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## **The Role of Quality Characteristics in Pricing Hard Red Winter Wheat**

**Shane Roberts, Kate Brooks, Lia Nogueira, Cory Walters – University of Nebraska-Lincoln**  
[shane.roberts@huskers.unl.edu](mailto:shane.roberts@huskers.unl.edu), [kbrooks4@unl.edu](mailto:kbrooks4@unl.edu), [lia.nogueira@unl.edu](mailto:lia.nogueira@unl.edu), [cwalters7@unl.edu](mailto:cwalters7@unl.edu)

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# Role of Quality Characteristics in Pricing Hard Red Winter Wheat (HRW)

Shane Roberts, Kate Brooks, Lia Nogueira, Cory Walters, University of Nebraska-Lincoln

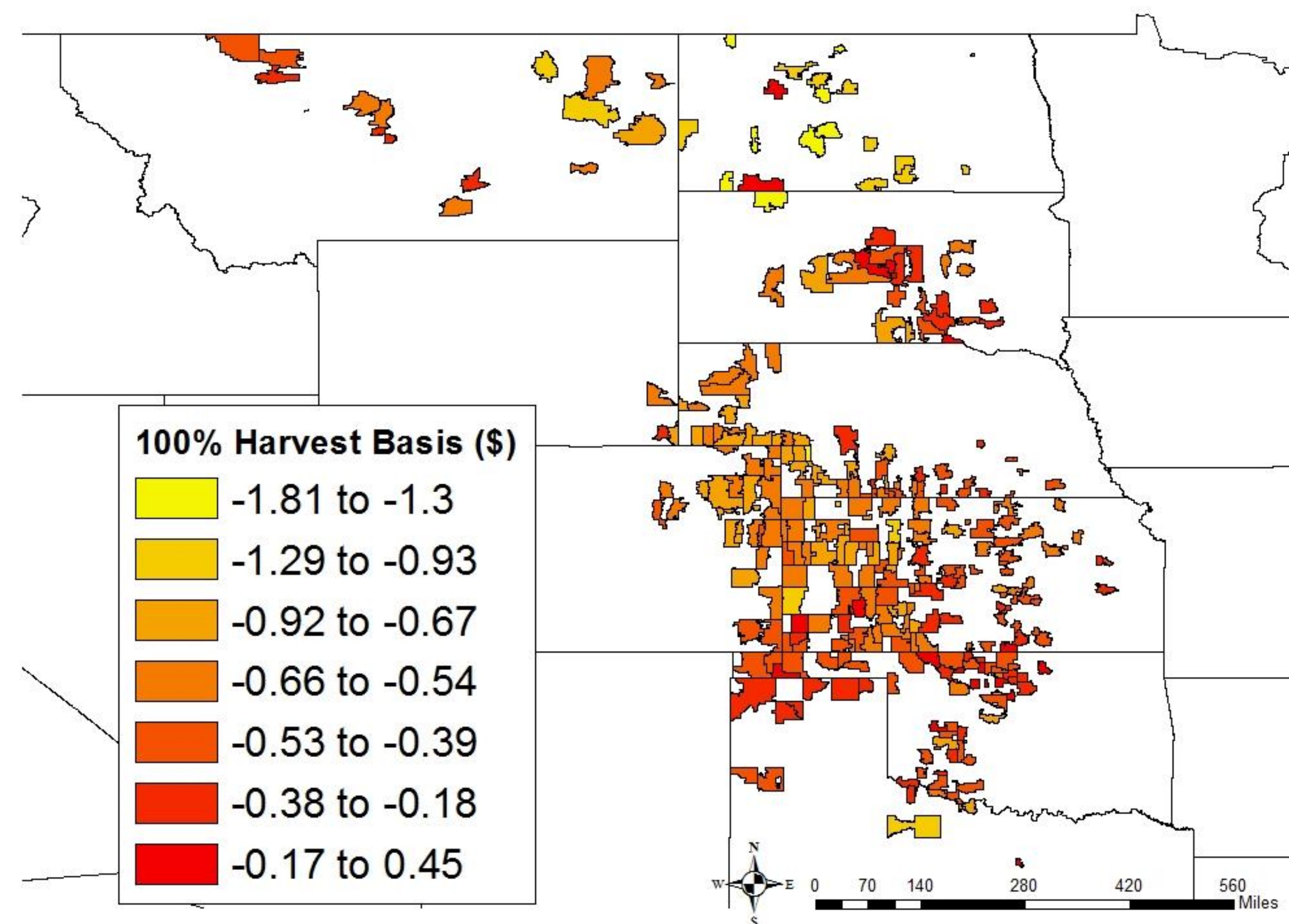
## Motivation:

- Milling companies utilize milling and baking, or end-use, quality characteristic data from wheat testing labs to inform their purchasing decisions
  - HRW producers only see the conventional characteristics used by the Federal Grain Inspection Service
- There appears to be a major disconnect between what farmers think they are paid for and what miller's value

## Research Question:

- Do end-use quality characteristics affect the local price of HRW?

## 100% Harvest Basis by Zip Code:



## Data:

- Characteristic data at the zip code level from Plains Grains Inc for 2012-2019
- Prices at the 50% and 100% harvest completion periods from DTN for 2012-2019
- Transportation cost data from USDA-AMS

## Model:

- Following Ladd and Martin (1976) Input Characteristics Model (ICM) and Espinosa and Goodwin (1991) application of ICM on the Kansas HRW market
- Zip code level fixed effects; harvest time analysis ( $i$ = Zip,  $t$ =Year)

$$Price_{i,t} = \beta_0 + \alpha_i + \sum_{j=1}^4 \beta_j Conv_{i,t} + \sum_{j=5}^{10} \beta_j Milling_{i,t} + \sum_{j=11}^{16} \beta_j Baking_{i,t} + \sum_{t=2012}^{2019} \theta_t Year_t + \rho Transportation_{i,t} + \varepsilon_{i,t}$$

## Implications:

- We find evidence that end-use characteristics impact the price of HRW
- Results suggest that farmers are paid for end-use quality implicitly through price rather than explicitly with premiums/discounts
- Protein became significant in the later harvest period, indicating temporal component to pricing and the importance of new market quality information

## Marginal Effects:

Variables	Harvest Prices	
	50%	100%
<b>Conventional Characteristics:</b>		
Test Weight (lb/bu)	0.335 **	0.615 ***
Moisture (%)	0.004	0.011
Protein (%)	0.048	0.145 ***
Falling Number (sec)	-0.036	-0.101 ***
<b>Milling Characteristics:</b>		
Thousand Kernel Weight (g)	0.025	-0.045
Large Kernels (%)	-0.071 ***	-0.110 ***
SKCS Weight Standard Deviation (mg)	0.162 ***	0.117 **
SKCS Diameter Standard Deviation (mm)	-0.183 ***	-0.180 ***
SKCS Hardness (-20-120)	-0.146 ***	-0.182 ***
SKCS Hardness Standard Deviation (-20-120)	0.050 *	0.026
<b>Baking Characteristics:</b>		
P/L Ratio	0.030 **	0.067 ***
Water Absorption (%)	0.891 ***	1.072 ***
Mixing Time (min)	-0.075 ***	-0.116 ***
Loaf Volume (cc)	-0.103 *	-0.026
Crumb Grain (0-6)	0.055 ***	0.038 **
Mixing Tolerance (0-6)	-0.007	-0.010
<b>Transportation Cost</b>		
50% Harvest (\$)	-0.122 **	
100% Harvest (\$)		-0.111 *
N=1329, Zip Code FE, Year Effects, *** p<0.01, ** p<0.05, * p<0.1		

•Espinosa, J. A. & B. K. Goodwin. 1991. "Hedonic Price Estimation for Kansas Wheat Characteristics." *Western Journal of Agricultural Economics* 16(1):72-85.

•Ladd, G. W. & M. B. Martin. 1976. "Prices and Demands for Input Characteristics." *American Journal of Agricultural Economics* 58(1):21-30.

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