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Government Costs of Yield and Revenue Insurance

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the period from 7.31 to 7.50 billion dollars. (Net
exports for soybeans go from 22.2 to 24.2 million
metric tons; soybean meal, 5.7 to 7.1 million metric
tons; and soybean oil, 0.8 to 1.2 million metric tons.)
The value of feed-grain exports ranges between 5.9 and
7.2 billion dollars over the period. Corn accounts for
most of the feed-grain exports and its value ranges
from 5.3 to 6.6 billion dollars over the period.

Figure 8: Crops - Value of Net Exports

Land Use
Land enrolled in the CRP is expected to fall from the
current 36.4 million acres to just over 25 million acres
in 2002 (Figure 9).

Figure 9: CRP Area

Total land planted to the 15 major crops increases to
272 million acres in 1996, then stabilizes around 265
million acres thereafter (Figure 10). Corn planted area
increases by 10 million acres from 1995 to 1996, and
then declines slightly (800,000 acres) over the period.
Over most of the period, wheat planted area is down
3.4 million acres, barley is down 1.6 million acres,
sorghum is down 100,000 acres, and oat planted area
is down 300,000 acres. Soybean area is up 1.9 million
acres with a 1.7 million acre increase in the Corn Belt
region.

Figure 10: Planted Crop Area

Summary
FAPRI analysis of the agricultural reconciliation
compromise, ARA-95, provides insights about potential
results of the 1996 Senate Farm Bill. The results
indicate continued strength in agricultural markets
and in aggregate net farm income under this type of
program structure.

Government Costs of Yield and Revenue
Insurance
(Chad Hart, 515/294-6307)
(Darnell Smith, 515/294-1184)

With the recent development of revenue insurance
products and earlier interest in a dual insurance
program, questions arise about the aggregate govern­
ment costs of these insurance options if they were
available on a nationwide basis. Before the announce­
ment of the CRC and IP revenue insurance products
(outlined in the article, “A Review of New Revenue
Insurance Programs” on page 10), we had conducted
an analysis estimating government costs of existing
yield insurance and a hypothetical revenue insurance
product. This article outlines how we obtain govern­
ment cost estimates for yield and revenue insurance for
the 1996-2003 period under the FAPRI variable
weather scenario. For this government cost compari­
son, we assume one program or the other is in place
over the projection period.

For additional information on the variable weather
scenario and how the data were incorporated in the
analysis, please see “Weather Volatility and Farm Bill
Options” and “How Revenue Assurance and Yield
Insurance Stack Up: A Cost Comparison” in the
September 1995 issue of the Iowa Ag Review.

Estimating Yield Insurance Costs
Under the 1994 crop insurance reform bill, yield
insurance became mandatory for producers enrolled in
federal farm programs. Thus, participation in yield
insurance will be significantly higher than it was before. For the 1996-2003 projection period, we have assumed that all producers who are active in the federal farm programs will participate in yield insurance and those farmers who are not enrolled in the farm programs will participate in yield insurance at the average historical yield insurance participation rate. Government subsidies of yield insurance premiums are set at the 1995 level.

Yields across a state are assumed to be normally distributed with the standard deviation chosen such that simulation results over the 1982-1989 period match the actual performance of yield insurance over the same period. From this assumption, the percentage of acres with losses and the average yield loss are computed. Statewide losses are the product of the price election, the yield shortfall below the yield guarantee, and the number of acres with losses.

Federal Crop Insurance Corporation (FCIC) administrative costs are set at $100 million per year over the projection period. Government costs are taken to be the sum of the premium subsidies, administration costs, and excess losses (i.e., losses over and above total premiums). Given this setup, yield insurance government costs by state and crop are estimated for 1996-2003.

Estimating Revenue Insurance Costs

At the time the analysis was conducted, revenue insurance was not available for the crops studied here, therefore no historical data on its price or performance existed. We proceeded to create a “history” for revenue insurance. For this “history,” revenue insurance costs are estimated over the period from 1980 to 1989. From this, the average payout per acre is set as the premium for revenue insurance in 1990. All producers are assumed to participate in the revenue insurance program. From 1991 on, premiums are based upon historical loss ratios and are formulated to approach actuarial soundness in the same way as yield insurance premiums. Government subsidies of revenue insurance premiums are set at the same rate as for yield insurance. Losses are computed as under revenue assurance. More information on the estimation of revenue insurance costs can be obtained in CARD Working Paper 95-WP 140, “Estimating the Costs of Revenue Assurance.”

We assumed that the revenue guarantee would be set at a given percentage of a five-year moving average of revenue (like revenue assurance). As with yield insurance, administration costs are set at $100 million per year over the projection period. Government costs are taken to be the sum of the premium subsidies, administration costs, and excess losses. Government costs of revenue insurance by state and crop are estimated for 1996-2003.

Results

The average 1996-2003 government cost figures for yield and revenue insurance for the farm program crops and soybeans are given in Table 1. Yield insurance is set at 65 percent yield coverage (65 percent of the yield guarantee at 100 percent of the price election), which has been the average yield insurance coverage selected by producers over the 1980s and the early 1990s. Revenue insurance is set at 70 percent revenue coverage. The government subsidy rate of premiums under both insurance plans is set at 41.7 percent of total premiums.

Average annual government costs of both programs are about $2 billion. Revenue insurance annual costs average about $100 million less than yield insurance. When examined by crop, yield insurance government costs are lower than revenue insurance government costs for upland cotton, oats, grain sorghum, and wheat. The reason is that these crops do not benefit as much from the inverse relationship between realized yields and market price that is prevalent for other crops, especially by region.

Table 1. Average Government Costs, 1996-2003.

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Average Costs</td>
<td>Average Costs</td>
</tr>
<tr>
<td>Barley</td>
<td>39.41</td>
<td>27.25</td>
</tr>
<tr>
<td>Corn</td>
<td>737.03</td>
<td>632.91</td>
</tr>
<tr>
<td>Upland Cotton</td>
<td>294.75</td>
<td>306.44</td>
</tr>
<tr>
<td>Oats</td>
<td>10.06</td>
<td>37.46</td>
</tr>
<tr>
<td>Rice</td>
<td>43.31</td>
<td>37.20</td>
</tr>
<tr>
<td>Grain Sorghum</td>
<td>73.41</td>
<td>83.44</td>
</tr>
<tr>
<td>Soybeans</td>
<td>389.12</td>
<td>264.48</td>
</tr>
<tr>
<td>Wheat</td>
<td>464.85</td>
<td>576.47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2051.95</strong></td>
<td><strong>1965.66</strong></td>
</tr>
</tbody>
</table>

Table 2 provides the annual government cost estimates over the projection period. These estimates are again derived from a variable weather scenario where the weather over the period 1982-1989 is applied to the projection period 1996-2003. Government costs under yield insurance vary much more than under revenue insurance. While revenue insurance government costs stay fairly stable at around $2 billion, yield insurance government costs vary between $1 and $4 billion from year to year.
Table 2. Annual Government Cost Estimates.

<table>
<thead>
<tr>
<th>Year</th>
<th>65% Yield Insurance Government Costs</th>
<th>70% Revenue Insurance Government Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Billion Dollars)</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>1.180</td>
<td>1.875</td>
</tr>
<tr>
<td>1997</td>
<td>3.715</td>
<td>1.892</td>
</tr>
<tr>
<td>1998</td>
<td>1.522</td>
<td>2.001</td>
</tr>
<tr>
<td>1999</td>
<td>1.313</td>
<td>1.973</td>
</tr>
<tr>
<td>2000</td>
<td>1.365</td>
<td>1.951</td>
</tr>
<tr>
<td>2001</td>
<td>1.300</td>
<td>1.985</td>
</tr>
<tr>
<td>2002</td>
<td>4.078</td>
<td>1.976</td>
</tr>
<tr>
<td>2003</td>
<td>1.942</td>
<td>2.073</td>
</tr>
</tbody>
</table>

Conclusions

These results indicate that government costs under the two insurance plans are nearly the same on average, but yield insurance costs are more highly variable than revenue insurance costs. The information gathered from this article, in addition to what has been presented in the Emerging Issues section regarding new revenue insurance products, reveals that new insurance packages have a promising future from the perspectives of both producers and the U.S. government. Additionally, it may well be the case that U.S. agricultural policy is in transition toward an income safety net based on farm revenue rather than on market price alone. The results indicate that this is a viable policy option.

Emerging Issues

A Review of New Revenue Insurance Products
(Chad Hart, 515/294-6307)
(Darnell B. Smith, 515/294-1184)

The Federal Crop Insurance Reform Act of 1994 legislated several significant reforms in federally subsidized crop insurance. The legislation diminished congressional authority for direct agricultural disaster payments and offered a replacement program of catastrophic coverage crop insurance (CAT) for a $50 fee per crop. CAT was mandatory for farm program participants, and the fee applied to all persons with an economic interest in the operation—extended families paid the fee many times over.

The reform act also mandated that the Federal Crop Insurance Corporation (FCIC) develop a pilot revenue insurance program. This spring, two revenue insurance products will be available in Iowa. These are Crop Revenue Coverage (CRC), developed by American Agrisureance Inc., and Income Protection (IP), developed by the FCIC. The IP plan is actually a revenue insurance product that embodies the safety-net structure of the proposed Revenue Assurance program. With IP, producer's premiums are partially subsidized; with Revenue Assurance, however, premiums would be paid in full by the government.

Under the traditional APH (Actual Production History) plan of multiple peril crop insurance (MPCI), a farmer is insuring against risk due to low yields. The new revenue insurance products allow the producer to insure against risk due to low revenues—the risk that realized revenue would be below the guaranteed amount. For a farmer to receive an indemnity under traditional MPCI, the actual yield must fall below the yield guarantee. For a farmer to receive an indemnity under a revenue insurance product, the computed harvest revenue must be less than the revenue guarantee.

A revenue indemnity can be triggered by low prices or low yield realizations or a combination of the two. Note also, that because revenue insurance is based on a combination of price and yield, it is possible for an insured producer to have below normal yields and not receive a revenue indemnity. In years with droughts or floods, low yields may be accompanied by high market prices. Thus, for revenue, higher market prices would tend to offset yield reductions.

The two revenue insurance products share many features. Crop price discovery of both products employs the use of commodity futures markets. Yields are computed under the APH guidelines and producers may choose coverage levels from 50 to 75 percent of the APH yield times projected price. Premium subsidies will be similar to other MPCI plans. Coverage exclusions are not available for hail, fire, and prevented planting.

The products also differ in several ways with important differences summarized in Table 1. The unit coverage level offered for the two new products is not the same. CRC provides coverage in basic and optional units (same as traditional MPCI), while IP insures at the "enterprise" level by county. The enterprise level means that all acreage in a county of the insured crop in which the farmer has a share must be covered and insured as one unit.

The revenue guarantee for IP is computed by the product of the coverage level, the APH yield, and the spring commodity price. The revenue guarantee for CRC is the product of the coverage level, the APH yield, and the higher of the spring or harvest commodity price.

The IP product uses 100 percent of the average daily futures market closing price prior to the insurance