Farm Risk Policy at a Crossroad

Keith H. Coble

Legislatively mandated declines in government program payments have coincided with sharp declines in most major crop commodity prices. Thus, a debate has begun about the direction of future farm policy. The debate has been largely expressed in terms of a "safety net" for producers. This paper address several economic issues associated with proposals to enhance the agricultural "safety net." The case is made that crop insurance reform cannot satisfy the desire for above-market price supports. Characteristics required for an insurable risk are discussed, as are the interactions between public and private risk-management tools.

Key Words: agricultural policy, crop insurance, risk

In 1996, farm policy took a significant step by eliminating the long-standing deficiency payment program. This reduction in the intrusion of federal policy into the management of our farms was coupled with non-risk-responsive and declining AMTA[1] payments. This was perhaps not as dramatic a step as many characterize it, because it really represents the third consecutive farm bill which moved away from tight supply management controls. As Keith Collins (1999), the USDA's Chief Economist, has suggested, this trend was predicated on an underlying belief that farmers' well-being would be increased by allowing them to compete effectively in the world marketplace.

The "Freedom to Farm" Act was passed in a period of high crop prices and record market income. In the early years of that policy, producers reaped the windfall of both good crop prices and government payments well above what would have been offered through deficiency payments. But that period has passed. Legislatively mandated declines in AMTA payments have coincided with precipitous declines in most major crop commodity prices. Thus, a debate has begun about the direction of future farm policy. This debate has already led to passage of ad hoc disaster legislation in 1998, and near-certain passage of another bill in 1999. Since it remained the major risk-responsive policy tool, crop insurance has received unparalleled attention this

[1] AMTA, the Agricultural Market Transition Act (H.R. 2854, 1995), is better known as the "Freedom to Farm" Act.

year. A reform package has already been passed out of committee in the House of Representatives. Further, many have called for reconsideration of the 1996 Farm Act. Thus, debate on a successor to "freedom to farm" has begun well before its 2002 expiration.

This paper attempts to address this debate from an economic perspective. In particular, the issue of providing governmentally subsidized insurance "safety nets" is enjoined. These designs have been at the forefront of much of the debate on farm policy to date. Past experience can be instructive in these discussions. Further, this paper includes consideration of the long-term implications of such proposals. Past experience with farm policy suggests that producers have often been the victims of well-intended, but short-sighted policy which ignored well-known economic dynamics.

Agricultural risk policy is complex, as is the risk-management decision environment for producers. Because of the production lags associated with crop and livestock production, producers are exposed to considerable risk from unexpected changes in input and output prices or weather events which affect yields. Agriculture also tends to be fairly capital intensive with considerable investment in items such as land and machinery. Producers are confronted with risks not only in making short-term production and marketing decisions, but also with longer term investment decisions such as purchasing land or equipment. This has led many to suggest that we can protect against other agricultural risks besides crop yields through an insurance mechanism. And so, our discussion here largely centers around the question of whether or not superior risk policies are possible.

In this forum, the fundamental question of policy objectives must be asked. It is obvious that the structure, technology, and economic forces in agriculture are changing rapidly. Common sense would seem to suggest that policy should be oriented to at least the current context and be flexible enough to prove adequate in the long run. In general, the widely repeated concept of a "safety net" appears ill-defined. It offers the connotation of risk protection, but little else. Further, it generally appears to be assumed that AMTA payments are not a safety net, although there is no provision which precludes using them to pay down debt or to purchase put options which are strongly risk reducing. What is clear is that the 1996 Act placed more responsibility on farmers to manage their own risk.

Ultimately, it is obvious that there is still a strong political sentiment for federal farm support programs. At the moment, it seems this is not a question of "if," but "what" safety net. We are in at least a temporary era of budget surpluses, and Congress is so evenly split that the political parties are in a bidding war for farm votes. Thus, we see additional subsidies looming in Washington. In this context, the pragmatic question is: "What is the least distorting, inefficient, and inconsistent policy?" Clearly, some policies are worse than others. The remainder of this paper speaks to issues which are relevant in this discussion.

Given the rapid evolution of the agricultural sector, policy that recognizes the current reality and attempts to shape the future context of production agriculture seems imperative. Efforts to maintain the status quo, though politically attractive,

inherently ignore critical issues such as biotechnological change, structural change, and world trade issues. Ultimately, such a strategy may be an exercise in futility, precluding positive policy contributions that could improve societal welfare. Further, in a volatile environment such as currently exists, expediency may lead to adoption of appealing, but poorly designed policies.

The Origins of Current Crop Insurance Policy

It is useful to place the current discussions in the context of where we have been with agricultural insurance programs in the past decade. Let me briefly summarize changes in these programs since the late 1980s.[2] During the late 1980s, there was significant dissatisfaction with crop insurance because the program had two weaknesses. First, the 1980s was an era characterized by actuarial unsoundness, and the program failed to achieve established actuarial targets. At the same time, even with subsidies, a relatively small percentage of crop producers in the United States were willing to pay the price to purchase crop insurance. As a result, beginning in the late 1980s and carrying forward into the early 1990s, we saw a succession of ad hoc disaster bills authorized. These bills were costly to the federal government, but perceived to be needed because crop insurance had not been widely adopted. The U.S. General Accounting Office documented widespread abuse of these disaster programs. Further, they were perceived to be inequitable because they were conditioned on sufficiently widespread losses to attract political notice and justify action by the Congress.

This was the context in which the 1994 Crop Insurance Reform Act was enacted. This act had multiple objectives. The first was to create a situation where the provision of ad hoc disaster payments was not undermining insurance demand. Secondly, efforts were taken to improve the actuarial soundness of the crop insurance program. With these objectives in mind, catastrophic coverage crop insurance was created, which on average gave producers a roughly equivalent level of protection as that afforded by the disaster programs. Subsidies were increased on higher levels of coverage as well. For example, the subsidy on a 65% yield coverage policy was increased from 30% to 41.7%.

Since 1995, it appears that the crop insurance program has, in some regions and some commodities, achieved an actuarially sound and stable condition. And it has done so with reasonably high levels of participation. Crop insurance liability in 1998 was just less than $28 billion, which is slightly more than double the liability in 1994. Excluding catastrophic coverage, buy-up liability in 1998 was 53% higher than in 1994. Loss experience is more difficult to measure because multiple years are needed to assess outcomes under various random events. Comparing buy-up coverage during the 1980s versus the 1990s, the aggregate loss ratio (indemnities divided by total premium) has fallen from 1.50 to 1.08.

---

[2] For a survey of U.S. multiple-peril crop insurance literature since 1980, see Knight and Coble (1997).

As discussed later in this paper, this is not the case in every crop and every region. At the time of the 1994 reform, the changes brought about by the 1996 farm bill had not been envisioned. Thus, we are now looking at the crop insurance program from a very different perspective. That is why we are asking the question, "Can we provide a stronger safety net for agricultural producers, which mitigates losses from events beyond the traditional crop insurance protection?" This question underlies suggestions to protect multiple-year losses, expand coverage to livestock producers, and increase subsidies, as well as many of the other recommendations being brought out in this discussion.

Crop Insurance Reform Will Not End the Debate

The current angst in the agricultural community is driven largely by declines in commodity prices from the high levels of a few years ago. Interestingly, the major legislative action this year has been crop insurance reform, which will not in any significant way mitigate this problem. These legislative proposals are designed primarily to make crop insurance more attractive to producers and to prompt them to avail themselves of greater protection. While these objectives may be achieved, current revenue insurance products only offer protection from intra-seasonal price declines. In 1999, a year where most major commodities entered the planting season with low prices, current insurance designs only offered protection against further declines.

It appears that some entered this debate assuming this was a deficiency which could be easily remedied through legislative changes. However, others have recognized that research and past experience with crop insurance have well documented that farm-level insurance can induce perverse incentives for producers (Coble et al., 1997). The bottom-line insurance fundamental is: *You cannot insure something for more than it is worth.*

It should be made very clear that programs such as loan rates and deficiency payments have in the past induced additional acreage to come into production. However, once the planting decision is made, deficiency payments do not affect the incentives to produce a crop, and loan programs tend to encourage carrying the crop to harvest. Crop insurance can have a similar effect on planting decisions, although the effect has been less obvious because historically the amount of a subsidy to crop insurance has been much smaller.

But note that farm-level crop or revenue insurance can induce another effect because the risk insured is partially under the control of the insured individual. After the crop is planted, farm-level insurance can provide incentives for producers not to use best management practices, or to intentionally defraud the insurer. The quickest way to create such a scenario is to insure the crop for more than it is worth. Producers can easily be placed in a situation where grain is more valuable going out the back of a combine rather than into the grain bin. This drives up the cost of the program and makes rating difficult. Further, it places producers in the

perverse situation of having to defraud the insurer and the government to gain this benefit.

At a time when market prices are relatively low, there is a strong desire to insure prices at levels above those offered by the market. This is understandable; nevertheless, it is also one of the most effective ways to induce this kind of behavior. For example, consider a producer with a poor cotton crop and an insurance guarantee of $0.70, while market prices have fallen to $0.50. In this case, every pound of cotton not produced is worth $0.20 more than a pound produced.

Ultimately, we are faced with the choice of destroying insurance as a real risk-management tool by including above-market prices, or maintaining insurance program integrity and seeking other mechanisms to address long-term low prices.

The Unspoken Agricultural Risk

Secretary of Agriculture Daniel Glickman declared 1999 "the year of the safety net." As previously mentioned, much attention has been given to declining commodity prices and crop disasters. When one takes an economic view of the risk producers face, a critical uncertainty confronting producers is simply "What will policy be in the future?" Perhaps what we have created is the agricultural policy roulette wheel rather than a safety net.

Consider the situation of cotton farmers last spring. Did market prices offer a positive cash flow on loan applications? In many cases, the answer appears to have been no. However, if a several-billion-dollar disaster bill is forthcoming, a producer would have needed to plant to receive a portion of that substantial payment. What does a producer or lender do in such a scenario? Perhaps a better example is that of a young farmer trying to expand an operation to a more economical size. The purchase of capital items such as equipment and land are long-term investments. How much the farmer can pay for land is really predicated upon the stream of future returns. It is easy to see the bidding for land going to those who assume the greatest stream of future government payments.

This argument is supported by more concrete evidence of policy risk—what producers themselves think. A recent risk-management survey, sent to crop producers in Mississippi, Indiana, Nebraska, and Texas, asked producers to rate on a scale of one to five the potential for various uncertainties to affect them. Fifty percent of Mississippi producers and 37% of all respondents gave "changes in farm programs" a score of five, indicating that uncertainty about farm programs had a high potential to affect them (Coble et al., 1999).

This is one of the primary reasons why the return to ad hoc disaster bills is a matter of concern. Many have suggested that ad hoc disaster bills are a political inevitability. Perhaps so. However, the uncertainty of whether there will be a disaster bill and how large it will be compounds the problems of delays and inequity that go with such programs.

**What Is the Fundamental Objective of
Insurance Programs?**

As a review of insurance program history suggests, policy changes in the early 1990s were primarily directed toward making insurance a more useful risk-management tool that conformed to actuarial targets. It appears that policy makers are faced with a fundamental decision about federal insurance programs this year. Can they be turned into an income support program used to pump billions of dollars to the agriculture sector, or can some other mechanism be found?

There are strong economic reasons to not undo the efforts of the past decade. The following discussion makes the case for maintaining actuarial soundness goals. The Risk Management Agency has legislatively mandated targets for actuarial soundness. One might assume that actuarial soundness targets are simply cost-control mechanisms, but our system of subsidies mitigates this effect. However, there is another important aspect of actuarial soundness which needs to be recognized—that actuarial soundness is largely a matter of equity. An actuarially unsound program will not be sustainable because it will be widely recognized as arbitrarily unfair to good managers.

One of the best examples comes from the situation that currently exists with crop insurance in Mississippi. If we examine the crop insurance program experience in that state, what we observe are two apparently contradictory facts. First, crop insurance programs in the mid-South have not been actuarially sound. Figure 1 illustrates the particular situation with soybeans. Historically, indemnities paid out far exceed total premiums. At the same time, we see a program that is widely disliked and where buy-up participation is extremely low. Figure 2 shows the percentage of buy-up soybean crop insurance coverage in the mid-South during 1998. As seen by the figure 2 graph, soybean buy-up participation by the five mid-South states was well below U.S. averages.

How does one reconcile that insurance has been profitable for those who insure, but that most producers are unwilling to insure? It is because the program has been actuarially unfair. The outcome is that a few producers are able to gain a benefit from the program, while their neighbors are priced out of the insurance market. This occurs because the past loss experience of all producers in a county is used to set rates.

There are two dimensions to this problem. The first is that a program which is poorly underwritten and poorly designed will be subject to abuse by those inclined to do so. Further, a program that is not based on sufficiently strong actuarial data will produce inaccurate rates and unintentionally price people out of the market. This is simply an unintended consequence of the difficult challenge of setting insurance rates on farm-level yields. The same problem will apply to a revenue insurance design. In this instance, good managers are receiving little or no benefit from the program. This is a challenge inherent in most of our current set of insurance designs.
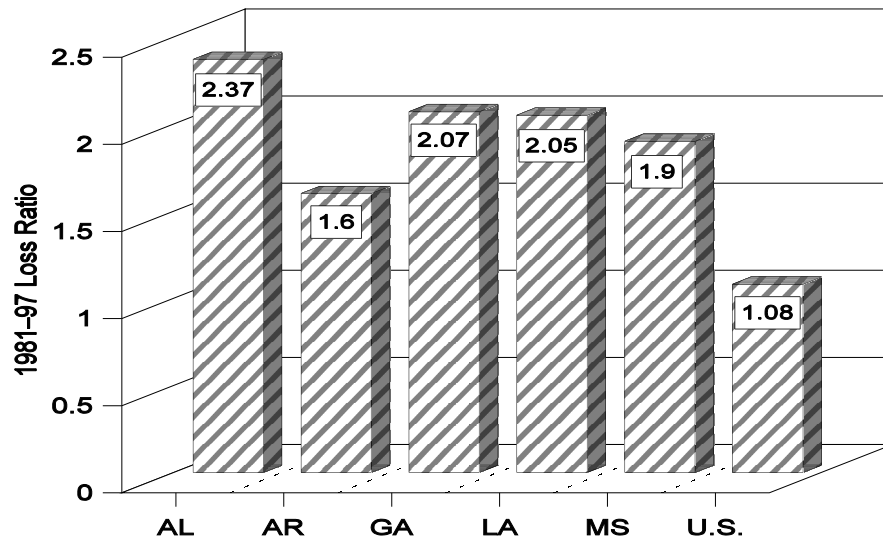
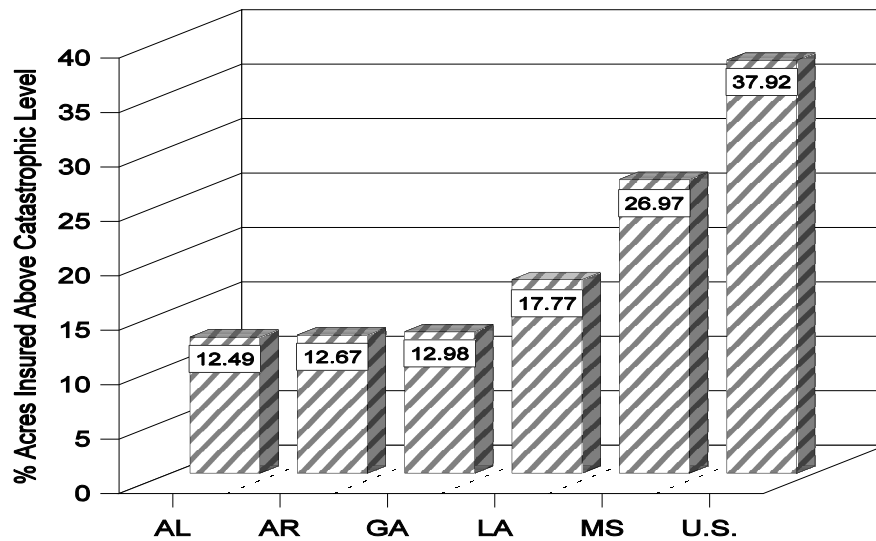**Figure 1. Mid-South and U.S. soybean crop insurance loss experience**

Figure 2. Mid-South and U.S. soybean buy-up crop insurance participation (1998)

The Actuarial Challenge of Farm-Level Insurance

Many suggestions are being brought forward as alternatives or additions to the currently available product list. Yet, most ignore the fact that not every risk is equally insurable. Further, government involvement does not eliminate problems such as inequity when one attempts to insure the uninsurable. Insurance experts have identified six *ideal* conditions for a risk to be considered insurable (Rejda, 1995, pp. 23–24):[3]

1. Determinable and measurable loss;
2. Large number of roughly homogeneous, independent exposure units;
3. Accidental and unintentional loss;
4. No risk of catastrophic losses;
5. Calculable chance of loss; and
6. Economically feasible premiums.

In reality, most insurance products deviate, at least slightly, from these ideal conditions. Yet, insuring risks that stray too far from these ideal conditions will likely result in difficulties and unintended consequences.

It is very easy to suggest alternative coverages, alternative guarantees, or more generous benefits to producers. However, it is very difficult to design superior insurance mechanisms that have generous benefits, but do not exacerbate the insurability problems just described. Further, it is rather naive to think increasing the subsidies will solve these problems. Although increasing the subsidy to an actuarially unsound program will increase the benefits to all producers, high-risk producers will receive a disproportionate share of any across-the-board subsidy increase. While the producers who are currently not insuring would receive some marginal benefit, their neighbors, who are receiving the majority of benefits, will have their benefits enhanced to a greater degree.

Our current insurance programs are largely based on an individual's yield. This is intended to protect producers against their own losses regardless of whether the cause was highly individualized or widespread. However, many of the problems with traditional crop insurance programs relate to the fact that it is very difficult to set appropriate rates because risk differs from farm to farm. This heterogeneity occurs not only across regions, but may be observed even within small areas (such as a county) because of differences in soil type, production practices, slope of the soil, and management practices. All can potentially influence the likelihood of loss.

Collectively, these problems represent a key component in explaining why our current program has a relatively high cost. In 1998, the Risk Management Agency (RMA) had to set rates for 2.6 million insured units. To correctly rate an individually based program requires the paperwork of individual-level yield histories from producers and large actuarial research staffs on the part of the insurer. To limit abuse,

---

[3] Barnett and Coble (1999) discuss how these ideal conditions apply to the agricultural insurance context.

crop insurance programs require adjusters to evaluate every loss that occurs on every unit. Thus, the transaction costs of this program are extremely high. As we consider new insurance designs for covering risk at other levels of aggregation or other commodities, these issues still loom, and in fact may be exacerbated in many cases.

Recognizing that Producers Adapt to Risk and Risk Programs

Much of the rhetoric associated with the risk safety net debate this year has seemed to ignore the fairly obvious economic reality that if producers change decisions in response to risk, then they will respond to a government program that reduces their risk. Said another way, if you subsidize risk management, farmers will tend to take on more risk. If the risk of planting soybeans is taken away, then soybean producers will be more aggressive in doing what they are good at doing—producing soybeans. This is purely rational on the part of the producer. Yet much of the discussion on risk policy appears to ignore this basic economic dynamic.

To be fair, many of those who disagree are considering the past crop insurance programs with which they are familiar. In many regions, the effect of insurance has been trivial compared to other government programs. What they are unfamiliar with are the national differences in the net crop insurance payout. An examination of the past decade's county crop insurance average annual net transfers (indemnity paid – producer premium) shows a range from – $17.86 to $105.77 per insured acre. Given that benefits are conditioned on the riskiness of a producer, these effects would seem to be a lower bound on incentives. If one assumes producers are equally risk averse, then high-risk producers are receiving a relatively greater risk benefit as well.

As a policy instrument being considered for greater subsidization, the relative benefits of insurance versus traditional policy mechanisms should be recognized. Deficiency payments and transition payments provide support on a per unit basis. Thus, farms with a higher established yield receive relatively greater payments— i.e., the most productive farms are rewarded with greater support. Conversely, federal crop insurance programs provide the greatest benefits to farms with the greatest relative variability. This has the potential to shift production toward high-risk regions.

Several studies support the conclusion that crop insurance has increased production in marginal regions (Wu, 1999; Goodwin, Smith, and Hammond, 1999; Keeton, Skees, and Long, 1999). This is a result of offering insurance with identical percentage coverage limits and percentage subsidies. Increasing subsidies without altering the program subsidy structure would increase the regional distortion.

A Final Caution on New Approaches to Farm Safety Nets

Having put forth a number of concerns regarding farm-level safety net issues, there are several implications that should be considered in attempting to develop new approaches. Much of the discussion has centered on protecting new risks such as

livestock, or aggregate risks such as whole-farm insurance. These risks are inherently different from crop yield risk, both in magnitude and complexity.

To suggest that the solution is simple is at the very least naive. A program that subsumes multiple risks, for example, may appear superficially simple only because the complexity is hidden. However, those complexities have potentially serious downside consequences. Further, the distribution of benefits is likely to differ dramatically from those of the current insurance designs.

In the policy debate this year, much has been made of the allocation of benefits across regions and commodities. This seems typical of any agricultural policy debate. Which region is the relative winner or loser? Such comparisons are generally based on aggregates that can mask some important realities. Producers who are concerned about getting a share of the benefits for their region or commodity may want to consider how the benefits are apportioned among their neighbors.

Figure 3 shows an example from Washington County, Mississippi. It compares the crop insurance subsidy for a low-risk and a high-risk soybean farm in the county. Given current crop insurance rates for 75% coverage, the high-risk farm receives a subsidy equal to slightly more than 15% of expected crop revenue. In contrast, the low-risk farm receives a subsidy equal to slightly less than 5% of the expected crop revenue. This illustrates the point that there may be significant variation in the benefits of insurance programs even within a county. As new designs are suggested, these issues must be examined.

Interrelationship of Government Programs and Private Risk Markets

Another question to be addressed as the debate regarding agricultural safety nets continues is: "What likely influence will government programs have on existing or potential private risk-management markets?" In the United States there are a number of privately provided risk-transfer markets and mechanisms that agricultural producers are able to use. The evidence suggests that since the 1996 Farm Bill, producers have availed themselves of these markets to a greater degree (Harwood et al., 1999). Examples include commodity futures and options markets, and forward pricing contracts. Particularly, as one considers moving beyond providing yield risk protection, there is a very real potential to limit the demand for other risk-management mechanisms, such as forward contracting and futures and production contracts. This suggests there may be unintended consequences of providing a better safety net to agricultural producers.

It is becoming clearer that these effects may be direct or indirect, but they can be recognized. For example, Coble and Heifner (1998) have shown that insurance can have an effect on the demand for forward pricing and futures contracts. Further, this effect can be either positive or negative. An example is illustrated in Figure 4. The chart compares the optimal hedge and put ratios given insurance is purchased and given three alternative insurance designs at 75% coverage. The optimal hedge and
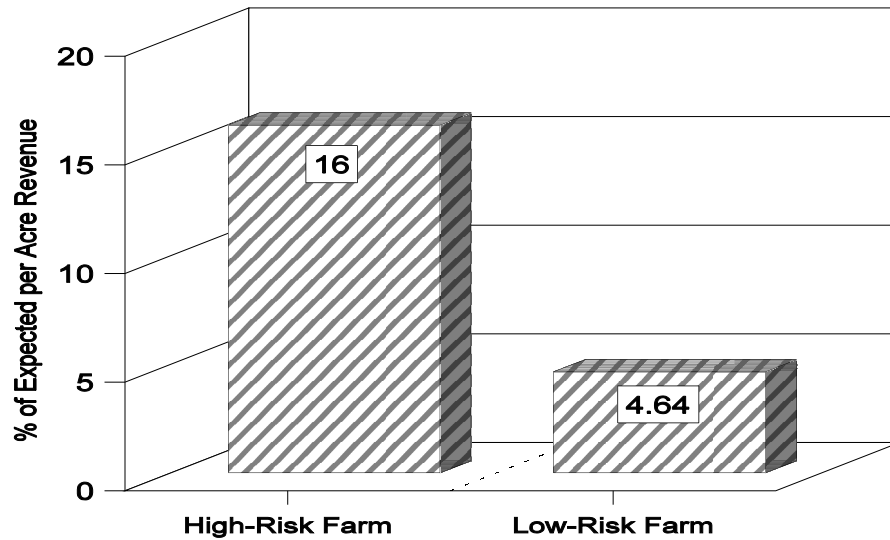
Figure 3. Comparison of current crop insurance subsidy as a percent of expected per acre revenue: Low-risk and high-risk soybean farms, Washington County, Mississippi
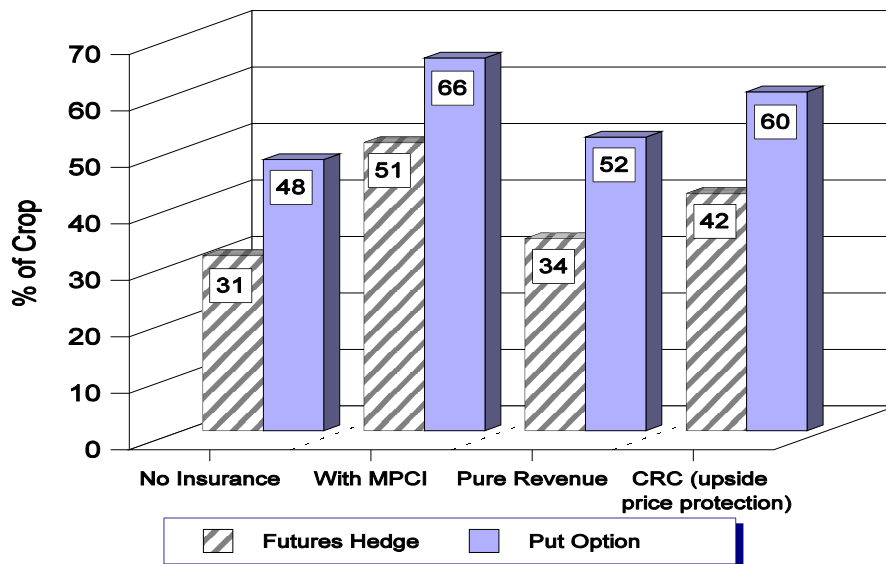

Figure 4. Effect of insurance on forward pricing: Percent of expected crop to forward price given alternative insurance designs, Mississippi Delta soybean farm

put ratios rise dramatically when yield insurance is purchased. However, not all insurance has the same effect. The optimal hedge ratio with a pure revenue design falls to near the uninsured level, while crop revenue coverage with its upside price protection maintains an optimal hedge ratio level near that of yield insurance.

Food for Thought

The current problem of prolonged low commodity prices is not a new one. We have seen downturns such as this before. We have to remember that the agricultural sector is inextricably linked to the macro economy. What has often been ignored in the current debate is that we are attempting to correct a long-term problem with short-term tools. Crop insurance provides protection from planting until harvest. Futures and options are normally traded no more than 18–20 months out from expiration. Producers make long-term investments which cannot be effectively hedged using currently available tools. As the policy debate continues, it would seem that greater consideration should be given to this missing market.

Two aspects of this problem are worthy of further consideration. It appears obvious that we should look to the nonagricultural sector to see if tools used there could be brought to agriculture. The recent development of risk-management tools in financial markets has been staggering. However, the potential for these designs in agriculture has been stifled by prior agricultural policy. It is plausible that if the Commodity Futures Trading Commission (CFTC) rules associated with agricultural trade options free up private development of trade options, or if some kind of a voucher system for risk management is instituted, there will be an explosion of new privately developed risk-management tools for agriculture (Skees and Barnett, 1999).

Second, we need to recognize that there are other mechanisms besides farm-level insurance which can be used to manage risk. Most of the actuarial issues associated with crop insurance are largely eliminated by going to an area-based design. Area yield designs have been piloted for a few years, and an area revenue design is offered for the first time this year. But these designs have not yet received significant attention or popularity. In part, this is because these products are inherently disadvantaged in the subsidy to producers and sales agent incentives relative to other insurance products. However, they eliminate much of the overhead cost and paperwork, and they prevent abuse.

Another set of concepts that deserves attention are savings plans. The Farm and Ranch Risk Management (FARRM) accounts create a tax mechanism for producers to save income in high revenue years for years of shortfall. A similar design, Net Income Stabilization Accounts (NISA), is a centerpiece of the Canadian agricultural program. The NISA program receives direct government subsidies. These plans provide a completely different form of risk protection than insurance, and pose the same issues as are currently being debated with the Social Security system—that is, does the federal government provide insurance (Social Security) or allow individuals

to invest those funds in investment accounts held for future events? While both FARRM accounts and NISA have design issues which are of concern, they probably merit further consideration as well.

Summary

Today's attention is focused on crop insurance as a policy tool. However, crop insurance is particularly well suited to some risks and less well suited to others. It is unlikely that crop insurance reform, if enacted, will end the policy debate. Crop insurance is a poor vehicle for income enhancement because it has the potential not only to influence acreage decisions, but also to create the perverse situation where crops are worth more lost than produced. This suggests that efforts should be directed toward developing workable, cost-effective, and actuarially fair risk-management tools. But this will not come easily. Significant effort and creativity will be needed to develop and implement such changes. It is unlikely there is a panacea waiting in the wings. Rather, in-depth analysis and sound decisions will be required to achieve programs which are workable and useful to the good producer desiring truly effective risk-management tools.

Defining the proper public role is also difficult because of interactions between public and private institutions. Appropriate policy must balance incentives for creativity and competition with care in protecting the public good. There are opportunities for greater private-sector innovation. Allowing this innovation should require reconsideration of the appropriate federal-private sector reinsurance relationship. Secondly, private risk-management markets do exist and may be competitive with government provision of agricultural risk protection. The market failure argument for public intervention is particularly weak in such instances. Ideally, government policy and private risk-management tools could complement one another to enhance the risk-management options available to producers.

Finally, while attention is currently directed toward insurance as a vehicle for risk management, it is not the only mechanism by which risk may be mitigated. Insurance works particularly well for certain risks and quite poorly for others. For example, long-term price downturns and the risks of agricultural investment are probably much more adapted to mitigation through other mechanisms. Ultimately, sustainable farm policy will need to accommodate the particular nature of these risks.

References

Barnett, B. J., and K. H. Coble. (1999, August). *Understanding Crop Insurance Principles: A Primer for Farm Leaders.* Bulletin No. 1087, Mississippi Agricultural and Forestry Experiment Station, Mississippi State University.

Coble, K. H., and R. Heifner. (1998, April). "The effect of crop or revenue insurance on optimal hedging." Paper presented at NCR-134 Conference, Chicago, IL.

Coble, K. H., T. O. Knight, G. F. Patrick, and A. E. Baquet. (1999, September). "Crop producer risk management survey: A preliminary summary of selected data." Information Report No. 99-001, Department of Agricultural Economics, Mississippi State University.

Coble, K. H., T. O. Knight, R. D. Pope, and J. R. Williams. (1997, February). "An expected indemnity based approach to the measurement of moral hazard in crop insurance." *American Journal of Agricultural Economics* 79, 216–226.

Collins, K. (1999, May 28). "U.S. farm policy—2003 and beyond." Speech presented at annual meeting of the American Cotton Shippers Association, Colorado Springs, CO.

Goodwin, B. K., V. H. Smith, and C. E. Hammond. (1999). "Endogenous soil erosion and U.S. agricultural policy." Unpublished manuscript, Department of Agricultural and Resource Economics, North Carolina State University, Raleigh.

Harwood, J. L., R. Heifner, K. H. Coble, J. Perry, and A. Somwaru. (1999, March). "Managing risk in farming: Concepts, research, and analysis." AE Report No. 774, U.S. Department of Agriculture, Economic Research Service, Washington, DC.

Keeton, K., J. Skees, and J. Long. (1999, August). "The potential influence of risk management programs on cropping decisions." Paper presented at annual meetings of the American Agricultural Economics Association, Nashville, TN.

Knight, T. O., and K. H. Coble. (1997). "Survey of U.S. multiple peril crop insurance literature since 1980." *Review of Agricultural Economics* 19, 128–156.

Rejda, G. E. (1995). *Principles of Risk Management and Insurance.* New York: Harper-Collins College Publishers.

Skees, J. R., and B. J. Barnett. (1999, Fall/Winter). "Conceptual and practical considerations for sharing catastrophic/systemic risks." *Review of Agricultural Economics* 21, 424–441.

Wu, J. (1999, May). "Crop insurance and acreage decisions." *American Journal of Agricultural Economics* 81, 305–315.