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DIVISION OF AGRICULTURE

RESEARCH & EXTENSION

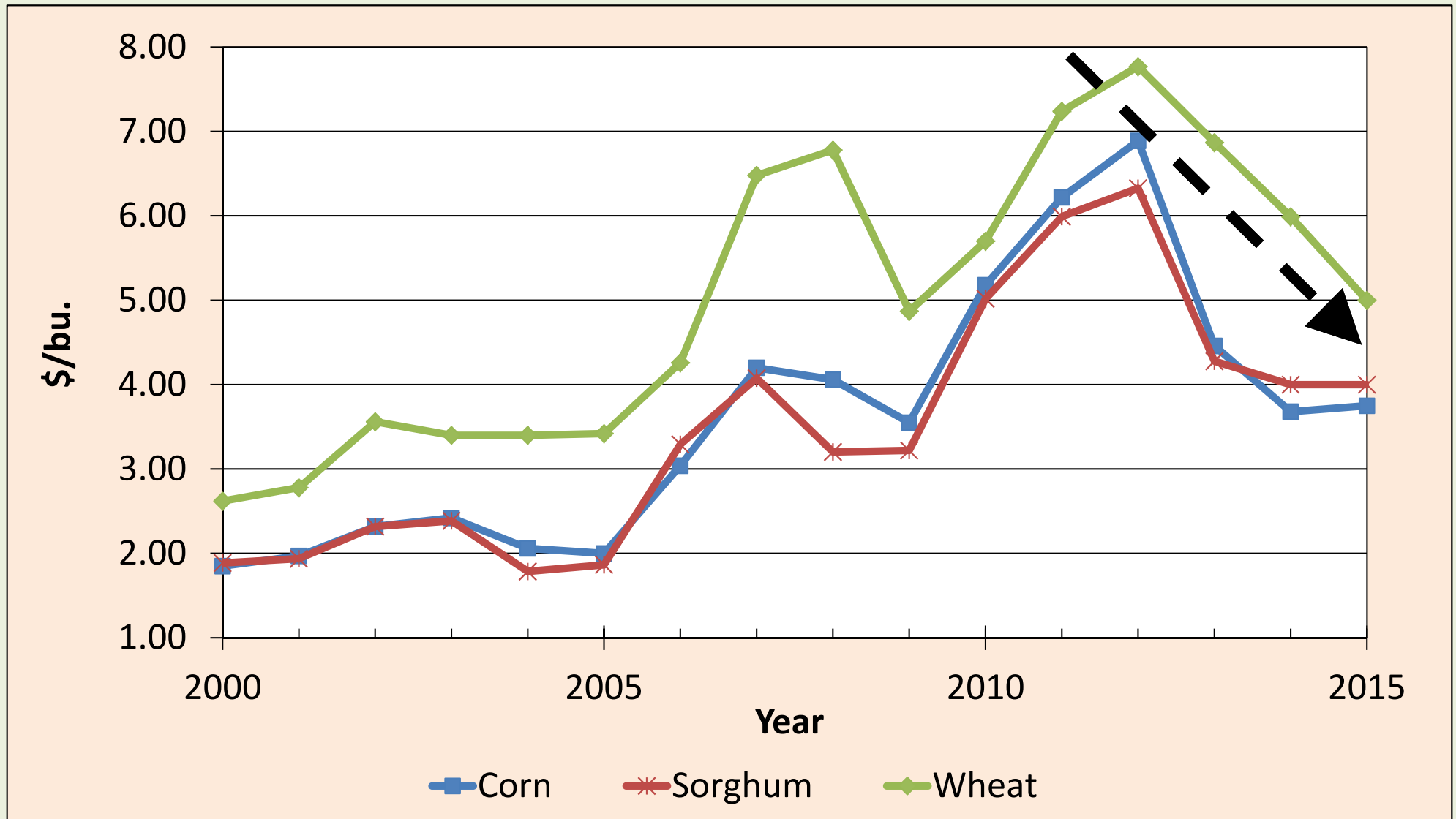
University of Arkansas System

**Archie Flanders
University of Arkansas
Northeast Research and Extension Center
Keiser, AR**

Corn, Grain Sorghum, and Wheat Outlook

**2015 Southern Region Outlook Conference
Atlanta, GA
September 23, 2015**

Commodity Prices, 2000-2015F



Background

- Corn and Grain Sorghum
 - The broad category of **coarse grains** as defined by the USDA includes corn, grain sorghum, barley, oats, rye, millet and mixed grains.
 - USDA **feed grains** are corn, grain sorghum, barley, and oats
 - Corn is 85% of U.S. feed grain planted acreage
- Wheat
 - Classes are hard red winter, hard red spring, soft red winter, white, and durum
 - Classes have specialized uses with limited substitution

2015 Use by Percentage

Use	Corn	Sorghum
Exports	13	78
Ethanol	38	
Food, Seed & Other Industrial	10	3
Feed & Residual	39	19
Total	100	100

U.S. Corn in the Global Market

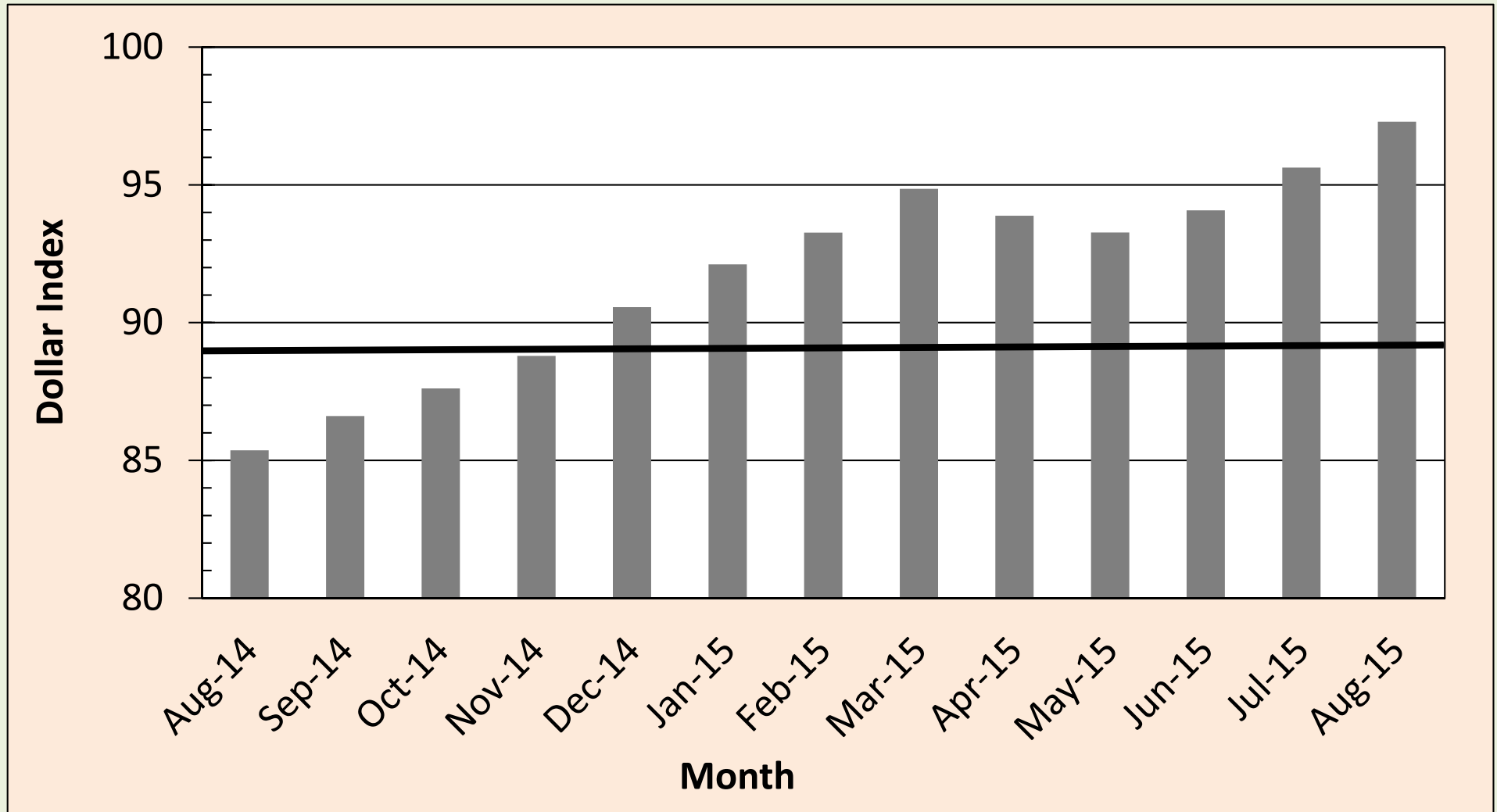
- U.S. accounts for 35% of global corn production
- 13% of U.S. corn production is exported
- U.S. accounts for 38% of global corn exports
- **U.S. depends upon global corn demand to maintain domestic equilibrium supply and demand**

Corn: Price = f(X), 1975-2014

Variable (natural logarithm)	Estimate = Elasticity
Intercept	3.576*
Total Cost	0.868*
Yield	-0.672*
U.S. S/U	-0.194*
ROW S/U	-0.203*
Dollar	-0.595*
Trend	-0.016*
Policy Dummy = 1, 1978-1985	0.177*
Price Dummy = 1, 2006-2014	0.304*
R ² = 0.951 DW = 1.836	*Statistically Significant

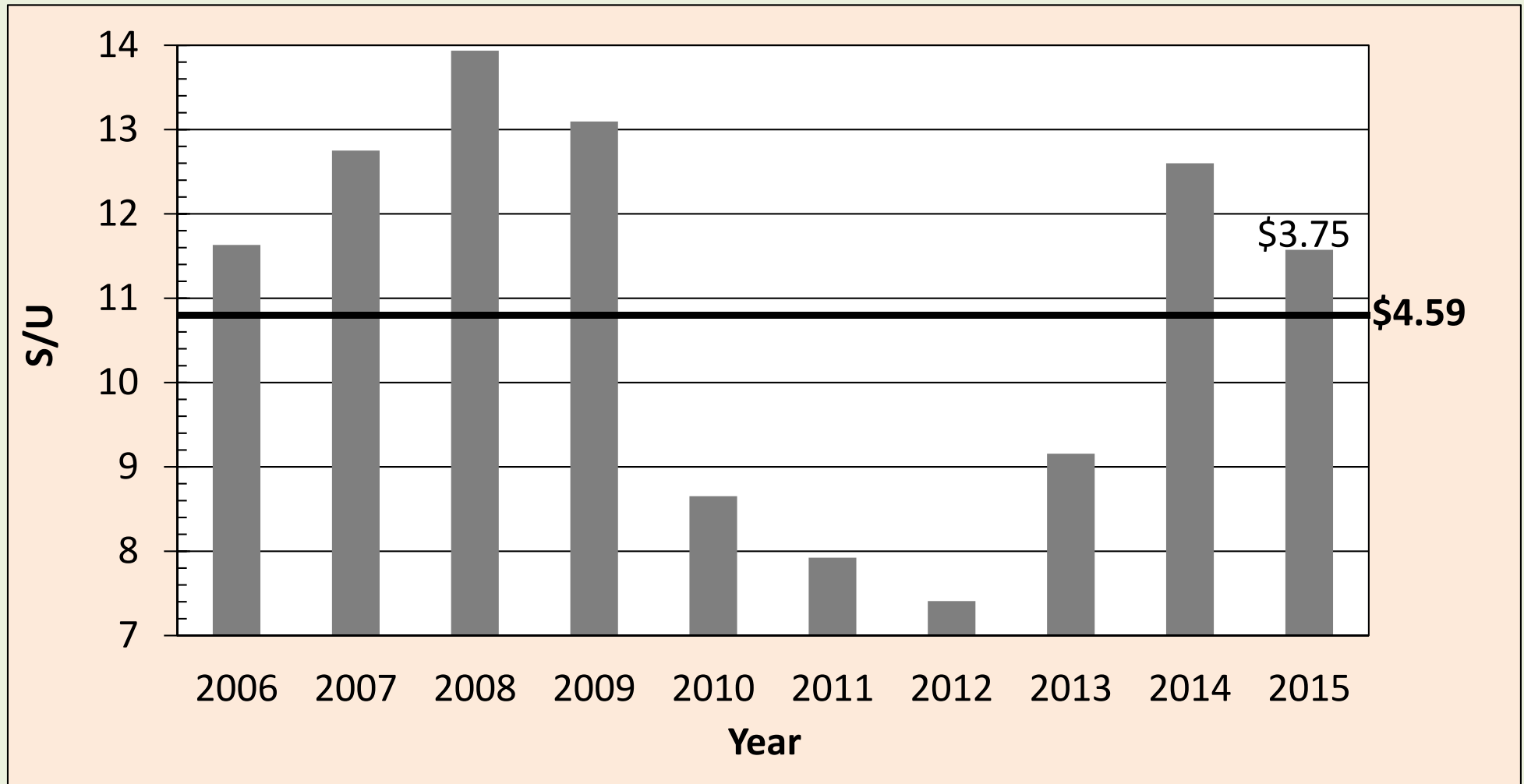
Real Broad Dollar Index

2006-2014 Average = 88

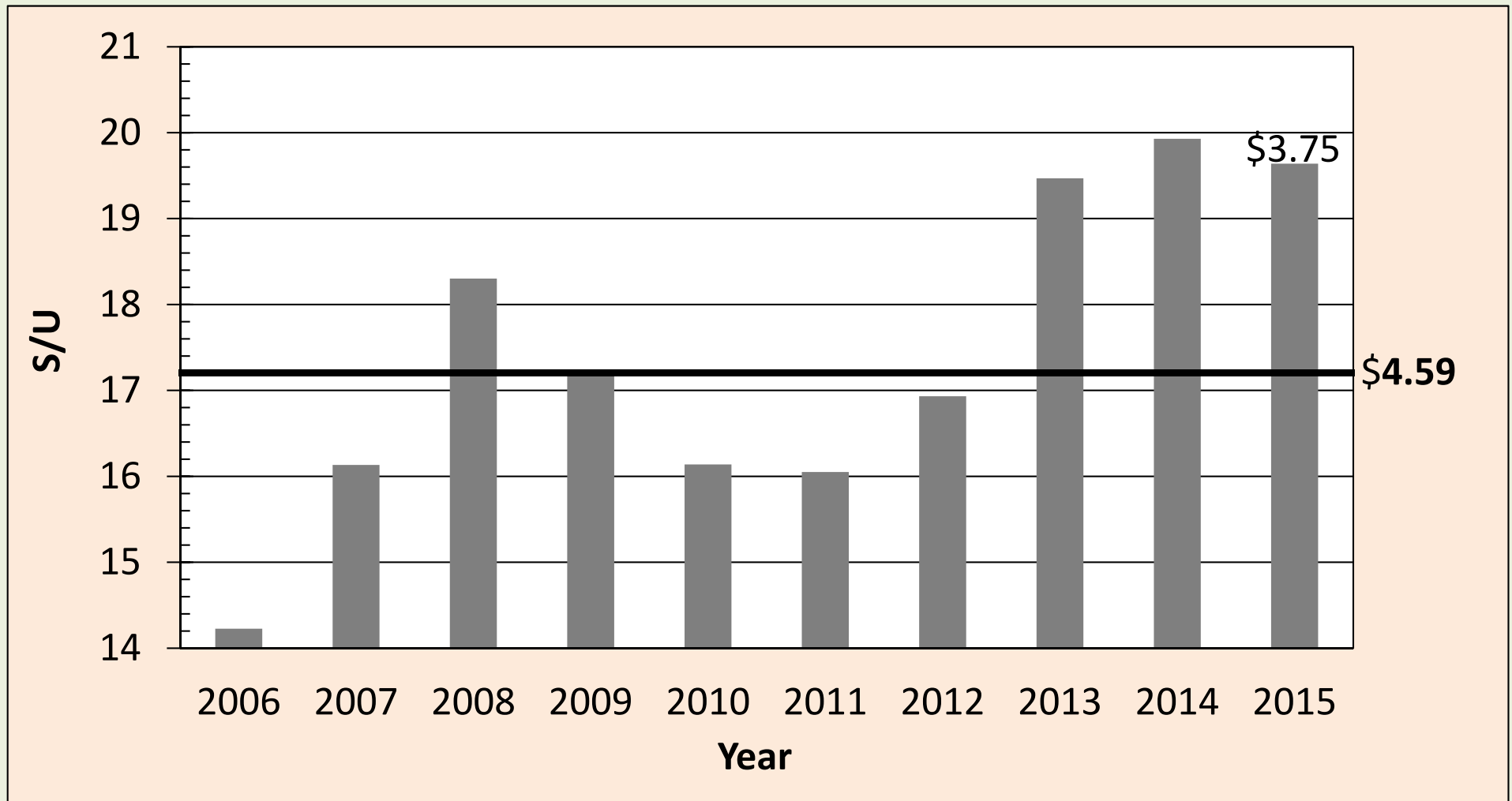


Corn U.S. Stocks-to-Use & Price

2006-2014 Average = 10.8 & \$4.59/bu.

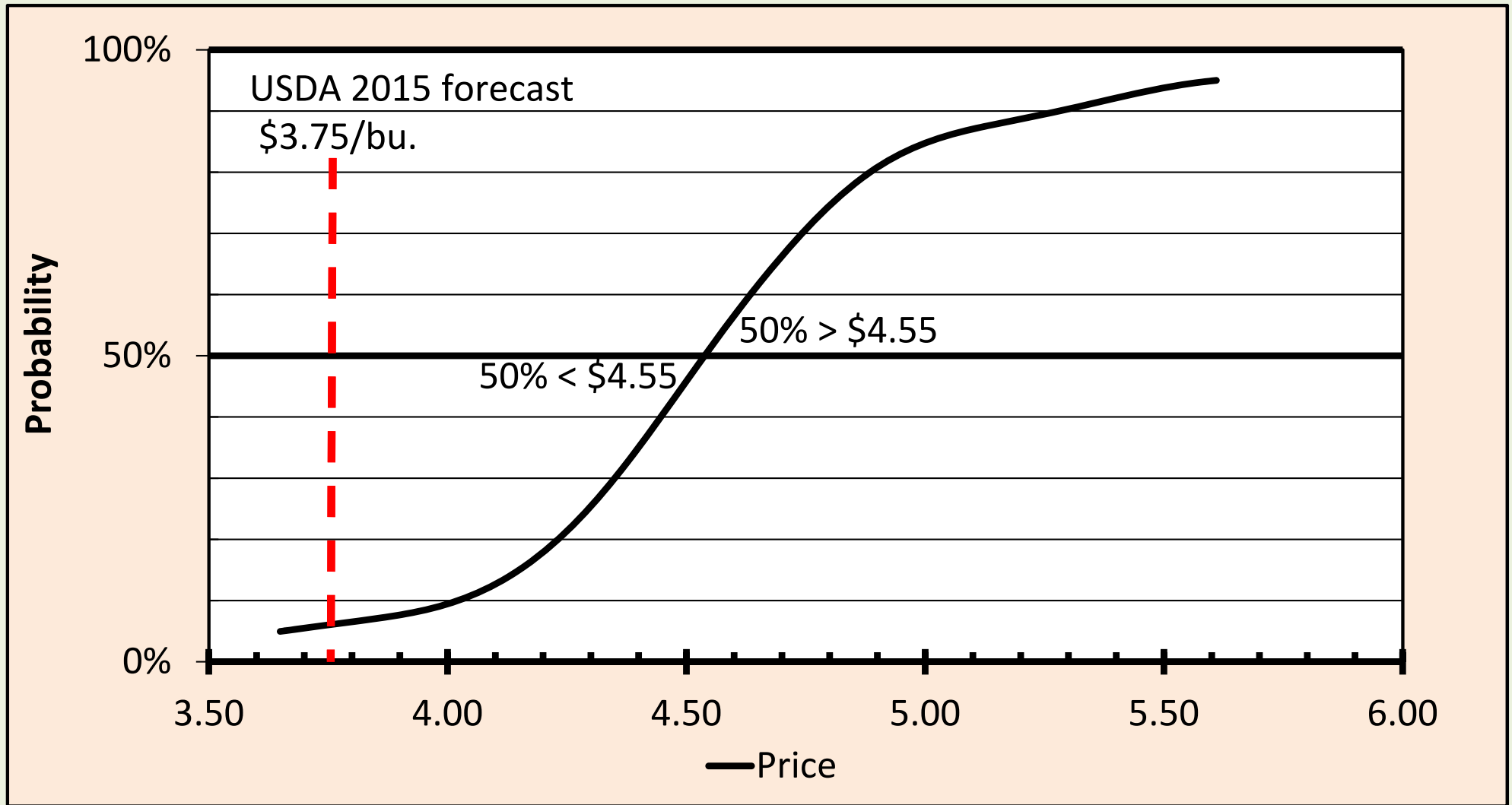


Corn ROW Stocks-to-Use & U.S. Price 2006-2014 Average = 17.2 & \$4.59/bu.



U.S. Corn Price Equilibrium CDF

Supply > Demand: U.S. & ROW S/U



Corn: Planted Acreage = $f(S/U, X)$

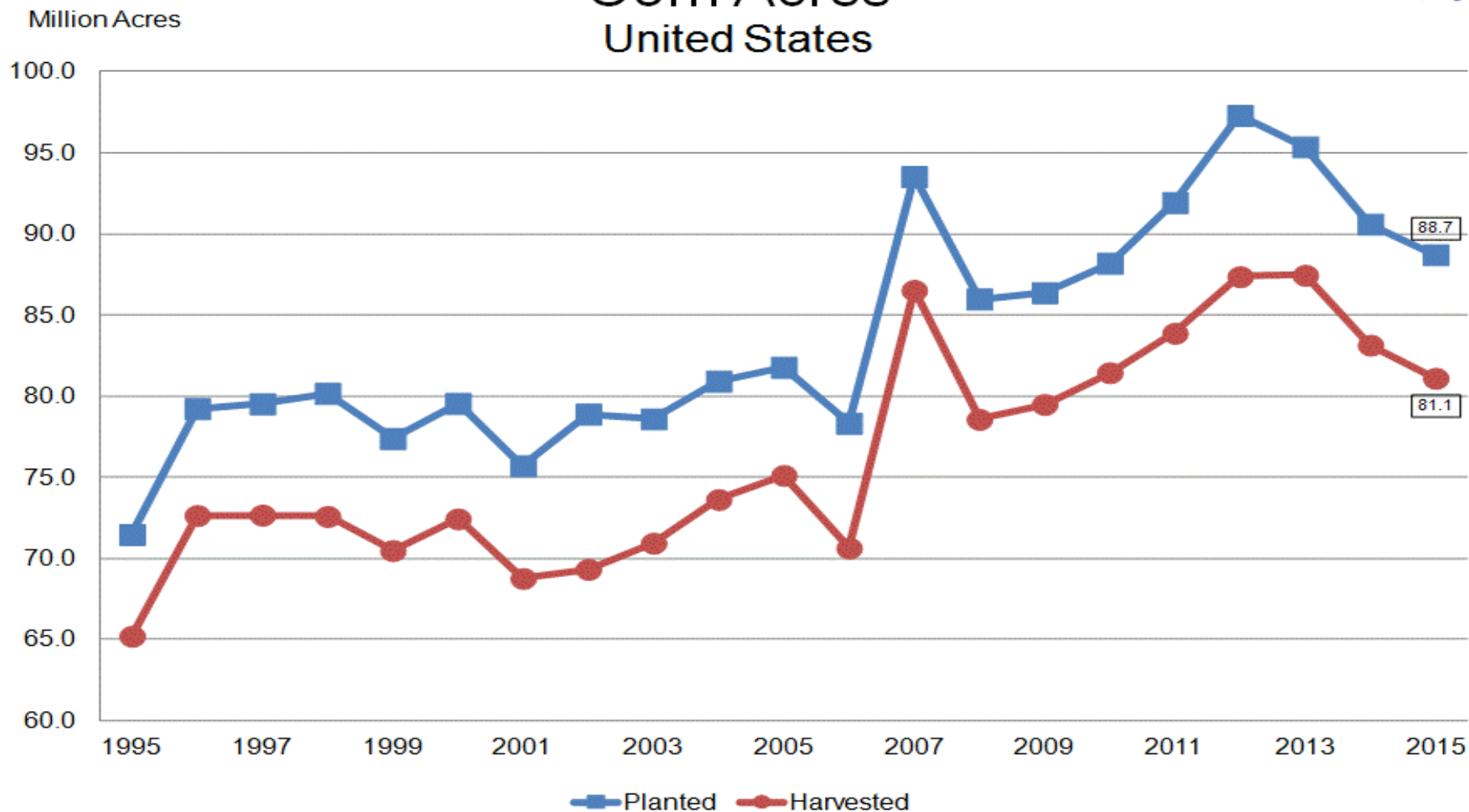
1975-2014

Variable (natural logarithm)	Estimate = Elasticity
Intercept	7.938*
U.S. S/U	-0.071*
Trend	-0.001
Policy Dummy = 1, 1978-1985	0.029
Price Dummy = 1, 2006-2014	0.059
Lag Acreage (IV variable)	0.573*
R ² = 0.734 DW = 2.078	*Statistically Significant

Corn Acreage & Equilibrium S/U



Corn Acres United States



USDA-NASS
9-11-15

U.S. 2016F Production Costs

USDA ERS Costs & Returns

Expense	Corn (162 bu.)
Operating Expenses	337.09
Bu. Cost	2.08
Total Costs less Land	500.82
Bu. Cost	3.09
Total Costs	682.18
Bu. Cost	4.21
Total Costs include opportunity cost of land.	

Northern Delta Corn Budget, 2015

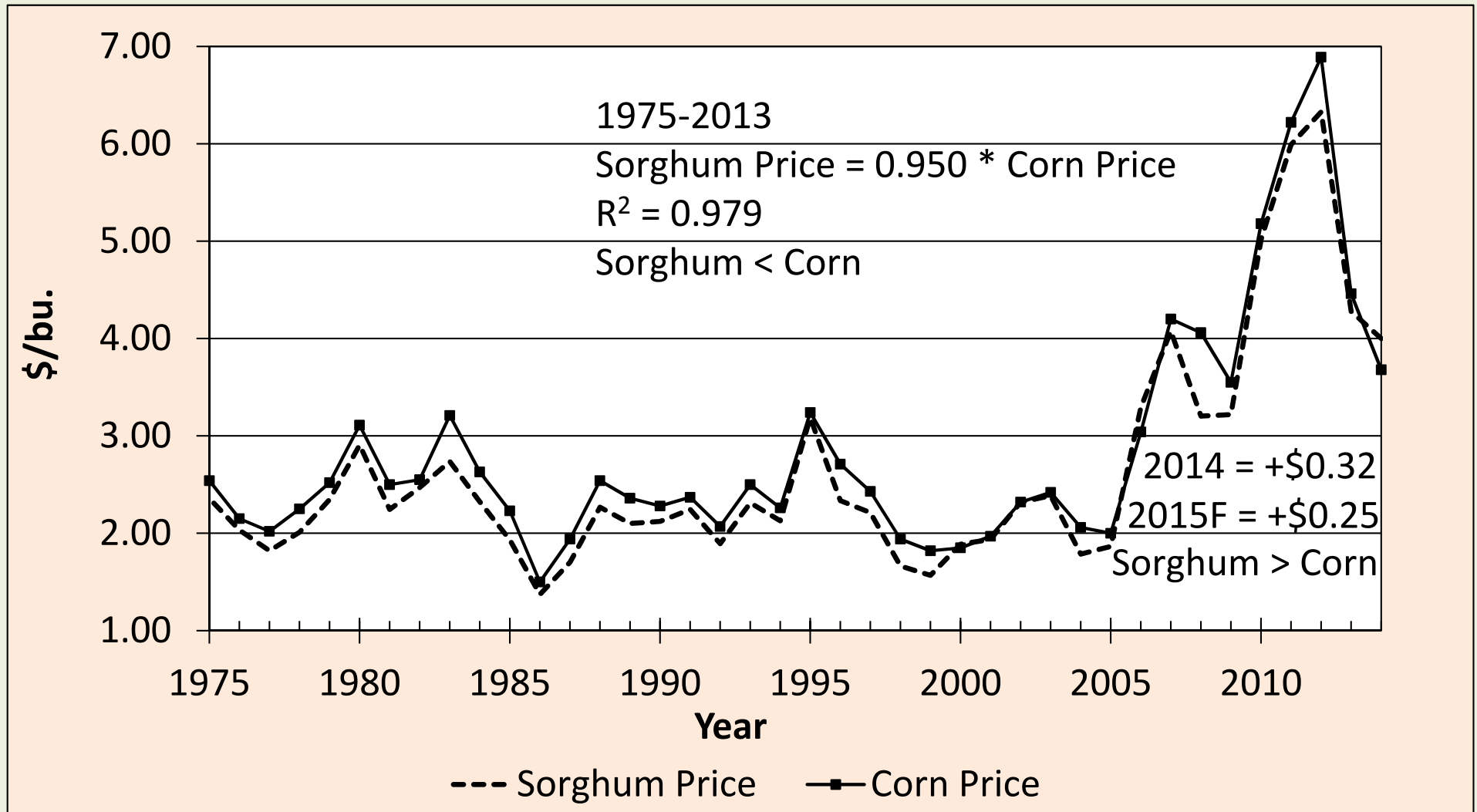
Receipts	Corn	Corn
Yield (bu.)	220	220
Price (\$/bu.)	3.75	3.75
Grower Share, %	100%	75%
Crop Revenue	825.00	618.75
Operating Expenses		
Input Costs	409.32	409.32
Crop Insurance	0.00	0.00
Other Operating Expenses	47.98	46.24
Total Operating Expenses	457.30	455.56
Post-harvest Expenses	99.00	99.00
Net Operating Expenses	556.30	554.56
Cash Land Rent	0.00	0.00
Returns to Operating Expenses	268.70	64.19
Fixed Costs	84.98	73.54
Total Specified Expenses	641.28	628.10
Returns to Specified Expenses	183.72	-9.35
Operating Expenses/bu.	2.53	2.52
Total Expenses/bu.	2.91	2.86
Land Cost/acre	0.00	206.25
Land Cost/bu.	0.00	0.94

Corn Demand & Equilibrium S/U

- Domestic food and other uses have a stable demand
- Ethanol demand has stability due to biofuels mandates
 - 2014 - 15.9 billion gallons
 - 2015 - 16.3 billion gallons
 - 2016 - 17.4 billion gallons
- **Domestic feed usage and exports for feed have potential for increasing demand to achieve equilibrium S/U**

Sorghum

S/U is not significant in the Price Model



Sorghum

- Historically, sorghum price trends with corn price at a discount
- Trend is at a premium to corn price in 2014 and 2015F
- Northern Delta forward contract premium at \$0.75/bu. (\$5.00 - \$4.25) over corn in January 2015;
China non-GMO demand
- Expectations in Northern Delta are that 2015 premium over corn will not continue

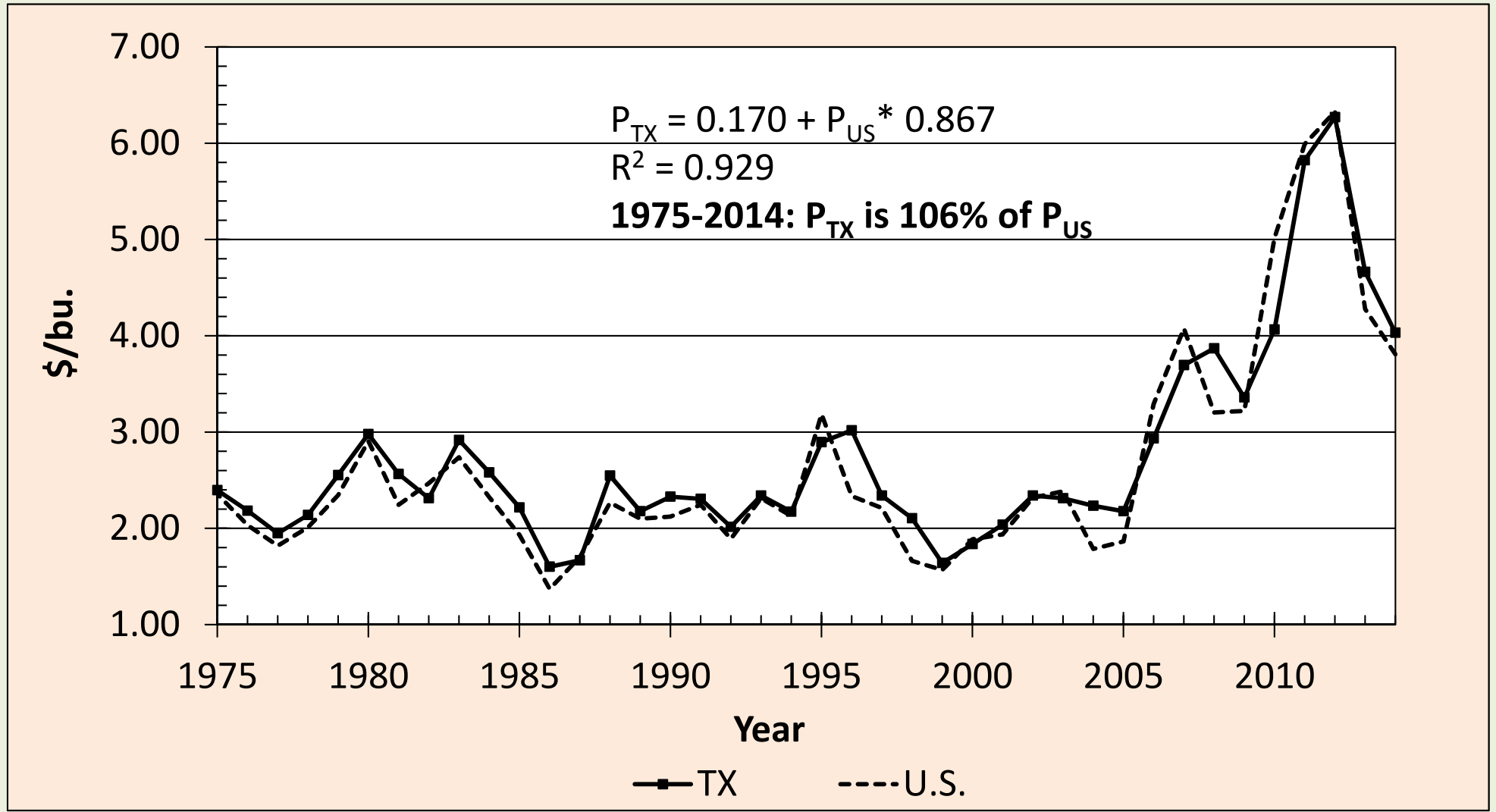
Sorghum

- Drought tolerance is superior to corn
- Lower production cost/acre than corn
- Net returns could be superior to corn in regions with stressful growing conditions
- Not desired as a poultry feed, corn is preferred
 - less broiler weight gain than corn
 - white egg yolks from layers
- Optimal domestic potential is use as a cattle feed

Sorghum Acreage

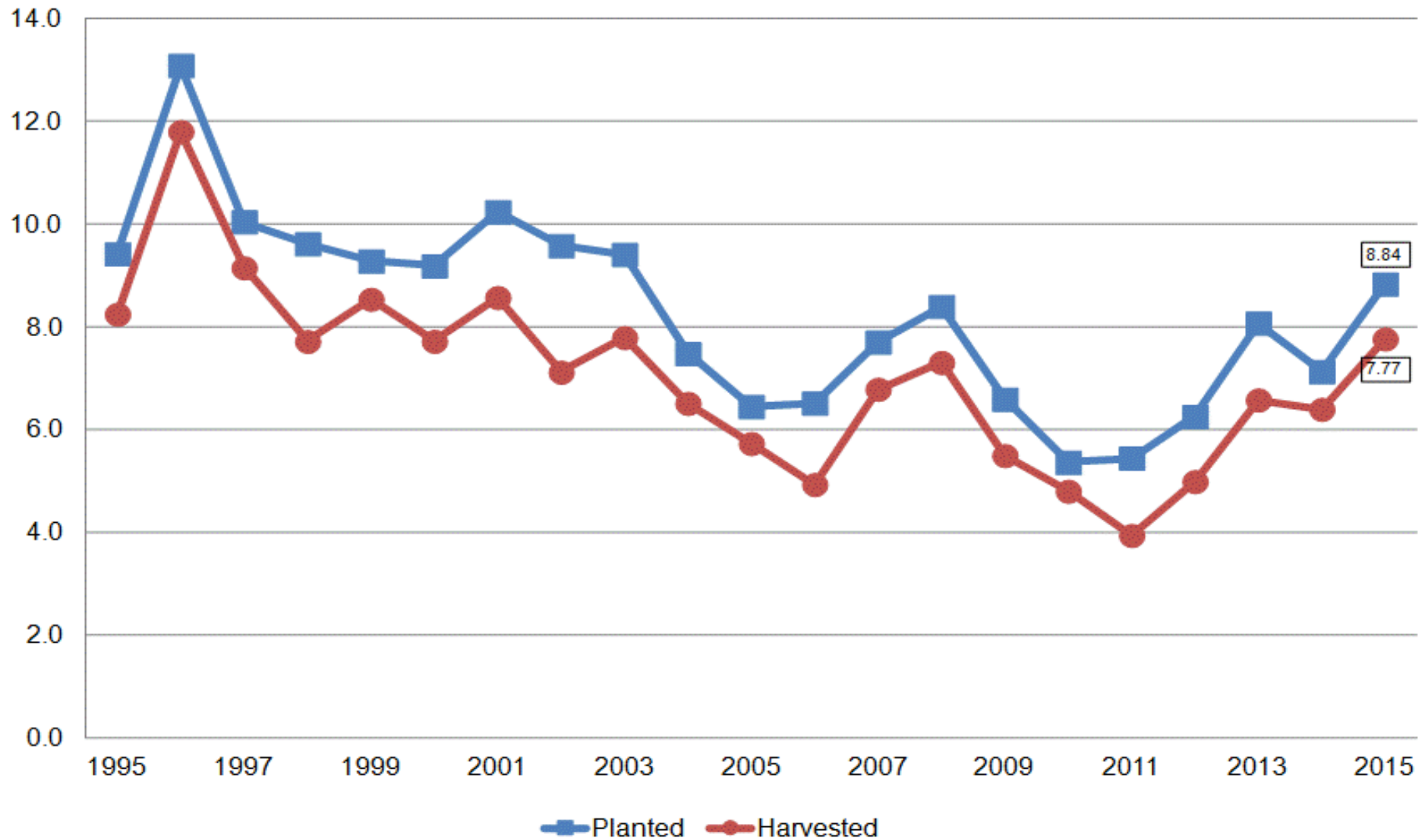
State	Harvested Acres 2015F	Percent 2015/2014
Arkansas	480,000	291%
Georgia	26,000	113%
Louisiana	82,000	85%
Mississippi	95,000	90%
Oklahoma	430,000	139%
Texas	2,700,000	120%

Sorghum Price, Texas & U.S.



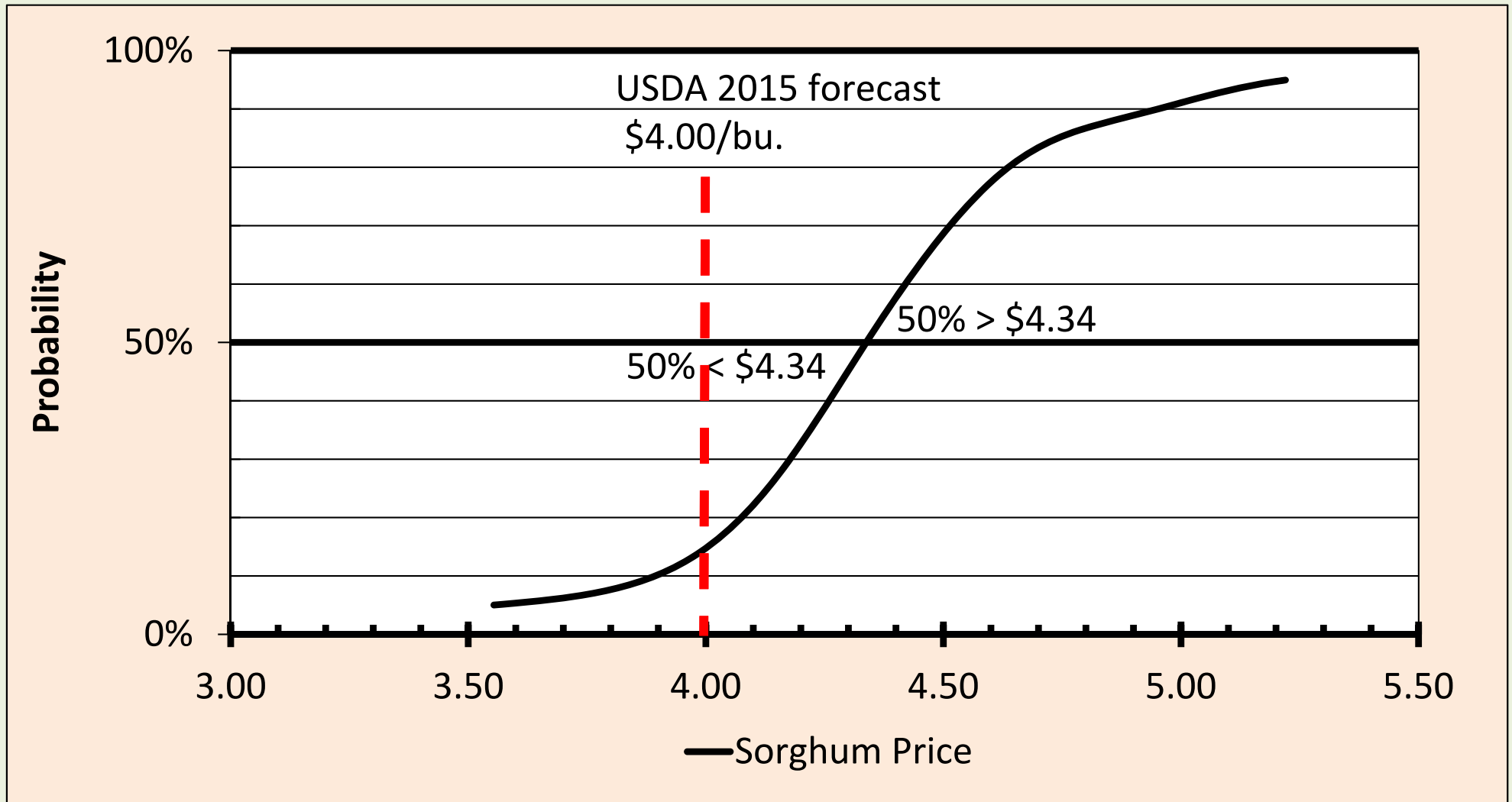
Sorghum Acres United States

Million Acres



USDA-NASS
6-30-15

U.S. Sorghum Price Equilibrium CDF Trends with Corn Price to Equilibrium



Corn and Sorghum Outlook

- Corn acreage is adjusting to meet equilibrium price
 - Some recently added acreage returns to prior use
 - General attrition of acreage for development near Midwestern metropolitan areas
- Expanding cattle supply leads to increased feed demand
 - Decreased current slaughter indicates expansion
 - Herd expansion after periods of liquidation due to pasture and hay droughts
 - Low grain prices → attractive margins for feed lots; broiler & pork production have outlooks for expansion
- Sorghum price will trend with corn price
 - Slight discount? Continues historical relationship
 - Slight premium?

2015 Wheat Use by Percentage

Use	Wheat
Exports	42
Food	45
Seed	3
Feed & Residual	10
Total	100

U.S. Wheat in the Global Market

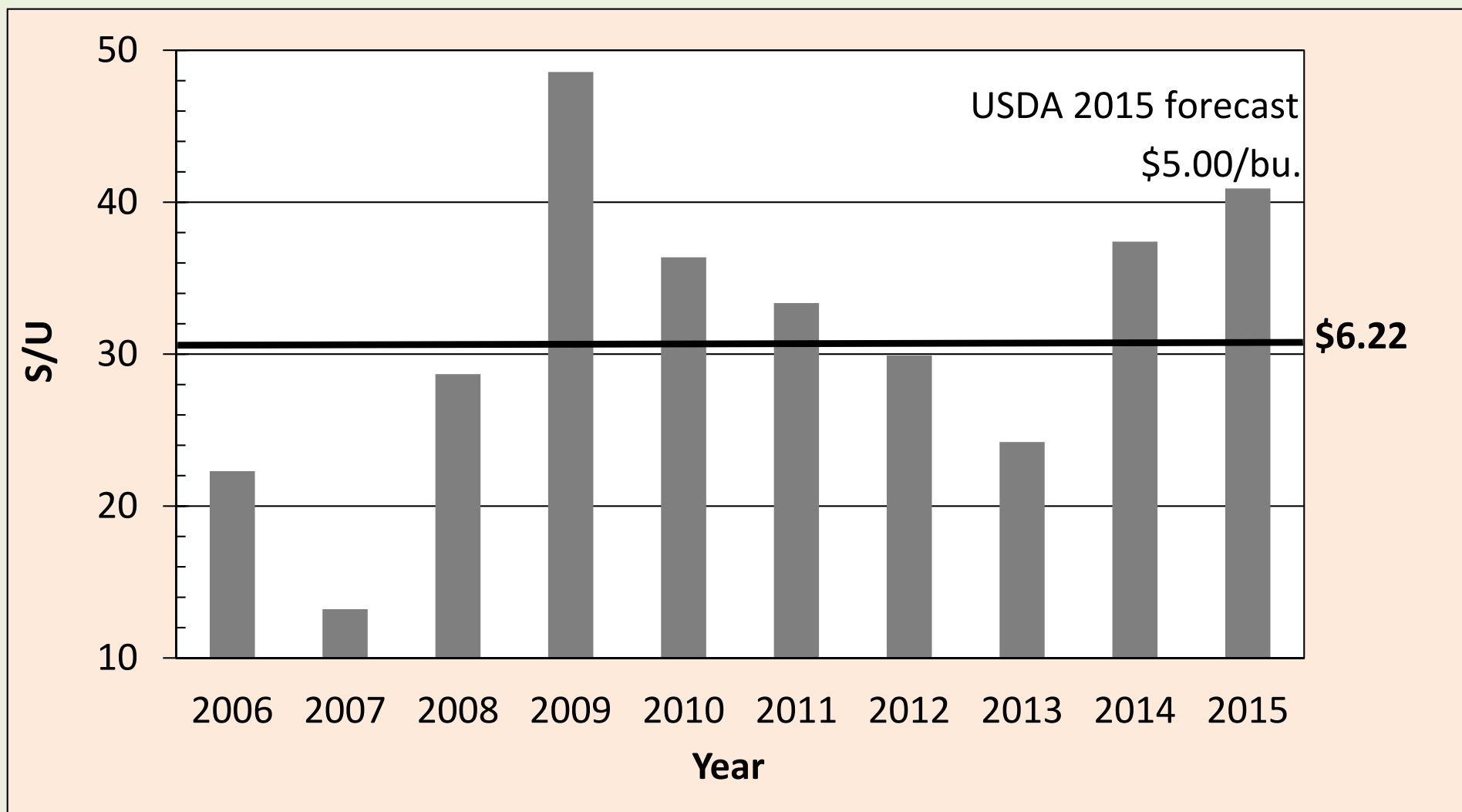
- U.S. accounts for 8% of global wheat production
- 42% of U.S. wheat production is exported
- U.S. accounts for 16% of global wheat exports
- U.S. depends upon wheat exports for reducing excessive supply
- In contrast to corn, ROW is not dependent upon U.S. wheat

Wheat: Price = f(X), 1975-2014

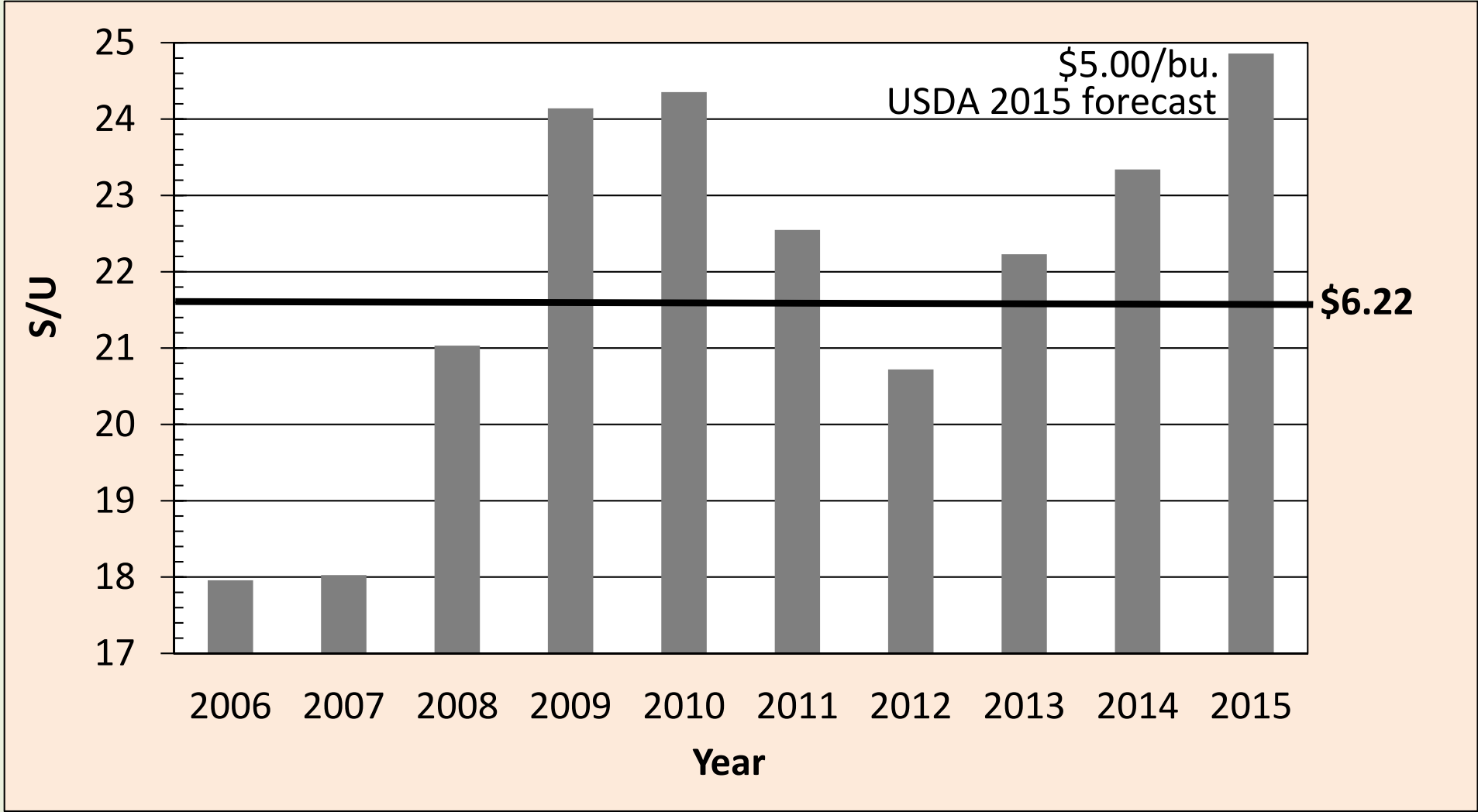
Variable (natural logarithm)	Estimate = Elasticity
Intercept	0.394
Total Cost	1.249*
Yield	-0.786*
U.S. S/U	-0.225*
ROW S/U	-0.055
Dollar	-0.222
Trend	-0.023*
Policy Dummy = 1, 1978-1985	0.063
Price Dummy = 1, 2007-2014	0.412*
R ² = 0.929 DW = 1.585	*Statistically Significant

Wheat U.S. Stocks-to-Use & Price

2006-2014 Average = 30.5 & \$6.22/bu.

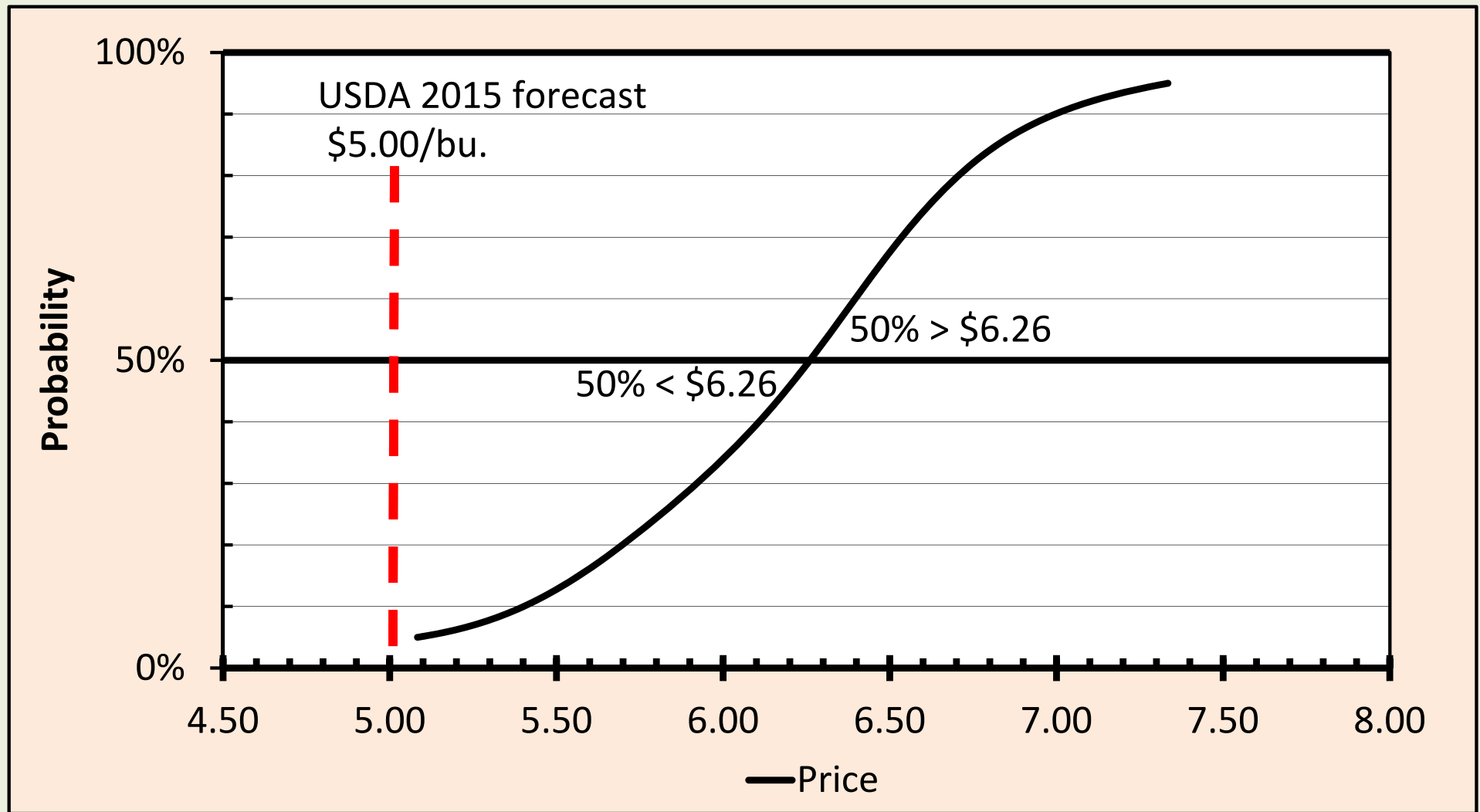


Wheat ROW Stocks-to-Use & U.S. Price 2006-2014 Average = 21.6 & \$6.22/bu.



U.S. Wheat Price Equilibrium CDF

Supply > Demand: U.S. S/U



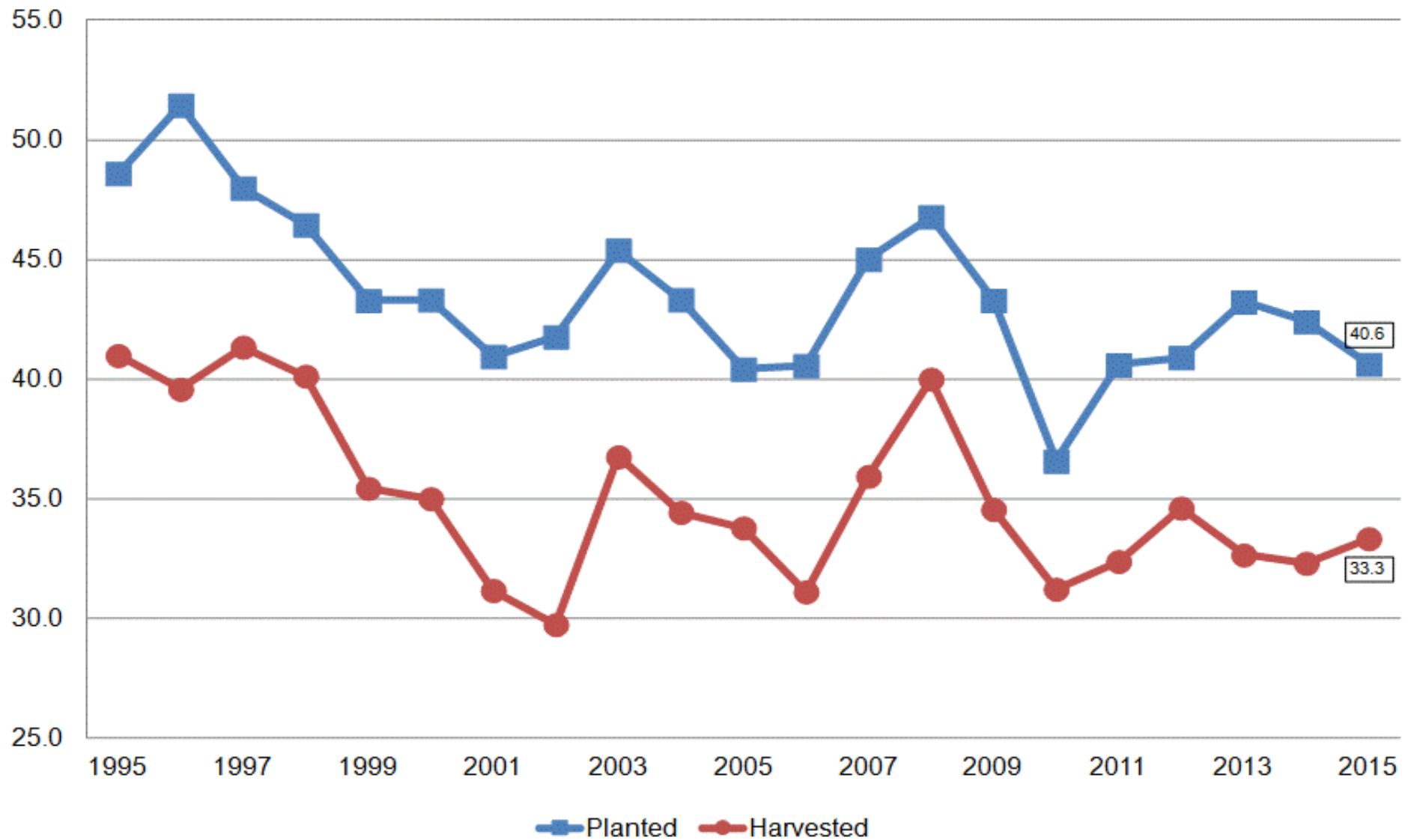
Wheat: Harvested Acreage = $f(S/U, X)$

1975-2014

Variable (natural logarithm)	Estimate = Elasticity
Intercept	4.336
U.S. S/U	-0.086*
Trend	-0.004
Policy Dummy = 1, 1978-1985	0.033
Price Dummy = 1, 2006-2014	0.022
Lag Acreage (IV variable)	0.778*
$R^2 = 0.842$ $DW = 1.536$	*Statistically Significant

Winter Wheat Acres United States

Million Acres



USDA-NASS
7-10-15

Wheat Acreage

Southern State Acres > 200,000	Harvested Acres 2015	Percent 2015/2014
Alabama	225,000	100%
Arkansas	270,000	68%
Kentucky	450,000	88%
North Carolina	630,000	82%
Oklahoma	3,200,000	132%
Tennessee	410,000	86%
Texas	3,600,000	160%
Virginia	225,000	87%

Wheat Prices

State	State/U.S. 2006-2014 Average Percentage
Arkansas	91%
Kentucky	90%
North Carolina	87%
Oklahoma-Texas Weighted Average	101%

Dryland Wheat Enterprise Budget - Grain and Graze

1000 acres farmed, 160 acres for this budget

**Name****Farm Description**

				Total
PRODUCTION	Units	Price	Quantity	\$/Acre
Wheat	Bu.	\$ 5.75	31.97	\$ 183.83
Small Grain Pasture	Acre	\$ 67.10	1	\$ 67.10
Other Income	Acre	\$ -	0	\$ -
Total Receipts				\$ 250.93
OPERATING INPUTS	Units	Price	Quantity	\$/Acre
Wheat Seed	Bu./acre	\$ 9.60	1.50	\$ 14.40
Fertilizer	Acre	\$ 52.48	1	\$ 52.48
Custom Harvest	Acre	\$ -	0	\$ -
Pesticide	Acre	\$ 27.61	1	\$ 27.61
Crop Insurance	Acre	\$ 8.00	1	\$ 8.00
Annual Operating Capital	Dollars	6.25%	69.03	\$ 4.31
Machinery Labor	Hrs.	\$ 15.00	0.79	\$ 11.85
Custom Hire	Acre	\$ 5.15	1	\$ 5.15
Machinery Fuel, Lube, Repairs	Acre	\$ 38.51	1	\$ 38.51
Other Expense	Acre	\$ -	0	\$ -
Total Operating Costs				\$ 162.31
Returns Above Total Operating Costs				\$ 88.62
FIXED COSTS	Units	Rate		\$/Acre
Machinery/Irrigation	\$/value			
Interest at	Dollars	6.20%		\$ 7.94
Taxes at	Dollars	1.00%		\$ 1.98
Insurance	Dollars	0.60%		\$ 0.77
Depreciation	Dollars			\$ 13.99
Land	\$/acre	\$ -		
Interest at	Dollars	0.00%		\$ -
Taxes at	Dollars	0.00%		\$ -
Total Fixed Costs				\$ 24.68
Total Costs (Operating + Fixed)				\$ 186.99
Returns Above All Specified Costs				\$ 63.94

Oklahoma Wheat Production

- Wheat is a primary crop
 - Is not a secondary crop double cropped with soybeans
- Low input costs
- Low grain yield
- Has dual value as a grazing pasture and in the grain market
- **Increased value of cattle → Increased value of wheat**
 - **Are favorable cattle prices an incentive to produce wheat during periods of low wheat prices?**
- How similar is wheat production in Texas?

PLC and ARC

Percent of Base Acres, National by Crop

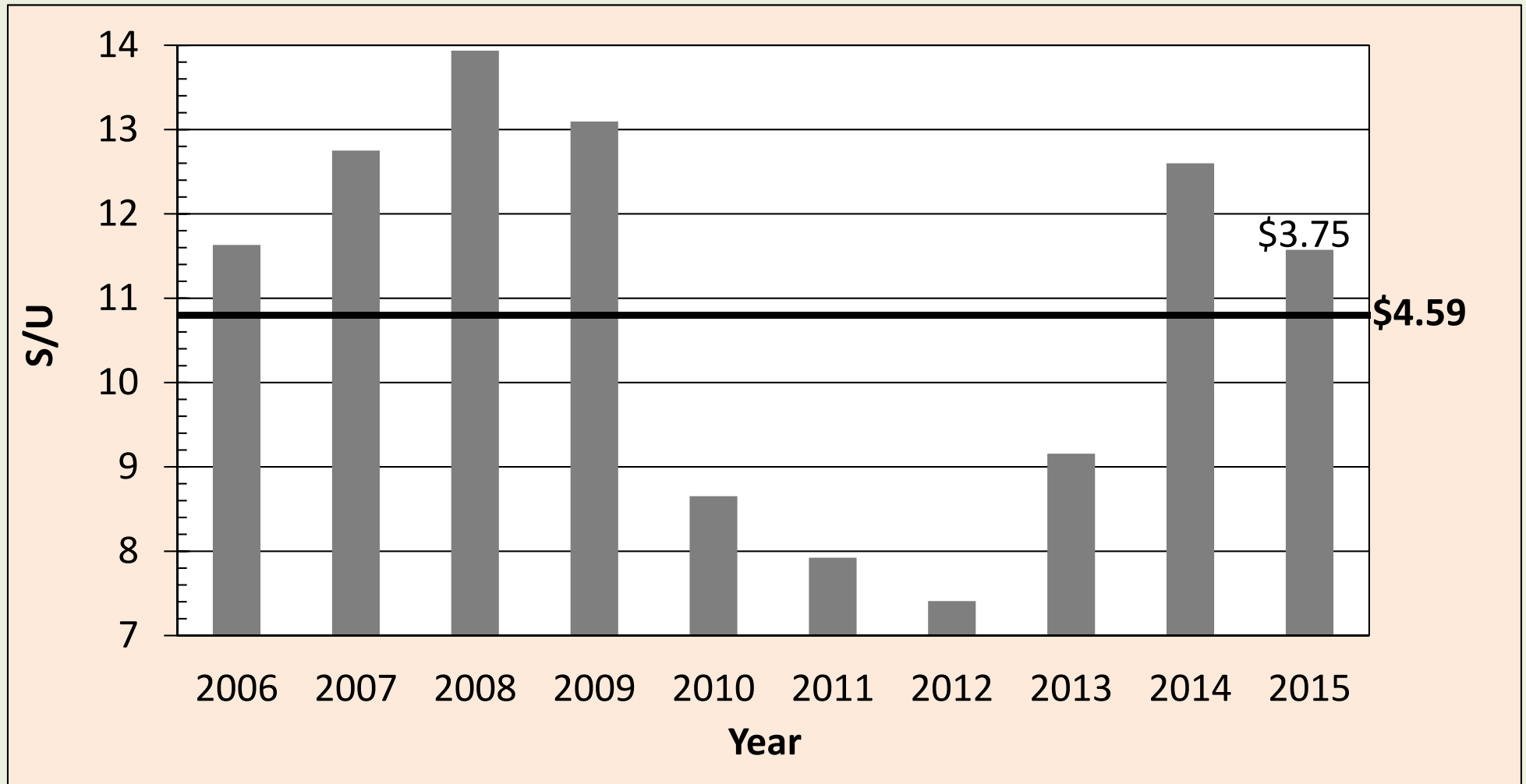
Crop	PLC	ARC-CO	ARC-IC	Total
Corn	7%	93%	0%	100%
Grain Sorghum	66%	33%	0%	100%
Wheat	42%	56%	2%	100%

Outlook Summary

- Corn and Wheat: Global S/U indicates excessive supply
 - Prices are significantly less than equilibrium prices
- Global sorghum demand has its price near the equilibrium price
- U.S. corn acreage is already adjusting downward as a supply response
- Expectations are for increased protein production as a demand response for feed grains
- As a supply response, winter wheat acreage will decrease mostly in states where it is a secondary double crop
- Global wheat use as food does not lead to a demand response

Corn U.S. Stocks-to-Use

10.8 = 39 days, 11.6 = 42 days



Conclusion

- Questions?

aflanders@uaex.edu

- Comments?