

## **2. The Competitive Position of the Black Sea Region in World Wheat Export Markets**

**Dan O'Brien**

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*Daniel O'Brien was raised on a grain and livestock farm in south central Nebraska, in which he still has an interest with his father and three brothers. He received both Bachelor of Science (1978) and Master of Science (1980) degrees in Agricultural Economics from the University of Nebraska-Lincoln. The focus of his M.S. thesis was on analyzing the impact of agricultural cooperatives on rural Nebraska fertilizer markets. O'Brien then worked as an extension agent in western (Lincoln County) and northeastern (Pierce County) Nebraska for seven years beginning in early 1981. While attending graduate school at Iowa State University beginning in 1987, O'Brien worked as an Extension Assistant in Agricultural Marketing, focusing on analysis of grain and livestock markets and price risk management strategies. He completed his Ph.D. in December 1993, focusing his dissertation research on developing a method by which to forecast the probability of alternative U.S. harvest time corn futures price outcomes. While working as Extension Farm Management Specialist in Northwest Iowa during 1993 through early 1995, he became heavily involved in analysis of the structural changes in the Iowa livestock industry associated with contract hog production. From March 1995 through May 2003, O'Brien worked as the Extension Agricultural Economist in Northwest Kansas based out of the Northwest Research and Extension Center in Colby. He held the position of Northwest Area Extension Administrative Director starting in June 2003 before returning to his Extension Agricultural Economist position in January 2007. Daniel O'Brien's ongoing extension and applied research interests and efforts are in the areas of a) grain market supply-demand analysis, bioenergy impacts and price-income risk management strategies, b) grain industry market structure, conduct and performance – focusing on grain handling and transportation issues, and c) economic analysis of irrigated and dryland cropping systems, and associated cropland leasing arrangements.*

### **Abstract/Summary**

*Differences in physical quality characteristics among classes or types of wheat are often reflected in global cash wheat prices in general, and in wheat prices and sales involving major Black Sea Region exporters Russia, Ukraine and Kazakhstan in particular. Black Sea Region wheat export markets appear to be somewhat associated with each in other in terms of price dynamics, while still exhibiting important differences. Differences in wheat class quality characteristics and logistical-transportation factors play an important role in determining the competitive, cointegrated nature of world and Black Sea Region wheat market price relationships, along with the dynamics of changing wheat supply-demand balances. Black Sea Region wheat prices display some degree of price interrelatedness for milling quality wheat, but not complete uniformity. Ukraine milling wheat export prices show evidence of being cointegrated with German milling wheat export prices, but less so with those of Russia. Russian milling wheat export prices appear to be cointegrated with both U.S. hard red winter and soft red winter wheat export prices, but less so with those of the Ukraine. Kazakhstan milling wheat export prices show evidence of being somewhat associated with Russian milling wheat export prices, but not so with those in Ukraine.*

# THE COMPETITIVE POSITION OF THE BLACK SEA REGION IN WORLD WHEAT EXPORT MARKETS

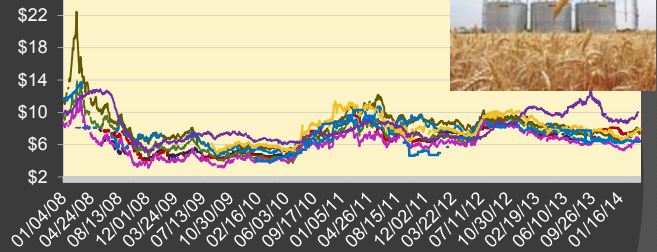
2014 RISK AND PROFIT CONFERENCE  
MANHATTAN, KANSAS  
AUGUST 21-22, 2014

Daniel O'Brien – Kansas State University  
Frayne Olson – North Dakota State University



## Key World Wheat Daily Price's

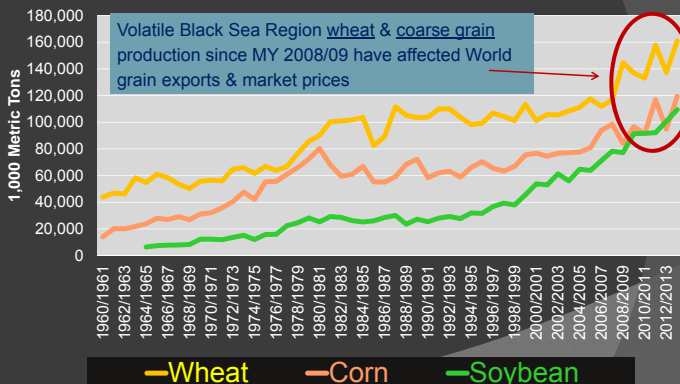
January 4, 2008 – April 8, 2014



—RUS Nvrsk 11.5% —UKR 11.5% —KAZ 11.5%  
—US HRW Wheat —US HRS Wheat —US SRW Wheat  
—CA Ont HRS Wheat —AUS Alb 13% —ARG East Parana  
—GRMY RstkHiQ

## World Exports of Major Grains

1960/61 thru 2013/14 Marketing Years, 1,000 Metric Tons



USDA – WASDE – April 9, 2014 & USDA PSD Online Custom Query

## Statement of the Problem...

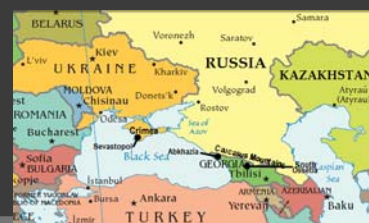
Q? How do  $\Delta$ 's in Black Sea Region (BSR) wheat exports impact World wheat trade?

- Growing Russia, Kazakhstan, & Ukraine wheat & feed grain exports since mid-1990s
  - Both higher quality "Milling" or "Food" grade & lower quality "Feed" grade wheat available from BSR
  - Shipping cost advantages to key North African & Middle Eastern importers vs other World wheat exporters
  - Increasing BSR feed/coarse grain production: Will or could this have a "crowding out" effect on BSR wheat exports?
  - Impact of geopolitical disruptions on wheat markets?

## Research Objectives

- To examine the inter-relationships of Black Sea Region Country wheat export prices
  - Within countries in the Black Sea Region
  - With major outside World wheat export competitors
- The "big picture" question that has emerged...
  - How do a) wheat class quality differentials, b) the need for specific wheat characteristics to produce different flour-based products, & c) other geographic-logistical factors impact World wheat exports & market prices on a country-by-country basis?

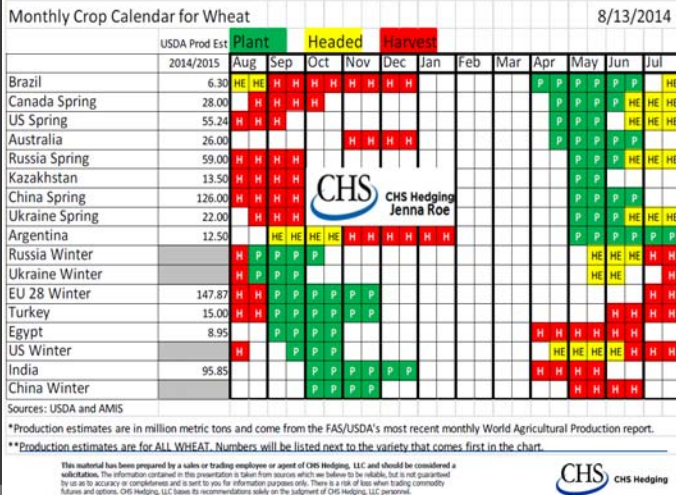
## The Black Sea Region & Grain Ports



## Black Sea Ports for Grain Shipments



## Kazakhstan – East of the Black Sea



## The Unique Characteristics of Wheat Classes & Markets

- World & U.S. wheat markets **MAY** be viewed by some as somewhat similar to corn & soybeans
  - Fairly homogenous in terms of grain quality
  - Having a high degree of substitution across time & production region
- However*, the 6 U.S. wheat classes have distinct production, quality & end use characteristics
  - The U.S. wheat grading system imposes discounts for “contrasting classes”
  - Example:** Discounts for mixing HRW with HRS wheat

## Limited Wheat Class Substitution

- Wheat WITHIN a specific wheat class IS often **blended** to improve consistency & attain specific contracted quality standards
  - Wheat flour** – produced from different wheat classes – is often blended to improve consistency & attain specific contracted quality standards
  - Larger volume Mills may tend to blend classes of wheat rather than processed wheat flour for efficiency sake
- However**, there is limited substitution BETWEEN wheat classes due to differing end use characteristics

## Examples of Limited Substitution

- **Examples:**
  - Pizza dough made from SRW wheat (*instead of HRS wheat*) will not rise well & will easily break apart after baking – spilling all the toppings
  - Pasta made from HRW wheat (rather than durum wheat) will easily break in the package & make “pasty” noodles when cooked
- U.S. wheat prices ARE differentiated by class, BUT tend to generally move together over time due to substitution across classes for some uses



## U.S. Wheat Classes: Characteristics & Use

Wheat Class	Key Characteristics	Primary End Use
<b>Hard Red Winter (HRW)</b>	Red bran, wide protein range, good gluten strength	Breads, rolls, flat breads, tortillas, cereals & general purpose flour
<b>Hard Red Spring (HRS)</b>	Red bran, high protein, strong gluten strength	Breads, rolls, croissants, bagels, pizza crust, specialty breads, & some Asian noodles
<b>Soft Red Winter (SRW)</b>	Red bran, low protein, weak gluten strength	Cookies, crackers, pretzels, pastries & flat breads
<b>Hard White (HW)</b>	White bran, medium protein	Whole wheat white flour, tortillas, Asian style fried noodles, pan bread & flat breads
<b>Soft White (SW)</b>	White bran, low protein, low water absorption, & weak gluten strength	Cakes, pastries, snack foods, Asian style noodles, Japanese style sponge cake, & Middle Eastern flat breads
<b>Durum (D)</b>	Amber bran, translucent starch, high gluten content	Pasta, couscous, & some Mediterranean breads

## Differing Classes in World Markets

- World wheat markets are relatively **liquid** – trading both **milling quality** & **feed wheat** types
  - Milling wheat classifications vary considerably across countries
  - Both **whole grain** & **flour** characteristics are used to classify wheat in the World market
- Therefore** - comparing wheat prices across countries & classes is very “problematic”
  - The wheat price quote from “Country A” may represent a different class & end use, than the wheat quote from “Country B”

## Contract Trade Specifications Used for Wheat & Wheat Flour\*\*

Whole Grain (used by farmer, elevator and miller)	Flour & Baking (used by miller and baker)
Test Weight	Flour Extraction
Protein	Flour Ash
Moisture	Flour Protein
Shrunken/Broken Kernels	Starch Damage
Foreign Material	Wet Gluten
Total Defects/Damage	Gluten Index
Sour/Musty	Farinograph Absorption
Contrasting Classes	Farinograph Peak Time
Deoxynivalendol (DON) or Vomitoxin	Farinograph Stability
Falling Numbers	Alveograph P, L & W
Vitreous Kernels	Loaf Volume
	Crumb Grain & Texture
	Loaf Symmetry

## Wheat Export Classifications

U.S., Kazakhstan, Russia & Ukraine

US Class	Kazakhstan	Russia	Ukraine
Hard Red Winter (HRW) (≈40%)	Class 1, 2 & 3 (≈ 33% ? HRW)	Primary crop districts = Southern, Central, Northern Caucasus & Volga (≈ 67% ?? HRW Wheat)	<b>Mostly Food Uses:</b> Common Wheat, Group A, Grade 1 & 2 (higher protein) (>50% HRW Wheat?)
Hard Red Spring (HRS) (≈25%)	Class 1, 2 & 3 (≈ 67% ? HRS)	Primary crop districts = Siberia, Volga & Urals (≈ 33% ?? HRS Wheat)	
Soft Red Winter (SRW) (≈20%)			<b>Mostly Feed Uses:</b> Common Wheat, Group A, Grade 3 & some Group B, Grade 4 & 5 (<50% SRW?)
Hard White (HW) (≈1%)			
Soft White (SW) (≈11%)			
Durum (D) (≈3%)	Could not determine classification		Durum Wheat, Grade 1 & 2 (small amount)

## Wheat Export Classifications

United States, Australia, France & Canada

US Class	Australia (also classed by growing zone)	France	Canada
Hard Red Winter (HRW) (≈40%)	Australian Hard by growing region (15-20% HRW-W) (yellow alkaline)	BSP-E,1 (superior bread qual.) BP-E,1 (bread quality) BAF-E,1 (improving wheat)	Canadian Western Red Winter (small acreage)
Hard Red Spring (HRS) (≈25%)	Australian Prime Hard (5-10% HRS-W) (yellow alkaline)		Canadian Western Red Spring (≈85%)
Soft Red Winter (SRW) (≈20%)	Australian Soft (<5% SRW Wheat)	BP – 2,3 (bread quality) BB (biscuit baking quality) BAU (other uses)	
Hard White (HW) (≈1%)	Australian Premium White (30-40%), Aust. Premium White Noodle (5-10%), Australian Standard White (20-25%)		Canadian Western Hard White Spring (small acreage)
Soft White (SW) (≈11%)	Australian Noodle (<5% SW Wheat)		CA Western Soft White Spring (small acreage)
Durum (D) (≈3%)	Australian Premium Durum (<5% D)		Canadian Western Amber Durum (≈10%)

## Wheat Export Classifications

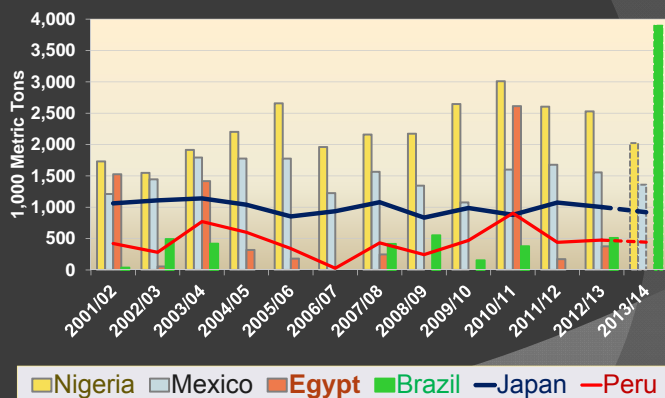
U.S., Argentina & Germany

US Wheat Class	Argentina	Germany
Hard Red Winter (HRW) (≈40%)	Group 1 – Corrector (industrial baking) Group 2 – Traditional (fermentation of > 8 hrs.) Group 3 – Direct Baking (< 8 hr. fermentation) (100% HRW Wheat)	<b>Common Wheat:</b> Elite – E High Quality – A Normal – B (75%-85% HRW-Wht)
Hard Red Spring (HRS) (≈25%)		<b>Common Wheat:</b> Elite – E (high protein) (5%-15% ??? HRS-W)
Soft Red Winter (SRW) (≈20%)		<b>Common Wheat:</b> Soft – K (5%-15% ??? SRW-W)
Hard White (HW) (≈1%)		
Soft White (SW) (≈11%)		
Durum (D) (≈3%)		Durum (<5% Durum)



## U.S. HRW-Wheat: Top 6 Export Buyers

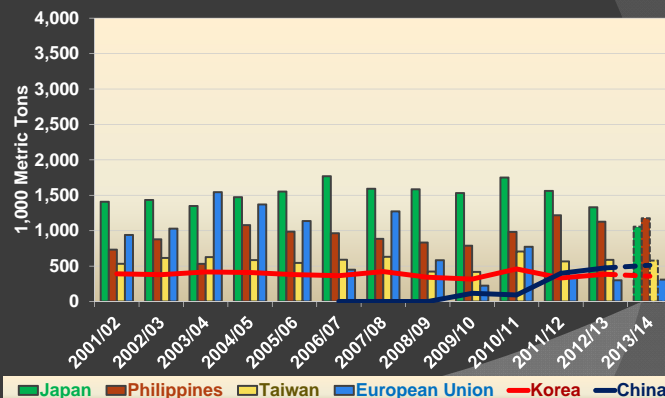
(1,000 Metric Ton)



U.S. Wheat Associates Commercial Sales Reports (04-17-14)

## U.S. HRS-Wheat: Top 6 Export Buyers

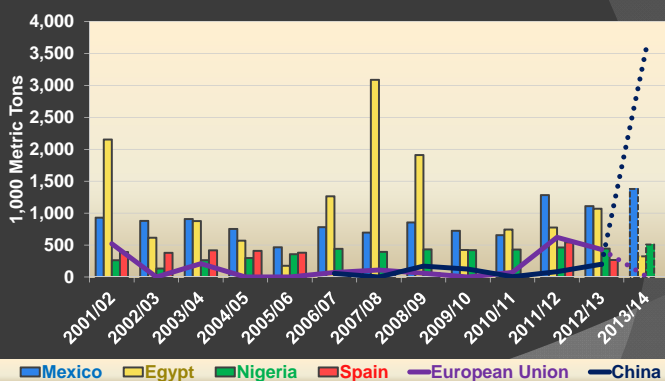
(1,000 Metric Ton)



U.S. Wheat Associates Commercial Sales Reports (04-17-14)

## U.S. SRW-Wheat: Export Buyers

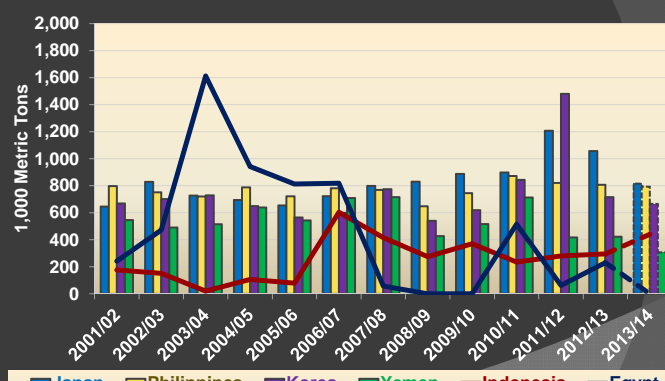
(1,000 Metric Ton)



U.S. Wheat Associates Commercial Sales Reports (04-17-14)

## U.S. White Wheat: Top 6 Export Buyers

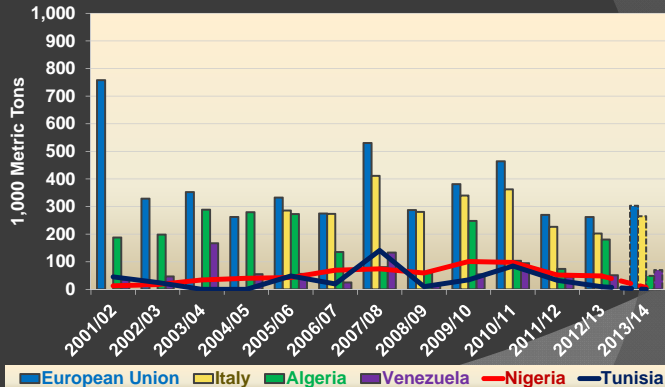
(1,000 Metric Ton)



U.S. Wheat Associates Commercial Sales Reports (04-17-14)

## U.S. Durum Wheat: Top 6 Export Buyers

(1,000 Metric Ton)



U.S. Wheat Associates Commercial Sales Reports (04-17-14)

## WHEAT PRICE RELATIONSHIPS FOR THE BLACK SEA REGION & MAJOR WORLD COMPETITORS



## Key Black Sea Wheat Price Series

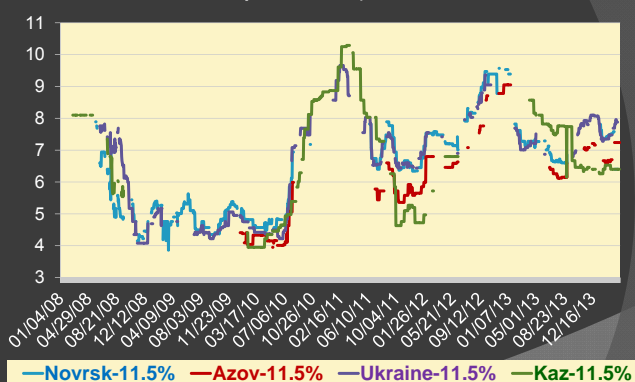
- **Kazakhstan**
  - Milling Wheat – 11.5% Protein, FOB
- **Russia**
  - Novorossiysk Milling Wheat – 11.5% Protein, FOB
  - Novorossiysk Animal Feed Wheat – FOB
  - Azov Sea Ports Milling Wheat – 11.5% Protein, FOB
  - Azov Sea Ports Animal Feed Wheat – FOB
- **Ukraine**
  - Milling Wheat – 11.5% Protein, FOB
  - Milling Wheat – 3<sup>rd</sup> Grade, FOB
  - Generic “Wheat” – lower quality, FOB

## Milling Wheat Prices - Black Sea

Price Series January 4, 2008 - April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
Kazakhstan Milling Wheat (11.5%)	Daily	766	\$6.79	\$1.67	0.01
Novorossiysk <sup>RUS</sup> Milling Wheat (11.5%)	Daily	981	\$6.29	\$1.44	0.33
Azov Sea Ports <sup>RUS</sup> Milling Wht (11.5%)	Daily	508	\$5.96	\$1.34	0.37
Ukraine Milling Wheat (11.5%)	Daily	885	\$6.41	\$1.59	(0.01)
Kazakhstan Milling Wheat (11.5%)	Weekly	174	\$6.78	\$1.67	0.05
Novorossiysk Milling Wheat (11.5%)	Weekly	235	\$6.33	\$1.45	0.31
Azov Sea Ports Milling Wheat (11.5%)	Weekly	195	\$5.63	\$1.50	0.65
Ukraine Milling Wheat (11.5%)	Weekly	222	\$6.46	\$1.56	(0.07)
Ukraine Milling Wheat – 3 <sup>rd</sup> Grade	Weekly	288	\$5.48	\$1.26	(0.11)
Black Sea Milling Wheat – 3 <sup>rd</sup> Grade	Weekly	185	\$6.33	\$1.58	0.12

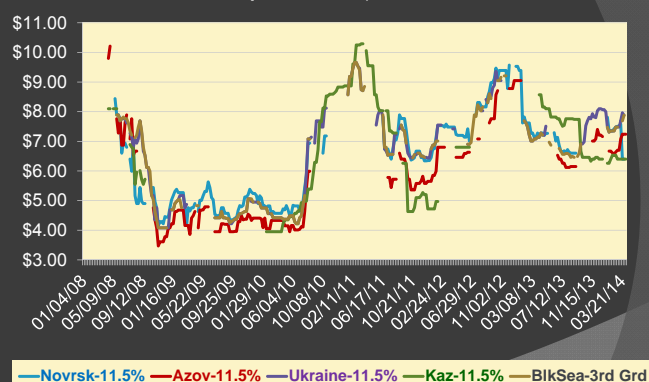
## Milling Wheat Daily \$'s – Black Sea

January 4, 2008 – April 8, 2014



## Milling Wheat Weekly \$'s – Black Sea

January 4, 2008 – April 4, 2014

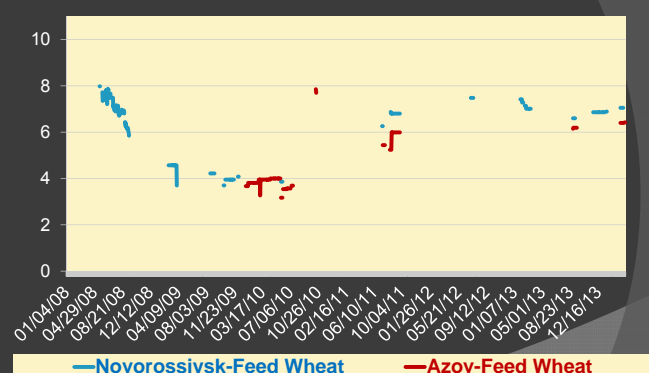


## Feed Wheat Prices – Black Sea

Price Series January 4, 2008 - April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
Novorossiysk <sup>RUS</sup> Animal Feed	Daily	255	\$6.16	\$1.34	(0.78)
Azov Sea Ports <sup>RUS</sup> Animal Feed	Daily	189	\$4.60	\$1.16	0.84
Novorossiysk <sup>RUS</sup> Animal Feed	Weekly	74	\$6.08	\$1.39	(0.64)
Azov Sea Ports <sup>RUS</sup> Animal Feed	Weekly	82	\$4.96	\$1.56	0.69
Ukraine “Lower Quality” Wheat	Weekly	293	\$4.88	\$1.37	(0.35)

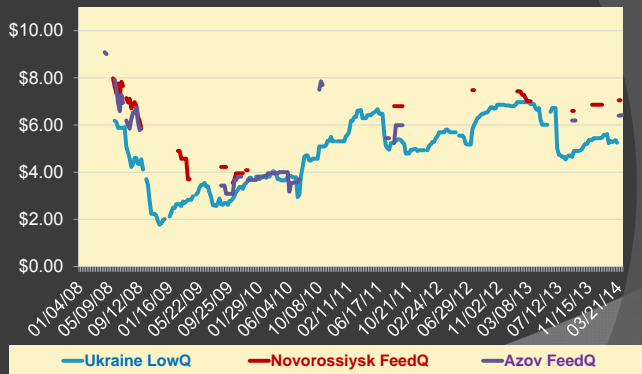
## Feed Wheat Daily \$'s – Black Sea

January 4, 2008 – April 4, 2014



## Feed Wheat Weekly \$'s – Black Sea

January 4, 2008 – April 4, 2014



## Germany & Australia Wheat Prices

### Germany

- Rostock Wheat – “Higher” Quality, Carriage paid
- Rostock Wheat – “A” Quality, 13.0% Protein, Carriage paid
- Hamburg Wheat – “A” (13%) & “B” (12%) Quality, Delivered
- Koln Milling Wheat – Delivered

### Australia (several locations, example = Albany, AU)

- Albany-Western Hard – 13.0% & 11.5% Protein, Track \$\$
- Albany-Western Utility / FEED – Track Price
- Albany-Western Std White & Feed Grades – Track Price

## Milling Wheat Prices – Germany

Price Series January 2008 - April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
Rostock Wheat – “Higher Quality”	Daily	1,560	\$8.34	\$1.85	0.24
Rostock Wheat – “A” Quality, 13% protein	Daily	1,552	\$7.72	\$1.85	0.17
Rostock Wheat – “Higher Quality”	Weekly	322	\$8.31	\$1.86	0.29
Rostock Wheat – “A” Quality, 13% protein	Weekly	322	\$7.70	\$1.85	0.18
Hamburg Wheat – “A” Quality, 13% prot.	Weekly	145	\$8.25	\$0.91	0.46
Hamburg Wheat – “B” Quality, 12% prot.	Weekly	298	\$7.56	\$1.78	(0.02)
Koln Milling Wheat - Delivered	Weekly	234	\$7.35	\$1.88	(0.12)

## Milling Wheat Prices – Australia

Price Series August 18, 2009 - April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
Albany Western – Hard, 13% min, Track\$	Daily	1,103	\$7.91	\$1.52	0.12
Albany Western – Hard, 11.5% min, Track\$	Daily	1,104	\$7.71	\$1.42	0.05
Albany Western – Standard White, Track\$	Daily	1,104	\$7.15	\$1.44	0.09
Albany Western – Feed Grade, Track\$	Daily	1,085	\$6.02	\$1.39	0.07
Albany Western – Utility FEED, Track\$	Daily	532	\$5.72	\$1.57	0.65
Albany Western – Hard, 13% min, Track\$	Weekly	243	\$7.94	\$1.54	0.14
Albany Western – Hard, 11.5% min, Track\$	Weekly	243	\$7.75	\$1.45	0.10
Albany Western – Utility FEED, Track\$	Weekly	242	\$7.34	\$1.48	(0.01)
Albany Western – Standard White, Track\$	Weekly	243	\$7.15	\$1.46	0.12
Albany Western – Feed Grade, Track\$	Weekly	242	\$6.02	\$1.38	0.07

## U.S., Canada & Argentina Wheat Prices

### United States

- HRW, HRW, & SRW Wheat – FOB
- Gulf No. 2 Soft Red Winter – FOB
- Gulf Hard Red Winter – 11.5% Protein

### Canada

- Ontario HRS, HRW, SRW & SSW Wheat – Bids
- Port Hope, Ontario HRW & SRW Wheat – Bids
- Thunder Bay Wheat – FOB

### Argentina

- Parana Bread Wheat (North, East & Southeast) – Wholesale & Warehouse delivered bids

## Milling Wheat Prices – United States

Price Series January 2008 - April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
U.S. HRS Wheat – FOB	Daily	1,554	\$8.22	\$2.23	1.81
U.S. HRW Wheat – FOB	Daily	1,552	\$7.04	\$1.70	0.29
U.S. SRW Wheat – FOB	Daily	1,553	\$6.01	\$1.53	0.27
U.S. Gulf #2 SRW Wheat	Daily	1,465	\$6.92	\$1.47	0.08
U.S. HRS Wheat – FOB	Weekly	327	\$8.24	\$2.23	1.71
U.S. HRW Wheat – FOB	Weekly	327	\$7.05	\$1.72	0.30
U.S. SRW Wheat – FOB	Weekly	327	\$6.03	\$1.55	0.28
U.S. Gulf #2 SRW Wheat	Weekly	318	\$6.97	\$1.51	0.19
U.S. Gulf HRW Wheat – 11.5% Protein	Weekly	135	\$7.80	\$1.63	(0.21)



## Milling Wheat Prices – Canada

Price Series January 2008 – April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
Ontario HRS Wheat – Bid (8/1/2008+)	Daily	1,223	\$7.28	\$1.33	(0.03)
Ontario HRW Wheat – Bid (6/2/2008+)	Daily	1,387	\$6.05	\$1.30	(0.19)
Port Hope, Ontario HRW-W (6/15/09+)	Daily	1,017	\$6.48	\$1.08	(0.24)
Ontario SRW Wheat – Bid (1/4/2008+)	Daily	1,404	\$5.62	\$1.25	(0.09)
Port Hope, Ontario SRW-W (6/15/09+)	Daily	1,017	\$5.92	\$1.09	(0.44)
Ontario SWW Wheat – Bid (6/2/2008+)	Daily	1,365	\$5.86	\$1.24	(0.11)
Ontario HRS Wheat – Bid (8/1/2008+)	Weekly	275	\$7.26	\$1.34	(0.02)
Port Hope, Ontario HRW-W (6/19/09+)	Weekly	230	\$6.42	\$1.10	(0.48)
Port Hope, Ontario SRW-W (6/19/09+)	Weekly	232	\$5.87	\$1.12	(0.41)
Ontario SWW Wheat – Bid (6/6/2008+)	Weekly	301	\$5.83	\$1.25	(0.08)
Thunder Bay Wheat – FOB	Weekly	222	\$7.43	\$2.05	2.38

## Milling Wheat Prices – Argentina

Price Series January 2008 – April 4, 2014	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
North Parana Bread Wheat – Warehouse	Daily	1,474	\$7.15	\$1.59	0.83
North Parana Bread Wheat – Wholesale	Daily	1,553	\$8.07	\$1.87	0.86
East Parana Bread Wheat – Warehouse	Daily	1,403	\$7.32	\$1.56	0.81
East Parana Bread Wheat – Wholesale	Daily	1,549	\$8.25	\$1.84	0.79
East Parana Wheat – FOB	Daily	1,403	\$7.32	\$1.56	0.81
SE Parana Bread Wheat – Wholesale	Daily	1,552	\$8.18	\$1.24	0.84
North Parana Bread Wheat – Warehouse	Weekly	316	\$7.14	\$1.57	0.85
North Parana Bread Wheat – Wholesale	Weekly	326	\$8.07	\$1.87	0.85
East Parana Bread Wheat – Warehouse	Weekly	301	\$7.31	\$1.54	0.83
East Parana Bread Wheat – Wholesale	Weekly	326	\$8.25	\$1.83	0.78
East Parana Wheat – FOB	Weekly	301	\$7.31	\$1.54	0.83
SE Parana Bread Wheat – Wholesale	Weekly	326	\$8.18	\$1.80	0.84

## Correlation of Daily Wheat Price's

	Russia Nvrsk <sup>11.5%</sup>	Ukraine Ports <sup>11.5%</sup>	Kazak'n Wheat <sup>11.5%</sup>	AUS Hard <sup>13%</sup>	US HRW FOB	US HRS FOB	US SRW FOB	GRMNY High-Q
Russia Nvrsk <sup>11.5%</sup>	1.00	0.93	0.70	0.91	0.85	0.76	0.92	0.70
Ukraine Ports <sup>11.5%</sup>	0.93	1.00	0.85	0.90	0.90	0.77	0.90	0.85
Kazak'n Wheat <sup>11.5%</sup>	0.70	0.85	1.00	0.84	0.67	0.53	0.70	0.93
AUS Hard <sup>13%</sup>	0.91	0.90	0.84	1.00	0.88	0.85	0.87	0.84
US HRW FOB	0.85	0.90	0.67	0.88	1.00	0.90	0.94	0.83
US HRS FOB	0.76	0.77	0.53	0.85	0.90	1.00	0.82	0.77
US SRW FOB	0.92	0.90	0.70	0.87	0.94	0.82	1.00	0.86
GRMNY High-Q	0.82	0.89	0.75	0.91	0.91	0.86	0.87	1.00

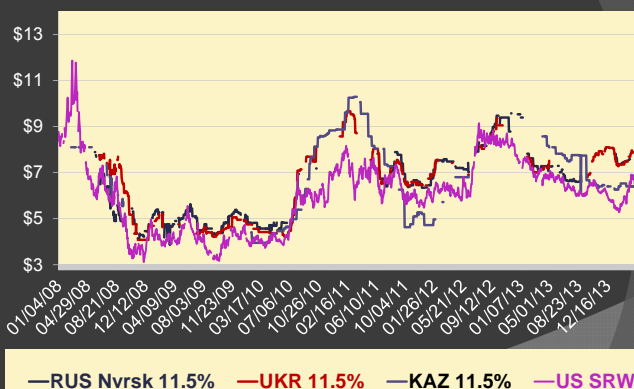
## Black Sea vs AUS 13% Wheat Daily \$'s

January 4, 2008 – April 8, 2014



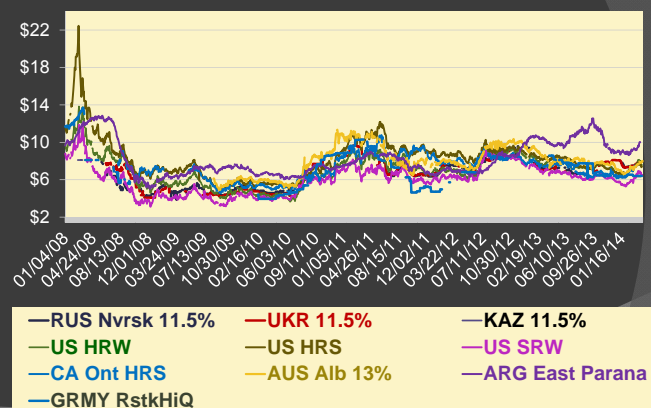
## Black Sea vs U.S. SRW Wheat Daily \$'s

January 4, 2008 – April 8, 2014



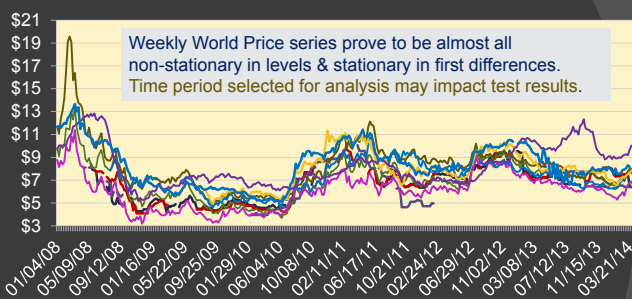
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—RUS Nvrsk 11.5% —UKR 11.5% —KAZ 11.5%  
 —US HRW —US HRS —US SRW  
 —CA Ont HRS —AUS Alb 13% —ARG East Parana  
 —GRMY RstkHiQ

## Correlation of Weekly Wheat Price's

	Russia Nvrsk <sup>11.5%</sup>	Ukraine Ports <sup>11.5%</sup>	Kazak'n Wheat <sup>11.5%</sup>	AUS Hard <sup>13%</sup>	US HRW FOB	US HRS FOB	US SRW FOB	GRMNY High-Q
Russia Nvrsk <sup>11.5%</sup>	1.00	0.94	0.69	0.90	0.84	0.75	0.91	0.82
Ukraine Ports <sup>11.5%</sup>	0.94	1.00	0.82	0.89	0.89	0.77	0.90	0.89
Kazak'n Wheat <sup>11.5%</sup>	0.69	0.82	1.00	0.84	0.71	0.62	0.75	0.75
AUS Hard <sup>13%</sup>	0.90	0.89	0.84	1.00	0.88	0.85	0.87	0.91
US HRW FOB	0.84	0.89	0.71	0.88	1.00	0.94	0.94	0.91
US HRS FOB	0.75	0.77	0.62	0.85	0.94	1.00	0.82	0.86
US SRW FOB	0.92	0.90	0.75	0.87	0.94	0.82	1.00	0.87
GRMNY High-Q	0.82	0.89	0.75	0.91	0.91	0.86	0.87	1.00

## Cointegration of Weekly Wheat \$'s 10% LOS

	Russia Nvrsk <sup>11.5%</sup>	Ukraine Ports <sup>11.5%</sup>	Kazak'n Wheat <sup>11.5%</sup>	AUS Hard <sup>13%</sup>	US HRW FOB	US HRS FOB	US SRW FOB	GRMNY High-Q
Russia Nvrsk <sup>11.5%</sup>	---	Mixed	YES	Mixed	YES	Mixed	YES	Mixed
Ukraine Ports <sup>11.5%</sup>	Mixed	---	NO	NO	Mixed	NO	NO	YES
Kazak'n Wheat <sup>11.5%</sup>	NO	NO	---	---	---	---	---	---
AUS Hard <sup>13%</sup>	YES	NO	---	---	Mixed	NO	YES	YES
US HRW FOB	YES	NO	---	NO	---	NO	Mixed	Mixed
US HRS FOB	Mixed	NO	---	Mixed	NO	---	NO	NO
US SRW FOB	YES	NO	---	YES	YES	NO	---	NO
GRMNY High-Q	Mixed	YES	---	Mixed	NO	NO	NO	---

## Cointegration Test Results <sup>A</sup>

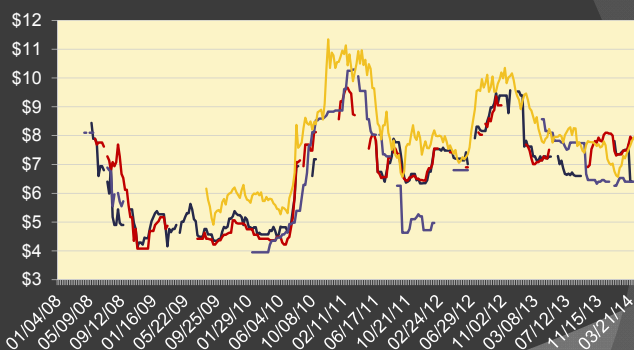
- **Russia<sup>Nvrsk11.5%</sup>**
  - **Cointegrated:** US-HRW<sup>FOB</sup>, US-SRW<sup>FOB</sup>
  - **Mixed results:** Ukraine<sup>11.5%</sup>, Kazakhstan<sup>11.5%</sup>, Australia<sup>13%</sup>, US-HRS<sup>FOB</sup>, Germany<sup>HighQ</sup>
  - **NOT Conintegrated:** Argentina<sup>Wht</sup>
- **Ukraine<sup>11.5%</sup>**
  - **Cointegrated:** Germany<sup>HighQ</sup>
  - **Mixed results:** Russia<sup>Nvrsk11.5%</sup>, US-HRW<sup>FOB</sup>
  - **NOT Cointegrated:** Kazakhstan<sup>11.5%</sup>, Argentina<sup>Wht</sup>, Australia<sup>13%</sup>, US-HRS<sup>FOB</sup>, US-SRW<sup>FOB</sup>

## Cointegration Test Results <sup>B</sup>

- **Kazakhstan<sup>11.5%</sup>**
  - **Mixed results:** Russia<sup>Nvrsk11.5%</sup>
  - **NOT Conintegrated:** Ukraine<sup>11.5%</sup>
- **Australia<sup>13.0%</sup>**
  - **Cointegrated:** US-SRW<sup>FOB</sup>
  - **Mixed results:** Russia<sup>Nvrsk11.5%</sup>, US-HRW<sup>FOB</sup>, US-HRS<sup>FOB</sup>, & Germany<sup>HighQ</sup>
  - **NOT Conintegrated:** Argentina<sup>Wht</sup>, Ukraine<sup>11.5%</sup>

## Black Sea vs AUS 13% Weekly Prices

January 4, 2008 – April 4, 2014



—RUS Nvrsk 11.5% —UKR 11.5% —KAZ 11.5% —AUS Alb 13%

## Cointegration Test Results <sup>C</sup>

### U.S. Hard Red Winter Wheat <sup>FOB</sup>

- **Cointegrated:** Russia<sup>Nrvsk11.5%</sup>
- **Mixed results:** Ukraine<sup>11.5%</sup>, Australia<sup>13%</sup>, US-SRW<sup>FOB</sup>, Germany<sup>HighQ</sup> US-HRS<sup>FOB</sup>
- **NOT Cointegrated:** Argentina<sup>Wht</sup>



### U.S. Hard Red Spring Wheat <sup>FOB</sup> ⇔ Canada<sup>HRS</sup>

- **Cointegrated:** None
- **Mixed results:** Russia<sup>Nrvsk11.5%</sup>, Australia<sup>13%</sup>,
- **NOT Cointegrated:** Argentina<sup>Wht</sup>, Ukraine<sup>11.5%</sup>, US-HRW<sup>FOB</sup>, US-SRW<sup>FOB</sup>, Germany<sup>HighQ</sup>

## Cointegration Test Results <sup>D</sup>

### U.S. Soft Red Winter Wheat<sup>FOB</sup>

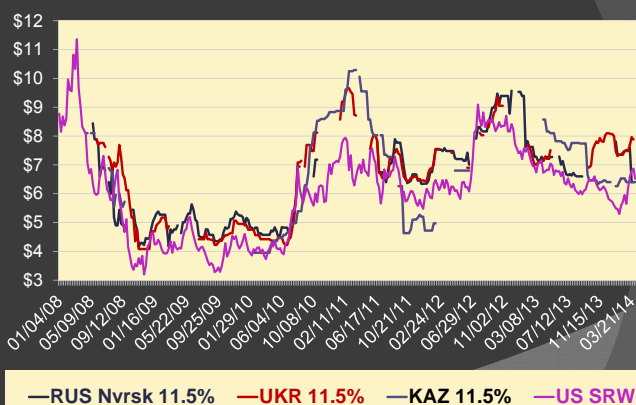
- **Cointegrated:** Russia<sup>Nrvsk11.5%</sup>, Australia<sup>13%</sup>
- **Mixed results:** US-HRW<sup>FOB</sup>
- **NOT Cointegrated:** Ukraine<sup>11.5%</sup>, Germany<sup>HighQ</sup>, US-HRS<sup>FOB</sup>, Argentina<sup>Wht</sup>,

### Germany<sup>Rostock High Quality</sup>

- **Cointegrated:** Ukraine<sup>11.5%</sup>
- **Mixed results:** Russia<sup>Nrvsk11.5%</sup>, Australia<sup>13%</sup>, US-HRW<sup>FOB</sup>
- **NOT Cointegrated:** Argentina<sup>Wht</sup>, US-HRS<sup>FOB</sup>, US-SRW<sup>FOB</sup>

## Black Sea vs U.S. SRW Weekly Prices

January 4, 2008 – April 4, 2014



## Closing Comments <sup>A</sup>

- **Physical differences** in wheat-by-class are often reflected in U.S. & World cash wheat prices
  - “Heterogeneity” by class in quality characteristics *may* be a factor in analysis & determination of the competitive – cointegrated nature of U.S. & World wheat market price relationships
  - Logistical factors associated with wheat location, storage & transportation also should be considered
  - **Quality & Logistical factors** operate within the context of a) *dynamic supply-demand balances* among competing World wheat exporters, & b) potential *cross-market effects* from coarse grains

## Closing Comments <sup>B</sup>

- Black Sea Region wheat export markets appear to be “*differentially associated*” among themselves & other Non-BSR export competitors – being driven by **quality & logistical** factors
  - **Ukraine** prices seem to be cointegrated with German wheat – less so with Russian \$’s
  - **Russian** prices seem to be cointegrated with U.S. HRW & U.S. SRW wheat export prices – less so Ukraine \$’s
  - **Kazakhstan** prices *may* be somewhat associated with Russian wheat \$’s, but not Ukraine \$’s

## Closing Comments <sup>C</sup>

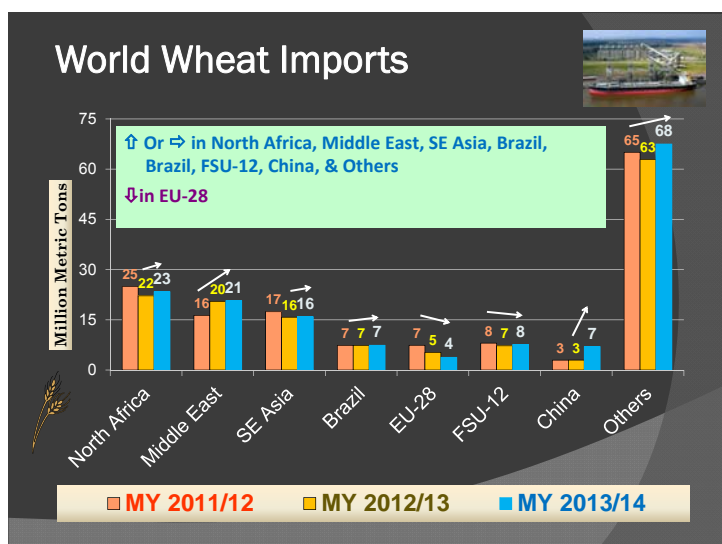
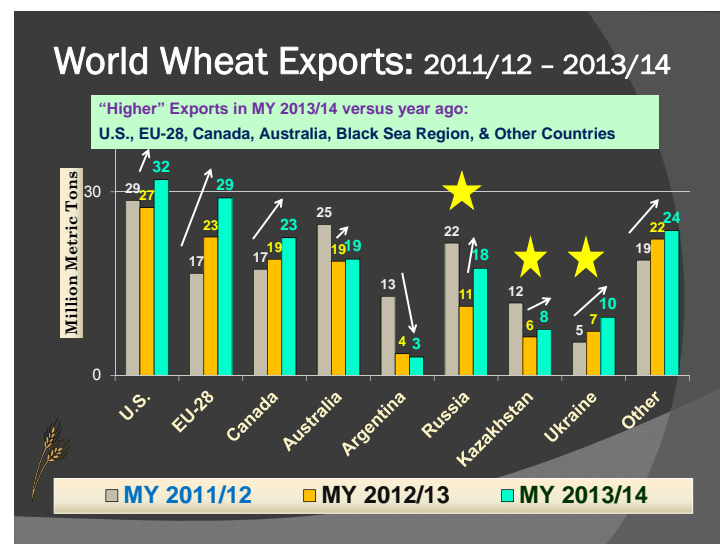
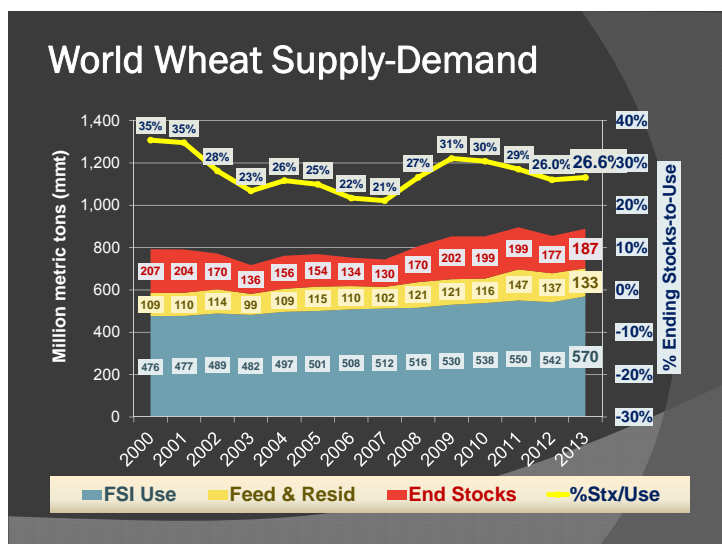
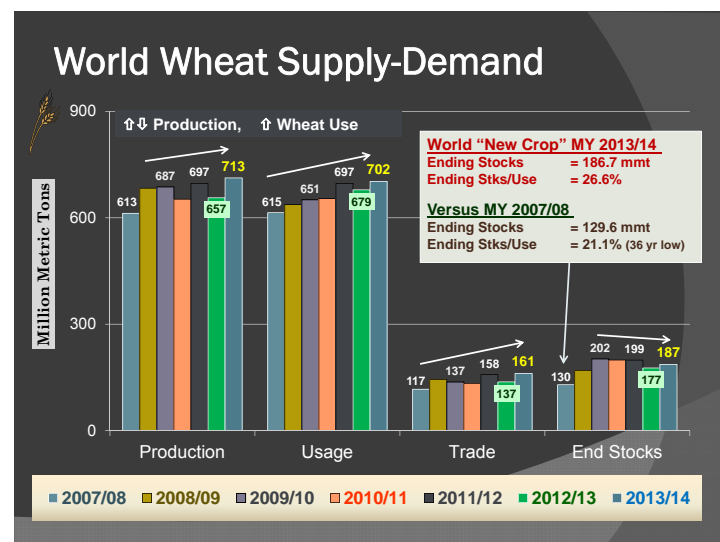
- Data “gaps” are a serious problem with Black Sea Region price analysis – for both daily & weekly \$’s
  - Grain **quality, price & other data** are “sketchy” as BSR countries are yet developing market reporting abilities
  - Current geopolitical events & potential implications add to an element of *crucial relevance* of this analysis
- **Future Work**
  - **Supportive Hedonic Analysis** of the market value of wheat quality factors would be useful...
    - IF proprietary commercial transaction data associated with specific physical lots of wheat were available





**OBSERVATIONS?**  
**QUESTIONS?**  
**SUGGESTIONS?**

**KANSAS STATE UNIVERSITY** Department of Agricultural Economics



### U.S. Wheat Futures Prices

Price Series	Daily or Weekly	No. of Obs.	Average \$/bu	Std Dev. \$/bu	Skew
CBOT Wheat – Lead Month, since June 1, 2012	Daily	465	\$7.43	\$0.87	(0.10)
CBOT Wheat – Lead Month, since June 1, 2012	Weekly	97	\$7.42	\$0.89	(0.09)
Kansas HRW Wheat – Lead Month, since June 1, 2012	Weekly	97	\$7.82	\$0.84	(0.06)
MGEX HRS Wheat – Lead Month, since June 1, 2012	Weekly	97	\$8.06	\$0.96	(0.28)

## U.S. Wheat Futures - Weekly

Continuous Lead Contract Prices Since June 1, 2012

