



Should Government Subsidize Farmers' Risk Management?

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One look at the long list of abbreviations used for U.S. farm programs indicates the pervasive role that government plays in providing subsidized risk management to the U.S. crop sector. To take full advantage of these subsidies, farmers and those who serve them need to be able to decipher not only what ACRE, GRP, SURE, GRIP, RA, CRC, APH, LDP, DP, CCP, and HRO stand for but also how the programs work and how they either substitute for or complement one another as well as other private risk management efforts.

These programs guarantee crop prices; yields at the field, farm, and

county levels; and revenue at the field, farm, county, and state levels (see the table below). The price guarantees can increase if farm prices rise after planting. Some guarantees are based on historic acreage; others are based on the current year's planted acreage. Some guarantees are based on past prices and yields; others are based on projected prices and yields. One program (DP) pays out every year, even if yields and prices are at all-time record levels. Another program (SURE) requires that farmers buy crop insurance.

The programs are also complex in their administration. Some of the guarantees are administered by USDA's Farm Service Agency (FSA). Others are administered by the USDA's Risk Management Agency (RMA). The RMA programs are



delivered to farmers by private crop insurance agents who are paid commissions fully funded by taxpayers. FSA programs are delivered to farmers by government employees fully funded by taxpayers. Payments from RMA programs come from a fund that farmers contribute to but that is mostly funded by taxpayers. A portion of the risk from the fund is borne by private insurance companies, but most of the RMA program risk is borne by taxpayers. All of the FSA program risk is paid for by taxpayers.

Fundamental questions that never seem to be addressed by those who support taxpayer subsidies for risk management are whether the public receives any benefits from these subsidies, and if it does, whether the benefits outweigh the costs. If there is no broad public purpose served by subsidizing farmers' risk management decisions, then we need to look at parochial regional benefits and the profits of private businesses to understand why the programs are proliferating at such a rapid rate.

Agricultural Risk Management Programs and Options

Acronym/ Initialism	Full Name	Type of Program
Administered by the Risk Management Agency (Farmer pays a portion of cost)		
APH	Actual Production History	Farm/field-level yield insurance
CRC	Crop Revenue Coverage	Farm/field-level revenue insurance
GRP	Group Risk Plan	County-level yield insurance
GRIP	Group Risk Income Protection	County-level revenue insurance
HRO	Harvest Revenue Option (of GRIP)	Option to increase revenue guarantee if prices rise
RA	Revenue Assurance	Farm/field-level revenue insurance
Administered by the Farm Service Agency (No premium charged)		
ACRE	Average Crop Revenue Election	State-level revenue insurance
CCP	countercyclical payments	Price insurance on fixed amount of production
DP	direct payments	Fixed annual payments
LDP	loan deficiency payments	Price insurance on actual production
SURE	Supplemental Revenue Assistance Program	Farm-level revenue insurance

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The Cost of Agricultural Risk

Farmers are not unlike other investors: they invest in annual operating inputs (land rent, seed, fertilizer, fuel, and chemicals), machinery, and land in the hope that they will earn enough from the sale of their crops to cover their operating costs and payments on their machinery and land. If they do, then they earn a profit. If not, then they must call on their own assets to cover the loss or ask forbearance from their lenders.

Economists measure the cost of risk as the difference between the amount of money that an investor expects to make on average from a risky investment and the smallest amount of money that the same investor would accept to sell the risky investment. If the investment has low risk, then this difference will be small. Very risky investments lead to a high cost of risk because of a large probability that the investment will be lost. Most investors will not take on high-risk investments unless the payback when the investment is not lost is substantial. This gives rise to the risk/return trade-off. To induce investment in risky assets, the returns when the investment pays out must be large enough to compensate investors for the high probability that the investment will be lost.

The cost of risk is a real production cost. And because the cost of risk is greater for riskier crops and in riskier regions, farmers who grow these crops or who farm in these regions have higher costs of production than farmers who do not.

Private or Public Provision of Risk Management?

Farmers should treat risk just as they treat any other production input, such as fertilizer, seed, and machinery, by balancing the returns from its use with the associated increased cost. For example, in years in which the returns to corn are expected to be higher than the returns to soybeans, farmers can increase expected profits by planting

more corn and less soybeans. But the increase in expected profits only comes about by taking on more risk, because growing more corn typically reduces diversification. Farmers that have a high tolerance for risk (which means that risk imposes a low cost on them) will tend to plant more corn than will farmers with a lower tolerance of risk.

Farmers should also invest in activities that reduce the cost of risk by more than the cost of the activity. The value of the risk reduction from diversification of family labor and management efforts into both on- and off-farm activities often is greater than the cost associated with that diversification. Most farmers find that the value of associated risk reduction is greater than the cost of hail, fire, disability, health, and life insurance. Many farmers find that the value of reducing price risk is greater than the cost of buying put options on commodity exchanges. And a few farmers find that the value of hedging against poor weather during the growing season by buying put or call options on future weather is greater than the cost of the options.

If farmers fully understand the risks they face and private markets exist to allow them to pay for desired levels of risk reductions, then the efficiency with which agriculture operates cannot be increased through subsidized risk management. The reason we have so many subsidized risk management programs is either that the private sector is incapable of providing the kind of tools that farmers desire or that Congress uses the subsidies to meet some other objective.

Private Price and Yield Insurance

On April 10, 2009, the 2009 new-crop corn futures price closed at \$4.22 per bushel. New-crop soybeans closed at \$9.22 per bushel. Farmers can protect against drops in their harvest-time selling prices by selling a futures contract at these prices. There is no cost to selling a futures

contract, but farmers must deposit funds on each contract they sell and they must have access to sufficient credit to make margin calls if prices rise. Put options are an alternative means of price protection whereby a farmer pays an amount up front (the option premium) for the right to sell a futures contract at a specified price. The existence of commodity exchanges with highly liquid markets implies that the private sector is quite capable of providing price protection for farmers.

Commodity exchanges work to provide price protection for farmers when there are sufficient numbers of natural buyers who will take the opposite position of the natural selling interests of farmers. Agricultural processors who are harmed when prices rise are those natural buyers in price contracts. Futures markets for state average yields failed because there were no interests that desired protection against high yields. This meant that no one was interested in buying farmers' attempts to sell yield futures. However, in the Corn Belt, the conditions that favor high corn and soybean yields harm sellers of electricity used to run air conditioners in the summer. Cool summers tend to lead to low profits for generators and high yields. Hot summers lead to high demand for electricity and large profits for power generators. Hot summers can also lead to low yields. Thus, a private market for weather contracts (which are actively traded on the Chicago Mercantile Exchange) could be used by farmers as yield insurance.

Crowding Out the Private Sector

So why don't more farmers trade weather contracts to protect against the financial losses caused by low yields? Because taxpayers fund a crop insurance program that offers insurance agents a large commission to get farmers to sign up for an insurance policy that pays out, on average, twice what a farmer is asked to pay as a premium. Private insurance companies are willing to

The private sector simply cannot compete with the heavily subsidized risk management programs offered by the government.

insure a farmer's yield because a large portion of the risk of this insurance is borne by taxpayers. Why should a farmer care about weather contracts when taxpayers provide more reliable coverage against low farm yields at a small fraction of the true cost of insurance?

Farmers who sign up for ACRE are protected against corn prices below \$3.75/bu, soybean prices below \$8.75/bu, and wheat prices below \$6.00/bu. Farmers who buy subsidized revenue insurance receive revenue guarantees based on \$4.04 for corn, \$8.80 soybeans, and \$6.20 spring wheat. Farmers who sign up for both ACRE and crop insurance will receive double compensation if harvest prices fall dramatically. Why should farmers use the private sector and hedge against low prices when taxpayers are providing heavily subsidized price protection?

The private sector simply cannot compete with the heavily subsidized risk management programs offered by the government. The question then becomes whether taxpayers are getting anything in return for their investment or whether the subsidies are really just a hidden means of transferring money to farmers and the crop insurance industry.

Do Taxpayers Benefit from Risk Management Subsidies?

Left on their own to manage risk, farmers would choose to buy products and to use strategies that reduce the probability of financial

ruin to levels that reflect the cost of the risk reduction. Given that many farmers in the United States and other countries survive and thrive without large risk management subsidies, it is apparent that farmers' actions combined with products provided by the private sector would be sufficient to keep U.S. agriculture viable and producing abundant supplies of food for U.S. and world consumers. It is difficult to find the extraordinary circumstances that make the production and marketing of corn, soybeans, wheat, rice, and cotton so different from that of other crops around the world that U.S. producers require heavily subsidized risk management to grow these crops. But this does not mean that elimination of all the risk management subsidies would have no impact.

Because the cost of risk is a real production cost, risk management subsidies are essentially a cost-of-production subsidy. It follows that the main effect of the subsidies is to increase the production of the crops that receive the subsidized risk management. The crops and regions that have the largest reduction in risk will have the largest increase in production. High-risk crops and regions include dryland cotton in Texas, wheat in arid regions of the Great Plains, and corn and soybeans in parts of the Dakotas and the Southeast. The production of low-risk crops in low-risk regions would be largely unaffected by elimination of risk management subsidies because the percentage of reduction in production costs would be small.

Why might taxpayers benefit from expanded production of select crops in high-risk, largely low-productive regions? If expanded production in high-risk regions is large enough to significantly affect U.S. and world aggregate production, then risk management subsidies will lower market prices for the subsidized commodities. Any such

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Intricacies of Meeting the Renewable Fuels Standard

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Consumption of biofuels is scheduled to ramp up to 36 billion gallons over the next 13 years if the timetable set in the Renewable Fuels Standard (RFS) is to be maintained. To ensure that fuel blenders meet this volume, the Environmental Protection Agency (EPA) uses the market for biofuel RINs (Renewable Identification Numbers) to create a sufficient incentive.

Gasoline producers and importers are assigned a number of RINs that they must give to EPA each year. Because each gallon of biofuels has a RIN associated with it, producers and importers can obtain RINs by buying biofuels and keeping the RINs. Alternatively, they can enter the RIN market and buy the RINs from somebody else. Sellers of RINs are companies who purchase biofuels but who have no obligation to meet an EPA requirement or who purchase more biofuels than they need to fulfill their EPA requirement. The market for RINs works because the demand for RINs increases when the quantity of biofuels purchased is insufficient to meet the RFS. An increased demand for RINs increases the RIN price, which improves the relative attractiveness of buying biofuels instead of RINs. An example shows why.

Suppose that the wholesale price of ethanol is \$2.00 per gallon but the wholesale price of gasoline is only \$1.50. With these prices, the demand for ethanol would be quite low. However if with every \$2.00 gallon of ethanol a buyer obtains a RIN with a value of \$0.25 per gallon, then ethanol is more attractive because the net cost of ethanol would be \$1.75 per gallon. If the RIN price is \$0.75 per gallon, then the demand for \$2.00 ethanol would be quite high because the

... a key factor in the determination of future RIN prices is how the U.S. market will value biofuels once U.S. consumption advances beyond about 12 billion gallons, which will happen in the next year or two.

net cost of using ethanol to meet fuel demand would be only \$1.25 per gallon. The RIN price will eventually settle at a level at which the demand for ethanol is just great enough to meet the RFS.

Meeting the RFS is more complicated than simply meeting a single RIN target, however. Individual mandates for conventional biofuels, cellulosic biofuels, other advanced biofuels, and biodiesel must all be met. Although the EPA has not issued final rules about how the RFS will be met, it seems plausible that there will be at least four separate RIN markets at work, one for each type of biofuel.

Determining the Price of RINs

The price of a RIN reflects the difference in the market value of a biofuel in meeting fuel demand and the price that is needed to allow biofuel producers to cover the costs of producing the required amount of biofuel. This means that RIN prices will reflect changes in both market values and production costs. Because biofuels substitute for petroleum-based fuels, the price of crude oil will be one factor that determines RIN prices. Higher crude

oil prices will lead to lower RIN prices. Feedstock costs should remain the largest and most variable determinant of production costs. Thus, high crude oil prices and low feedstock prices would seem to create a favorable climate for biofuels, which would be reflected in low RIN prices. But a key factor in the determination of future RIN prices is how the U.S. market will value biofuels once U.S. consumption advances beyond about 12 billion gallons, which will happen in the next year or two. This valuation will depend on whether the advanced and cellulosic biofuels mandates are met with ethanol or with some other biofuel such as biocrude.

How to Use 35 Billion Gallons of Ethanol

Suppose non-diesel automotive fuel use in 2022 rises from its current level of 135 billion gallons to 150 billion gallons, of which 35 billion gallons comes from ethanol. If some small portion of the U.S. gasoline supply remains as unblended fuel (say 10 percent), then the fuel supply will consist of 106 billion gallons of E10, 15 billion gallons of gasoline, and 29 billion gallons of E85. This scenario assumes that there are sufficient flex-fuel vehicles in the fleet to use this amount of E85. The prices of these fuels must be such that a sufficient number of flex-fuel vehicles use E85 instead of E10. Because E85 has about 75 percent of the energy value of E10, E85 must have a retail price that is at least 25 percent less than E10. For comparison, Brazilian consumers pay 40% less for 100% ethanol relative to E25, a discount that is greater than the energy difference. The extra discount likely is needed to compensate drivers for the time required to make more frequent stops at the gas station.

Consumers choose fuel based on retail prices. Blenders use wholesale prices to determine

what fuel blends to use. Retail fuel prices equal the wholesale price plus taxes plus transportation costs plus a profit margin. Of key importance here is the share of the spread between retail and wholesale prices that are accounted for by cents-per-gallon taxes, rather than percentage taxes. The federal gas tax and most state taxes are cents-per-gallon taxes. A reasonable approximation for the spread between wholesale and retail fuel prices is that the retail price equals the wholesale price plus 10 percent plus 40¢. This formula allows for calculation of the wholesale price of ethanol that would be required to make E85 competitive with E10 at the retail level. Table 1 provides the results for crude oil prices ranging from \$30 to \$90 per barrel. The prices associated with the 25 percent discount will occur if consumers choose E85 at a retail price that reflects only the lower fuel economy of E85. Even with this optimistic assumption, the wholesale price of ethanol relative to gasoline will be discounted by more than its energy content because of the cents-per-gallon gas taxes.

Table 1. Wholesale price of 100 percent ethanol needed to induce use of E85

Price of Crude Oil (\$/barrel)	Wholesale Gas Price (\$/gal)	Required E85 Discount Relative to E10 (\$/gallon)		
		25%	30%	35%
30	1.00	0.56	0.47	0.39
50	1.50	0.90	0.78	0.67
70	2.00	1.24	1.09	0.95
90	2.50	1.57	1.40	1.22

Table 2. Wholesale price of ethanol needed to induce use of E15

Price of Crude Oil (\$/barrel)	Required E15 Discount Relative to E0 (\$/gallon)		
	0%	2.5%	4.8%
30	1.00	0.77	0.56
50	1.50	1.19	0.90
70	2.00	1.61	1.24
90	2.50	2.02	1.57

A larger retail discount implies an even larger ethanol discount at the wholesale level.

These prices hold even if U.S. policy is changed to allow E20 blends. If 10 percent of fuel will be pure petroleum gasoline and the rest an E20 blend, then a maximum of 27 billion gallons of ethanol could be used in an E20 blend. This implies that the remainder will need to be sold as E85, and the prices in Table 1 remain good estimates of the wholesale ethanol prices that would be needed to induce consumption of 35 billion gallons of ethanol.

Inexpensive crude oil in 2022 implies a wholesale ethanol price of between 39¢ and 56¢ per gallon (depending on the E85 discount needed at retail level) in order to make E85 competitive with blended fuel. Even if oil rises to \$90 per barrel (which implies a retail gasoline price of \$3.15 per gallon), the required wholesale ethanol price would fall to between \$1.22 and \$1.57 per gallon.

These prices are well below the levels needed to induce investors to spend the billions of dollars need-

ed to meet the cellulosic biofuels mandate. These prices are not even high enough to induce investors to expand corn ethanol capacity to the RFS target of 15 billion gallons. However, the price outlook for ethanol would be brighter if the advanced and cellulosic biofuels mandates could be met by biofuels other than ethanol.

Alternatives to Ethanol

The economic drawback to using 35 billion gallons of ethanol to meet the RFS is that its lower energy content, combined with the way that we tax automotive fuels, means that the price of ethanol will need to be heavily discounted relative to gasoline to get consumers to choose E85. The situation may change, however, if 15 billion gallons of ethanol are used to meet the conventional biofuels mandate, the EPA allows blend levels to rise to 15 percent (E15), and the advanced biofuels mandate is met by biofuels other than ethanol.

If we allocate the 150 billion gallons of fuel use to 15 billion gallons of corn ethanol and 20 billion gallons of other biofuels, then we have 100 billion gallons of E15 and 20 billion gallons of other biofuels, which may be part of the E15 blend or blended with the remaining 30 billion gallons of gasoline. Given the lower energy content of ethanol, fuel economy from E15 relative to gasoline would drop by about 4.8 percent, or 1.45 miles per gallon on a 30-mile-per gallon car. Most likely, not many drivers would even notice a drop of this magnitude. Table 2 shows the wholesale ethanol prices that would be needed to induce drivers to fill up with E15 instead of petroleum gasoline under three different discounts. A zero discount implies that drivers would be indifferent between E15 and E0, perhaps because of higher octane possibilities with E15. The 2.5 percent discount compensates for a small drop in fuel mileage. The 4.8 percent dis-

count assumes that drivers suffer a 4.8 percent drop in miles per gallon and that they recognize the drop. A comparison of the estimates in Table 2 of required ethanol prices with the estimates in Table 1 shows that the worst-case scenario for E15 is equal to the best-case scenario for E85: namely, that ethanol is priced at its energy value at the retail level. For all other scenarios, limiting ethanol to 15 billion gallons and moving to other biofuels substantially increases the market valuation of ethanol.

RINs versus Direct Subsidies

Advocates of biofuels should pay more attention to the problem of closing future gaps between the market value of biofuels and the price needed to justify the large investments that will be required to meet the RFS. As previously discussed, one method of closing the gap created by conventional biofuels is to move away from ethanol and instead meet the advanced biofuels mandates with other types of biofuels, such as biobutanol or biocrude. If the advanced biofuels have higher energy content than ethanol (such as biobutanol) or can more easily be used by the existing vehicle fleet (such as products made from biocrude), then there is some hope that the market value of advanced biofuels could be equal to gasoline.

But a gap between the market value of biofuels and the needs of investors will likely continue to exist because of high feedstock prices or low crude oil prices. Current methods that are used to close the gap include tax credits and the market for RINs. At present, the RIN price reflects the difference between the ethanol price that is required to keep ethanol plants running and the market value of the ethanol plus the 45¢ tax credit for corn ethanol.

If the RIN market is to be used to induce investment in expanded capacity, the RIN price would have to be high enough to cover both the variable costs of producing biofuels and the risk-adjusted costs of capital for new plants as well. The risk adjustment is necessary because investors know the EPA can waive the RFS if the RIN-inflated cost of fuel becomes too high or if existing plant capacity or feedstock availability is inadequate to produce enough biofuels to meet the RFS. Furthermore, the market for RINs seems ill suited for inducing investment in plant capacity because of the time needed for a new plant to come online. Will investors risk their money today hoping that in two or three years the RFS for advanced biofuels will continue to be enforced and the market price of RINs will cover their capital costs

as well as their production costs? The risk-adjusted return on capital would need to be very high indeed.

Higher tax credits to induce investment in expanded capacity would be more effective because tax credits are paid for by the U.S. Treasury rather than by fuel consumers. Thus, they are less likely to trigger requests for waivers from the RFS. Congress recognized this and decided to keep the 45¢-per-gallon tax credit for corn ethanol and to pass a new tax credit of \$1.01 per gallon for cellulosic biofuels.

The promised ramp-up in the production of cellulosic biofuels will take more than legislation. It will require billions of dollars in private investment. It is doubtful that the required level of private investment will take place without significant involvement of the federal government. Funding for research, direct subsidies in the form of tax credits and loan guarantees, and guarantees of adequate fuel prices at the plant through enforcement of the RFS will all be needed. Supporters of biofuels will have to make the case that biofuels can increase energy independence and reduce greenhouse gas emissions at lower cost than other transportation technologies such as trains and plug-in hybrids. Only then can a strong case be made for an expanded federal role in the biofuels sector. ♦

ACRE: Price Support or Crop Insurance?

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Although farm programs and crop insurance programs are increasingly similar, one feature continues to differentiate them: crop insurance programs use prices that reflect market conditions at sign-up time, whereas farm programs do not. Crop insurance programs must use current price information to set guarantees to keep farmers from moving into or out of the program based on whether revenue guarantees are more or less likely to generate a payout. Because the government does not ask farmers to contribute toward meeting the costs of farm programs, there is less financial need for the programs to reflect current market conditions. But the lack of influence of current market conditions on the prices used to set farm program guarantees often means that these programs will offer too little or too much support to farmers.

Today's Safety Net

Currently, the only traditional farm program that offers any support to corn, soybean, and wheat farmers is the direct payment program, because it does not depend on the level of market prices. The countercyclical and marketing loan programs offer little or no support because market prices are expected to stay well above the levels that would trigger payments. The situation in the late 1990s and early 2000s was exactly the reverse in that the fixed support prices generated large payments to farmers and likely caused farmers to plant for the government rather than the market.

The new ACRE (Average Crop Revenue Election) program uses a hybrid approach to setting price guarantees by using a two-year moving average of past prices. This

means that ACRE guarantees will reflect market conditions of the two previous years, but not necessarily of the current year.

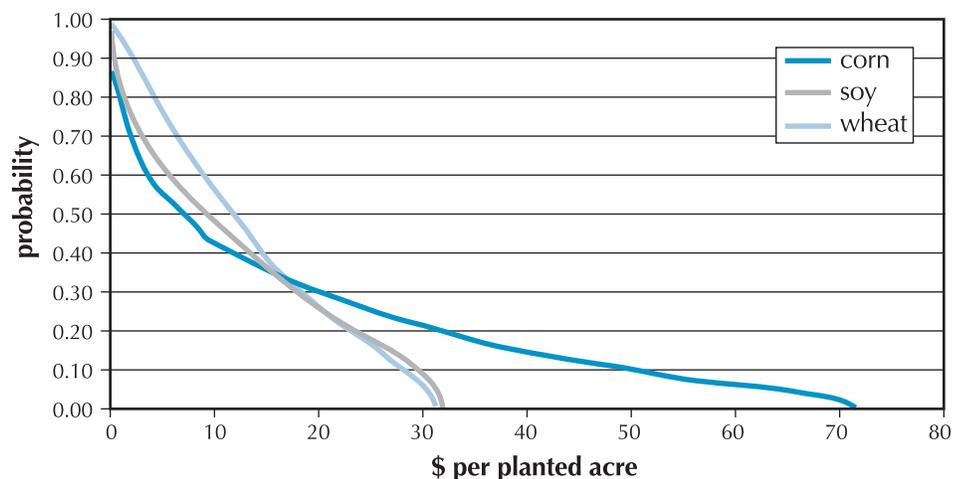
As farmers finalize their 2009 spring planting decisions, estimated ACRE prices for the 2009 crop are \$4.20/bu for corn, \$9.88/bu for soybeans, and \$6.67/bu for wheat. If 2009 state yields are close to their past five-year average, then ACRE payments will commence if prices fall 10 percent below these levels. Thus, ACRE provides good price protection (at a cost equal to 20 percent of a farmer's direct payment) at \$3.78/bu, \$8.89/bu, and \$6.00/bu for the three crops. For corn and soybeans, these protection points are somewhat below the expected market price. For wheat, the expected market price is about \$5.50 per bushel, which is below the level of the ACRE protection point.

ACRE Probable Payouts

The graph below shows the range and associated probabilities of national average per acre payouts by crop if all 2009 corn, soybean, and wheat acreage is enrolled in ACRE. Large payouts will occur if 2009 prices drop dramatically or if large-production states have low yields. The vertical axis shows the probability that average U.S. ACRE payments per acre will be greater than or equal to the indi-

cated level on the horizontal axis. As shown, there is a 50 percent chance that corn payments will exceed \$7 per acre, a 50 percent chance that soybean payments will exceed \$9 per acre, and a 50 percent chance that wheat payments will exceed \$12 per acre. Given that 20 percent of per acre direct payments comes to an amount much lower than these payments, the chance is much better than 50-50 that average ACRE payments will exceed the average loss in direct payments. This suggests that many corn, soybean, and wheat farmers will find it advantageous to enroll in ACRE.

Because ACRE looks to the past for prices, and because ACRE guarantees can only change by a maximum of 10 percent in any year, there is a chance that 2010 ACRE guarantees will be much greater than what producers can expect to get from the market for their 2010 crop. This will occur if there is a large drop in crop prices during the next 10 months. Under these circumstances, farmers could once again use government prices instead of market prices for guidance about what to plant. This potential weakness of ACRE could have been avoided had Congress followed the precedent of crop insurance, which bases its guarantees on futures prices rather than historic prices. ♦



Distribution of national average ACRE payments for the 2009 crop

Crop Outlook for 2009

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Although uncertainties abound, the outlook for Corn Belt corn and soybean farmers is bright. Demand for corn and soybeans remains high despite cutbacks in corn exports, feed use, and the financial difficulties of the biofuels industry. World supplies have not grown as rapidly as expected because of moderating prices, less-than-ideal growing-season weather around the world, and credit constraints caused by the world financial crises. A comparison of the situation farmers face today with what they faced in April 2006 before the rapid run-up in commodity prices offers some perspective on how the fortunes of corn and soybean farmers have changed over the last three years.

Costs and Prices, Then and Now

Table 1 compares April 2006 conditions with current conditions. New crop futures prices have increased dramatically since 2006, with corn prices up 35 percent and soybean prices up 56 percent. These higher prices combined with continued growth in yields mean that for a farmer growing 50-50 corn-soybeans, expected revenue has increased 68 percent after accounting for average Iowa price basis. But, as any Iowa farmer will attest, costs have grown as well. Although the increases in fertilizer costs have garnered the most headlines, seed costs have also increased dramatically. It is difficult to compare seed costs across time because new, more productive hybrids and varieties are constantly being released. Cost-of-production budgets at Iowa State University estimated per acre

soybean seed costs at \$32 in 2005 and \$54 for 2009, which implies a 14 percent annual increase in seed costs. Estimated per acre corn seed costs have increased even more, from \$40 per acre to \$93 per acre, which implies an average annual increase of more than 20 percent.

The price of fertilizer soared along with all other commodity prices in May and June of 2008. Most co-ops and other Midwest fertilizer dealers were worried about obtaining adequate supplies, so they booked their 2009 orders early to ensure availability. Many Iowa farmers have had to pay more than \$1,000 per ton for DAP (diammonium phosphate), which represents a price just below the peak world price that occurred last summer. Current world prices are around \$340 per ton. Many Iowa farmers are currently applying \$900-per-ton anhydrous ammonia, which is about equal to the peak world price last summer. Current world anhydrous prices are about \$300 per ton.

The high prices that farmers are paying for fertilizer and seed have about doubled variable production costs for a 50-50 corn-soybean farmer, as shown in Table 1. Although it would seem that a doubling of variable production costs combined with a 68 percent increase

in revenue would result in lower net returns, Table 1 shows that, in fact, returns to land, management, and machinery have gone up about \$70 per acre, or by about 43 percent, over 2006 levels. Of course, not all farmers have seen this increase in returns. Land renters have seen land rents go up by at least this amount, which leaves them in the same position as 2006 or worse off.

Table 1 shows that if fertilizer prices for the 2010 crop reflect current world prices, and all other costs stay at their 2009 levels, then expected returns in 2010 should increase by another \$70 per acre. The idea that Monsanto and Pioneer will hold the line on seed prices may not be realistic, but of greater importance to crop farmers' bottom line is whether crop prices can stay at their 2009 levels.

Impact of Biofuels on Corn and Soybean Prices

The ethanol industry used a little more than 2.1 billion bushels of the 2006 corn crop. The industry will need about 4.3 billion bushels from the 2010 crop. This additional corn represents about 10 million acres after accounting for the additional distillers grains that replace corn in livestock rations. Another billion bushels of corn will be needed from

Table 1. Costs and returns for Iowa corn and soybeans

	2006		2009		2010	
	Corn	Beans	Corn	Beans	Corn	Beans
Yield	164.8	48	172.1	49.4	174.5	49.9
Price	2.69	6.04	4.15	9.47	4.15	9.47
Revenue	386	268	654	446	663	450
Cost	211	117	411	223	305	163
Returns	175	151	243	223	358	287

Notes: Yield is Iowa trend yield (bushels per harvested acre). Price is the new crop futures price on April 16. Revenue equals yield times price adjusted for average Iowa basis. Cost is total variable cost as estimated by Mike Duffy and Darnell Smith of Iowa State University. Costs in 2010 equal 2009 costs except that fertilizer costs are returned to 2006 levels. Returns are per acre returns to land, management, and machinery.

the 2015 crop if mandated levels of ethanol are to be met. If the world financial crisis is resolved in the next year or two, then world demand for livestock feed will again resume because both incomes and population will continue to grow. The combination of growing demand from biofuels and from a larger, richer world population will outstrip yield growth over the next five years, unless yields grow faster than recent trends indicate. This means that the United States and the world will need to devote more acres to feed grain production to meet world demand. And the only way to expand acres is with higher expected returns to feed grains.

This rosy scenario relies on maintenance of current biofuels policy. If the ethanol industry severely contracts because of a change in biofuels or climate policy, then the resulting drop in the demand for U.S. corn could greatly affect price. There seems to be a limit to how severe the contraction could be, however, because the U.S. fuel industry has a robust demand for ethanol as a source of octane, and it is the only acceptable oxygenate for meeting Clean Air Act regulations. The sensitivity of corn and soybean prices to a change in biofuels policy can be measured by using a model of the 2009 corn and soybean markets that includes all current policies. The model simulates the impacts of

removing each policy, first individually and then in tandem.

The model was calibrated to USDA's March 31 prospective planting report and the April 9 World Agricultural Supply and Demand Estimates. Market-clearing prices for corn, soybeans, ethanol, biodiesel, soybean oil, and soybean meal were calculated for each of 500 different gasoline and diesel prices, export demands, and corn and soybean production levels. Crude oil prices average \$63 per barrel across the 500 draws. The market valuation of ethanol is set equal to 67.8 percent of wholesale gasoline prices unless ethanol supplies drop below 6 billion gallons, when the demand for ethanol becomes much less price sensitive. The model results are summarized in Table 2.

The first thing to note is that corn prices are more sensitive to changes in biofuel policies than are soybean prices. The reason is that corn to ethanol represents a much larger proportion of corn demand than soybean oil to biodiesel represents to total soybean demand. If a change in biofuel policies results in sharply lower corn prices relative to soybean prices then in subsequent years, corn plantings would drop and soybean plantings would increase, thereby offsetting some of the relative price changes.

If the tax credit were eliminated, corn prices would hardly drop at

all. This reveals that in most of the scenarios examined, the ethanol mandate is binding so that a drop in the tax credit would simply increase the RIN (Renewable Identification Number) price. This can be seen by the \$0.32-per-gallon increase in the average ethanol RIN price. If the Renewable Fuels Standard (RFS) were waived, then corn prices would drop by \$0.50 per bushel (11 percent). Elimination of the import tariff would reduce domestic ethanol production by about 900 million gallons per year. Imports would increase by an average of one billion gallons. The substitution of imported ethanol for domestically produced ethanol in subsequent marketing years would be larger because Brazil would eventually increase its export capacity. Removal of all incentives would reduce corn prices by about 20 percent. The estimated drop would be even larger, but ending stocks increase by an average of more than 800 million bushels. If the elimination of biofuel policies were permanent, then it is unlikely that stocks would grow by such an amount, and market prices would drop by an even greater amount.

An Outlook Linked to Energy Policy

The results in Table 2 clearly indicate that strong crop prices depend on a continuation of biofuel policies. If crude oil prices stay at projected levels, then maintenance of the RFS has the greatest impact on keeping crop prices high. Removal of the import tariff would have modest price impacts at first, but over time an increasing share of the RFS would be met by imported sugarcane ethanol. That the outlook for Corn Belt farmers depends on maintenance of a large biofuels sector should not be surprising. After all, the earliest, strongest, and most consistent supporters of biofuel policies have been farm groups. ♦

Table 2. Impact of biofuel policies on average 2009 prices

	Maintain Current Policies	Eliminate Tax Credit	Waive RFS	Eliminate Import Tariff	Remove All Incentives
Corn (\$/bu)	4.38	4.35	3.88	4.23	3.48
Soybean (\$/bu)	9.52	9.49	9.51	9.53	9.46
Ethanol (\$/gal)	1.78	1.71	1.62	1.66	1.42
Biodiesel (\$/gal)	2.91	2.75	2.75	2.91	2.60
Ethanol RIN (\$/gal)	0.20	0.52	0	0.13	0
U.S. Biofuels Production (million gallons)					
Ethanol	11,400	11,159	8,424	10,518	5,835
Biodiesel	898	644	577	898	231

*Should Government Subsidize
Farmers' Risk Management?
Continued from page 3*

decrease in commodity prices will benefit consumers somewhat.

But the prospect of slightly lower commodity prices cannot justify the billions of annual risk management subsidies. Furthermore, a large proportion of the subsidies do not even flow to farmers but rather go to the crop insurance industry. Instead of looking at taxpayer benefits of expanded production in high-risk areas, it is more instructive to look at the political benefits of this expanded production, and at the lobbies that guard against changes in risk management policy.

Political Benefits of Subsidizing Farmers' Management of Risk

Members of Congress who represent high-risk, low-productive agricultural areas of the United States are among the biggest supporters of traditional farm subsidies, crop insurance, and disaster payments. This support is entirely consistent with a desire to serve their constituents' interests in maintaining agricultural production and the associated support infrastructure. Given the prominent role that agriculture plays in many Great Plains states, it is not surprising that

*. . . the prospect of
slightly lower commodity
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the billions of annual risk
management subsidies.*

sufficient support for continuing subsidies is so easily obtained.

What is not so easy to understand is why we choose to fund a vast network of insurance agents to induce farmers to buy heavily subsidized crop insurance, and why we need to pay private insurance companies large amounts of money to service the insurance contracts. Regional political interest in supporting agriculture in high-risk areas could be accomplished at much lower expense by eliminating program duplication through program consolidation, and by administering all programs through the FSA (as we are doing with SURE, ACRE, LDP, CCP, and DP). This would save on aggregate program expenditures, and it would save the large fees currently paid to crop insurance agents and companies.

One straightforward explanation for why attempts at such a consolidation were not successful in the 2008 farm bill is that crop insurance agents and companies have their own supporters in Congress. Together, supporters of crop insurance agents, crop insurance companies, and of agriculture in higher-risk regions make a formidable barrier to agricultural reform.

Different lobbying groups often need to support each other's priorities in order to keep the political coalition together. Thus, we see that the new FSA-administered SURE disaster program, which was a priority of senators from Montana and North Dakota, requires that farmers buy crop insurance, which automatically increases compensation to that industry.

It is possible that reform will come about simply through public awareness of the excesses of the risk management subsidies. But if history is any guide, it will take something more. Perhaps the need to finance trillion-dollar deficits as well as federal programs that provide benefits like clean air and water, transportation infrastructure, and nutrition will eventually force Congress to economize by increasing the efficiency of risk management programs in agriculture. ♦

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