
Regional Grain Market Competition

Price Spreads & Transportation

Daniel O'Brien

Extension Agricultural Economist

K-State Research and Extension

Grain Handling, Transportation and Competitive Grain Markets

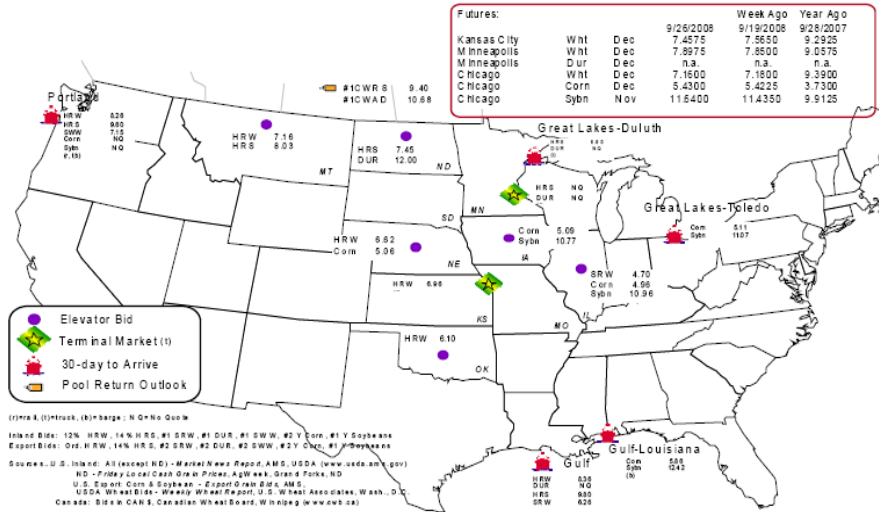
- Grain Price Competition in Local Markets
 - Kansas Cash Grain Price Spreads
 - Grain Hauling-Transportation Costs
 - Survey Data
 - Semi-tractor & trailer example
 - Profitability of Hauling Kansas Grain
-

Economic Principles of Grain Price Competition *within* Local-Regional Grain Markets

Grain Origins & Destinations

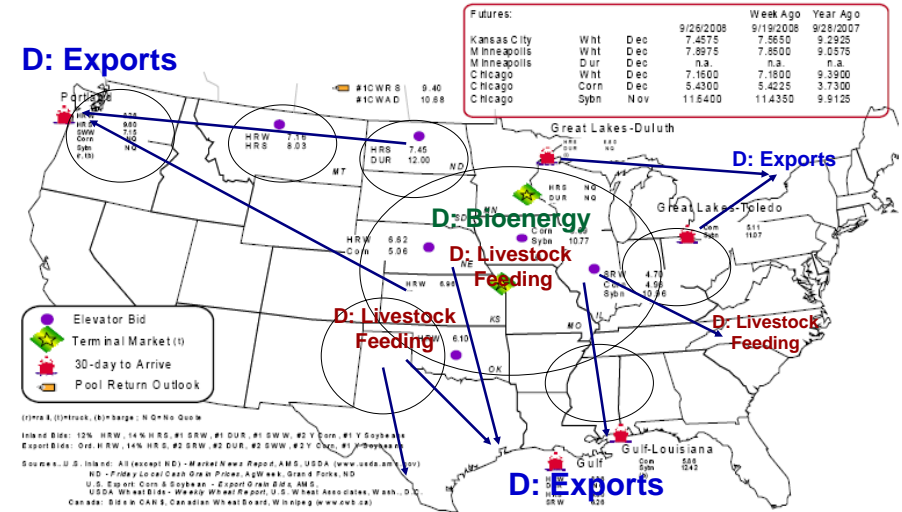
- **Grain Market Origins**
 - Locations *from which* grain is transported *to other destinations*
 - HRW Wheat originates from Western & Central KS
 - Corn originates from Corn Belt, Milo from High Plains
 - **Grain Market Destinations**
 - Locations *to which* grain is transported *from other points of origin*
 - Kansas HRW Wheat destined for Flour Mills or Export
 - Feedgrains destined for SW Kansas livestock feeders, Ethanol-Processing Plants, or Export
-

U.S. Grain Prices by Major Location



USDA Ag Market Service, October 2, 2008

Supply-Demand Flows of U.S. Grain



USDA Ag Market Service, October 2, 2008

Principles of Spatial Grain Price Differences Between Markets

- Spatial grain price relationships are determined by transfer costs among regions in competitive grain markets
- **Transfer Costs = Arbitrage Costs**
 - **Arbitrage (Dictionary):** "Buying goods in one market and selling them at a profit in another market."
 - **Arbitrage in Grain Markets (for Farmers):** Transferring & selling grain to the most profitable buyer/location relative to other selling opportunities

Transfer Costs = Arbitrage Costs

- Transportation expense
- Loading / Unloading (in-out) charges
- Risks from moving grain over distance & owning grain over time
 - Risk of negative changes in buy-sell price margins
- Other transfer costs:
 - Entrepreneurial expertise & time
 - Contracting, insurance, fees;
 - Testing, grading, phyto-sanitary test risks

Inter-Region Grain Price Spreads

“Competitive Arbitrage Across Space”

- 1) Price differences between any 2 regions that **do trade** with each other will just **equal** transfer costs
 - Price differences between regions cannot **exceed** transfer costs (*or else someone will exploit it!*)
- 2) Price differences between any 2 regions that **do NOT trade** with each other will be **less than** or **equal to** transfer costs

Principles of “Market Structure”

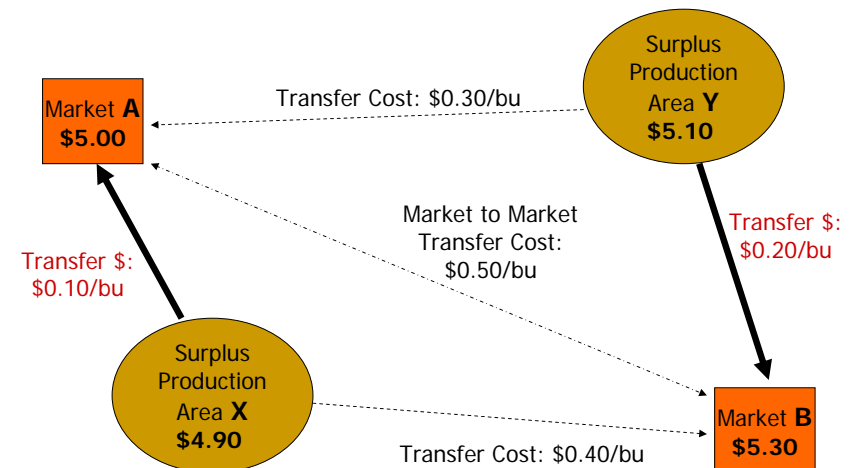
- 1) The **lowest-cost surplus production area determines the prevailing \$Price** in each area of **surplus demand**
 - Producers sell in markets providing them with the highest net return
- 2) The **Prevailing \$Price** in each **surplus-production area equals....**
 - Deficit market \$Price less transfer cost to that market

The Price Structure of Competitive Grain Markets

- **Structure of Grain Prices is a function of:**
 - **Pattern of trade** (producers from which areas ship to what other areas)
 - **Transfer costs** between regions that engage in trade
- **Example of Grain Market Structure**
 - Two (2) Markets – A, B (*deficit areas*)
 - Two (2) Production Areas – X, Y (*surplus areas*)
 - Transfer Costs between the 4 locations

Grain Market Structure Example

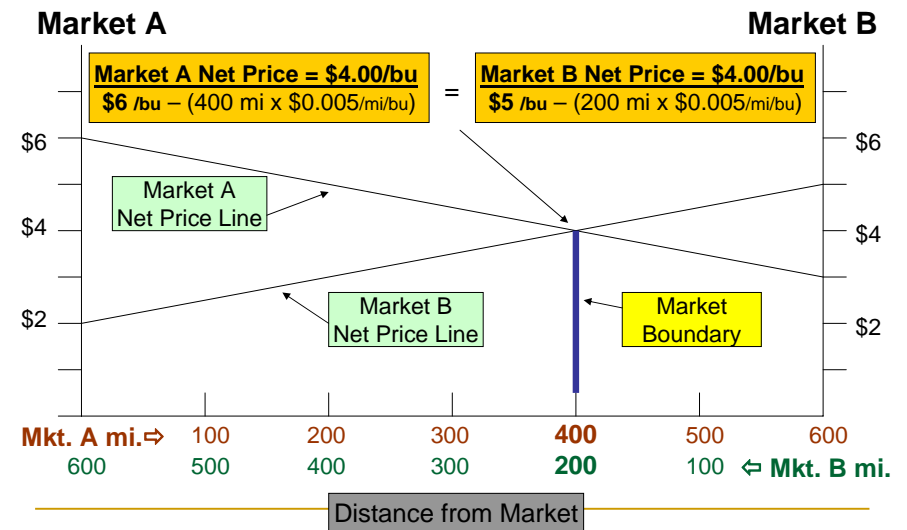
Area X ⇌ Market A / Area Y ⇌ Market B



Defining Market Boundaries

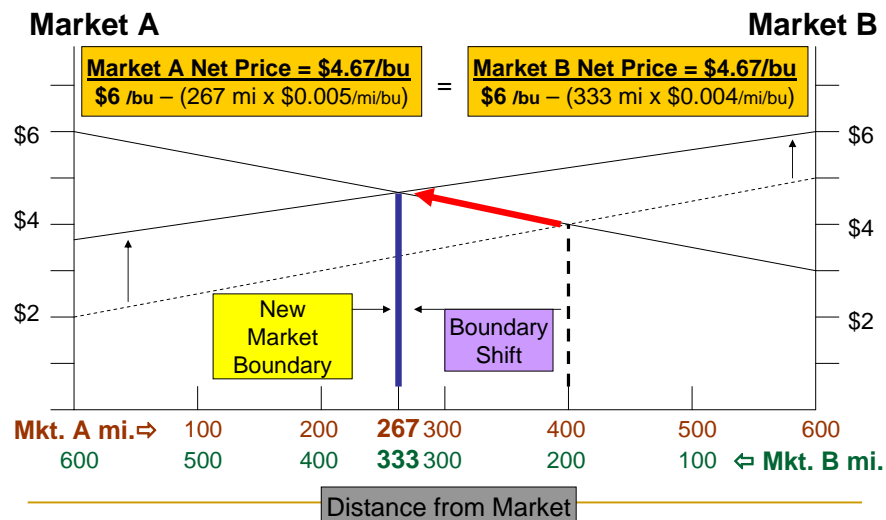
- **Boundaries:** Where the **Net Grain Prices Received** (net of transfer costs) from shipping to different markets are **equal**
 - Producers are indifferent between markets
- **Assume....**
 - Opportunity to ship grain to alternative markets
 - **No physical barriers** (rivers, mountains, state lines, etc.)
 - Transfer costs decline continuously with distance

Grain Market Boundary Example



Shifting Market Boundary

Market B: \$6.00/bu, \$0.004/mi/bu Transfer \$



Grain Price Spreads *across*
Competitive Grain Markets *in*
Kansas

Kansas Grain Sorghum \$ Spreads

Origin: Salina, Kansas, Wednesday, October 2, 2008

Location	\$Price /bu.	Vs Salina
Salina ^{Central}	\$3.99	---
Concordia ^{NC}	\$3.89	(\$0.10)
Hutchinson ^{SC}	\$3.94	(\$0.05)
Colby ^{NW}	\$3.89	(\$0.10)
Garden City ^{SW}	\$3.94	(\$0.05)
Topeka ^{EC}	\$3.99	---
Hiawatha ^{NE}	\$3.64	(\$0.35)
Columbus ^{SE}	\$3.89	(\$0.10)

Soybean Cash Markets



Kansas Soybean \$ Spreads

Origin: Salina, Kansas, Wednesday, October 2, 2008

Location	\$Price /bu.	Vs Salina
Salina ^{Central}	\$9.63	---
Concordia ^{NC}	\$9.33	(\$0.30)
Hutchinson ^{SC}	\$9.73	+\$0.10
Goodland ^{NW}	\$9.18	(\$0.45)
Garden City ^{SW}	\$9.48	(\$0.15)
Topeka ^{EC}	\$9.90	+\$0.27
Hiawatha ^{NE}	\$9.66	+\$0.03
Columbus ^{SE}	\$9.78	+\$0.15

The Economic Cost of
Transporting Grain Off-Farm *by*
Semi-Tractor/Trailer

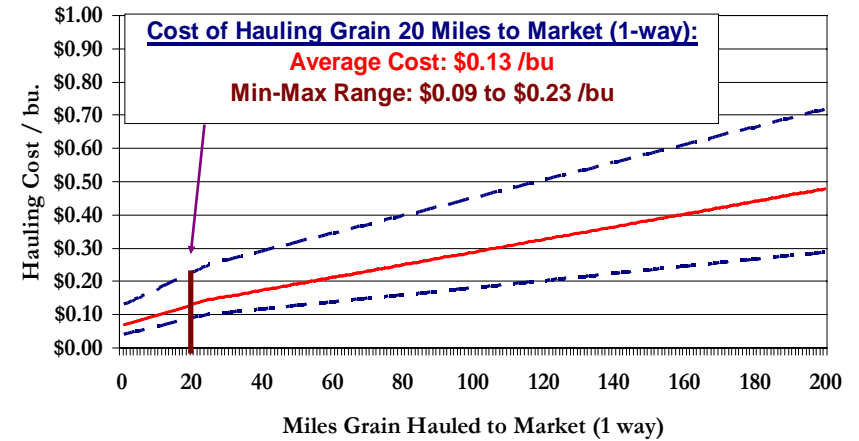
2007 Iowa Farm Custom Rate Survey

Custom Grain Trucking/Hauling Costs (March 2008)

	Average	Low	High
5 miles (1-way)	\$0.083 /bu	\$0.05 /bu	\$0.15 /bu
25 miles (1-way)	\$0.145 /bu	\$0.10 /bu	\$0.25 /bu
100 miles (1-way)	\$0.288 /bu	\$0.18 /bu	\$0.45 /bu

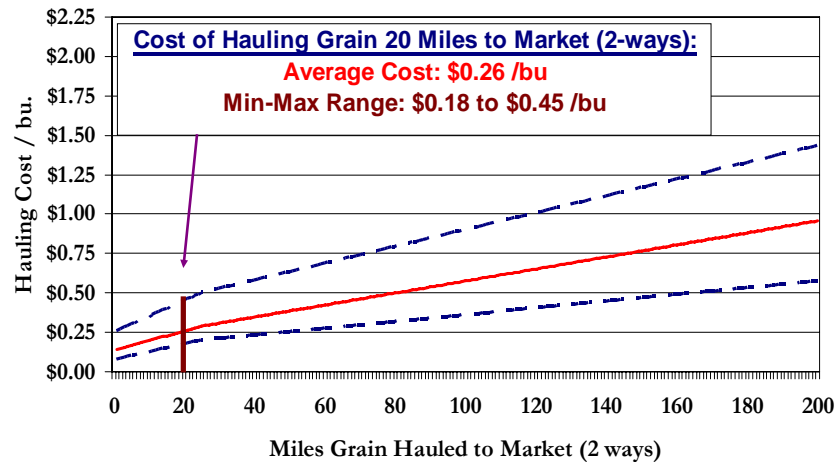
Custom Grain Hauling Costs

Iowa Custom Rate Survey – March 2008



Custom Grain Hauling Costs

Iowa Custom Rate Survey – March 2008



Grain Transportation Cost Example

Semi-Truck Expense & Use Estimates

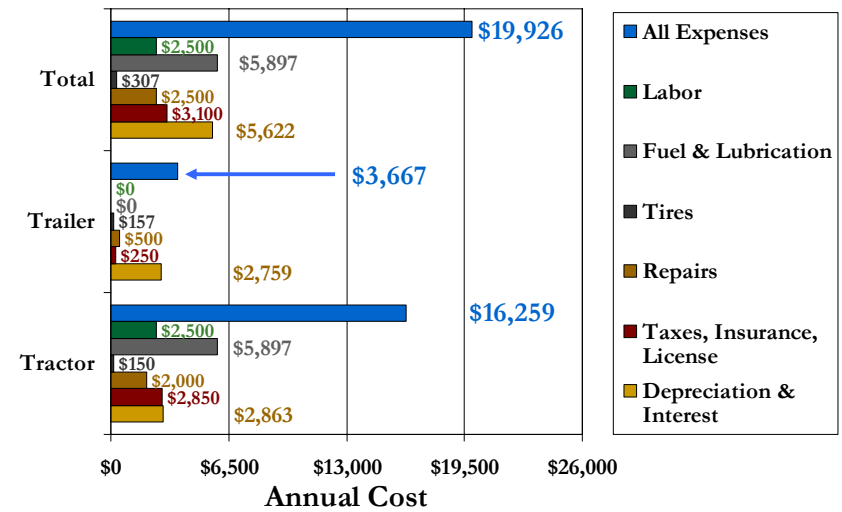
- **Purchase Price (Used)**
 - \$25,000 (\$20K - \$30K)
- **Useful Life**
 - 10 years
- **Salvage Value**
 - \$12,500 (\$10K - \$15K)
- **Repairs/Year**
 - \$2,000
- **Tire Expense (10 tires)**
 - \$400/tire, 200K miles/tire
- **Annual Use**
 - 7,500 miles
 - 200,000 bushels
- **Fuel**
 - \$3.93/gallon, 5.5 mpg
 - 45 mph average hauling speed
- **Other**
 - License-insurance: \$2,850
 - Labor \$12/hr, 8% Interest

Grain Transportation Cost (more)

Semi-Trailer Expense Estimates

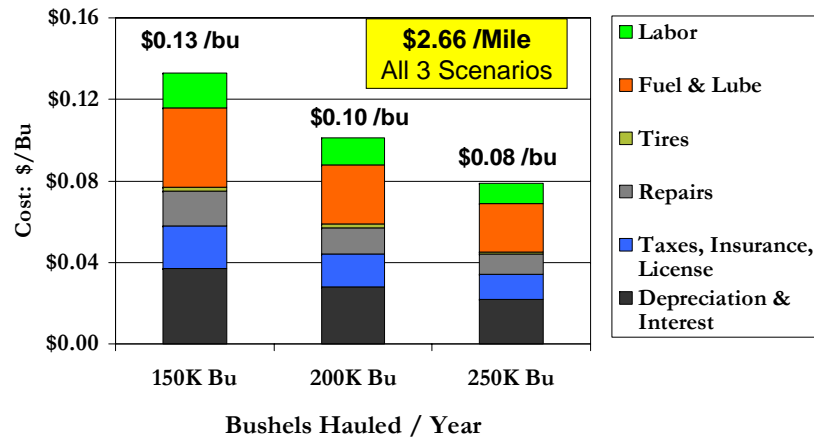
- **Purchase Price (Used)**
 - \$25,000 (\$20K - \$30K)
- **Useful Life**
 - 10 years
- **Salvage Value**
 - \$14,000 (\$13K - \$15K)
- **Repairs/Year**
 - \$500 (\$400-\$500)
- **Tire Expense** (8 tires)
 - \$262/tire, 100K miles/tire
- **Software Analysis Tool**
 - Grain Truck Transportation Cost Calculator
 - Iowa State University Extension (Edwards)

Example: Semi-Truck/Trailer Costs



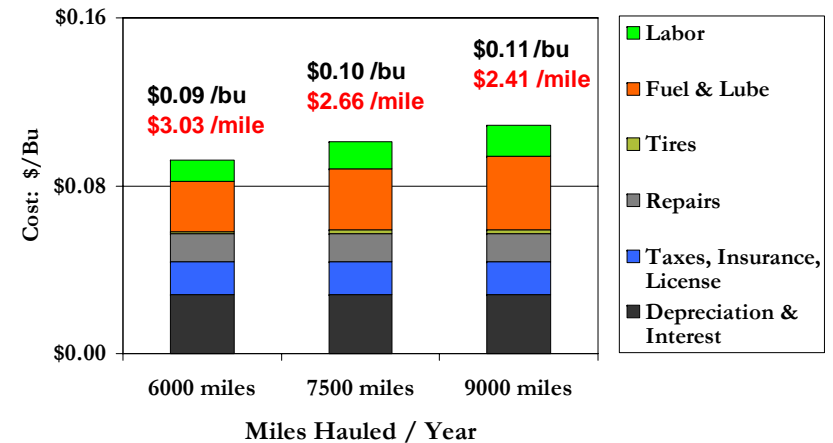
Grain Trucking Example: \$Cost/bu.

Semi-Tractor/Trailer (7,500 miles/yr)



Grain Trucking Example: \$Cost/bu.

Semi-Tractor/Trailer (200,000 bushels/yr)



Wheat Destination: South Central KS

2-Way Trips (Empty Backhauls Included)

- Operating Costs: \$1.¹⁶³ /mile or \$0.04⁴ /bu.
 - Total Cost: \$2.⁶⁵⁷ /mile or \$0.10 /bu.
-
- **Colby ⇒ Salina: 406 miles**
 - Operating Cost = \$472 / Total Cost = \$1,079 per load
 - **Scott City ⇒ Hutchinson: 428 miles**
 - Operating Cost = \$498 / Total Cost = \$1,137 per load
 - **Chanute ⇒ Wichita: 242 miles**
 - Operating Cost = \$281 / Total Cost = \$643 per load

Corn Destination: Southwest Kansas

2-Way Trips (Empty Backhauls Included)

- Operating Costs: \$1.¹⁶³ /mile or \$0.04⁴ /bu.
 - Total Cost: \$2.⁶⁵⁷ /mile or \$0.10 /bu.
-
- **Colby ⇒ Garden City: 210 miles**
 - Operating Cost = \$244 / Total Cost = \$558 per load
 - **Hutchinson ⇒ Dodge City: 252 miles**
 - Operating Cost = \$293 / Total Cost = \$670 per load
 - **Pratt ⇒ Cimarron: 200 miles**
 - Operating Cost = \$233 / Total Cost = \$531 per load

The Estimated Profitability of Hauling Kansas Grain As of September 26, 2008

Wheat \$ Differences Less Transportation

Great Bend to Hutchinson; No In-Out Cost (10/2/08)

Location	\$/bu.	Vs Colby
Great Bend ^{SW}	\$6.17	---
Hutchinson ^{SC} (81 mi. 1-way)	\$6.59	<u>Dif: +\$0.42</u>
VC: [81 x \$1.163 /mi] ÷ 850 bu = \$0.11 /bu		Net: +\$0.31
TC: [81 x \$2.657 /mi] ÷ 850 bu = \$0.25 /bu		Net: +\$0.17
Hutchinson ^{SC} (162 mi. 2-way)		Net: +\$0.20
VC: [162 x \$1.163 /mi] ÷ 850 bu = \$0.22 /bu		Net: (\$0.09)
TC: [162 x \$2.657 /mi] ÷ 850 bu = \$0.51 /bu		

Corn \$ Differences Less Transportation

Colby to Garden City; No In-Out \$; 10/2/08

Location	\$/bu.	Vs Colby
Colby ^{NW}	\$4.51	---
Garden City ^{SW} (105 mi. 1-way) VC: [105 x \$1.163 /mi] ÷ 950 bu = \$0.13 /bu TC: [105 x \$2.657 /mi] ÷ 950 bu = \$0.29 /bu	\$4.65	<u>Dif: +\$0.14</u> Net: +\$0.01 Net: (\$0.15)
Garden City ^{SW} (210 mi. 2-way) VC: [210 x \$1.163 /mi] ÷ 950 bu = \$0.26 /bu TC: [210 x \$2.657 /mi] ÷ 950 bu = \$0.59 /bu		Net: (\$0.12) Net: (\$0.45)

Milo \$ Differences Less Transportation

Hays to Salina; No In-Out \$; 10/2/08

Location	\$/bu.	Vs Colby
Hays ^{Central}	\$3.84	---
Salina ^{Central} (98 mi. 1-way) VC: [98 x \$1.163 /mi] ÷ 950 bu = \$0.12 /bu TC: [98 x \$2.657 /mi] ÷ 950 bu = \$0.27 /bu	\$3.99	<u>Dif: +\$0.15</u> Net: +\$0.03 Net: (\$0.12)
Salina ^C (196 mi. 2-way) VC: [196 x \$1.163 /mi] ÷ 950 bu = \$0.24 /bu TC: [196 x \$2.657 /mi] ÷ 950 bu = \$0.55 /bu		Net: (\$0.09) Net: (\$0.40)

Soybean \$ Differences Less Hauling Cost

Abilene to Emporia; No In-Out \$; 10/2/08

Location	\$/bu.	Vs Colby
Abilene ^C	\$9.68	---
Emporia ^{EC} (119 mi. 1-way) VC: [119 x \$1.163 /mi] ÷ 850 bu = \$0.16 /bu TC: [119 x \$2.657 /mi] ÷ 850 bu = \$0.37 /bu	\$10.13	<u>Dif: +\$0.45</u> Net: +\$0.29 Net: +\$0.08
Emporia ^{EC} (238 mi. 2-way) VC: [238 x \$1.163 /mi] ÷ 850 bu = \$0.33 /bu TC: [238 x \$2.657 /mi] ÷ 850 bu = \$0.74 /bu		Net: +\$0.12 Net: (\$0.29)

Grain Handling, Transportation and Competitive Grain Markets

- Grain Price Competition in Local Markets
- Kansas Cash Grain Price Spreads
- Grain Hauling-Transportation Costs
 - Survey Data
 - Semi-tractor & trailer example
- Profitability of Hauling Kansas Grain

Questions *or* Comments?

K-State Extension Agricultural Economics:

www.AgManager.info