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Risk Management Concerns for Spring Crops

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Producers made their crop insurance decisions during March and are now looking for other ways to manage the remaining risk associated with this year's crop. Attendees at Master Business Manager workshops this past winter routinely identified production risk; that is, not receiving their expected yield as their primary concern. However, now that the growing season is underway, price risk moves to the forefront. This article looks at the nature of price and yield risk in South Dakota and identifies concerns of which producers should be aware as they make their price risk management decisions.

Nature of yield and price risk in South Dakota

Yield risk is a warranted concern in South Dakota which, for agronomic reasons, has a lower average yield over time for corn than other corn-belt states. At the same time, the variability per unit of yield is high relative to much of the corn-belt. Thus, the impact of yield risk is relatively high in South Dakota. Producers shocked by the high cost of insurance should be conscious of the fact that insurance may also pay indemnities more often than similar coverage in other states.

The relation between yield risk and price risk is of special concern for South Dakota and other states on the fringes of the corn belt. For many corn-belt states, if yields are low in a given year the price received is often higher as their production levels influence U.S. supply and price to a greater extent than fringe states. For such states, a natural hedge exists and some price risk is mitigated. The situation is different in South Dakota where corn, soybeans, and winter wheat yields have a low correlation with U.S. prices. Thus, South Dakota producers are more susceptible to the risk of low yields and low prices relative to other states. At the same time, high prices could come regardless of South Dakota's yields and potentially when there is little to sell elsewhere.

Managing yield risk

Yield risk is large in terms of its impact on profit and is usually not in the control of producers. Hence, crop insurance is the primary tool as it transfers losses to the insurance company in exchange for a premium. There are a variety of crop insurance programs and policies, but this article focuses on the most common programs utilized for corn, soybean, and wheat acres in South Dakota.

Catastrophic Risk Protection (CAT) is minimal coverage available for a low per-crop fee. Producers willing and able to self-insure against smaller yield losses use CAT. Multi-Peril Crop Insurance (MPCI) is the most common form of yield insurance, covering a larger percentage of historic yields. Crop Revenue Coverage (CRC) is one form of revenue insurance with higher coverage on price and yield relative to MPCI. For details concerning these programs, contact a local crop insurance agent.

The purchasing pattern of crop insurance in 1999 reveals the extent of insurance coverage in South Dakota for the principal crops. Shown in Table 1, producers covered 3.5 million corn acres with insurance, compared to 3.65 million planted acres. For soybeans, they covered 3.7 million acres compared to 3.9 million planted acres. For wheat, 3.6 million acres were covered compared to 3.3 million planted acres. Wheat acreage and insured acres may not agree because planted acres are estimated instead of actual numbers. Producers extensively used both MPCI and CRC and received substantial indemnity payments in a reasonable crop year.
Tabl« 1. lnurance Covmtage Statistics for South Dakota in 1999

<table>
<thead>
<tr>
<th>Crop</th>
<th>Policies Sold</th>
<th>Coverage (%)</th>
<th>Indemnities Received ($)</th>
<th>Premiums Paid ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.D. Crop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybeans - APH</td>
<td>16,416</td>
<td>2,354,216</td>
<td>244,246,442</td>
<td>17,848,747</td>
</tr>
<tr>
<td>Soybeans - CRC</td>
<td>7,364</td>
<td>1,380,906</td>
<td>163,492,357</td>
<td>13,827,466</td>
</tr>
<tr>
<td>Wheat - APH</td>
<td>15,748</td>
<td>2,190,213</td>
<td>118,049,405</td>
<td>15,363,810</td>
</tr>
<tr>
<td>Wheat - CRC</td>
<td>3,011</td>
<td>473,877</td>
<td>36,764,952</td>
<td>5,077,328</td>
</tr>
</tbody>
</table>

Note: APH and CRC policies for soybeans are available in 33 states and 17,000 counties in the U.S.

Queues of producers revealed a variety of reasons for choosing among the various insurance products. For example, producers also cited tradition and having different products was an obvious driving factor in determining the specific coverage chosen by producers. Policy sales data indicate a preference among soybean producers for CRC coverage in 1999, where 37% of the policies were for CRC. In 2000, 49% of policies were for CRC for soybeans, and 39% were for CRC for com. This trend continues to dominate all crop types, as shown in Table 2.

Table 2. Selected Prices for Insurance Products and Loan Rates

<table>
<thead>
<tr>
<th>Crop</th>
<th>2000 Loan Rate</th>
<th>APH Price</th>
<th>CRC Price</th>
<th>2000 Loan Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Com</td>
<td>1.90</td>
<td>2.51</td>
<td>3.46</td>
<td>1.72 - 1.90</td>
</tr>
<tr>
<td>Soybeans</td>
<td>5.16</td>
<td>5.32</td>
<td>5.46</td>
<td>2.28 - 2.68</td>
</tr>
</tbody>
</table>

Managing price risk

The government loan program is a commonly used risk management tool during times of low prices. The loan rate is a form of insurance that pays an indemnity when a substantial yield loss occurs. The loan rate only applies to bushels actually produced. This can have a substantial impact on downside price protection. The ranges of 2000 loan rates for Com are shown in Table 2.

Loan deficiency payments (LDPs) are often compared to put options. However, with put options, the loan rate for South Dakota is the loan rate for South Dakota.
options the producer chooses the coverage level by choosing the hedge ratio. With LDPs it is as though the put options disappear on any lost yield. With low yields and low prices, put options could provide better protection than LDPs, regardless of their higher cost.

Price risk is prevalent regardless of yield risk, but crop insurance products can influence price risk management. For example, CAT coverage is widely utilized in South Dakota and is inexpensive relative to the amount of coverage it provides. However, CAT coverage can work against an aggressive marketer. An equity threatening case is found when CAT is the only insurance, the expected production is fully hedged with a futures or forward contract, and a yield disaster and high U.S. prices result. In such a scenario, CAT would likely only cover a small portion of the economic cost of planting the crop plus there would be hedging losses due to rising prices. However, such dangers from over-hedging can be mitigated by purchasing out-of-the-money call options.

MPCI allows a doubling of coverage relative to CAT for a small, subsidized premium. Currently, futures prices less harvest-time expected basis levels give an implied forward price that is fairly close to the APH price for corn. This implies that producers with MPCI coverage could hedge a larger portion of their expected crop, relative to CAT coverage, and not have to worry about major losses. MPCI coverage does not protect against any price risk. Because of the low correlation between U.S. price and South Dakota yield, it seems reasonable to expect that price risk would be as large of a concern as yield risk. Yields low enough to trigger indemnity payments, especially when the more typical lower election levels are chosen, are not likely to occur.

While not perfect, CRC is useful because it is revenue insurance. CRC behaves like MPCI for yield coverage, but also like a long option straddle. If prices move low enough or high enough (if yields are low enough), CRC may pay an indemnity. Unfortunately, CRC is still only triggered in the event of a substantial yield loss. Producers should make sure they understand what the worst case scenario with insurance looks like. Especially in corn this year, the loan rate is substantially less than the CRC price. Thus, in the event of a complete yield loss, the CRC revenue protection is greater than the revenue that would occur with a yield at the trigger level. The situation is less pronounced in soybeans and wheat. However, the specifics will depend on farm and county specific characteristics and assumptions.

Summary

Both yield risk and price risk are prevalent in South Dakota and complicate the risk management plans of producers. Crop insurance is the primary method of managing yield risk, and revenue products have become increasingly popular in South Dakota. The loan rate provides price protection, but only on the bushels produced. Overhedging is a potentially risk-increasing venture unless adequate crop insurance is in place. Finally, while CRC sounds like a lot of coverage, the worst-case scenario is likely to be at trigger yield levels.

References:


2 Nationwide maps of yield and price correlation are shown in Schnepf, Heifner, and Dismukes (1999).

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