Basis Convergence & Forward Contracting

- Wheat basis trends in Kansas 2001 to Present
- Forward contracting by farmers
- Variable storage rate (VSR)
- Impacts of the VSR on cost of forward contracting for wheat
Wheat Basis in Kansas
Wheat Basis, 07-05-2018

Basis = Cash Price - Nearby Futures Price

KCBT Sept Futures Price: $5.03

$/Bushel:
-0.45
-0.08
-0.12
-0.15
-0.22
-0.23
-0.29
-0.35
-0.49
-0.83

Wheat Basis, 07-05-2017

Basis = Cash Price - Nearby Futures Price

KCBT Sept Futures Price: $5.70

$/Bushel:
-0.00
-0.69
-0.77
-0.84
-0.85
-0.89
-0.90
-0.94
-1.00
-1.02
Forward Contracting for Wheat
What is a forward contract?
- Pre-harvest agreement between local grain elevator and a farmer
- Sets price to be paid (received) at harvest for a fixed amount of grain

Removes uncertainty of price for farmer

More popular today because of crop insurance
Basis Risk

- Forward contract protects farmer from *price* and *basis* risk
  - Harvest price is fixed
  - Hedging with a futures contract still exposed to basis risk

- Ability to predict based on historical basis levels is reduced
  - Hard for elevators to price forward contracts
  - Elevators will hedge all contracted grain
Forward Contracting

- Previous studies
  - Cost of forward contracting wheat
    - Taylor, Dhuyvetter, & Kastens (2003): 9¢/bu
    - Townsend & Brorsen (2000): 6-8¢/bu

- Findings
  - Year-to-year variation in cost is low
  - Costs decline as approach harvest
    - As more information is available, basis risk declines
Cost of Forward Contracting

![Graph showing the average cost of forward contracting over the weeks of the year.](image-url)
Data

- Forward contract bids offered
  - 18 Kansas elevator locations
  - Week 1 to week 25 of the calendar year
  - 2001 to 2012
  - Harvest period: 4th week of June

- Unbalanced panel
  - 69 to 172 observations per elevator
  - 2,111 total observations
Elevator Locations

KS Forward Contract Data Sources: 2001-2012

[Map of Kansas with various locations marked, including Andale, Bartlett, Bird City, Brewster, Beloit, Great Bend, Haddam, Hope, Minneola, Ottowa, Sabetha, Scott City, and Scott City.]
Cost of Forward Contracting

Calculate the harvest basis at the time the forward contract is offered

Time between FC purchase and harvest

Subtract actual harvest basis from basis calculated at time of FC purchase

Result = the cost of forward contracting paid by the farmer
Costs of Forward Contracting

- **2001 to 2007**
- **2008 to 2012**
Cost of Forward Contracting
Variable Storage Rate for KC Wheat
Variable Storage Rates – Timeline and Calculation

1. For each day during the observation period, a Daily % FFC is calculated using the formula below:

\[
\text{Daily } \% \text{ FFC} = \frac{(2\text{nd Month Future} - \text{Nearby Future})}{\# \text{ Days} \cdot (\text{INT/360} \cdot \text{Nearby Future} + \text{Daily Storage})}
\]

2. At the end of the period, the % FFC is calculated to determine the change, if any, in storage rates for the next period:

\[
% \text{ FFC} = \frac{\sum \text{[Daily } \% \text{ FFC]} \cdot \text{INT/360} \cdot \text{Nearby Future} + \text{Daily Storage}}{\# \text{ Days}}
\]

3. This change, if any, takes effect.

Variable Storage Rates – Adjustments

Based on the Percent of Financial Full Carry (”% FFC”), the storage rate for the next period will be adjusted.

If % FFC is:

- = or > 80%
  - Storage Rate Increases (Previous Rate plus 3 cents/month)
- < 80% but > 50%
  - Same Storage Rate (Previous Rate)
- = or < 50%
  - Storage Rate Decrease (Previous Rate minus 3 cents/month)

Storage rates will not be reduced below 5 cents per bushel per month.

Cost of Forward Contracting

![Graph showing the risk premium ($/bu) for each year from 2001 to 2012. The graph indicates that the highest risk premium occurred in 2011 with a value of 0.83 $/bu. The lowest risk premium was observed in 2007 with a value of -0.03 $/bu.]

- Risk Premium ($/bu) for each year from 2001 to 2012.
- The highest risk premium of 0.83 $/bu was observed in 2011.
- The lowest risk premium of -0.03 $/bu was observed in 2007.
HRW Wheat Basis - Salina, KS

The chart shows the HRW Wheat Basis in Salina, KS, with a focus on the 22-week period ending in 2022.

- The chart highlights the volatility in the wheat market, particularly in the 22-week period.
- The data points are marked with red circles, indicating significant changes in the basis.

The axis labels and values are not provided in the text representation.
Conclusions

- Non-convergence in basis is costly to farmers
  - Higher forward contracting risk premiums for those who choose to contract
  - Exposure to lower seasonal price patterns for those who choose not to contract

- Economic tradeoffs of VSR
  - Adds uncertainty for the cost of storage
  - Decreases basis convergence uncertainty and the cost to farmers of forward contracting, an important component of their marketing plans