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# Grain Storage in Wisconsin – Pricing Your Options

**2005/2006 Marketing Year**

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Current conditions for the 2005/2006 marketing year are such that storage of both corn and soybeans in Wisconsin may prove profitable. Basis levels (local prices relative to national futures prices) are quite weak, meaning cash prices in most Wisconsin locations are low relative to the overall market. In this situation local cash prices have the ability to move higher even if prices in the futures market do not increase. The key to cash price appreciation in later months is the movement of excessive inventory out of the local market. To date movement has been limited by the extraordinary size of current inventory and low river levels prior to Hurricane Katrina, and more recently by disruptions in river traffic resulting from the hurricane itself. However, Wisconsin would have faced storage capacity constraints this year even without the hurricane.

In addition to opportunities for basis improvement, futures prices for more distant delivery are showing a carry (meaning that futures prices for later delivery, say May, are higher than futures prices for delivery in November or December). This means that the futures market itself is offering returns to storage. For producers who may need to consider non-conventional storage strategies, it will be important to estimate whether the cost of the storage strategy will be offset by gains to storage. Below are a couple of examples showing how to calculate the expected returns associated with storing both corn and soybeans. Producers should do similar calculations for their own locations, and then subtract the costs of whatever storage option they intend to exercise, including counting for any potential grain losses associated with the storage activity.

## Corn

The most attractive opportunity for corn this near will likely come from collecting Loan Deficiency Payments (LDP) early and then storing corn into the spring months. Currently, LDP's for corn are averaging about 40 cents per bushel across Wisconsin.

To calculate the return to storage, producers need to compare the current market price (at harvest) with the price expectation for later months. The price expectation for later months is calculated as the current (at harvest) futures price for later delivery adjusted for the expected basis level in the month the stored grain will be sold. Since the cash markets in Wisconsin are generally lower than the futures

market, the adjustment will result in a cash expectation lower than the futures price.

The difference between two futures prices for different delivery months represents a measurement of the national average return to storage. For example, if the December corn contract is trading for $2.10 per bushel, and the March corn contract is $2.25 per bushel, the national market (as measured by Chicago futures prices) is offering 5 cents per month for storage between December and March. This does not mean that the local market is paying the same return to storage. By using historical basis patterns to localize each futures price, the local return to storage currently being offered can be estimated.

Assume cash prices for corn at harvest are $1.70 per bushel (this appears to be about the average offering at the time of this writing, September 12). Since the December futures price is $2.12, the local basis in this market is -$0.42, or the cash price is 42 cents lower than the futures price. On average, the basis across Wisconsin in June is about -$0.12, meaning the cash price in June is usually 12 cents per bushel below the July futures price (it is important to note that this is a statewide average, and it can vary significantly across different parts of the state). Since the current futures price for July delivery is $2.36 per bushel, then stored corn that is hedged in the July futures contract for June delivery would expect to get $2.24 per bushel (the current July futures price adjusted for the basis expected to exist in June). This is the best estimate at this time of the return to storage in the local market.

If I can sell today for $1.70, or I can hedge for a June delivery expecting to receive $2.24 in June, then my expected gross return to storage would be $2.24 - $1.70, or 54 cents per bushel for storage. The storage period is about 8 months (November through June). If it costs me 5 cents a month to store corn, then I would net 14 cents over my costs for stored corn that is hedged.

If I add a 40 cent LDP collected at harvest to my expected return to storage, then I would expect to end up 94 cents per bushel better off than the current market price of $1.70. However, it is important to recognize that I can collect the LDP whether I store or not, so the important information in making the storage decision is the net increase in price expected just from the storage (54 cents in the example above) and the estimated cost of earning the storage return (5 cents per month times 8 months, or 40 cents per bushel).

The table below illustrates how I would estimate my storage return for each month after harvest. For each month I look at the current futures price for the contract that is closest to maturity (not using the contract in the month it actually expires – in other words, since the March contract expires about the third week of March, than my March storage return estimate uses the May futures contract). I adjust that futures price by my expected basis (my expected basis is based on the actual average basis experienced each month over the last 3 years), and subtract from that price the cost of storing to each month (in the example 5 cents per month). This price is compared to the price I could receive today ($1.70 per bushel), and if it is higher it means the market is currently offering a profitable storage opportunity. Each price in the table represents the market price, and the realized price to me will be the market price plus any LDP I collect.

It is important to recognize that the table below is an estimate of expected storage return. It is based on the assumption that basis patterns will return to normal later in the marketing year. The further into the marketing year one goes (up until about June), the more realistic this assumption becomes. As we approach the end of the traditional storage season, basis patterns from year to year are generally quite stable. However, the only way to guarantee the storage return estimated is to actually hedge or forward

contract the price of the stored grain. If I store and do not forward price, then my actual storage return will be affected by changes in the futures price. If futures prices rise over the storage period, I may earn more than my calculated storage profit, but if futures prices fall and my storage was not forward priced my profits will diminish, and if price in the futures market goes down by more that 14 cents per bushel (my net profit in the example above), I will actually lose money on the storage activity.

Using basis information to evaluate a corn storage decision.

September 12, 2005

| | |
|---|---|
| Today's cash price | $1.70 |
| March futures price | $2.23 |
| May futures price | $2.30 |
| July futures price | $2.36 |

Expected cash prices for later delivery on September 12:

| Store Until: | February | March | April | May | June |
|---|---|---|---|---|---|
| Futures Price | $2.23 | $2.30 | $2.30 | $2.36 | $2.36 |
| Expected Basis | -$0.20 | -$0.22 | -$0.19 | -$0.18 | -$0.12 |
| Expected Cash Price | $2.03 | $2.08 | $2.11 | $2.18 | $2.24 |
| Storage Return | | | | | |
| Expected Cash Price | $2.03 | $2.08 | $2.11 | $2.18 | $2.24 |
| minus Today's Price | $1.70 | $1.70 | $1.70 | $1.70 | $1.70 |
| minus Storage Costs* | $0.20 | $0.25 | $0.30 | $0.35 | $0.40 |
| Total Return | $0.13 | $0.13 | $0.11 | $0.13 | $0.14 |
| Per Month Return | $0.033 | $0.026 | $0.018 | $0.019 | $0.02 |

**Soybeans**

Storage of soybeans in much of Wisconsin also looks profitable this year. However, I see more downside risk in the soybean market than the corn market as we move forward. Further the soybean market is not currently offering an LDP. As a result, I would suggest storing soybeans under loan. This does affect a producer's cost of storage, however. If the market rallies and he elects to pay back the loan and sell stored beans at the market price, he needs to add to his costs of storage all costs associated with servicing the loan. If I was to store soybeans and I did not want to hedge the storage, I would try to lock in a basis contract for the stored beans. A basis contract guarantees a specific basis level. This can be important in the soybean market. One reason people do not want to hedge or forward cash contract their storage is because they want to speculate on higher futures prices (they think they will receive the returns in the table below PLUS the additional gain resulting from a futures price rally). However, when the soybean market rallies aggressively (like last year) the futures market often out-runs the cash market. This means that cash prices do not rise as fast or by as much as futures prices, thus while market conditions are improving the storer's cash price is actually lower relative to futures than initially expected. One way to protect against this is to lock in the basis with a basis contract. On the downside,

this does result in a commitment for physical delivery in a specific time period, and so some flexibility relative to the sales date is lost.

The table below estimates the expected return to soybean storage using state average prices and basis levels, and again assuming a 5 cent per bushel storage costs. The calculations are made in exactly the same way as for corn, expect that the basis levels are different, and based on a three year average of basis for soybeans.

Using basis information to evaluate a soybean storage decision.

September 12, 2005

| | |
|---|---|
| Today's cash price | $5.40 |
| March futures price | $6.01 |
| May futures price | $6.04 |
| July futures price | $6.11 |

Expected cash prices for later delivery on September 12

| Store Until: | February | March | April | May | June |
|---|---|---|---|---|---|
| Futures Price | $6.01 | $6.04 | $6.04 | $6.11 | $6.11 |
| Expected Basis | -$0.25 | -$0.35 | -$0.25 | -$0.30 | -$0.32 |
| Expected Cash Price | $5.76 | $5.69 | $5.79 | $5.81 | $5.79 |
| Storage Return | | | | | |
| Expected Cash Price | $5.76 | $5.69 | $5.79 | $5.81 | $5.79 |
| minus Today's Price | $5.40 | $5.40 | $5.40 | $5.40 | $5.40 |
| minus Storage Costs* | $0.20 | $0.25 | $0.30 | $0.35 | $0.40 |
| Total Return | $0.16 | $0.04 | $0.09 | $0.06 | $-0.01 |
| Per Month Return | $0.04 | $0.008 | $0.015 | $0.009 | $-0.001 |

Notice that the market is sending a strong incentive to store until February, but beyond February total storage return goes down. This is because futures prices for soybeans are not offering the same carry as the corn market. This has become a typical situation as the overall market share of world soybeans from South America has increased.

Calculating Storage Costs

It is critical that producers estimate a reasonable cost of storage if they are going to make an informed storage decision. For producers who own their own bins, storage costs are likely well below the 5 cents per bushel per month used in the examples above. However, they cannot store for free even if the bins are paid for. Many producers also underestimate the costs of additional handling associated with managing on farm storage. If producers have not actually calculated their storage costs for on-farm bins, a reasonable number to work with is about 3.5 cents per bushel. This is probably on the high side, but I would rather over-estimate costs slightly than underestimate costs in making this important

decision.

For producers who have contracted for commercial storage, costs are relatively straight forward. It is the commercial storage charge plus any opportunities forgone by not selling the grain now and investing the return somewhere else (or it is the cost of servicing debt that would be paid off if the grain were sold now). Given current interest rates, this cost may be minimal.

For producers who are considering non-traditional storage strategies, it is very important to attempt to get an accurate accounting of costs. These include the cost of developing the storage system (whether it is converting a corn crib, reinforcing machine shed walls, developing an aeration system, etc.), the costs of moving the corn into the storage facility, and the costs of moving it out of the storage facility when it is to be sold. Very important is coming up with an estimate of grain loss in the system selected. If I can sell 5000 bushels today for $1.70, but I expect a 20 percent loss with the non-traditional storage system I intend to use, than I will only have 4000 bushels to sell at the $2.24 price (based on the earlier example for corn). This means that $1.70 times 1000 bushels is an additional storage cost. Further, this $1700 has to be distributed across the grain I can actually sell later, thus to get a per bushel additional cost I would divide $1700 by 4000 bushels, resulting in an additional storage cost of $0.43 per bushel. Dividing this by an 8 month storage period (November to June), the per bushel, per month additional cost resulting from grain loss is about 5 cents per month. In many cases this additional cost may offset the expected returns to storage using a conventional storage system, and thus the storage incentive disappears.

Market Options without Storage

Producers who want to capture the expected improvement in local basis and the current carry in the futures market, but for whom storage is either not possible or too expensive, can consider using either a delayed (sometimes called deferred) price contract or a basis contract. In both, the producer delivers the grain to the buyer at harvest, but reserves the right to establish the price at a later date. In the case of a delayed price contract, no part of the price is established at harvest. In the case of a basis contract, the seller and buyer agree on a basis level that will be applied to a later futures price at the seller's discretion. Generally, the buyer charges a fee for every month that the seller defers his price option. To calculate the expected return from these two strategies, one would go through the exact same exercise as illustrated in the two tables above, except that the storage cost would be replaced by the buyer's deferment charge. Due to current capacity problems, all buyers may not be offering these arrangements this year.

It is important to note that while these opportunities looks like a storage strategy, THEY ARE NOT. The seller relinquishes ownership to the grain at delivery. If the buyer should become insolvent before the seller is paid, the seller will likely not receive any compensation – he is essentially an unsecured creditor standing in line behind all other creditors as the firm's assets are divided up. Part of this risk is often offset by an initial "down payment" to the seller at delivery. The buyer sometimes pays the seller some percent (often as high as 80 percent) of the market price at harvest, with the balance paid to the seller when the final sales price is established.

For producers who want to guarantee they earn the return they initially calculate using a delayed or basis contract, they can sell a futures contract as a hedge. This insures that if prices fall, they are still protected at the current price. This would be analogous to someone who has physical storage and protects his expected storage return with a hedge. For soybeans, an un-hedged contract does

have more risk than actual un-hedged storage because you no longer have the protection of the loan program (title of grain was given up at harvest and the opportunity to collect an LDP if soybean prices fall is no longer available).

Using Call Option

There are likely to be several people recommending the use of call option for producers that cannot physically store grain this year. THESE ARE NOT SUBSTITUTES FOR STORAGE. If a producer buys a call option on, say, a July futures contract and July futures prices go higher in the coming months, he will benefit. If futures prices go lower for July delivery he will lose. However, the returns to storage calculations and returns from the delayed or basis contracts discussed above were not based on changes in futures prices for a specific contract month. The potential positive returns are based on the combination of basis improvement (local cash price moving closer to current futures prices) and the current carry in the futures market (the fact the futures prices for contracts further from expiration are currently offering higher prices than contracts closer to expiration). Buying a call option does not allow you to profit from either one of those conditions - it is purely a speculative bet on which direction the futures market will move. If you think the futures market will go higher, a call option is a relatively low risk way to speculate, but it will not provide the same rewards that producers using storage or delayed/basis contracts are hoping to capture.