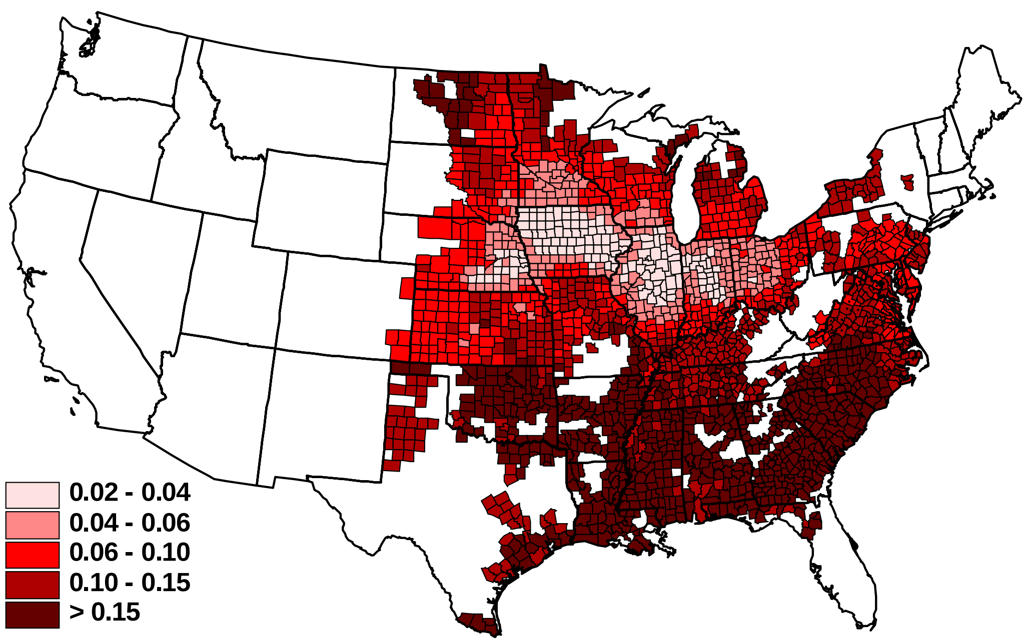


Figure 15. 65% APH premium rates for soybean for the 2002 crop year

An alternative is to rely on the extensive variation in yield risk across counties, as shown in Figures 14 and 15, and to aggregate individual farmer decisions into a county decision variable. This more aggregate approach models how county average changes in expected profits from higher crop insurance coverage levels influence the average coverage decision in a county. The following procedure was used to estimate the average change in expected yield profits at the county level.

RMA reports total premium and total liability by county, crop, and coverage level. Thus, for each coverage level we can measure the average premium rate for the county by dividing total premium by liability. Our goal is to measure the average yield risk of farmers in a county that purchase at least 65% coverage. We will measure the amount of yield risk by the average 65% premium rate charged to those farmers in the county. The data in Table 7 show a significant amount of acreage is insured at coverage levels greater than 65% so we do not want to restrict our measure to only those who insured at 65%. The procedure that we used to measure the average 65% rate for those producers who purchased at least 65% coverage is best explained with an example.

Table 8 presents 2002 corn data for Cass County, Illinois for APH. At each coverage level, the average rate is calculated by dividing total premium by total liability. The average rate at each coverage level is then converted to the corresponding average 65% rate by dividing it by the appropriate rate relativity factor. These rate relativity factors are 1.0 for 65% coverage, 1.215 for 70% coverage, 1.538 for 75% coverage, 1.954 for 80% coverage, and 2.462 for 85% coverage. The result of this multiplication is reported in the last column on Table 8. The average 65% rate is then calculated by talking the acreage-weighted average of the results in the last column. In this example the average rate 0.0591. This is a bit higher than the 0.052 rate that would be charged a farmer in Cass County in 2002 if the farmer had an APH yield equal to the reference yield of 120 bu/ac.

Table 8. Data for Cass County used to calculate average 65% premium rates

Coverage Level	Insurance Plan	Insured Acres	Total Liability	Total Premium	Average Rate	Average 65% Rate
(percent)		(acres)	($)	($)		
65	APH	2,446	456,555	28,563	0.0626	0.0626
70	APH	113	21,138	1,269	0.0600	0.0494
75	APH	341	75,912	4,590	0.0605	0.0393
80	APH	36	8,525	651	0.0764	0.0391
85	APH	0	0	0	na	na

Source: Summary of business reports from USDA RMA: http://www3.rma.usda.gov/apps/sob/

Given this estimate of the average rate we can estimate the average expected gain from moving to 75% coverage. Using the beta distribution that generated the rates in Table 4 in Babcock, Hayes, and Hart, the actuarially fair 75% premium rate is 0.0825.[3] Then using the above expressions for ΔI and ΔPP^{post}, we have $\Delta I = 0.02346 * p * Y$ and ΔPP^{post} =

[3] This 75% premium rate is a reasonable estimate of an actuarially fair rate if the 65% premium rate is actuarially fair and if marginal moral hazard is insignificant.

0.014927*p*Y. Thus the change in expected profits is 0.008533*p*Y. We normalize this change in expected profits by dividing through by our estimate of ΔI. The result then represents the change in expected profits as a percent subsidy. In this example, the result is 0.36, or that the change in expected profit amounts to a 36% subsidy.

Before moving to a discussion of how we estimate the change in expected profit for CRC, it is instructive to calculate the percent subsidy for Cass County before ARPA. Assuming that the average 65% premium rate in 1998 was 0.0591, the change in expected profit is -0.006296*p*Y which translates to a -27% subsidy. That is, Cass County farmers were being asked to pay 27% more than the actuarially fair incremental cost for 75% coverage in 1998. This switch from a 27% tax to a 36% subsidy creates a large change in incentives for the average farmer in Cass County to switch coverage levels.

Calculating the change in expected profits from higher coverage levels with CRC is more difficult than with APH because the CRC rating structure contains three separate components (yield risk, revenue risk, and price risk) and a portion of the change in expected indemnities is due to price variability. However, examination of the relationship between 65% APH base premium rates and CRC premium rates at the 65%, 75%, and 85% coverage levels reveals an exact linear relationship which is shown in Figure 16. Thus we can use the average premium rates for CRC at different coverage levels to reveal the average underlying 65% APH premium. This underlying 65% APH premium rate can then be used to calculate ΔPP^{pre} and ΔPP^{post}. What remains is how to calculate ΔI for CRC.

Because CRC premiums use the same constant rate relativities that are used to rate APH, we know that they cannot be used to calculate ΔI. What is needed is an independent measure of ΔI that is based on a revenue distribution, much like we used a yield distribution to calculate ΔI for APH.

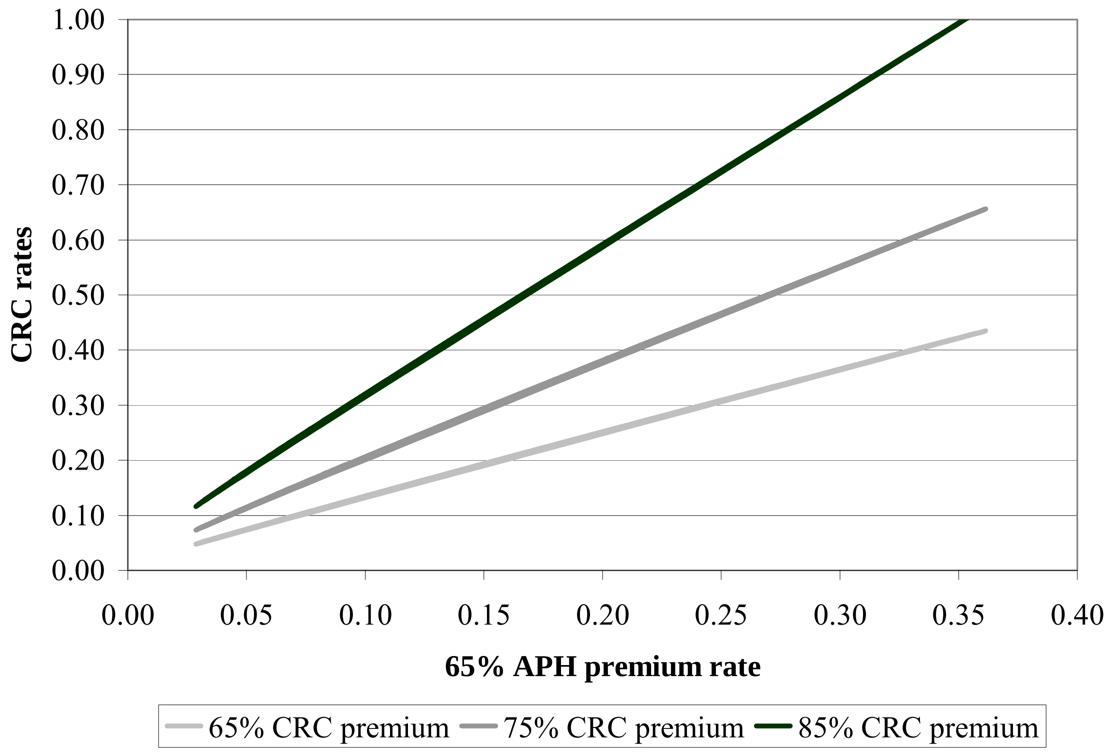


Figure 16. Predicting CRC premium rates with 65% APH premium rates

The rating equations for Revenue Assurance can be used to estimate ΔI for CRC coverage. The coverage provided by Revenue Assurance with the harvest price option is nearly identical to CRC and the current rating equations are based on Monte Carlo integration of revenue draws as discussed in Babcock and Hennessy. The rating equations were estimated by regressing the results of many Monte Carlo simulations on the level of rating variables that vary across the simulations. The rating variables included are price volatility, APH premium rate, APH yield divided by a county's reference yield, and coverage level. A quadratic functional form is used. Separate rating equations were estimated for different assumed levels of price-yield correlation. But because negative correlation does not significantly affect ΔI for CRC, we use the RA rating equation that is used for Iowa for corn for all states and crops. Table 9 provides the rating equation coefficients.

Table 9. RA rating equation used to estimate expected indemnities

Variable	Coefficient
Intercept	-0.096525
APH 65% rate	1.393955
APH 65% rate^2	-0.653385
Coverage	-0.052425
Coverage^2	0.273246
Yield ratio	0.074885
Yield ratio^2	0.001167
Price volatility	-0.312273

Price volatility^2	0.269246
Coverage x APH 65% rate	-0.226561
Yield ratio x APH 65% rate	0.043532
Price volatility x APH 65% rate	0.503837
Coverage x Yield ratio	-0.110972
Coverage x Price volatility	0.515275
Price volatility x Yield ratio	-0.032282

This regression equation is used to estimate the change in expected indemnities under CRC using the equation $\Delta I = p^*Y^*(0.75^*rate75 - 0.65^*rate65)$ where the *rate*75 and *rate*65 denote premium rates using the RA rating equation. Given these pieces of information, we constructed the average percent subsidy by county and crop for corn, soybean, and wheat for the 1998 and 2002 crop years.

One way to examine the shifts in both the coverage level selection by producers and the percent subsidy they received is to view scatter plots of these variables for both 1998 and 2002. Figures 17-22 contain these scatter plots. From these it is readily apparent that ARPA dramatically shifted the percent subsidy for insurance coverage above 65% and that producers shifted their choices to match.

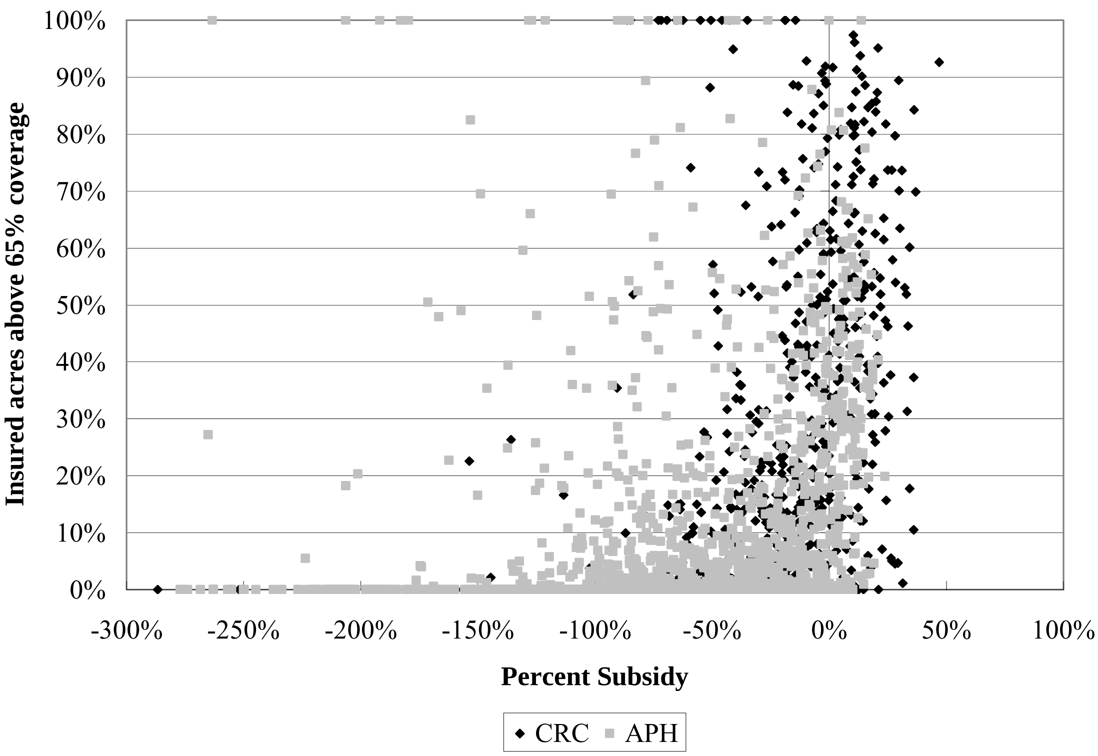


Figure 17. Percent subsidy and buy-up (above 65%) coverage for corn in 1998

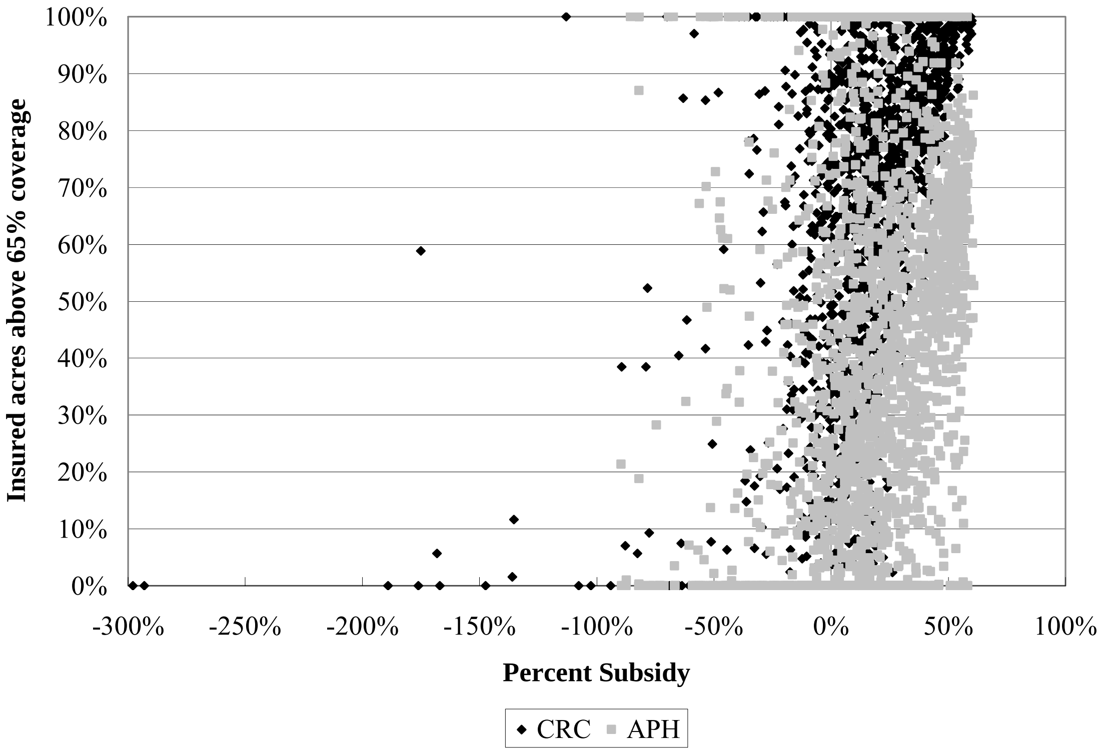


Figure 18. Percent subsidy and buy-up (above 65%) coverage for corn in 2002

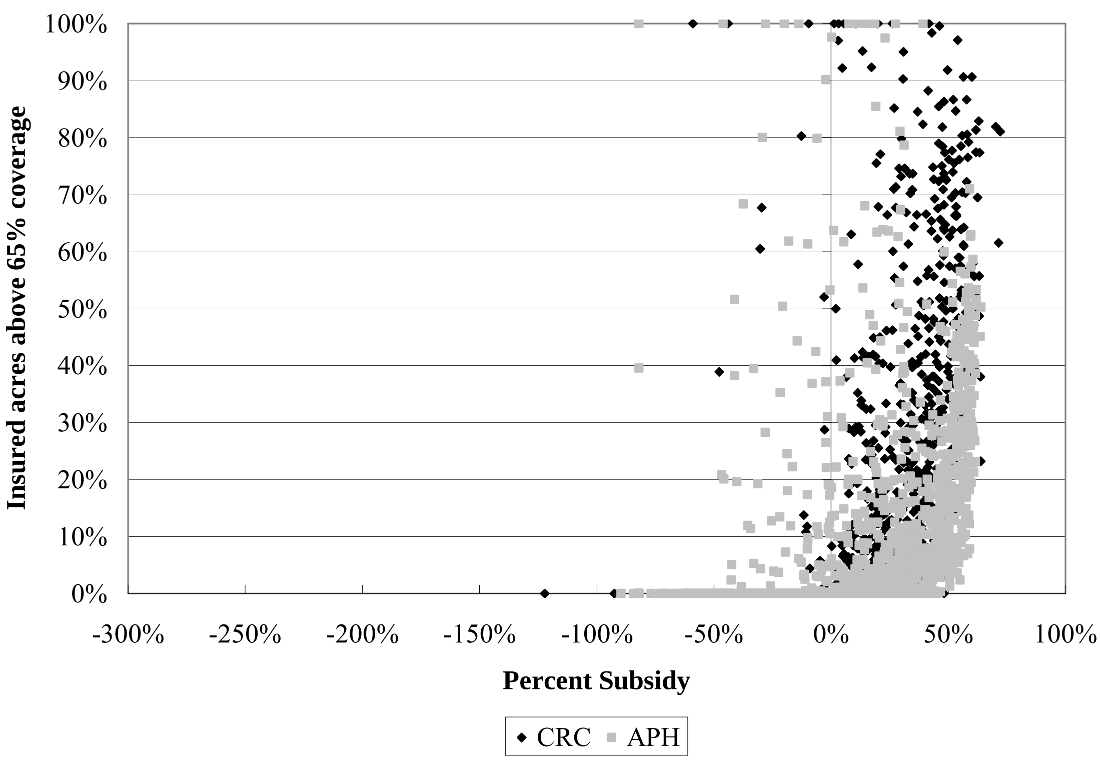


Figure 19. Percent subsidy and buy-up (above 65%) coverage for soybean in 1998

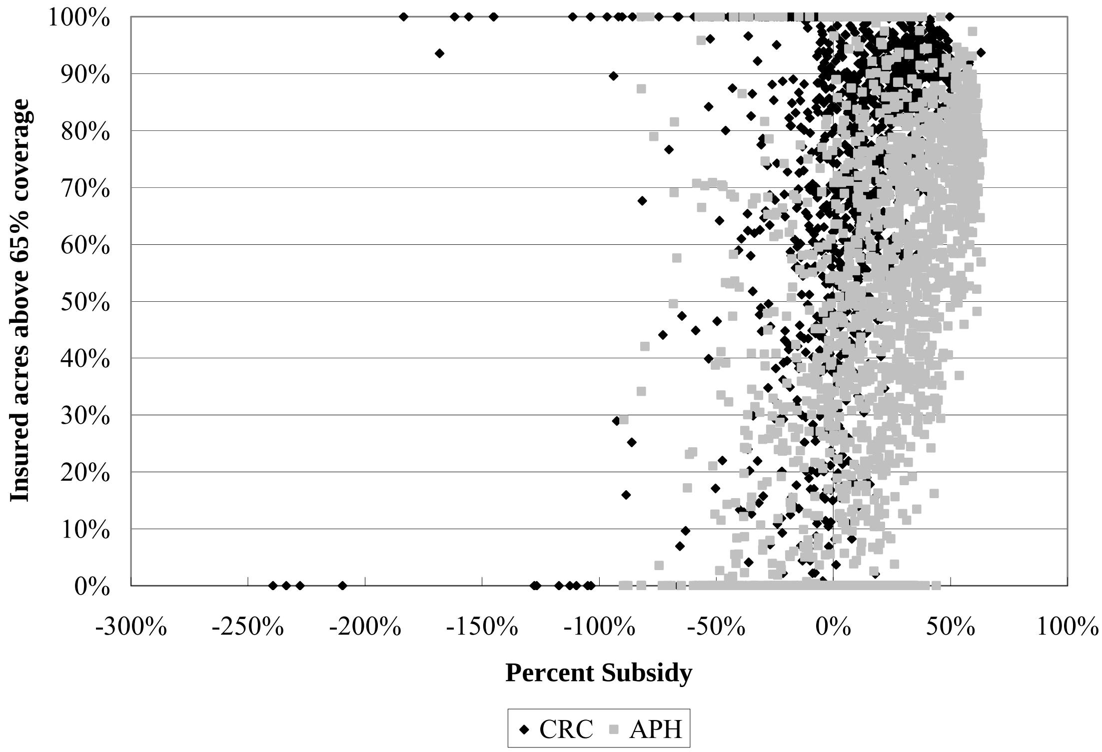


Figure 20. Percent subsidy and buy-up (above 65%) coverage for soybean in 2002

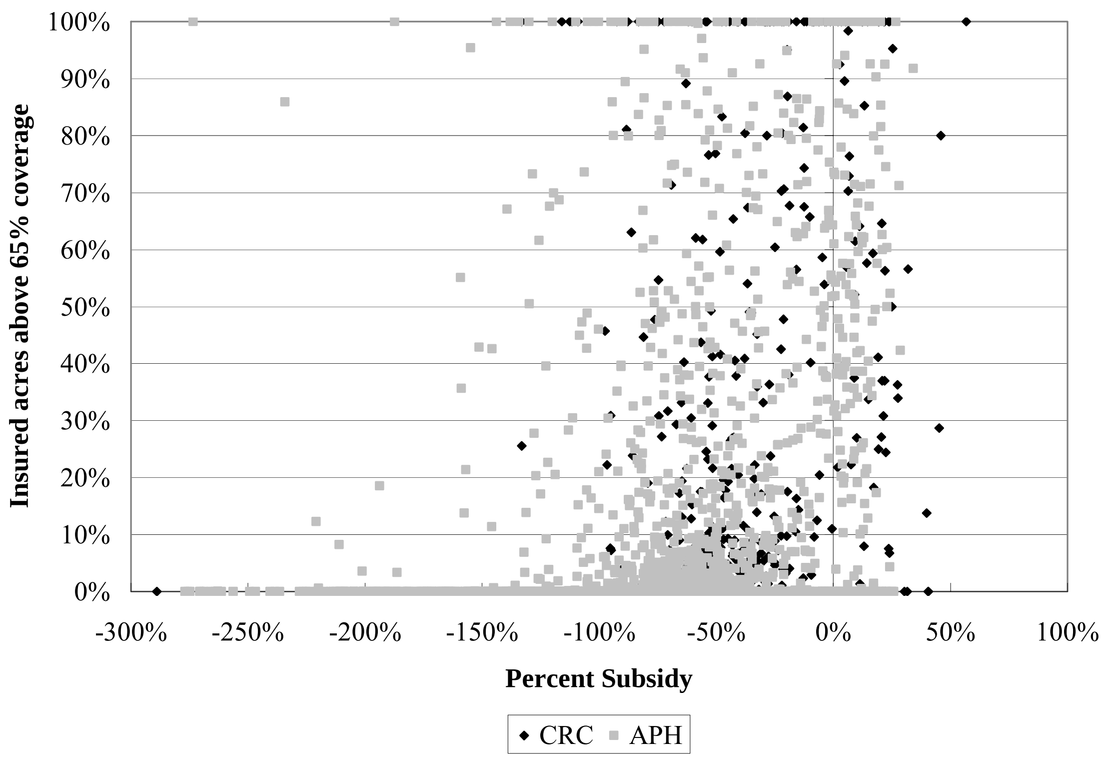


Figure 21. Percent subsidy and buy-up (above 65%) coverage for wheat in 1998

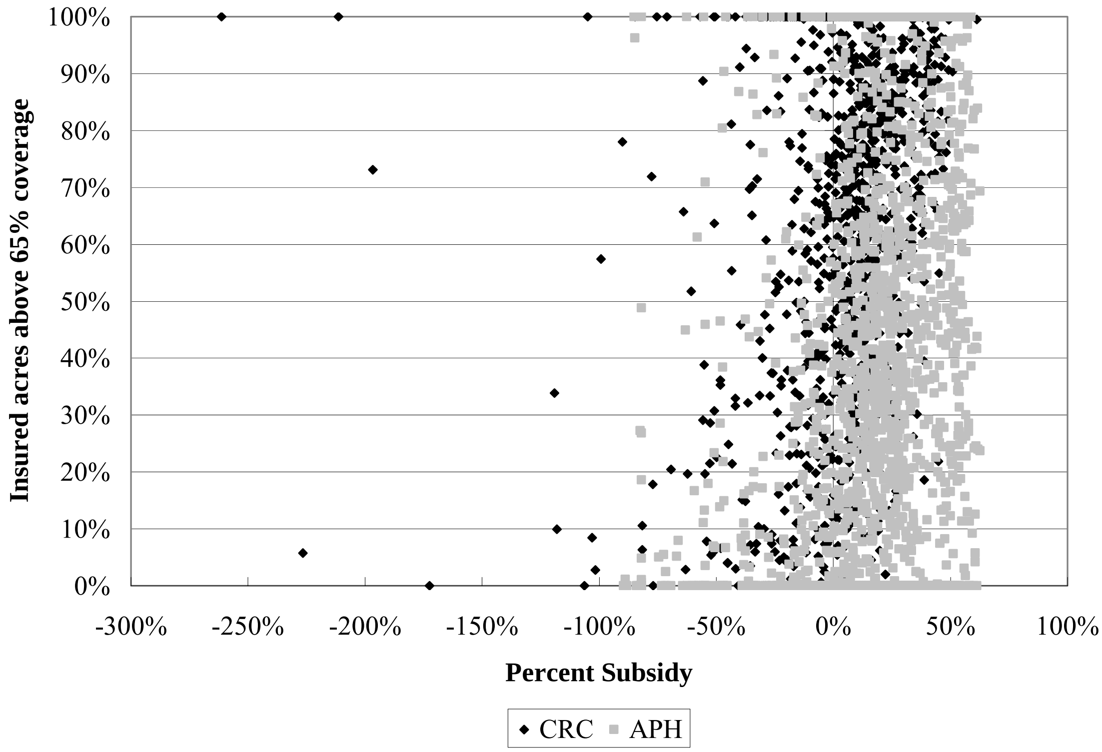


Figure 22. Percent subsidy and buy-up (above 65%) coverage for wheat in 2002

The Model

Under our premise, insurance participation at coverage levels above 65% is driven by the percent subsidy producers receive in changing from 65% coverage to a higher level of coverage. For our dependent variable, we have chosen the proportion of buy-up insured acres with coverage levels above 65%. As Figures 17-22 show, this ratio is limited to be between 0 and 1. Given this censored data, traditional regression analysis would not be appropriate. The statistical technique used in the analysis should account for this censoring. We have chosen to use a two-limit Tobit procedure for this work. This technique will account for the censoring at both ends of the (0, 1) interval and maintain predictions within the interval.

The model equation is given by:

$$(7) \quad \begin{aligned} Y_t &= X_t{*}\beta + u_t && \text{if } 0 < X_t{*}\beta + u_t < 1 \\ &= 0 && \text{if } X_t{*}\beta + u_t \leq 0 \\ &= 1 && \text{if } X_t{*}\beta + u_t \geq 1 \qquad \text{for } t = 1, 2, \ldots, T \end{aligned}$$

where Y_t is the proportion of buy-up insured acres with coverage levels above 65%, X_t is a vector of independent variables, β is a vector of coefficients, and u_t is an error term. The errors are assumed to be independently distributed with a zero mean and a constant variance of σ^2.

On the basis of Figures 17-22, we decided to utilize a linear and quadratic term for the percent subsidy as part of the vector of independent variables. Given the combination of crops, years, and insurance plans we are examining, we tested several specifications involving pooling the data across various combinations of crops, years, and/or insurance plans. We rejected the hypothesis that the response to subsidies was constant across crops, across products (APH or CRC) and across years. Thus, we estimated independent equations by crop, year, and insurance plan. To predict the changes from widespread adoption of a premium reduction plan, we will use crop-specific regression equations estimated from 2002 data.

The regression equation is:

(8) $$(\text{Proportion of Buy-Up Insured Acres with Coverage above 65\%})_t = \beta_0 + \beta_1 * (\text{Percent Subsidy})_t + \beta_2 * (\text{Percent Subsidy}^2)_t + u_t.$$

The results from the separate regressions are given in Table 10. Only the quadratic terms in the wheat-APH equations are not statistically significant; all other estimates are significant at the one-percent level. In all cases, the percent subsidy has an increasingly positive impact on the proportion of buy-up insurance beyond 65% coverage.

Table 10. Tobit regression estimates

Crop	Year	Ins. Plan	β_0	β_1	β_2	σ
Wheat	1998	CRC	0.2741	0.8731	0.0498	0.6170
			(0.0424)	(0.0821)	(0.0074)	(0.0296)
Wheat	1998	APH	0.3069	0.4939	0.0500	0.4305
			(0.0226)	(0.0538)	(0.0291)	(0.0116)
Wheat	2002	CRC	0.6076	0.4506	0.0211	0.4980
			(0.0142)	(0.0490)	(0.0034)	(0.0128)
Wheat	2002	APH	0.2415	0.4341	0.1099	0.4398
			(0.0161)	(0.0416)	(0.0916)	(0.0100)
Corn	1998	CRC	0.2847	0.9824	0.2646	0.3431
			(0.0154)	(0.0584)	(0.0544)	(0.0111)
Corn	1998	APH	0.1931	0.5583	0.1840	0.2723
			(0.0129)	(0.0329)	(0.0169)	(0.0069)
Corn	2002	CRC	0.5989	0.2501	0.0051	0.3954
			(0.0101)	(0.0239)	(0.0006)	(0.0081)
Corn	2002	APH	0.2465	0.3856	0.3712	0.3940
			(0.0130)	(0.0335)	(0.0740)	(0.0078)
Soybean	1998	CRC	-0.1718	0.7712	0.9518	0.3018
			(0.0191)	(0.0651)	(0.1134)	(0.0094)
Soybean	1998	APH	-0.1394	0.3495	0.6012	0.2377
			(0.0116)	(0.0278)	(0.0592)	(0.0063)
Soybean	2002	CRC	0.6387	0.5424	0.2110	0.3792
			(0.0115)	(0.0423)	(0.0385)	(0.0089)
Soybean	2002	APH	0.3326	0.4692	0.4933	0.3269
			(0.0118)	(0.0270)	(0.0622)	(0.0066)

Note: Standard errors are reported in parentheses below the estimates.

Model Prediction

Given the structure of the model, the prediction mechanism must account for the censoring of the data at zero and one. Following Greene (1990, p. 738), predicted values from a two-limit Tobit model can be computed as:

(9) $$\hat{Y} = U + L*\Phi(z_L) - U*\Phi(z_U) + [\Phi(z_U) - \Phi(z_L)]*X*\beta + \sigma*[\varphi(z_L) - \varphi(z_U)]$$

where $\hat{Y}$ is the predicted value, U is the upper censoring point, L is the lower censoring point, $\Phi(.)$ is the standard normal cumulative distribution function, $z_L = \sigma^{-1}*(L - X*\beta)$. We can use these predicted values to estimate the predicted acres insured at greater than 65% for different percent subsidies.

Figures 23 and 24 show the predicted values over the range of data for which we can make in-sample predictions.

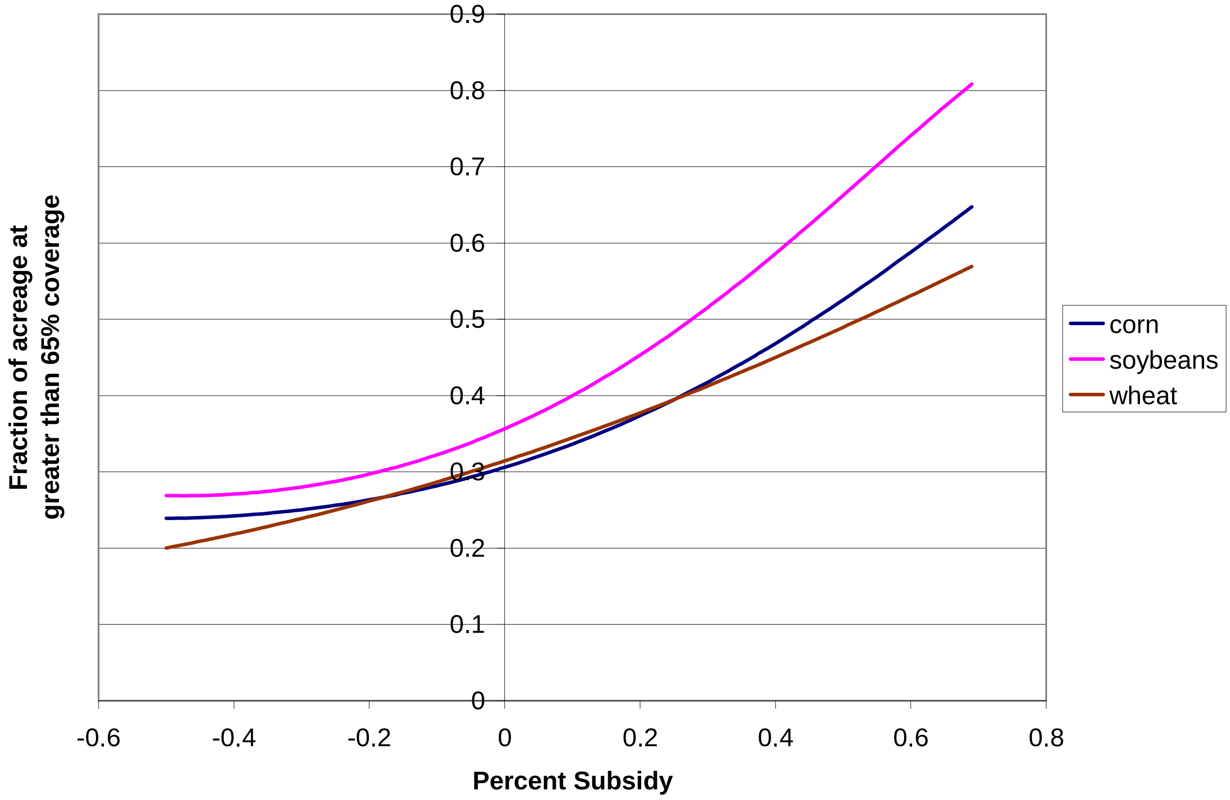


Figure 23. Predicted proportion of U.S. corn acreage insured at greater than 65% using the APH regression equations

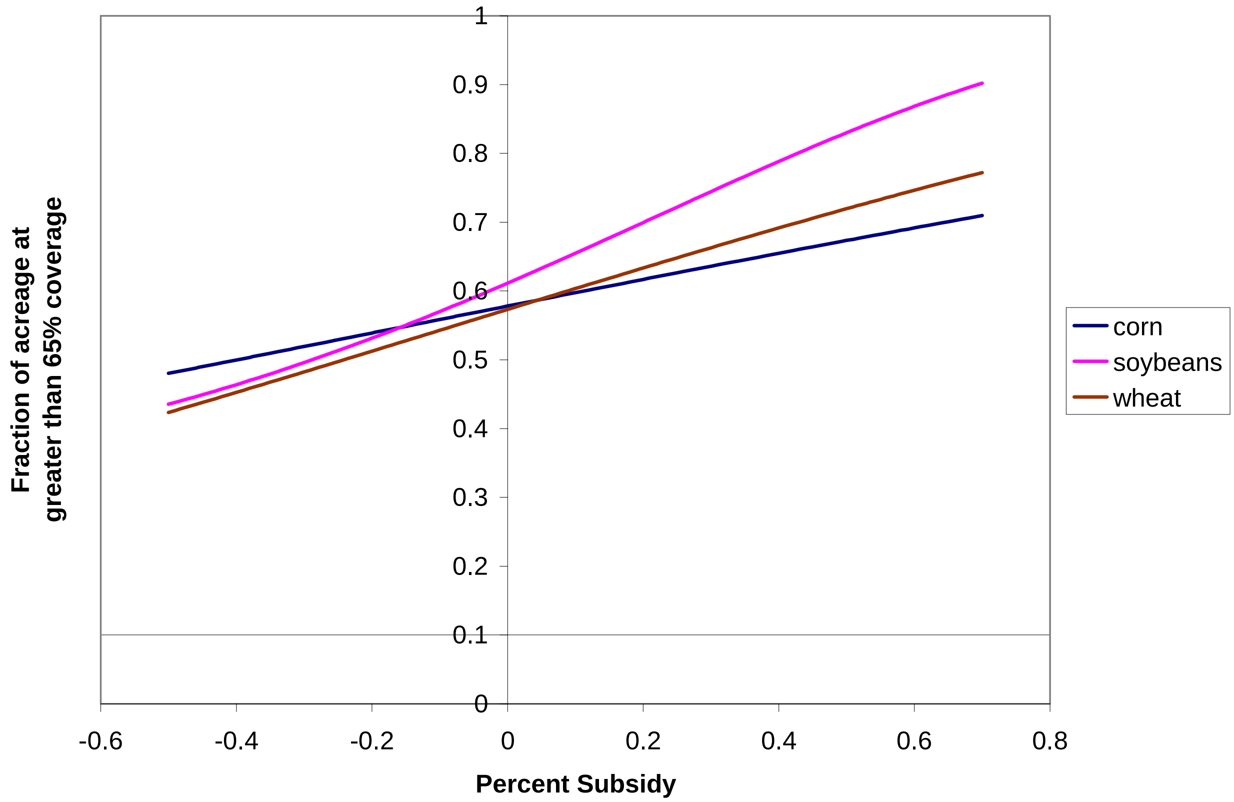


Figure 24. Predicted proportion of U.S. corn acreage insured at greater than 65% using the CRC regression equations

What we want to do now is to simulate the effects of premium reduction plan using the 2002 regression equations. Because the elasticity changes as the percent subsidy changes, we need calculate the elasticity at a point. The point we select is the percent subsidy in 2004 for RA. This subsidy is approximately 58.8%. We choose this point because the RA rate relativities with respect to coverage level are being slowly implemented for the other products.

Table 11 shows the predicted values, estimated elasticities, and the resulting change in acreage from a premium reduction plan that decreased producer premium by 3.5% of net book premium for each of the six curves shown in Figures 11 and 12.

Table 11. Results

	Corn		Soybeans		Wheat	
	APH	CRC	APH	CRC	APH	CRC
Predicted acreage at a 58.8% subsidy	58%	69%	73%	86%	53%	74%
Elasticity	0.65	0.15	0.62	0.25	0.46	0.21
Percent increase in subsidy	6%	6%	6%	6%	6%	6%
Percent increase in acreage insured at greater than 65%	3.9%	0.9%	3.7%	1.5%	2.8%	1.3%

As shown, the predicted changes are larger for APH than for CRC. One reason for a less elastic response for CRC is that the proportion of acreage above the 65% coverage level is much higher for farmers who purchase CRC than for those who purchase APH. Although seemingly modest, the predicted changes in acreage insured at greater than the 65% coverage level will have significant impact on farmers and the cost of the program.

D. National Acreage and Cost Effects of Premium Reduction Plans

As we have shown, widespread approval of the premium reduction plans will 1) increase the proportion of U.S. planted acreage that is insured; 2) increase the proportion of U.S. planted acreage that is insured at a coverage level of 65% or above; and 3) will increase the proportion of acreage insured at more than the 65% coverage level. So more acreage will be insured, less of the insured acreage will be insured under catastrophic coverage, and more of the buyup acreage will be insured at greater than the 65% coverage level. So one conclusion that we can make is that from a policy perspective, premium reduction plans are consistent with the goals of ARPA.

But, just as ARPA increased taxpayer costs of the crop insurance program, so will premium reduction plans. It may not seem that such plans will cost taxpayers anything because AIPs are asking for a reduction in A&O, and the reduction is simply passed dollar for dollar to farmers. However, because insured acreage will increase, CAT acreage will decrease, and lower deductible acreage will increase, total premium will increase. And because A&O expense is proportionate to total premium, taxpayer cost will increase from adoption of premium reduction plans. We can use our estimated impacts of the premium reduction plans to estimate the change in program costs.

To analyze the aggregate acreage and corresponding taxpayer cost effects of a premium reduction plan, we have to establish the structure of the premium reduction plan. For this analysis, we assume the premium reduction plan results in a 3.5 percent reduction in the total premium for crop insurance policies. The farmer would pay the total premium less the premium subsidy less the premium reduction plan amount. If the farmer chooses 65 percent coverage, then the farmer would pay the total premium less the 59 percent premium subsidy less the 3.5 percent premium reduction plan amount. Without a premium reduction plan the farmer pays 41 percent of the total premium and with a premium reduction plan the farmer pays 37.5 percent of the total premium. Thus a premium reduction plan of this size works like an increase to the premium subsidy from 59 to 62.5 percent, roughly a 6 percent increase in the premium subsidy. Given the elasticities from the previous sections, we can then estimate the percent changes in total and buy-up crop insurance participation. Using 2004 values for planted acres, total and buy-up participation, and average premium levels per acre; we then project insured acres and total premiums under the premium reduction plan. Changes in the government cost of the crop insurance program due to the premium reduction plan are represented by the changes in administrative and operating (A&O) expense reimbursement and underwriting gains. We assume that all crop insurance products are actuarially fair.

Tables 12-14 show crop insurance figures for the 2004 crop year. Crop insurance participation is roughly in line with the situation in 2002. Nationally, 75 percent of corn acres, 76 percent of soybean acres, and 77 percent of wheat acres were covered by some form of crop insurance. Buy-up coverage was purchased for 63 percent of all corn acres, 61 percent of all soybean acres, and 64 percent of all wheat acres.

Tables 15-17 show projections of crop insurance figures given a 3.5 percent premium reduction plan. The projections are performed at the state-crop level and use the elasticities from previous sections to create percent changes in total and buy-up crop insurance participation. These percent changes are then applied to the 2004 actual levels to project insured acres under the premium reduction plan. Total participation is projected to rise to 77% of all corn , 78.6% of all soybean acres, and 78% of wheat acres. Buy-up participation is projected to increase even more to 67.3% of all corn acres, 65.7% of all soybean acres, and 69% of all wheat acres. Total insured acreage under the three crops is projected to grow by 4.1 million acres, from 163.5 to 167.6 million acres.

As A&O expense reimbursements are scaled by coverage level, we then computed buy-up participation at coverage levels above 65 percent (we will refer to this as extended buy-up). We project extended buy-up participation as being 2 percent greater than occurred in 2004. This estimate is approximately at the mid-point of the estimates presented in the previous section. Table 18-20 show the 2004 and projected percentages of extended buy-up participation. These percentages are computed as the ratio of extended buy-up acreage over buy-up acreage. These tables also include the average per-acre total premium in 2004 for coverage levels below, at, and above 65 percent. These average premiums are used to construct total premiums for the projections and are across all insurance plans.

Table 12. 2004 Corn Crop Insurance Figures

State	Total Insured Acres	Buy-up Insured Acres	Planted Acres	Total Participation Rate	Buy-up Participation Rate
Alabama	151,257	86,772	240,000	0.630	0.362
Arizona	30,819	7,665	55,000	0.560	0.139
Arkansas	210,501	61,616	320,000	0.658	0.193
California	176,129	3,722	580,000	0.304	0.006
Colorado	1,098,079	1,041,082	1,200,000	0.915	0.868
Delaware	104,110	94,173	160,000	0.651	0.589
Florida	26,912	7,704	70,000	0.384	0.110
Georgia	227,251	93,107	330,000	0.689	0.282
Idaho	35,249	10,714	215,000	0.164	0.050
Illinois	7,798,709	6,825,990	11,700,000	0.667	0.583
Indiana	3,395,673	3,117,064	5,700,000	0.596	0.547
Iowa	10,701,441	9,883,671	12,700,000	0.843	0.778
Kansas	2,462,724	2,254,310	3,100,000	0.794	0.727
Kentucky	729,685	522,444	1,210,000	0.603	0.432
Louisiana	347,982	134,556	420,000	0.829	0.320
Maryland	312,096	261,103	490,000	0.637	0.533
Michigan	1,347,677	858,610	2,200,000	0.613	0.390
Minnesota	6,482,563	5,558,387	7,500,000	0.864	0.741
Mississippi	342,258	80,067	460,000	0.744	0.174
Missouri	2,155,941	1,431,463	2,950,000	0.731	0.485
Montana	30,808	17,127	70,000	0.440	0.245
Nebraska	7,171,063	6,739,556	8,300,000	0.864	0.812
New Jersey	57,776	26,221	88,000	0.657	0.298
New Mexico	71,972	22,657	130,000	0.554	0.174
New York	427,349	112,702	980,000	0.436	0.115
North Carolina	650,036	451,312	830,000	0.783	0.544
North Dakota	1,665,598	1,228,926	1,800,000	0.925	0.683
Ohio	2,270,268	2,072,262	3,350,000	0.678	0.619
Oklahoma	163,151	102,477	250,000	0.653	0.410
Oregon	17,366	2,823	55,000	0.316	0.051
Pennsylvania	727,113	527,764	1,400,000	0.519	0.377
South Carolina	247,154	147,917	310,000	0.797	0.477
South Dakota	4,359,528	3,983,270	4,650,000	0.938	0.857
Tennessee	390,847	218,736	680,000	0.575	0.322
Texas	1,593,172	984,907	1,800,000	0.885	0.547
Utah	10,054	6,859	53,000	0.190	0.129
Virginia	312,456	266,566	480,000	0.651	0.555
Washington	45,969	4,590	160,000	0.287	0.029
West Virginia	27,854	19,644	48,000	0.580	0.409
Wisconsin	2,103,439	1,553,167	3,650,000	0.576	0.426
Wyoming	51,915	43,216	95,000	0.546	0.455

Table 13. 2004 Soybean Crop Insurance Figures

State	Total Insured Acres	Buy-up Insured Acres	Planted Acres	Total Participation Rate	Buy-up Participation Rate
Alabama	150,890	68,400	210,000	0.719	0.326
Arkansas	2,098,370	452,471	3,200,000	0.656	0.141
Delaware	129,028	111,952	210,000	0.614	0.533
Florida	11,798	4,333	18,000	0.655	0.241
Georgia	198,581	83,063	280,000	0.709	0.297
Illinois	6,208,314	4,855,959	9,900,000	0.627	0.491
Indiana	3,147,732	2,787,691	5,500,000	0.572	0.507
Iowa	8,673,984	7,907,357	10,200,000	0.850	0.775
Kansas	2,155,981	1,970,906	2,800,000	0.770	0.704
Kentucky	856,350	580,174	1,310,000	0.654	0.443
Louisiana	942,838	167,764	1,100,000	0.857	0.153
Maryland	340,426	265,225	500,000	0.681	0.530
Michigan	1,233,774	978,309	2,000,000	0.617	0.489
Minnesota	6,676,232	6,139,355	7,300,000	0.915	0.841
Mississippi	1,445,287	491,859	1,670,000	0.865	0.295
Missouri	3,514,508	2,167,727	5,000,000	0.703	0.434
Nebraska	4,167,935	3,996,786	4,800,000	0.868	0.833
New Jersey	74,543	29,578	103,000	0.724	0.287
North Carolina	1,205,398	678,695	1,520,000	0.793	0.447
North Dakota	3,698,462	3,472,647	3,750,000	0.986	0.926
Ohio	2,810,695	2,521,335	4,450,000	0.632	0.567
Oklahoma	186,407	89,489	320,000	0.583	0.280
Pennsylvania	274,967	197,088	400,000	0.687	0.493
South Carolina	454,263	144,295	540,000	0.841	0.267
South Dakota	3,956,204	3,811,118	4,150,000	0.953	0.918
Tennessee	815,267	455,011	1,210,000	0.674	0.376
Texas	246,553	133,061	290,000	0.850	0.459
Virginia	402,459	337,755	540,000	0.745	0.625
Wisconsin	1,059,939	875,461	1,600,000	0.662	0.547

Table 14. 2004 Wheat Crop Insurance Figures

State	Total Insured Acres	Buy-up Insured Acres	Planted Acres	Total Participation Rate	Buy-up Participation Rate
Alabama	29,042	13,968	120,000	0.242	0.116
Arizona	60,448	21,477	107,000	0.565	0.201
Arkansas	361,514	100,534	700,000	0.516	0.144
California	352,309	84,562	670,000	0.526	0.126
Colorado	1,963,530	1,774,384	2,310,000	0.850	0.768
Delaware	13,153	9,050	45,000	0.292	0.201
Georgia	136,070	66,331	330,000	0.412	0.201
Idaho	711,895	490,787	1,210,000	0.588	0.406
Illinois	369,614	249,403	1,000,000	0.370	0.249
Indiana	124,642	95,868	450,000	0.277	0.213
Iowa	4,740	4,438	28,000	0.169	0.159
Kansas	8,492,190	7,927,342	9,900,000	0.858	0.801
Kentucky	184,680	104,167	520,000	0.355	0.200
Louisiana	120,866	43,592	150,000	0.806	0.291
Maryland	61,492	38,663	160,000	0.384	0.242
Michigan	302,141	211,427	630,000	0.480	0.336
Minnesota	1,621,729	1,249,595	1,677,000	0.967	0.745
Mississippi	103,902	34,108	170,000	0.611	0.201
Missouri	503,498	217,052	1,050,000	0.480	0.207
Montana	4,942,525	4,497,760	5,300,000	0.933	0.849
Nebraska	1,620,752	1,547,553	1,950,000	0.831	0.794
Nevada	9,743	4,596	14,000	0.696	0.328
New Jersey	9,017	1,184	28,000	0.322	0.042
New Mexico	315,947	109,586	470,000	0.672	0.233
New York	33,066	11,148	100,000	0.331	0.111
North Carolina	322,810	196,272	600,000	0.538	0.327
North Dakota	8,427,656	8,012,290	8,440,000	0.999	0.949
Ohio	310,684	273,283	900,000	0.345	0.304
Oklahoma	4,051,580	3,352,003	6,300,000	0.643	0.532
Oregon	740,983	684,008	1,050,000	0.706	0.651
Pennsylvania	42,084	32,519	140,000	0.301	0.232
South Carolina	136,403	66,494	190,000	0.718	0.350
South Dakota	2,904,666	2,543,375	3,315,000	0.876	0.767
Tennessee	118,926	30,919	400,000	0.297	0.077
Texas	4,318,394	2,942,674	6,300,000	0.685	0.467
Utah	89,878	73,608	142,000	0.633	0.518
Virginia	110,534	73,508	210,000	0.526	0.350
Washington	1,591,433	1,223,258	2,360,000	0.674	0.518
West Virginia	2,384	1,279	8,000	0.298	0.160
Wisconsin	79,955	57,155	250,000	0.320	0.229
Wyoming	129,772	117,267	157,000	0.827	0.747

Table 15. Projected Corn Crop Insurance Figures under a Premium Reduction Plan

State	Total Insured Acres	Buy-up Insured Acres	Planted Acres	Total Participation Rate	Buy-up Participation Rate
Alabama	162,159	118,028	240,000	0.659	0.409
Arizona	33,646	26,536	55,000	0.589	0.187
Arkansas	228,561	160,986	320,000	0.695	0.253
California	194,941	15,130	580,000	0.314	0.006
Colorado	1,137,668	1,114,914	1,200,000	0.945	0.937
Delaware	119,586	116,122	160,000	0.714	0.670
Florida	32,066	19,263	70,000	0.412	0.128
Georgia	231,351	133,824	330,000	0.698	0.317
Idaho	56,525	55,395	215,000	0.180	0.062
Illinois	8,057,547	7,637,627	11,700,000	0.682	0.623
Indiana	3,703,333	3,585,401	5,700,000	0.628	0.592
Iowa	10,867,980	10,314,843	12,700,000	0.854	0.804
Kansas	2,528,339	2,432,705	3,100,000	0.811	0.769
Kentucky	867,729	730,980	1,210,000	0.672	0.506
Louisiana	355,627	242,631	420,000	0.844	0.402
Maryland	342,898	316,148	490,000	0.677	0.593
Michigan	1,437,042	1,210,753	2,200,000	0.638	0.452
Minnesota	6,548,703	5,940,007	7,500,000	0.872	0.779
Mississippi	351,487	183,483	460,000	0.759	0.213
Missouri	2,273,701	1,724,236	2,950,000	0.760	0.533
Montana	34,137	23,927	70,000	0.461	0.269
Nebraska	7,322,913	7,140,828	8,300,000	0.880	0.851
New Jersey	68,835	49,407	88,000	0.740	0.376
New Mexico	70,113	33,550	130,000	0.546	0.189
New York	509,623	332,320	980,000	0.473	0.141
North Carolina	693,439	563,802	830,000	0.824	0.618
North Dakota	1,682,048	1,475,796	1,800,000	0.933	0.777
Ohio	2,463,752	2,414,477	3,350,000	0.717	0.683
Oklahoma	174,937	117,078	250,000	0.684	0.434
Oregon	16,800	9,668	55,000	0.313	0.057
Pennsylvania	918,591	799,290	1,400,000	0.590	0.450
South Carolina	263,338	191,828	310,000	0.839	0.545
South Dakota	4,397,606	4,259,656	4,650,000	0.946	0.908
Tennessee	467,239	356,275	680,000	0.640	0.387
Texas	1,618,306	1,123,870	1,800,000	0.897	0.589
Utah	13,319	13,053	53,000	0.202	0.177
Virginia	342,920	315,866	480,000	0.692	0.612
Washington	58,603	28,183	160,000	0.310	0.033
West Virginia	30,287	26,603	48,000	0.609	0.468
Wisconsin	2,187,903	1,828,754	3,650,000	0.589	0.458
Wyoming	55,268	52,263	95,000	0.565	0.498

Table 16. Projected Soybean Crop Insurance Figures under a Premium Reduction Plan

State	Total Insured Acres	Buy-up Insured Acres	Planted Acres	Total Participation Rate	Buy-up Participation Rate
Alabama	167,362	110,858	210,000	0.775	0.392
Arkansas	2,219,081	1,043,872	3,200,000	0.681	0.167
Delaware	146,273	137,864	210,000	0.664	0.599
Florida	13,010	8,614	18,000	0.699	0.298
Georgia	209,541	139,077	280,000	0.737	0.356
Illinois	6,416,423	5,670,254	9,900,000	0.640	0.531
Indiana	3,412,491	3,296,293	5,500,000	0.600	0.554
Iowa	8,796,831	8,358,057	10,200,000	0.860	0.809
Kansas	2,314,736	2,223,828	2,800,000	0.814	0.768
Kentucky	986,852	849,765	1,310,000	0.719	0.534
Louisiana	973,310	410,909	1,100,000	0.881	0.187
Maryland	358,410	314,257	500,000	0.705	0.582
Michigan	1,342,160	1,292,937	2,000,000	0.650	0.566
Minnesota	6,752,621	6,384,734	7,300,000	0.925	0.869
Mississippi	1,466,258	786,781	1,670,000	0.876	0.347
Missouri	3,752,648	2,772,776	5,000,000	0.736	0.487
Nebraska	4,288,104	4,202,342	4,800,000	0.890	0.874
New Jersey	83,246	48,169	103,000	0.785	0.339
North Carolina	1,282,418	940,515	1,520,000	0.833	0.524
North Dakota	3,750,000	3,645,025	3,750,000	1.001	0.969
Ohio	3,065,173	2,994,943	4,450,000	0.668	0.627
Oklahoma	218,881	149,675	320,000	0.642	0.333
Pennsylvania	334,139	281,448	400,000	0.789	0.597
South Carolina	481,708	298,390	540,000	0.884	0.343
South Dakota	3,979,668	3,900,074	4,150,000	0.958	0.939
Tennessee	943,930	781,333	1,210,000	0.746	0.477
Texas	266,445	194,624	290,000	0.908	0.556
Virginia	425,845	389,844	540,000	0.777	0.685
Wisconsin	1,115,772	1,025,896	1,600,000	0.685	0.598

Table 17. Projected Wheat Crop Insurance Figures under a Premium Reduction Plan

State	Total Insured Acres	Buy-up Insured Acres	Planted Acres	Total Participation Rate	Buy-up Participation Rate
Alabama	17,136	10,508	120,000	0.218	0.113
Arizona	58,089	22,906	107,000	0.553	0.204
Arkansas	364,611	164,603	700,000	0.518	0.157
California	350,146	153,279	670,000	0.524	0.139
Colorado	2,002,962	1,962,903	2,310,000	0.865	0.831
Delaware	15,000	14,700	45,000	0.304	0.231
Georgia	126,573	89,530	330,000	0.400	0.215
Idaho	765,461	658,293	1,210,000	0.614	0.462
Illinois	366,599	318,819	1,000,000	0.369	0.266
Indiana	132,556	119,158	450,000	0.282	0.224
Iowa	7,870	7,432	28,000	0.188	0.176
Kansas	8,682,680	8,509,026	9,900,000	0.874	0.848
Kentucky	230,150	213,100	520,000	0.386	0.242
Louisiana	121,083	54,118	150,000	0.807	0.311
Maryland	68,466	64,729	160,000	0.401	0.281
Michigan	322,662	269,140	630,000	0.496	0.367
Minnesota	1,621,768	1,324,040	1,677,000	0.967	0.778
Mississippi	101,758	37,378	170,000	0.603	0.205
Missouri	532,117	300,425	1,050,000	0.493	0.223
Montana	5,016,530	4,750,217	5,300,000	0.946	0.889
Nebraska	1,659,080	1,625,898	1,950,000	0.847	0.833
Nevada	11,175	5,430	14,000	0.767	0.348
New Jersey	10,857	5,969	28,000	0.343	0.049
New Mexico	322,972	171,462	470,000	0.682	0.264
New York	32,613	28,346	100,000	0.330	0.130
North Carolina	334,261	295,704	600,000	0.548	0.381
North Dakota	8,440,000	8,271,200	8,440,000	1.003	0.987
Ohio	313,171	306,907	900,000	0.346	0.319
Oklahoma	4,266,701	3,925,509	6,300,000	0.665	0.580
Oregon	784,774	769,078	1,050,000	0.735	0.719
Pennsylvania	51,586	50,554	140,000	0.321	0.273
South Carolina	141,188	103,456	190,000	0.736	0.418
South Dakota	2,942,955	2,737,194	3,315,000	0.886	0.812
Tennessee	162,519	141,958	400,000	0.329	0.098
Texas	4,485,642	3,624,757	6,300,000	0.703	0.518
Utah	101,193	99,169	142,000	0.683	0.620
Virginia	115,128	94,161	210,000	0.538	0.384
Washington	1,629,882	1,368,863	2,360,000	0.685	0.550
West Virginia	2,276	2,231	8,000	0.294	0.209
Wisconsin	83,513	70,528	250,000	0.325	0.241
Wyoming	137,128	132,373	157,000	0.866	0.819

Table 18. Corn Extended Buy-up Participation and Average Per-Acre Premiums

State		Coverage At 65%	Coverage Above 65%	2004 Extended Buy-up Rate	Projected Extended Buy-up Rate
Alabama	$6.62	$16.49	$26.57	0.614	0.626
Arizona	$5.18	$17.35	$27.59	0.644	0.657
Arkansas	$9.53	$29.80	$41.95	0.710	0.724
California	$3.78	$12.01	$25.08	0.848	0.865
Colorado	$9.57	$19.16	$32.89	0.873	0.891
Delaware	$4.72	$19.96	$28.34	0.887	0.904
Florida	$6.86	$20.82	$30.22	0.285	0.290
Georgia	$7.22	$22.08	$34.51	0.505	0.515
Idaho	$3.76	$13.14	$22.20	0.805	0.821
Illinois	$5.34	$12.99	$25.07	0.884	0.901
Indiana	$4.13	$15.49	$28.72	0.919	0.937
Iowa	$3.37	$11.04	$24.28	0.843	0.860
Kansas	$6.56	$17.39	$29.74	0.775	0.791
Kentucky	$5.58	$18.38	$27.47	0.791	0.807
Louisiana	$10.64	$21.14	$34.64	0.464	0.473
Maryland	$9.51	$22.77	$34.02	0.725	0.739
Michigan	$6.78	$20.04	$26.48	0.876	0.893
Minnesota	$7.62	$17.02	$27.75	0.766	0.781
Mississippi	$8.09	$20.71	$30.52	0.557	0.569
Missouri	$11.75	$24.67	$35.44	0.688	0.702
Montana	$6.87	$19.57	$26.20	0.564	0.575
Nebraska	$7.03	$14.20	$25.76	0.824	0.841
New Jersey	$6.67	$20.35	$32.54	0.695	0.709
New Mexico	$13.57	$38.36	$45.50	0.067	0.069
New York	$6.39	$18.41	$27.12	0.706	0.720
North Carolina	$7.27	$22.47	$30.12	0.464	0.473
North Dakota	$14.24	$24.30	$38.96	0.663	0.676
Ohio	$5.42	$14.17	$26.49	0.863	0.881
Oklahoma	$12.18	$21.66	$32.94	0.475	0.485
Oregon	$4.85	$14.28	$29.59	0.913	0.931
Pennsylvania	$8.64	$22.76	$38.55	0.832	0.848
South Carolina	$12.32	$26.91	$38.31	0.353	0.361
South Dakota	$12.83	$20.77	$30.34	0.699	0.713
Tennessee	$8.18	$20.41	$28.45	0.627	0.640
Texas	$10.76	$22.77	$31.74	0.419	0.427
Utah	$7.38	$20.79	$29.34	0.881	0.899
Virginia	$11.29	$26.00	$36.36	0.638	0.650
Washington	$3.39	$11.35	$18.86	0.751	0.766
West Virginia	$9.72	$22.90	$37.31	0.752	0.767
Wisconsin	$9.52	$20.85	$31.00	0.722	0.737

Wyoming	$7.67	$19.84	$36.47	0.885	0.903

Table 19. Soybean Extended Buy-up Participation and Average Per-Acre Premiums

State	Coverage Below 65%	Coverage At 65%	Coverage Above 65%	2004 Extended Buy-up Rate	Projected Extended Buy-up Rate
Alabama	$9.14	$19.93	$26.70	0.408	0.416
Arkansas	$7.37	$21.04	$30.44	0.499	0.509
Delaware	$2.52	$10.55	$16.30	0.903	0.921
Florida	$7.96	$26.74	$31.56	0.281	0.286
Georgia	$6.83	$18.98	$29.39	0.457	0.466
Illinois	$3.87	$8.93	$17.85	0.835	0.852
Indiana	$3.00	$11.25	$21.43	0.903	0.921
Iowa	$1.88	$6.70	$16.99	0.857	0.874
Kansas	$6.04	$15.30	$23.58	0.712	0.727
Kentucky	$4.94	$16.65	$20.46	0.776	0.792
Louisiana	$11.20	$22.59	$29.01	0.254	0.259
Maryland	$5.69	$15.05	$21.72	0.711	0.725
Michigan	$3.88	$14.09	$21.70	0.911	0.930
Minnesota	$5.27	$11.59	$20.04	0.825	0.842
Mississippi	$6.42	$16.73	$25.63	0.412	0.420
Missouri	$6.56	$16.07	$23.53	0.662	0.676
Nebraska	$3.69	$10.73	$20.31	0.850	0.867
New Jersey	$4.50	$11.94	$23.81	0.650	0.663
North Carolina	$6.31	$20.43	$32.01	0.515	0.525
North Dakota	$7.41	$14.14	$20.75	0.779	0.795
Ohio	$3.33	$10.18	$20.23	0.846	0.863
Oklahoma	$8.31	$17.22	$25.36	0.379	0.387
Pennsylvania	$4.94	$15.08	$27.51	0.866	0.883
South Carolina	$10.59	$25.23	$36.02	0.284	0.290
South Dakota	$6.97	$12.90	$20.59	0.794	0.810
Tennessee	$7.06	$17.44	$12.88	0.781	0.796
Texas	$12.89	$25.34	$39.97	0.215	0.219
Virginia	$5.09	$13.74	$21.72	0.644	0.657
Wisconsin	$4.27	$11.80	$20.53	0.808	0.824

Table 20. Wheat Extended Buy-up Participation and Average Per-Acre Premiums

State	Coverage Below 65%	Coverage At 65%	Coverage Above 65%	2004 Extended Buy-up Rate	Projected Extended Buy-up Rate
Alabama	$4.05	$9.67	$15.27	0.295	0.300
Arizona	$4.04	$11.25	$19.80	0.766	0.781
Arkansas	$5.23	$14.25	$22.63	0.605	0.617
California	$6.46	$21.65	$34.99	0.570	0.582
Colorado	$6.56	$12.59	$18.53	0.831	0.848
Delaware	$0.88	$3.33	$5.54	0.617	0.629
Georgia	$2.81	$8.94	$13.68	0.539	0.550
Idaho	$2.33	$7.94	$20.14	0.842	0.859
Illinois	$4.71	$12.75	$18.91	0.593	0.604
Indiana	$2.82	$8.50	$14.73	0.762	0.777
Iowa	$3.84	$12.56	$17.09	0.714	0.728
Kansas	$3.67	$8.39	$13.33	0.762	0.777
Kentucky	$3.02	$9.38	$14.69	0.645	0.658
Louisiana	$7.05	$16.00	$22.19	0.464	0.473
Maryland	$1.20	$4.29	$7.24	0.749	0.764
Michigan	$3.61	$9.79	$15.44	0.677	0.690
Minnesota	$11.15	$14.41	$19.32	0.603	0.615
Mississippi	$4.60	$12.70	$19.69	0.523	0.534
Missouri	$4.20	$11.61	$17.80	0.478	0.488
Montana	$3.64	$8.03	$12.91	0.709	0.723
Nebraska	$4.26	$9.16	$13.83	0.796	0.812
Nevada	$4.31	$-	$50.07	1.000	1.000
New Jersey	$1.30	$5.09	$7.22	0.580	0.592
New Mexico	$9.53	$14.50	$23.14	0.138	0.141
New York	$2.84	$7.52	$11.85	0.685	0.698
North Carolina	$2.83	$8.50	$14.37	0.548	0.559
North Dakota	$4.92	$10.21	$14.53	0.799	0.815
Ohio	$2.25	$6.10	$11.30	0.742	0.756
Oklahoma	$5.64	$10.14	$13.37	0.494	0.504
Oregon	$2.38	$6.20	$16.23	0.966	0.985
Pennsylvania	$1.34	$4.56	$8.40	0.801	0.817
South Carolina	$3.51	$9.51	$14.91	0.355	0.362
South Dakota	$8.08	$13.09	$18.07	0.563	0.574
Tennessee	$4.41	$11.58	$17.44	0.628	0.641
Texas	$8.08	$13.01	$16.88	0.323	0.330
Utah	$6.84	$12.52	$15.12	0.422	0.430
Virginia	$3.16	$8.73	$15.01	0.595	0.607
Washington	$1.45	$4.84	$9.71	0.886	0.904
West Virginia	$2.24	$6.68	$10.78	0.969	0.988
Wisconsin	$4.80	$11.98	$17.96	0.537	0.547
Wyoming	$3.74	$6.30	$10.17	0.807	0.824

Putting all of these pieces of information together, we calculate the change in total acreage and total premiums given a premium reduction plan. Table 21 presents the change in acreage. Participation rates increase, acreage at the 65% coverage level increases, and acreage at above 65% increases. These changes assume that premium reduction plans are widely available to all corn, soybean, and wheat farmers.

Table 21. Estimates of the Change in Acreage from a 3.5% Premium Reduction Plan

	Increase in Insured Acres	Increase in Buyup Acres	Increase in Acreage Above 65%
Corn	1,595,491	3,518,203	3,617,658
Soybeans	1,717,443	3,406,284	3,390,145
Wheat	793,777	2,507,397	2,212,704
Three-crop Total	4,106,712	9,431,885	9,220,506

The Board asks whether any increase in use of the crop insurance program for risk management will decrease the need for ad hoc disaster assistance programs. The history of ad hoc disaster assistance programs suggests that they fill the political needs of Congress rather than the financial needs of farmers. The current crop insurance program provides, in almost all circumstances, substantial financial protection for farmers yet Congress continues to pass disaster assistance programs. So there is no reason to believe that the increase in use of the crop insurance program from widespread use of premium reduction plans will have any impact on Congressional needs for disaster assistance programs.

The change in A&O expense reimbursement is roughly equal to 22 percent of the change in total premiums, given the 2005 Standard Reinsurance Agreement. The change in underwriting gains depends on the insurance companies' risk sharing arrangement with RMA; we have assumed an average gain of 10 percent of total premium for this analysis. Table 22 shows the changes in total premiums, A&O expense reimbursement, and underwriting gains we project under the premium reduction plan scenario.

Table 22. Changes in Total Premium, A&O Reimbursement, and Underwriting Gains

Crop	Change in Total Premium	Change in A&O Exp. Reimbursement	Change in Underwriting Gains
Corn	$88,310,597	$19,428,331	$8,831,060
Soybean	$65,190,814	$14,341,979	$6,519,081
Wheat	$27,668,572	$6,087,086	$2,766,857
3-Crop Total	$181,169,983	$39,857,396	$18,116,998

The total premium for these three crops in 2004 was $2.9 billion. Thus, the crop insurance changes related to the premium reduction plan will result in roughly a 6.25% increase in total premiums. To put this in perspective, between 1998 and 2002 (the years we examined for ARPA effects), total premiums jumped from $1.87 billion to $2.92 billion, a 56% increase in total premiums. Given the projected changes, this translates into an additional $40 million in A&O reimbursement and $18 million in underwriting gains.

Question 2. Impact on the Delivery System

a. Impacts on Agents, Claims Adjustment, AIPs, and Service

Allowing widespread price competition will dramatically lower agent commissions with almost all of the benefit being passed to producers. To see what impact this would have on the delivery system, all we need to do is to look to other industries that have experienced enhanced price competition. Two such industries are the airline industry and the trucking industry.

Enhanced price competition forced consolidation in both industries. The remaining companies were much larger, were more specialized, and had significantly lower costs. In other words, enhanced price competition forces inefficient companies out and rewards those companies that can provide the services that customers want at the lowest cost. Note that the level and types of service will change. For example, before deregulation, airlines competed mainly on service, not price. So airlines went all out providing a very high level of service. Customers did not have to pay additional amounts for this service so of course the benefits exceeded the costs to their customers. Today airlines operate with much tighter margins and only provide the types of services needed to remain competitive. So, for example, airlines increasingly are making food service an option that customers can choose to purchase. In addition, deregulated industries have a strong incentive to substitute technology and capital for labor in providing these services.

With regards to the crop insurance program, increased price competition through premium reduction plans will have similar effects. First, many small, part-time agents will quit the crop insurance business. Low-cost mega agencies will take over the business of selling crop insurance. The overall level of knowledge of products and provisions would increase as would the average level of agent training. From this perspective, the level of service provided to the average customer will increase. However, the bundle of services will change. Farmers will have access to better trained and more knowledgeable agents, but it is likely that the amount of individual (often unsolicited) attention a farmer receives from his or her agent will drop, unless the farmer is willing to pay extra for it. Crop insurance agents will still need to compete against on another in the types of service provided, but the added dimension of price competition will soon determine which services are the most valuable and cost-effective to provide.

Of concern to RMA is whether the level of contact between agents and farmers falls too low so that effective loss-adjustment and other monitoring can still take place. However, the often cozy relationship between agents and their customers is often a source of fraud and abuse in the crop insurance program. A more professional group of very large agents would likely reduce the amount of fraud in the program.

RMA should be concerned if premium reduction plans claim that efficiencies can be obtained from loss adjustments. A reduction in claims adjustment expenses should be a red flag to producers and to RMA. In the absence of any reduction in loss adjustment expenses there should not be any major impact on loss adjustment. We might expect a minor impact if the program continues to cut fixed costs because the AIPS will experience a financial squeeze and might attempt to pass some of this financial stress onto the independent loss adjusters.

b. Are Selective Plans OK?

Several of the plans are structured in a way that suggests that the AIP wishes to increase sales in business areas where expected profits are highest. They do this by offering different reductions across product lines, coverage levels and states. For example all of the plans that discriminate across states propose greater reductions in Iowa, Illinois and Indiana. As the previous discussion about the impacts that price competition will have, one would expect agents (through their AIPs) to ask for selective plans. It makes no economic sense to expect that a premium reduction plan in Iowa would be the same as one in Texas. If RMA wants to encourage price competition, then it should allow selective plans. It makes no sense for RMA to force companies to choose a single level of premium reduction across crops or states. It would defeat the purpose of the program. Also, it makes no sense to force the same amount of premium reduction across products.

At first glance these proposals raise concerns about adverse selection against RMA. The companies are clearly attempting to attract low risk business and if they succeed then some other part of the system will end up with the high risk business. However those who lose from this competition will be the non-participating AIPs, not RMA.

To the extent that premium reduction plans increase participation in the crop insurance program as estimated in our answer to Question1, if the pool of producers outside of the crop insurance program has low yield risk and higher expected yield, then one broadening participating should increase the financial soundness of the program.

To examine this question, we compared the county average yields from crop insurance participants to the NASS county yield estimates over the period 1990 to 2002 for Iowa corn. The county average yield from crop insurance participants is weighted by insured acreage and is not a simple average across insurance units. For this comparison we computed the average and standard deviation of NASS county yields and county average yield from crop insurance participants over the time period. Table 23 shows the average yields and standard deviations by county.

Table 23. County Yield Comparison, 1990-2002.

County	Average Yields			Yield Standard Deviation		
	NASS	Crop Ins. Participants	Difference	NASS	Crop Ins. Participants	Difference
		(bu./acre)			(bu./acre)	
Adair	125.05	123.69	1.35	22.69	23.76	-1.07
Adams	123.90	120.18	3.72	20.10	24.17	-4.07
Allamakee	136.63	128.48	8.15	21.35	25.52	-4.17
Appanoose	112.15	108.79	3.36	25.61	25.05	0.56
Audubon	130.84	130.67	0.17	18.47	22.22	-3.75
Benton	136.70	137.72	-1.02	26.60	24.21	2.39
Black Hawk	139.02	132.16	6.86	26.50	28.91	-2.41
Boone	145.22	142.76	2.45	23.80	26.05	-2.25
Bremer	144.89	137.44	7.45	24.60	28.26	-3.66
Buchanan	140.04	134.24	5.80	25.84	25.96	-0.12
Buena Vista	141.25	139.47	1.77	22.26	24.83	-2.57
Butler	138.26	131.74	6.52	23.55	25.83	-2.28
Calhoun	141.21	140.48	0.73	24.31	26.04	-1.73
Carroll	136.09	135.70	0.39	23.85	25.91	-2.06
Cass	127.41	122.33	5.08	19.86	22.75	-2.90
Cedar	144.23	141.29	2.94	26.05	24.95	1.10
Cerro Gordo	137.44	137.46	-0.03	24.80	32.30	-7.50
Cherokee	140.49	139.77	0.73	21.58	22.86	-1.28
Chickasaw	136.49	133.54	2.95	24.12	30.54	-6.42
Clarke	107.44	96.94	10.50	28.45	36.37	-7.92
Clay	136.73	131.81	4.92	25.12	30.11	-4.99
Clayton	140.17	134.25	5.92	20.32	21.14	-0.83
Clinton	143.68	141.52	2.16	21.95	22.76	-0.82
Crawford	132.74	131.60	1.13	22.28	23.75	-1.46
Dallas	139.71	139.45	0.26	17.79	18.38	-0.59
Davis	114.75	110.01	4.73	28.19	30.57	-2.38
Decatur	111.95	110.39	1.56	28.90	32.25	-3.35
Delaware	142.63	133.98	8.65	25.89	24.61	1.27
Des Moines	134.37	142.25	-7.88	21.99	21.55	0.44
Dickinson	131.87	129.62	2.25	25.45	32.94	-7.49
Dubuque	141.17	135.89	5.28	22.42	27.69	-5.27
Emmet	136.19	133.49	2.70	27.56	37.73	-10.17
Fayette	141.42	134.55	6.88	22.62	24.52	-1.89
Floyd	139.51	133.83	5.68	24.14	27.91	-3.77
Franklin	139.32	134.01	5.30	26.33	30.58	-4.24
Fremont	126.73	128.78	-2.05	21.46	24.16	-2.71
Greene	141.41	139.51	1.90	22.24	25.19	-2.95
Grundy	137.96	141.90	-3.94	24.10	26.55	-2.46

County	NASS	Average Yields Crop Ins. Participants	Difference	NASS	Yield Standard Deviation Crop Ins. Participants	Difference
		(bu./acre)			(bu./acre)	
Guthrie	130.12	126.63	3.48	18.83	18.45	0.38
Hamilton	145.58	141.47	4.10	27.21	26.97	0.24
Hancock	139.23	135.06	4.18	23.99	29.32	-5.33
Hardin	142.00	137.72	4.28	25.30	26.23	-0.93
Harrison	130.99	132.55	-1.56	16.76	19.15	-2.39
Henry	131.07	127.52	3.55	22.10	27.83	-5.74
Howard	132.89	127.32	5.57	25.17	33.08	-7.91
Humboldt	140.76	146.24	-5.48	25.75	27.77	-2.02
Ida	137.35	135.61	1.73	22.85	24.82	-1.97
Iowa	131.72	124.76	6.95	25.08	27.11	-2.03
Jackson	130.42	128.90	1.51	24.07	22.08	1.98
Jasper	141.71	136.38	5.32	21.77	20.21	1.56
Jefferson	121.53	119.04	2.49	24.56	27.12	-2.55
Johnson	131.07	128.22	2.85	25.81	23.19	2.62
Jones	140.21	132.82	7.38	25.45	26.31	-0.86
Keokuk	127.19	127.22	-0.03	24.14	26.80	-2.66
Kossuth	140.39	142.04	-1.65	24.87	31.25	-6.38
Lee	128.11	122.10	6.01	23.00	35.01	-12.00
Linn	137.02	132.62	4.40	26.95	25.09	1.87
Louisa	129.47	117.87	11.60	21.00	31.19	-10.19
Lucas	111.25	104.36	6.89	27.10	29.85	-2.75
Lyon	136.94	134.10	2.83	21.48	21.29	0.18
Madison	128.33	120.51	7.82	23.13	24.37	-1.24
Mahaska	133.35	126.96	6.40	22.98	24.80	-1.82
Marion	128.88	123.17	5.71	22.68	23.60	-0.92
Marshall	141.95	139.26	2.68	22.45	21.29	1.15
Mills	125.19	128.40	-3.21	20.96	24.76	-3.80
Mitchell	140.83	141.01	-0.18	25.13	30.28	-5.15
Monona	123.10	129.81	-6.71	18.19	18.94	-0.75
Monroe	115.11	102.71	12.39	23.95	27.65	-3.70
Montgomery	126.78	127.06	-0.29	21.36	24.93	-3.57
Muscatine	133.58	121.13	12.45	25.67	41.24	-15.57
O Brien	140.12	138.80	1.32	23.11	27.35	-4.24
Osceola	135.62	132.51	3.11	22.87	32.26	-9.39
Page	121.12	120.42	0.69	21.27	23.76	-2.48
Palo Alto	137.40	133.50	3.91	24.44	29.39	-4.94
Plymouth	135.19	132.83	2.36	20.37	18.91	1.46
Pocahontas	140.19	142.57	-2.38	24.34	25.39	-1.05
Polk	145.25	144.26	1.00	22.96	24.42	-1.46
Pottawattamie	131.85	128.52	3.33	19.34	23.84	-4.50
Poweshiek	135.16	130.77	4.39	25.60	21.74	3.86
Ringgold	110.11	104.55	5.56	29.50	37.53	-8.03

County	Average Yields NASS	Crop Ins. Participants	Difference	Yield Standard Deviation NASS	Crop Ins. Participants	Difference
		(bu./acre)			(bu./acre)	
Sac	140.09	139.67	0.42	24.25	25.18	-0.94
Scott	148.48	143.67	4.81	23.58	28.01	-4.43
Shelby	131.70	133.69	-1.99	17.44	22.54	-5.10
Sioux	144.27	143.99	0.28	20.00	18.68	1.32
Story	143.03	139.95	3.08	24.87	31.74	-6.87
Tama	135.89	131.38	4.50	24.37	23.77	0.61
Taylor	112.07	112.47	-0.40	24.35	28.03	-3.67
Union	120.27	117.62	2.65	28.47	27.59	0.88
Van Buren	115.09	110.43	4.66	25.63	28.80	-3.17
Wapello	124.44	121.86	2.57	22.69	27.53	-4.84
Warren	129.55	121.61	7.94	24.28	21.31	2.97
Washington	132.53	129.76	2.77	23.89	23.42	0.47
Wayne	107.75	104.40	3.34	28.63	33.36	-4.73
Webster	145.75	146.90	-1.15	25.10	25.49	-0.40
Winnebago	137.24	135.70	1.54	25.94	32.72	-6.79
Winneshiek	136.91	129.39	7.52	20.81	27.63	-6.83
Woodbury	126.69	127.08	-0.39	19.60	18.56	1.04
Worth	136.95	136.80	0.15	25.99	32.08	-6.09
Wright	140.58	140.39	0.19	24.87	27.18	-2.31

Averaging across the counties, we find that the NASS yield averages are three bushels per acre more than the county yield averages from crop insurance participants and the standard deviation of NASS yield averages is three bushels per acre less than the standard deviation of the county yield averages from crop insurance participants. This suggests the new participants that are brought into the crop insurance program by a premium reduction plan would be less risky in that they would have, on average, higher average yields and lower yield standard deviations than the average current participant in crop insurance.

The overall impact of this selection on RMA is small and probably positive. To see why this is true remember that the most intense competition among AIP's and agents is for existing customers. If one AIP lures an existing low risk customer from another AIP there is no impact on the risk expose of RMA. There are some producers who do not purchase crop insurance and others who purchase only CAT coverage and some of these might be enticed into the program with lower premium levels. However, these producers are typically outside of the program because they think that existing premiums are too high. Any farm level premium reduction that lures these low risk producers into the pool should on average reduce the overall risk exposure of RMA.

c. Who Should Select States?

If RMA wants to allow price competition, then it should allow the agents working with their AIPs to select the level of premium reduction. RMA is really in no position to determine where competitive forces will lead, nor should it be.

If RMA decides that the results of price competition are not desirable, then one way to stifle it is to demand that all AIPs offer uniform plans across states, crops, and products, and demand that they offer it to all their customers. RMA will soon find that they will not have too many premium reduction plans.

Question 3. Impact on Small, Minority and Limited Resource Farmers

Under the current structure of the crop insurance program, agents receive a fixed percentage of the total premium. This provides the agents with a very strong incentive to work with large producers and to sell them the most expensive policies. It would be difficult to devise an alternative incentive program that creates such a small incentive to work with small, minority and limited resource producers. One way to fix the problem with the existing program is to ensure that agents are paid a fixed amount for each policy that is sold. Another option would be to pay a fixed amount per policy plus a percentage commission that declines with the size of the premium, or to provide a commission bonus to work with small, minority or limited resource farmer.

Any premium reduction program implemented under the current fixed percentage commission program would have both a negative and a positive effect on small producers. On the negative side, such a program would reduce the marginal benefit to the agent of attracting smaller farmers. To see why this is the case, consider the situation faced by an agent with a marginal cost of $50 per producer and a commission of $2 per acre. Under the current program, this agent has no incentive to work with producer who farm less than 25 acres. Now assume that a successful premium reduction plan program reduces agent commissions to $1 per acre, now the break even size of farm will increase to 50 acres. This aspect of the premium reduction plan will clearly work to the disadvantage of smaller farmers.

A second positive effect of a successful premium reduction plan would be to lower producer premiums and to increase the proportion of total sales from modernized mega agencies. These larger agencies will have lower marginal costs and will therefore find it more attractive to attract smaller producers. In addition the lower overall producer premiums should make the program more attractive to these smaller producers.

On balance the premium reduction plan probably has a small negative impact on smaller producers. However, this negative impact is very small compared to the negative impact caused by the use of proportional agent commissions under the exciting program.

The question goes on to state that “concerns have been raised that the … premium reduction plan process could result in a reduction in service to small, minority and limited resource producers.” This concern may be a red herring devised to prevent premium reduction plans from being adopted to protect the agents from competitive pressures. The obvious way to make the crop insurance program more attractive to these producers is to create an A&O and agent reimbursement structure that gives agents a fixed amount per policy.

There are no grounds for rejecting premium reduction plans because of their small negative impact on small, minority or disadvantaged farmers. Fairly simple steps can be taken to rectify the small negative impacts. These steps should be taken to fix the incentive problem under for the current program, independent of whether premium reduction plans are adopted.

Question 4. Should Phase-In Be Required?

Response
A properly designed premium reduction plan would result in lower agent commissions, lower producer premiums, and eventually a more efficient delivery system of the crop insurance program. If the Board views this as a positive development it would logically wish for it to happen as soon as possible. The use of phase in plans will delay or indefinitely postpone the likely benefit of these plans.

If RMA decides that increased price competition is not desirable, then a phase-in requirement would greatly reduce the speed at which the effects of price competition are felt. However, a more straightforward way for RMA to decide to reduce the effects of premium reduction plans is to simply deny their approval.

Question 5. Cost Allocation for Complex Plans

Response
This question and all of its component questions would be moot if the application and approval process for premium reduction plans focused on the economic cost of most relevance for the programs: namely agent commissions. As we have described in our introductory comments, there is no ‘fair and equitable” way to allocate savings in fixed costs to decisions that are made at the margin. These allocations are made by accountants at the end of the year and have no impact on the economic realities of the marketplace.

Trying to document efficiencies gained from reductions in fixed costs is an impossible task. RMA should not spend resources in an attempt to quantify such phantom efficiencies.

We realize that RMA has an oversight responsibility to make sure that AIPs are operating in a financially sound manner, and perhaps we are not concerned enough about the effects of a premium reduction plan on an AIP's financial conditions, but if an AIP were to achieve efficiencies through a reduction in agent commission only, then there would be no need to overly concerned about other accounting issues.

Again, we advise RMA to focus on whether they think that a restructuring of the crop insurance delivery system through increased price competition that will result in a reduction in agent commissions is a good thing. If so, then the application and approval process should be as seamless as possible.

Question 6. Use of Affiliated Entities

The premium reduction plan submitted by **[Redacted Confidential Business Information]** proposes to set up an affiliated entity called **[Redacted Confidential Business Information]** to participate in the plan. Policies sold under **[Redacted Confidential Business Information]** would be eligible for premium reduction while those sold under **[Redacted Confidential Business Information]** would continue to be sold at full premium. From **[Redacted Confidential Business Information]** perspective the logic behind their proposal is that many producers (possibly a majority) do not pay very much attention to developments in crop insurance. These producers continue to purchase the same crop insurance products from year to year and they rely on agents to propose the best products. Those producers who do pay attention tend to be the larger more commercialized operators that agents and AIPs would like to attract.

The use of affiliated companies would allow the AIP and the agent to hide the availability of premium discounts from these less informed producers. Agents and AIPs could honestly state that they do not offer these premium reductions. By creaming off the larger producers with these plans the early innovators would provide the incentive for all companies to participate in this type of plan. This use of affiliates should be thought of as transitional in nature as AIPs and their agents attempt to keep a certain proportion of their business away from competition. If RMA allows widespread use of premium reduction plans, then competitive pressures would soon force agents and AIPs to adopt them across all their lines of business.

Again, if RMA wants to increase competition among agents, then it really should stay out of the way and allow agents working with their AIPs to devise the whatever kinds of programs they want.

Question 7. Impact on Agents' Compensation Plans

a. What standards should be used top evaluate and determine which profit-sharing arrangements should be allowed?

R**esponse**
RMA should not be concerned about if agents and AIPs enter into profit-sharing arrangements. RMA should set up the price competition rules and allows AIPs and agents to determine how to optimally compete for business. Profit sharing should increase the financial stability of AIPs because their costs will rise when their underwriting gains are large and their costs will fall when they face more financial pressure.

b. Improper reporting of agent compensation.

Response
We cannot determine when it would be in the interests of AIPs to claim that agent commissions are reduced when in fact they have not been. Why would an AIP ask for a lower A&O but then continue to pay an agent a high guaranteed commission? Such an AIP would not be in business very low with this trype of business practice. RMA can probably find other grounds for denying a premium reduction plan or an SRA to such an AIP.

c. Impact of premium reduction plans on the number of agents participating in the crop insurance program

Response
A restructuring of the way that crop insurance is sold by agents is an inevitable consequence of RMA moving forward with the type of price competition inherent in premium reduction plans. Fewer, more specialized agents will be a direct result from increased competition. The remaining agents will be much more specialized, knowledgeable, and much larger. The types of services provided will become more focused on the providing the services most demanded by farmers.

Again, if RMA does not want these impacts of increased competition, then it should not approve premium reduction plans. Premium reduction plans are perhaps the best way for RMA to discover if A&O rates can be reduced. The benefits of this reduction will accrue to farmers under premium reduction plans. But one can anticipate that the benefits could accrue to taxpayers if the lower A&O reimbursement rates were made permanent and the costs of the crop insurance program were reduced.

If RMA is really concerned about better serving the needs of small, minority, and limited resource farmers, then it should change the current incentive structure that base agents' commissions on the total premium. Rejecting premium reduction plans because of their small negative impact on this group of farmers is a disproportionate response to a problem that is inherent in the current delivery system.

Question 8. Can AIP's Continue to Cover Costs?

Response
This question shows the fundamental inconsistency between the way the premium reduction plans are being implemented and the economic realities of the marketplace. The internal costs provided by the AIPs are fixed costs. These companies are already operating in a competitive environment and they should by now have minimized these fixed costs. Their end of the year profits will depend in large part on the amount of business they can attract. If they participate in a successful premium reduction plan plan they will attract more business and make a net profit. It is useless to evaluate an initial plan of operations and to determine if the company will cover these fixed costs without knowing the volume of business they can attract with the premium reduction plan. The solution is to allow these companies to force agents to compete on commission. The use of a certified audit will not solve the problem because auditors will be forced to allocate fixed costs.

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Short Biographies

Bruce A. Babcock
Bruce Babcock is a partner of AgRisk Management, LLC, a Professor of Economics, and the Director of the Center for Agricultural and Rural Development at Iowa State University. Dr. Babcock received his Ph.D. in Agricultural and Resource Economics from the University of California at Berkeley in 1987. Dr. Babcock received his B.S. and M.S. degrees from the University of California at Davis in 1980 and 1981 respectively.

Dr. Babcock has conducted economic and statistical research on risk management and crop insurance issues since 1982. He has published widely on risk management issues, pioneering new uses of yield distributions to model economic behavior. His research has led directly to the development of new rating procedures for crop insurance products. Rates for Revenue Assurance, Group Risk Income Protection, Livestock Gross Margin, Group Risk Income Protection – Harvest Revenue Option, and a number of private insurance products were estimated using new rating procedures developed by Dr. Babcock and his colleagues.

Dermot J. Hayes
Dermot Hayes is a partner of AgRisk Management, the Pioneer Hi-Bred Professor of Agribusiness in the Department of Economics and the Department of Finance at Iowa State University. Dr. Hayes received his Ph.D. from the University of California at Berkeley. His undergraduate degree was received at University College in Dublin, Ireland in 1981.

Dr. Hayes has conducted extensive research on the use of futures and options to mitigate risk in agriculture. He has published widely on the risk management issues and is currently conducting work on the adequacy of current option pricing mechanisms for pricing long-term options that could be of direct benefit to farmers. His expertise on option pricing was used directly in the development of rating methods for Revenue Assurance, Group Risk Income Protection, and Livestock Gross Margin, and Group Risk Income Protection – Harvest Revenue Option.

Chad E. Hart
Dr. Hart is a research economist in the Center for Agricultural and Rural Development at Iowa State University. He received his Ph.D. in economics and statistics from Iowa State University in 1999 and his B.S. degree from Southwest Missouri State University in 1991.

Since 1995, Dr. Hart has been the crop insurance expert for the Food and Agricultural Policy Research Institute (FAPRI). He is responsible for developing FAPRI crop insurance national baseline estimates, which includes projections of program costs and participation rates. His knowledge of the crop insurance industry and his ability to translate that knowledge into economic and statistical models helped enable the rating of the Revenue Assurance and Livestock Gross Margin insurance products.