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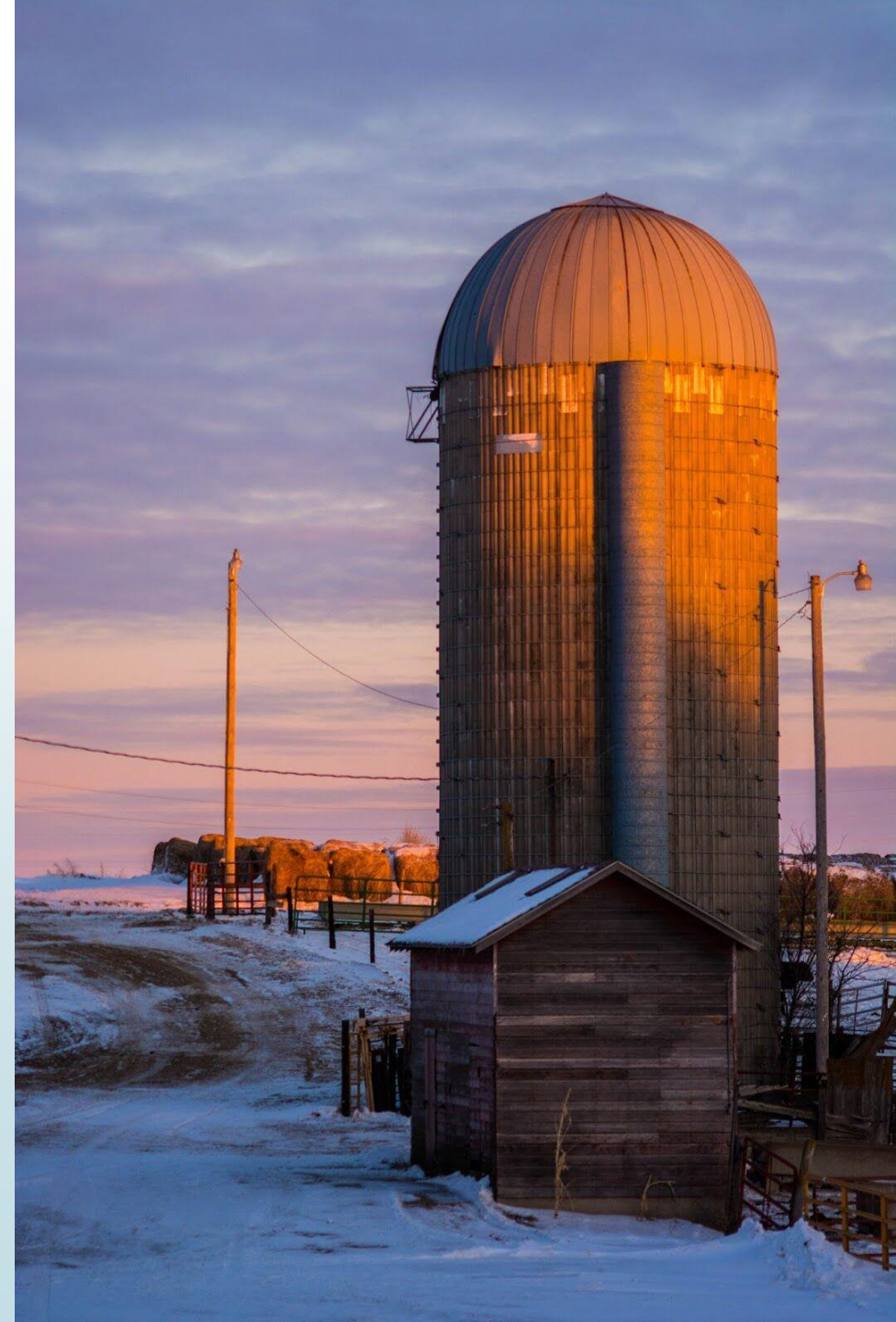
Differences in Land Values During Periods of Rapid Change

By Lucas Sudbeck, Mykel Taylor, Allen Featherstone, and Christine Wilson

Kansas State University

NC-1177 Conference

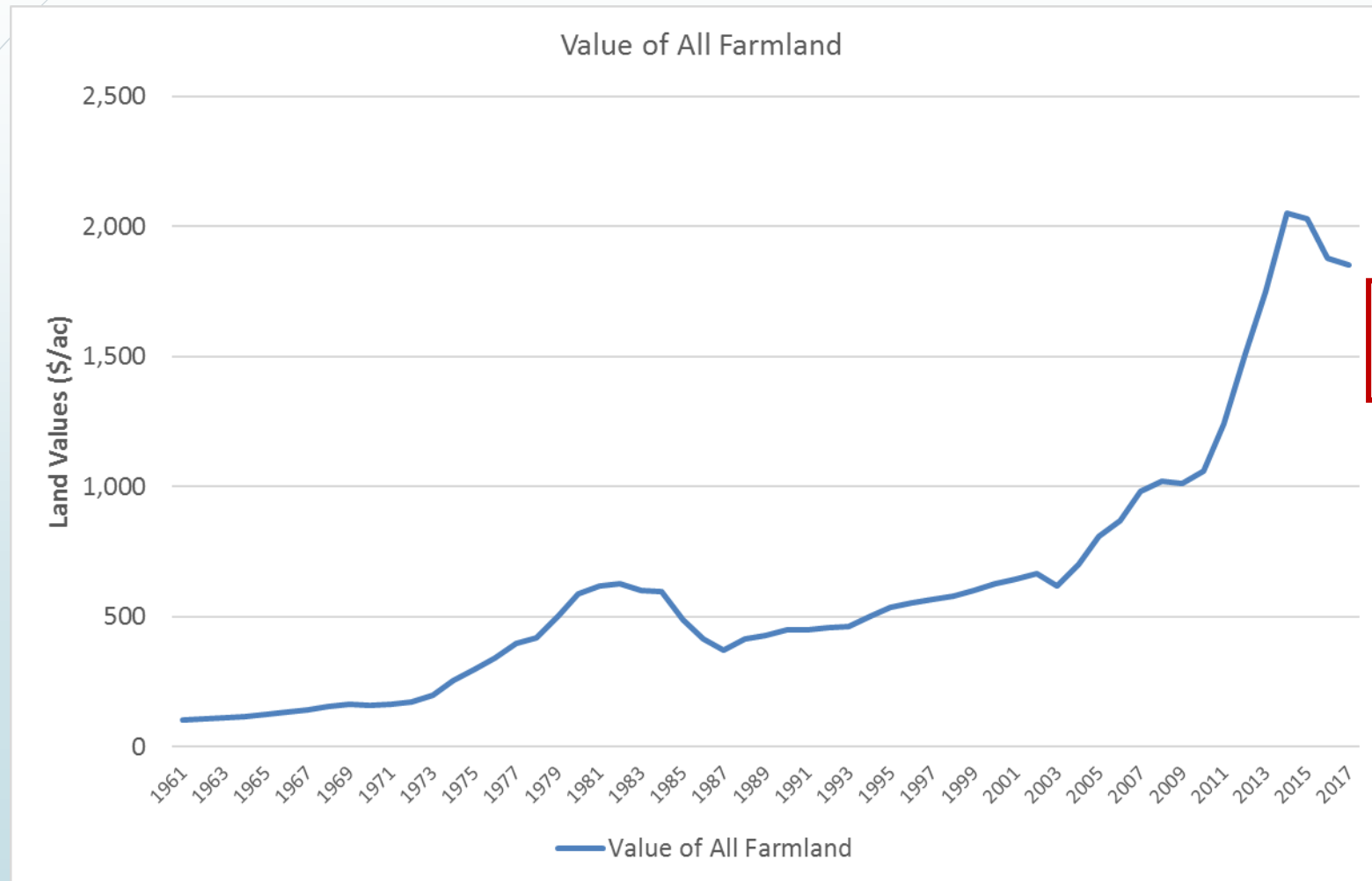
October 2, 2017





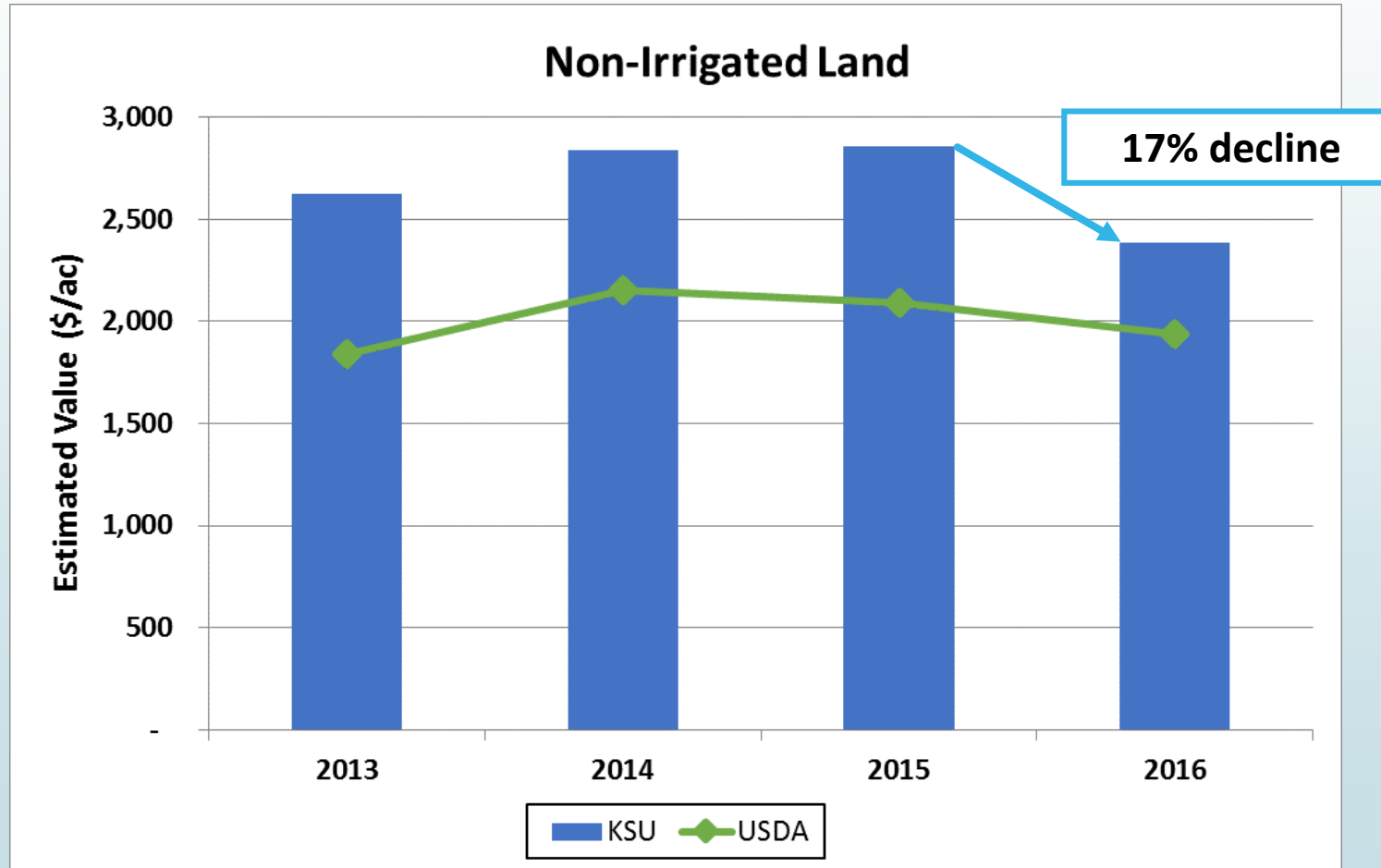
Land Value Trends

Kansas Land Values - USDA

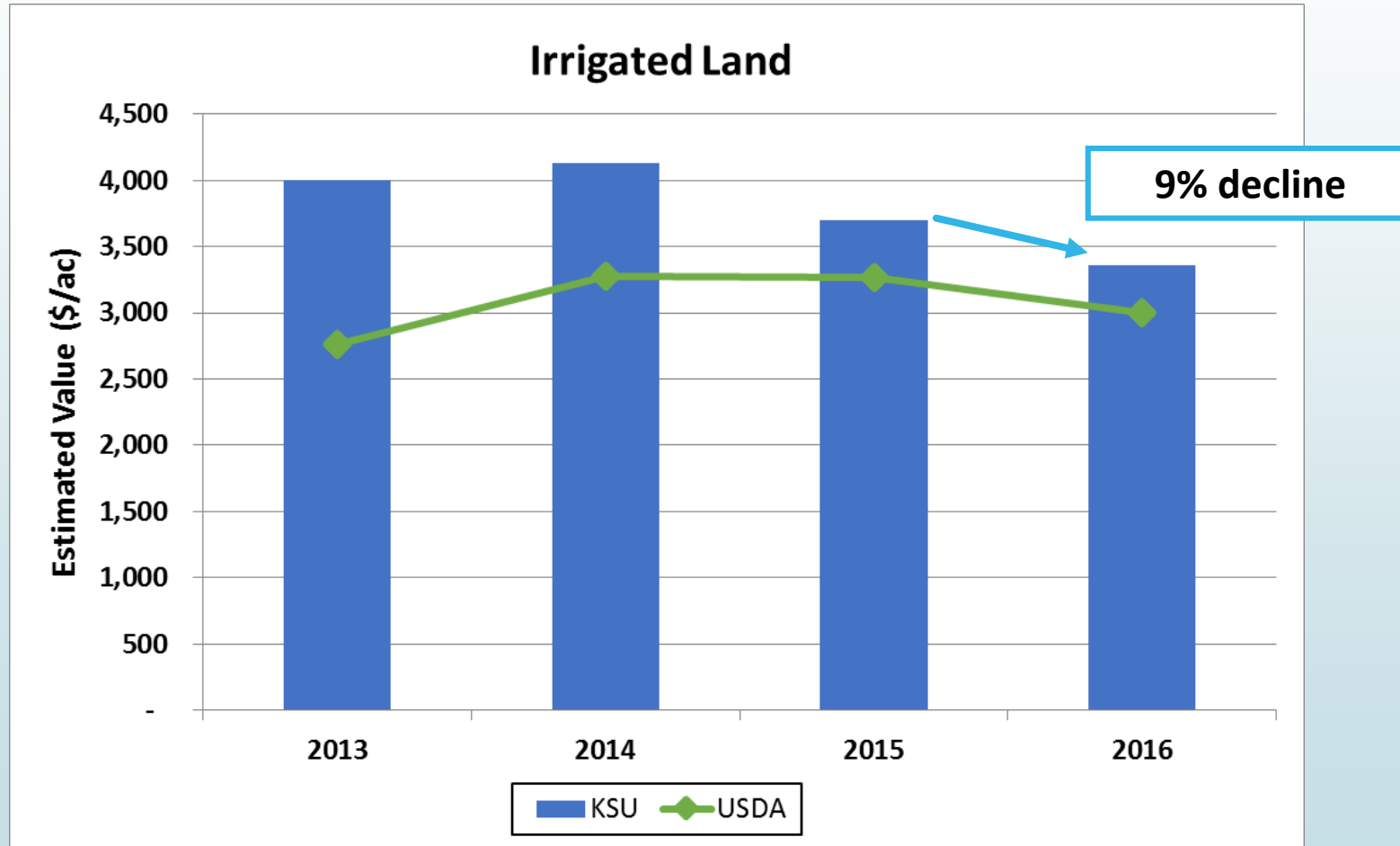


**9.8%
decline**

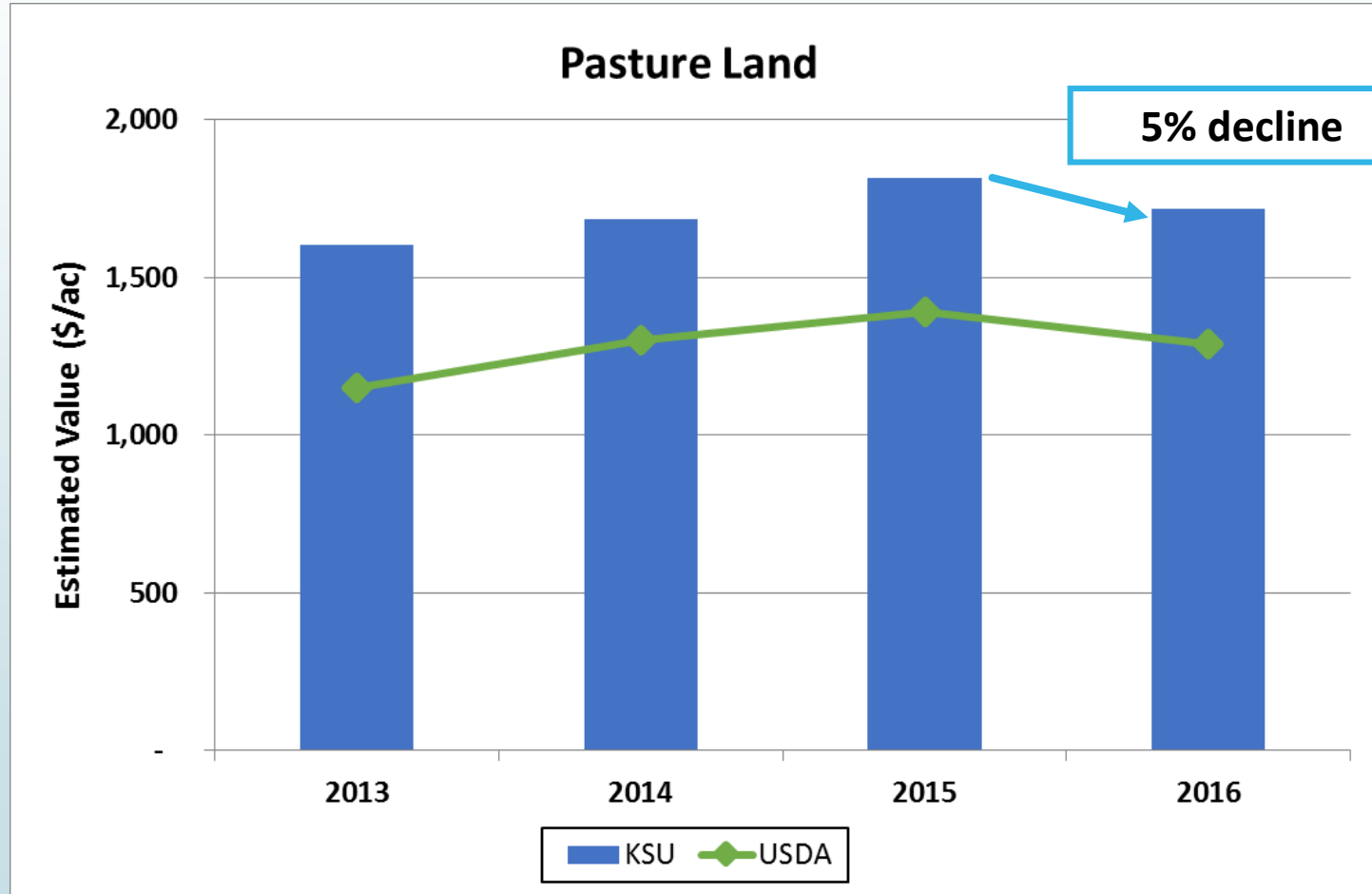
Kansas Land Values – Sales Data



Kansas Land Values – Sales Data

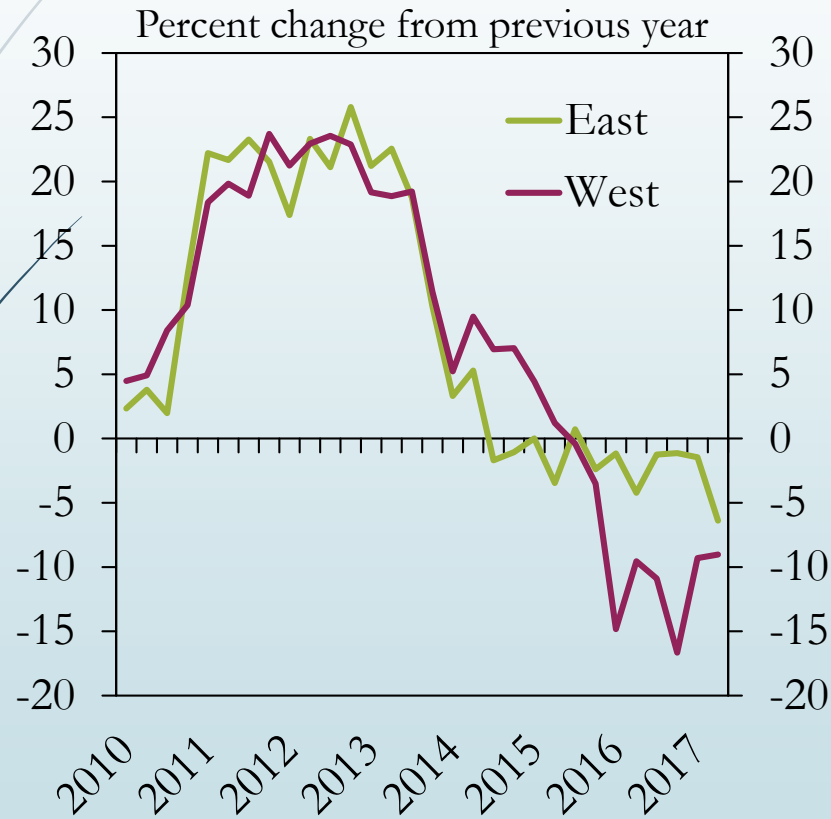


Kansas Land Values – Sales Data



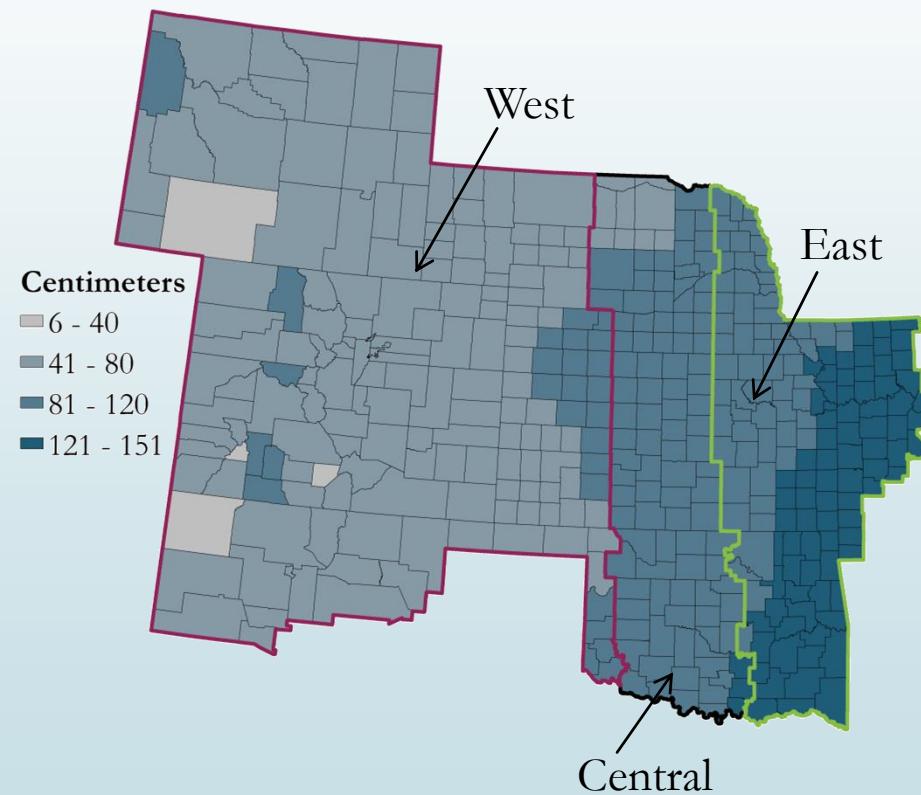
Variability in Land Values

Tenth District Nonirrigated Farmland



Land Quality

Soil Available Water Storage + Precipitation*



*Research has shown that root-zone available water storage (AWS) is an important soil property and a good indicator of soil quality. According to Cowley (2016), area-weighted average AWS and precipitation have significant and positive relationships with farmland values in the Tenth District. Sources: Federal Reserve Bank of Kansas City, USDA, NWS, and Cowley, C. 2016. "The Dispersion of Farmland Values in the Tenth District." Federal Reserve Bank of Kansas City, *Economic Review*, vol. 101, no. 4, pp. 29-67.

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Market Conditions

- ▶ “Land prices are still based on quality land having the highest demand and poor land having few buyers and lower prices.”

- ▶ Appraiser in Central Kansas, September 2017

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Motivation for Research

- Comments in the state regarding low quality land losing its value first, while the high quality land maintains its value
- Can we see a difference in the rate of change of land values during the recent downturn in Kansas?



Literature Review



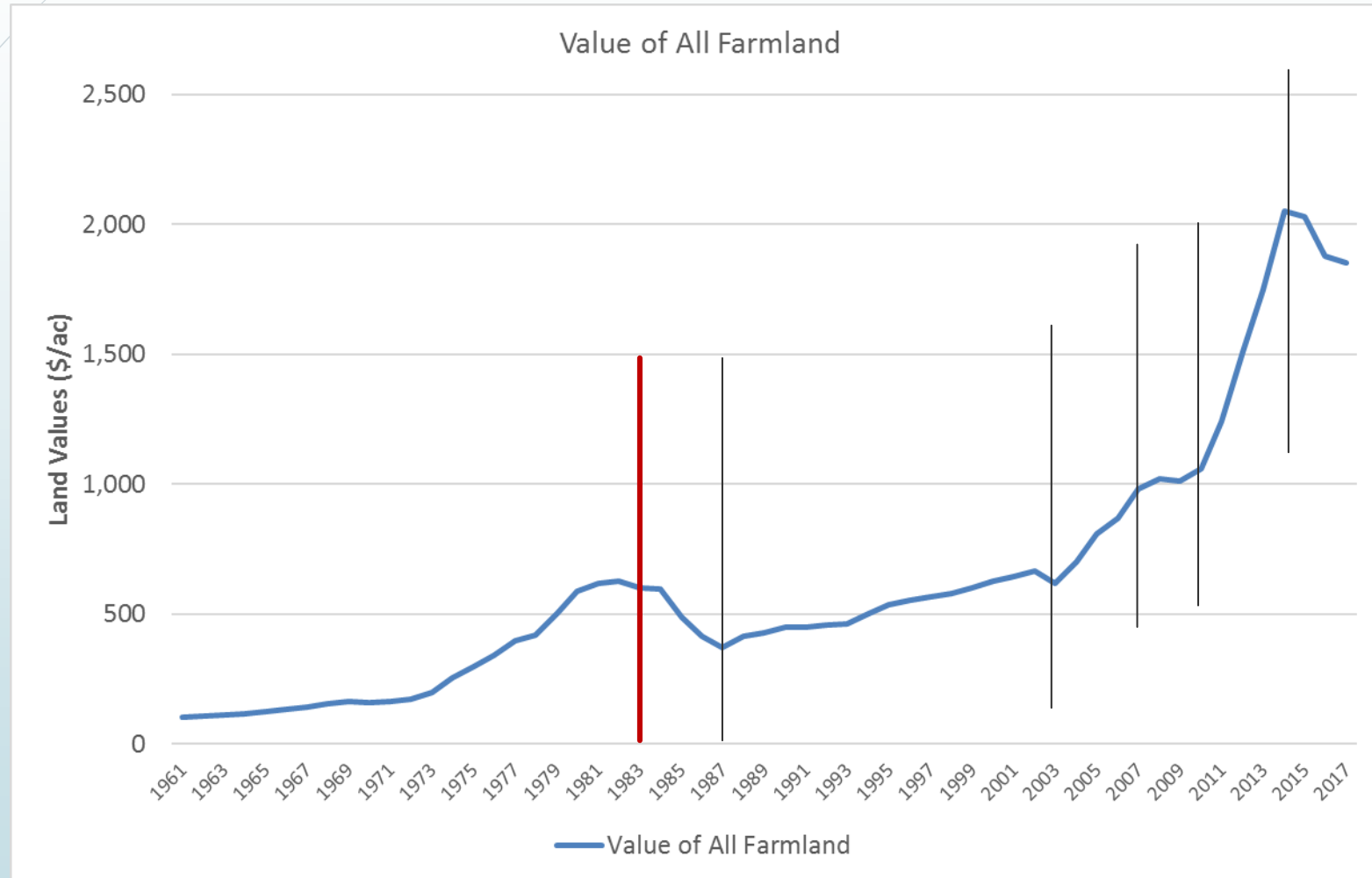
- Schurle, et al (2013)
 - Compared absolute and relative variability in land prices during periods of stable land prices versus rapidly changing land prices
 - While the absolute variability increased, the relative variability is nearly constant across years (1971-2011)
- Can we pick up changes using only the average land values? What about differences in quality and/or price point?



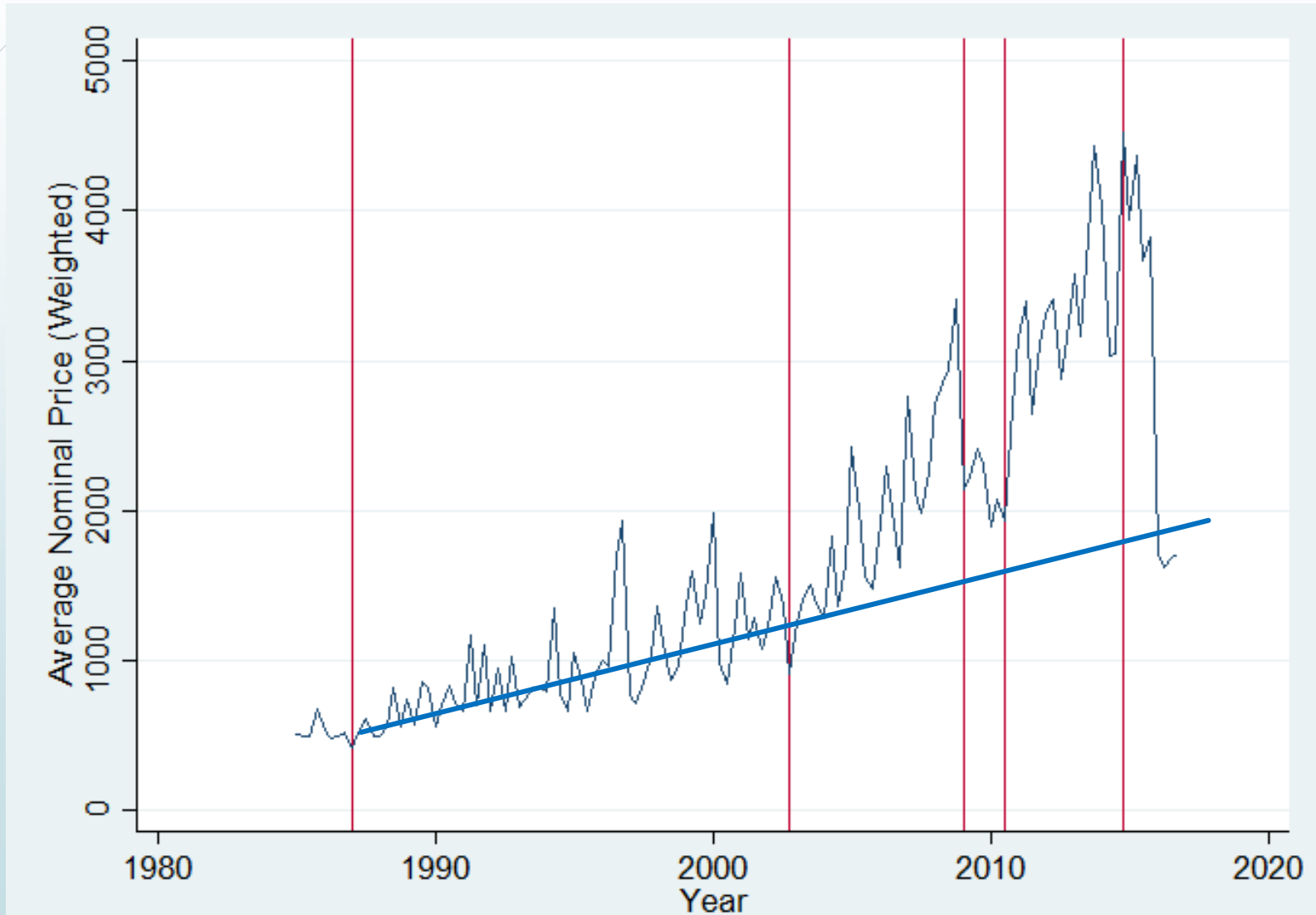
Dataset Construction

- Land sales in Kansas: 1986 to 2016
 - Market transactions – arm's length
 - Bare land values only
- Aggregation to a quarterly time series
 - Acre-weighted average by price quartile
 - Logged the acre-weighted averages to reduce skewness
 - Calculated the percentage change from same quarter in previous year

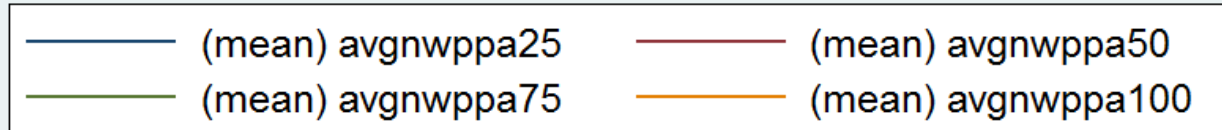
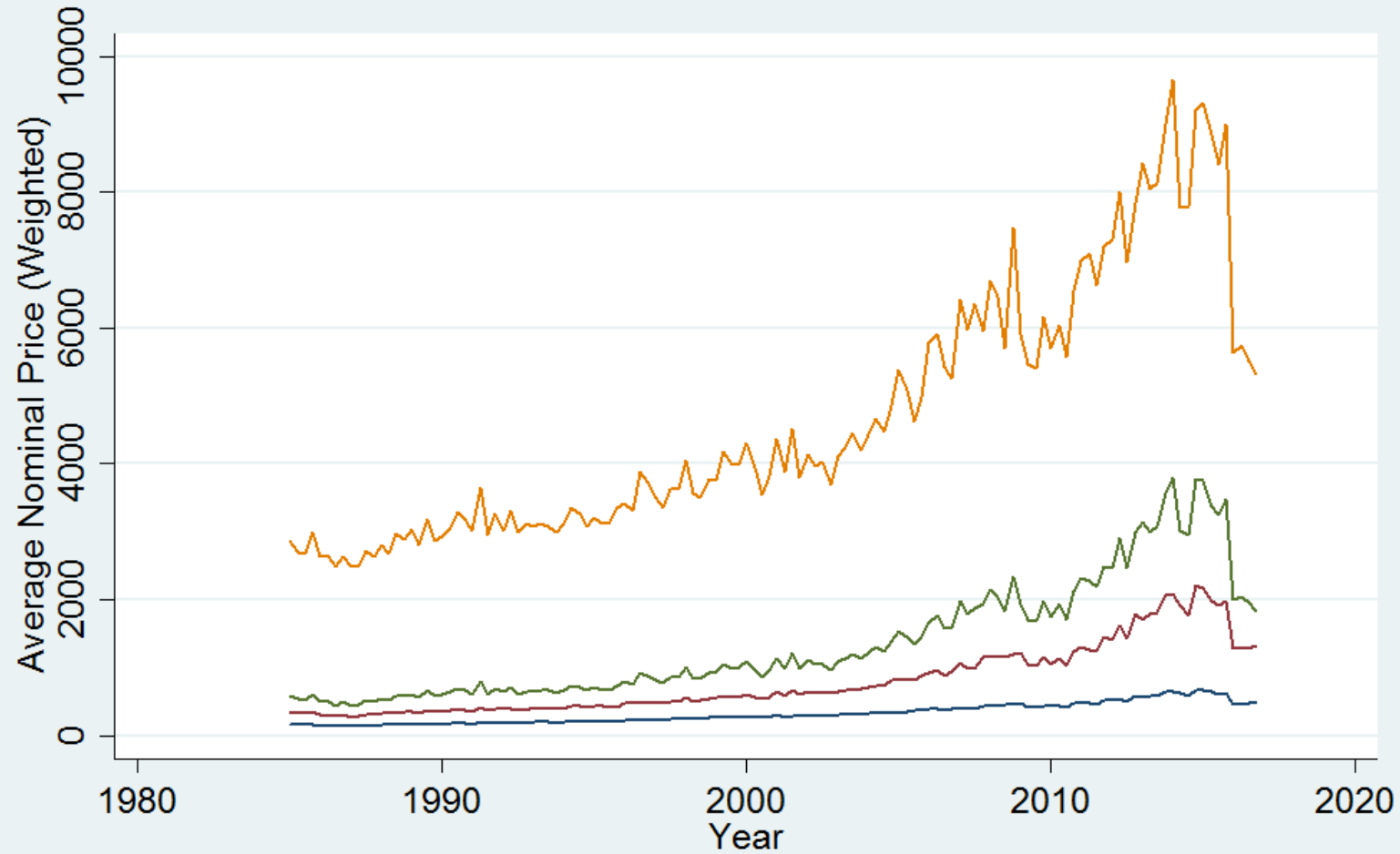
Kansas Land Values - USDA



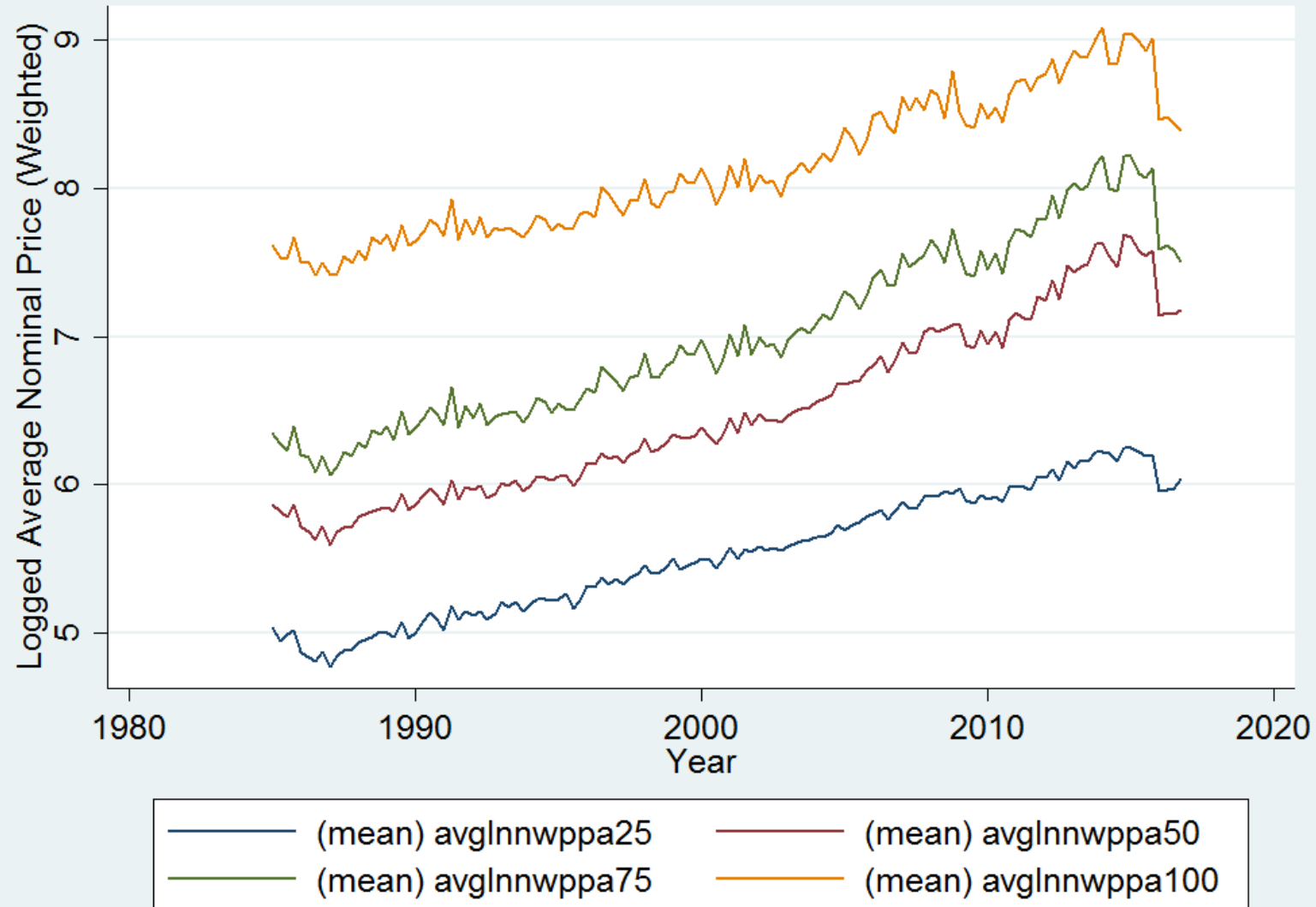
Kansas Land Values – Sales Data



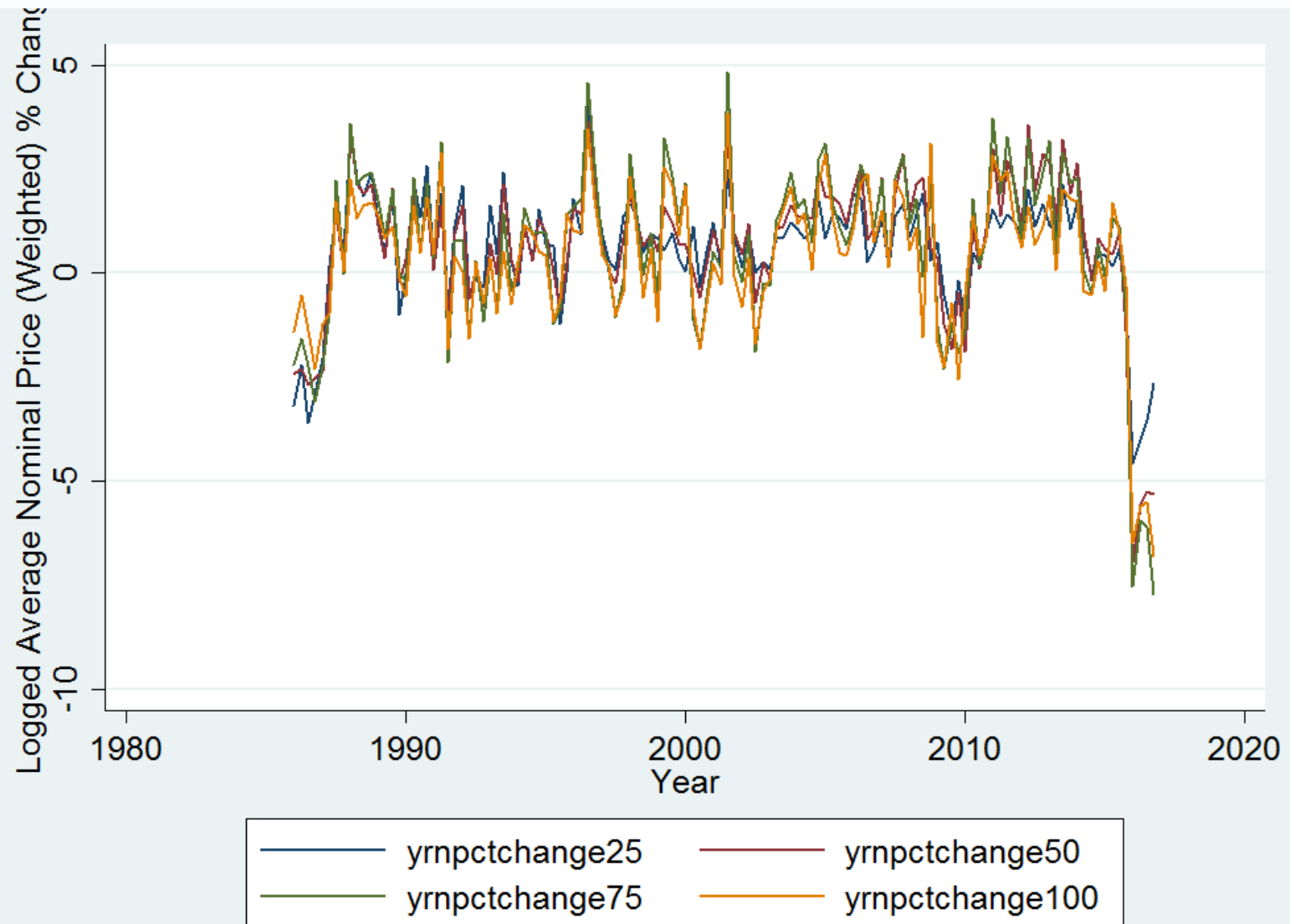
Kansas Land Values by Quartile



Kansas Land Values by Quartile



Kansas Land Values - % Change



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Regression Model

- ▶ Dependent variable
 - ▶ % change from same quarter in previous year
- ▶ Independent variables
 - ▶ Net Farm Income (annual)
 - ▶ DV's for periods of stability, upward, downward trends
 - ▶ Quarter DV's for seasonality

Regression Results

VARIABLES	25 th Quartile	50 th Quartile	75 th Quartile	100 th Quartile
Net Farm Income	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Period 1	-4.1804*** (1.2492)	-3.1446*** (0.6194)	-3.2135*** (0.8785)	-2.2327 (1.9207)
Period 3	0.7558 (0.6322)	0.8440*** (0.3135)	0.8040* (0.4446)	0.8033 (0.9720)
Period 4	-2.7996** (1.1964)	-1.0760* (0.5932)	-1.1863 (0.8414)	-2.3099 (1.8395)
Period 5	2.3837** (1.0457)	1.7410*** (0.5185)	2.0035*** (0.7354)	2.3101 (1.6078)
Period 6	-6.8392*** (1.0025)	-3.3552*** (0.4971)	-4.1902*** (0.7050)	-6.9781*** (1.5413)
Quarter 2	-0.0214 (0.6804)	0.0124 (0.3374)	-0.0069 (0.4785)	0.0462 (1.0461)
Quarter 3	0.1286 (0.6804)	0.0012 (0.3374)	0.0011 (0.4785)	-0.0618 (1.0461)
Quarter 4	-0.1214 (0.6802)	-0.1086 (0.3373)	-0.1974 (0.4784)	-0.4171 (1.0458)
Constant	1.1881 (0.9379)	0.5545 (0.4650)	0.9589 (0.6595)	1.9891 (1.4419)
Observations	124	124	124	124
R-squared	0.4101	0.5078	0.3890	0.2056

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

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Implications and Further Work

- Statistical evidence of differences between land price categories during periods of rapid change
 - Supports KC Fed chart of differences in land quality
- Further work to use a quality measure to separate the values into quartiles
 - Soils data from NRCS, precipitation at the section level
- Confirmation of observations from around the state
 - Implications for asset valuation by lenders

Questions?



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