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Why Not All Corn?

Projected prices for the 2007 crop indicate that corn will be much more profitable than soybeans on Illinois, high-productivity farmland. A question is: Why plant soybeans at all? A strategy that has relatively high profits and low risks is to plant all corn and lock in profits by purchasing a revenue insurance product with a high coverage level.

Corn and Soybean Returns

Chicago Board of Trade (CBOT) futures contracts, adjusted by basis, indicate that reasonable 2007 projected prices are \$3.80 per bushel for corn and \$8.00 per bushel for soybeans. These prices were used to project corn-after-corn and soybeans returns. Costs and yields were taken from University of Illinois budgets for central Illinois, high-productivity farmland (see Table 1). These budgets have a corn-after-corn yield of 170 bushels per acre, a soybean yield of 55 bushels per acre, and \$25 per acre of direct payments. Total non-land costs are \$333 per acre for corn and \$216 for soybeans. Costs include crop insurance premiums of \$32 for corn and \$18 for soybeans, representing the costs of a Crop Revenue Coverage (CRC) policy at an 85% coverage level.

Using these budgets, operator and farmland return is \$338 per acre for corn and \$249 per acre for soybeans (see Table 1). These returns are

above average. Between 1995 through 2005, operator and farmland return averaged \$182 per acre across all crops. Hence, the corn-after-corn return is \$156 above average (\$338 operator and land return - \$182 average) and the soybean return is \$67 above average.

Table 1. Crop Budgets, High-Productivity Farmland, Illinois.

	Corn-after -Corn	Soybeans
Yield	170	55
Price	\$3.80	\$8.00
Crop revenue	\$646	\$440
Direct payments	<u>25</u>	<u>25</u>
Total revenue	\$671	\$465
Direct costs ¹	190	102
Power costs ²	67	54
Overhead costs ³	44	42
Crop insurance costs ⁴	<u>32</u>	<u>18</u>
Total non-land costs	\$333	\$216
Operator and farmland return ⁵	\$338	\$249

¹ Includes fertilizer, pesticides, seed, drying and storage.

² Includes utilities, fuel, and machinery related items (repairs, hire, and depreciation).

³ Includes labor, building repair and depreciation, insurance, and misc.

⁴ A Crop Revenue Coverage policy at an 85% coverage level.

⁵ Represents a return that will be split between the farmer and land owner.

The difference between the corn and soybean returns also is very large. Corn return minus soybean return is \$89 per acre (\$338 corn return - \$249 soybean return). Between 2001 and 2005, the difference in profitability between corn and soybeans averaged \$20 per acre. Hence, the \$89 per acre estimate is \$66 above average.

This \$89 difference in profitability can have large impacts on profitability across farms planting various mixtures of corn and soybeans. Take, for example, a 1,000 acre farm that has a 100% production share on all acres. Moving from two-thirds corn (666 acres) to all corn (1,000 acres) will increase expected profits by \$29,726 (334 acre increase in corn times \$89 higher projected returns for corn), an increase representing a sizable portion of total net income in most years.

Crop Insurance Use

Revenue products such as Crop Revenue Coverage (CRC), Revenue Assurance (RA), or Group Risk Income Plan (GRIP) can be used to lock in high revenue guarantees. An example of the minimum revenue guarantees are shown in Table 2 for CRC and RA. In this example, the farm has a 165 bu. Actual Production History (APH) yield, a \$4.03 base price, and an 85% coverage level. The \$4.03 estimate of base price is made using settlement prices from Chicago Board of Trade contracts for February 1st through the 22th. The actual base price will vary from this estimate as the entire month of February will be used in its calculation.

Table 2. Minimum and Cash Equivalent Guarantees, Corn, CRC and RA.

Actual Production History yield	165
x Base price	\$4.03
x Coverage level	<u>85%</u>
Minimum revenue guarantee	\$565
Actual Production History yield	165
x Equivalent cash price ¹	\$3.80
x Coverage Level	<u>85%</u>
Cash equivalent revenue guarantee	\$533

¹ Base price minus an estimated basis (\$.23 per bushel).

As can be seen in Table 2, the minimum revenue guarantee is \$565 per acre. Crop insurance products use futures prices in calculating revenue and guarantees. Farmers generally receive cash prices below futures prices by the basis. The \$565 revenue guarantee can be stated as a “cash equivalent” revenue guarantee by adjusting the base price by a basis. Using a \$.23 per bushel basis results in a \$533 cash equivalent revenue guarantee (see Table 2).

Given a \$.23 basis, the \$533 cash equivalent guarantee represents the lowest crop revenue possible from an acre of corn. Crop insurance payments will occur if prices or yields fall, resulting in larger crop revenue shortfalls. A “low” revenue of \$533 is still considerably above average. Using a \$533 crop revenue in the budgets in Table 1 results in an operator and farmland return of \$225 per acre. This \$225 worst case is \$43 per acre above the \$182 average between 1995 through 2005.

GRIP Use

The above example used CRC in its example. GRIP, a county revenue insurance product, would offer similar coverage with one caveat. Use of GRIP introduces the possibility that the farm has a poor yield and the county does not. This introduces a risk that a farm may have a bad yield and not receive a payment.

While introducing the farm-to-county risk, GRIP has the advantage of being more profitable than CRC and RA in most Illinois setting where high-productivity farmland exists. In areas of high-productivity, GRIP's insurance payments tend to average higher than farmer-paid premiums. Conversely, CRC and RA have averaged less insurance payments than farmer-paid premiums in high productivity areas.

Risks of the All Corn Strategy

Planting all corn may result in lower returns than planting soybeans under certain price and yield scenarios. Scenarios that resulted in higher soybean returns were examined using the budgets in Table 1. Holding all other factors constant, situations where soybean returns exceeded corn returns include:

- Soybean prices exceed \$9.61 per bushel,
- Soybean yields are above 66 bushels per acre,
- Corn yields are below 146 bushels per acre, or
- Corn prices are below \$3.27 per bushel

There also are operational concerns with planting more corn. These include:

- Planting will have to occur in a shorter time window and yield losses may occur if planting does not occur in this window.
- Harvest may be more complicated. On many farms, harvesting corn is slower than harvesting soybeans. There is a possibility that planting more corn will complicate and lengthen the harvest season. In years with adverse weather, lengthening harvest could result in yield losses.
- Production risks are increased. Since only one crop is planted, any production problems related to diseases or pests have a larger chance of impacting all acres.

There also may be concerns with the all corn strategy in years beyond 2007. Planting all corn in 2007 means that there will be no possibility of rotating corn onto land that was previously planted to soybeans in 2008. Generally, corn-after-soybeans is more profitable than corn-after-corn. Hence, the decision to plant all corn in 2007 could lower profits in 2008.

Summary

Planting all corn in 2007 likely will be more profitable than planting soybeans on farms with high-productivity farmland. Revenue insurance at high coverage levels can be used to lock in profits, thereby reducing risks from planting all corn.

Difference in corn and soybean yields across farms will impact the advisability of planting all corn. A Microsoft Excel spreadsheet entitled the *Corn-Soybeans Rotation Tool* is available in the *FAST* section of *farmdoc*. An individual can use this spreadsheet to evaluate the profitability of specific situations.

Issued by: Gary Schnitkey, Department of Agricultural and Consumer Economics