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What Explains the Share of Farm Loss Systemic with County Loss?

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Findings

- Average farm yield and revenue loss systemic with county loss varies from one-third to two-third for states and crops examined and losses greater than 10%.
- In comparison, average cumulative county losses over the entire analysis period varies from 66% to 95% for states and crops examined and losses greater than 10%.
- Correlation, but not beta, between farm and county yield/revenue deviation is significantly associated with share of systemic farm loss, but correlation's explanatory power is at most 50%.
- For yield only, share of systemic loss is higher the lower is farm-to-county standard deviation.

Implications

- County programs can cover the majority of a farm's loss in excess of 10% if payments are viewed over time not by year. Systemic coverage is about 20 percentage points lower. Thus, insurance basis risk is substantial.
- Correlation between farm and county deviations leaves 50% of the variation in share of loss that is systemic with the county unexplained. Thus, farmers and their advisors should be aware of the limits of farm-county correlation when making risk management decisions.
- Beta's lack of explanation of farm-county systemic loss share needs additional analysis.

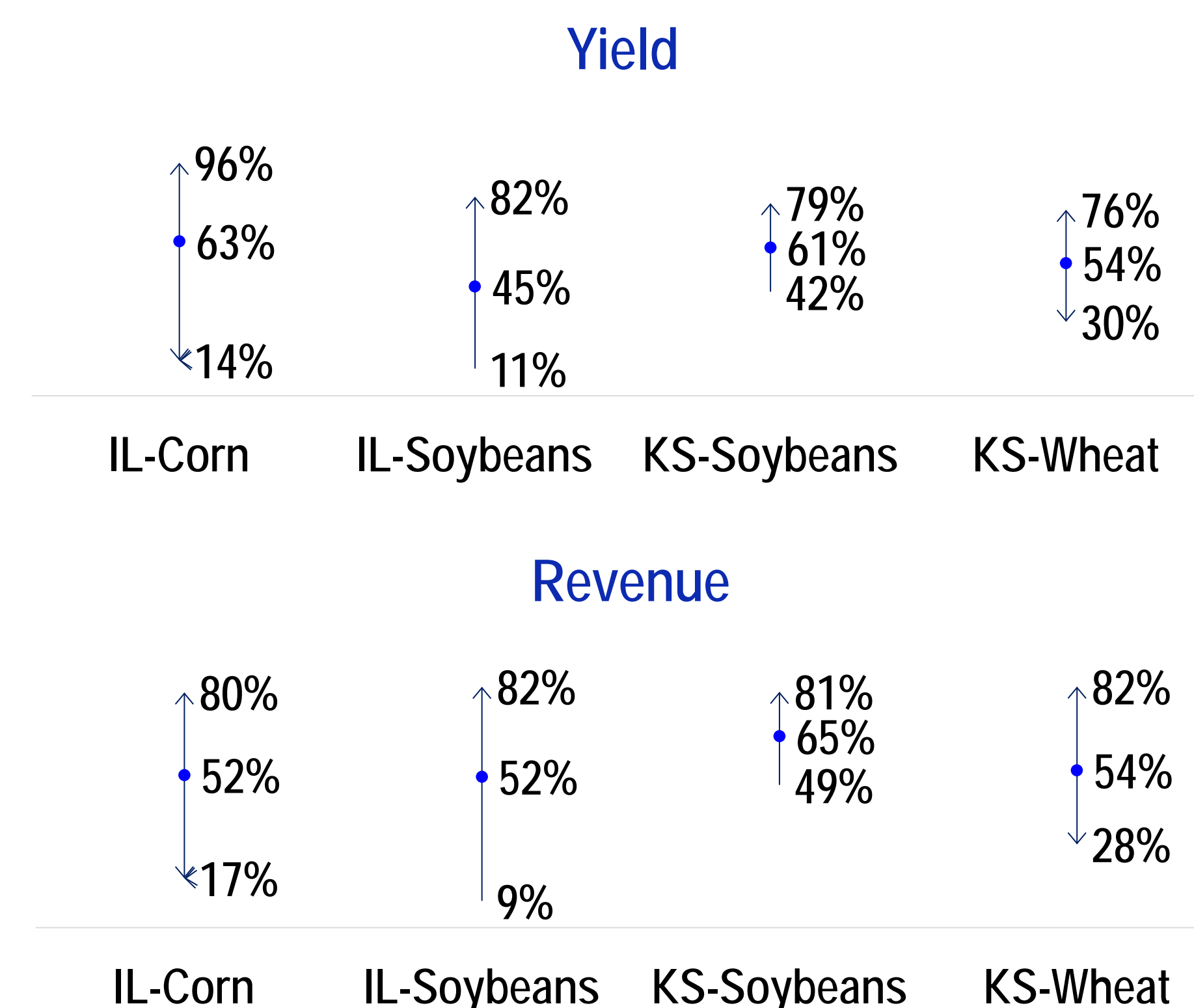
Introduction

- **Agricultural Act of 2014 authorized 2 new county risk programs (Agricultural Risk Coverage – County and Supplemental Coverage Option), suggesting county is area of choice for U.S. farm risk programs.**
- Relationship between farm loss and county loss is a key to understanding such programs, but studies of this relationship over time are limited by availability of data.

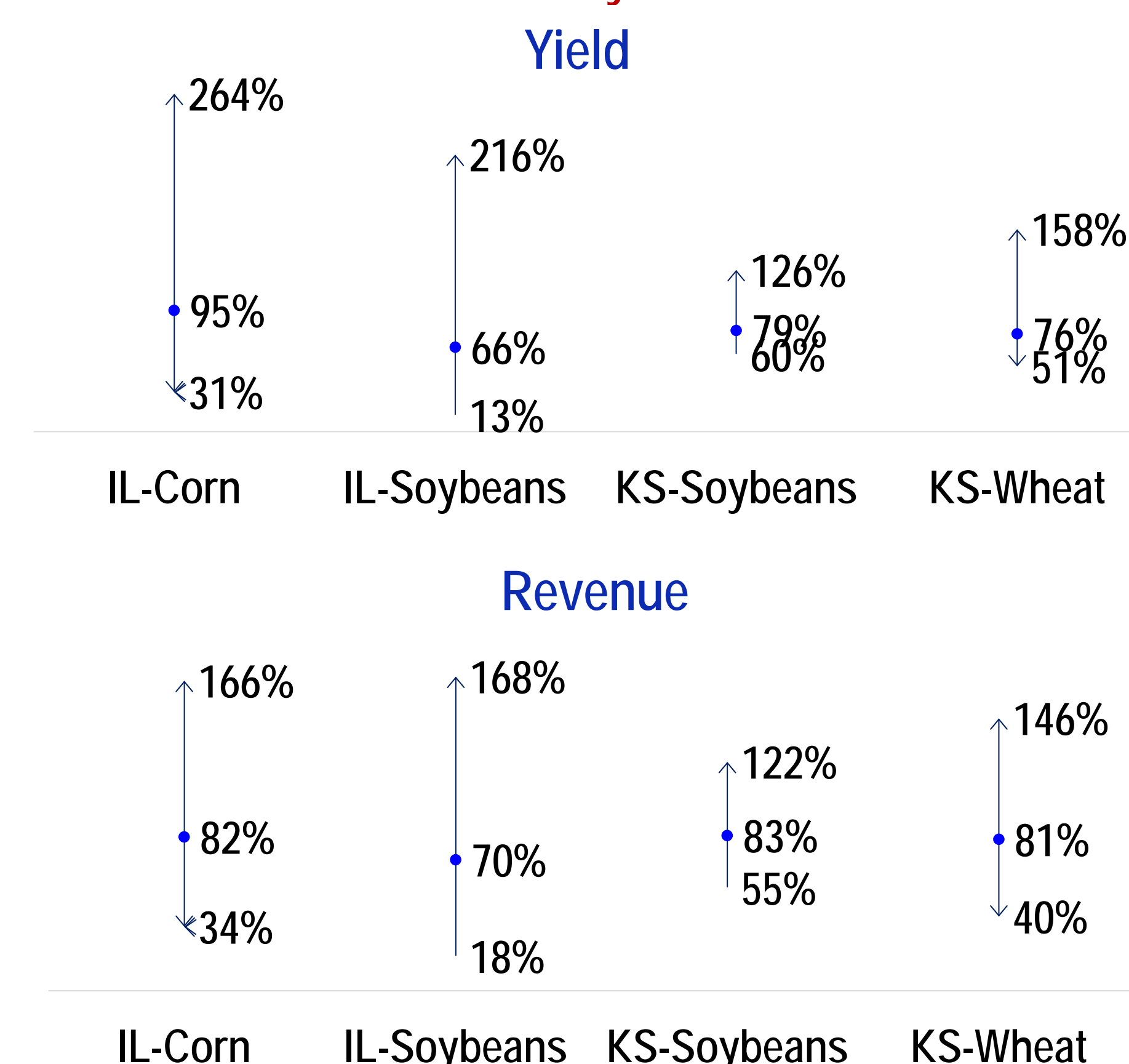
Objectives, Data, and Methods

- Explore share of farm loss systemic with county and factors associated with share using longitudinal data from Illinois and Kansas farm management associations.
- Yields available for 186 farms over 1973- 2012 crop years for corn,, soybeans and wheat. Only 69 farms had no missing data, so sample expanded to include farms with 1 year of missing data to increase analytical power.
- Expected yield calculated 2 ways: (1) 5-year Olympic moving average (OMA5) and (2) in-sample linear trend line yield. Results are similar; only OMA5 results presented.
- Pre-plant and harvest revenue per acre calculated using crop insurance prices.
- Share of farm's loss systemic with county loss per acre (SL) calculated as : $SL_{ijkt} = \frac{\min[\sum_{t=1}^{35} FL_{ikt}, \sum_{t=1}^{35} CL_{jkt}]}{\sum_{t=1}^{35} FL_{ikt}}$, where FL=farm loss and CL=county loss.
- Correlation and beta between farm and county yield / revenue deviations calculated.

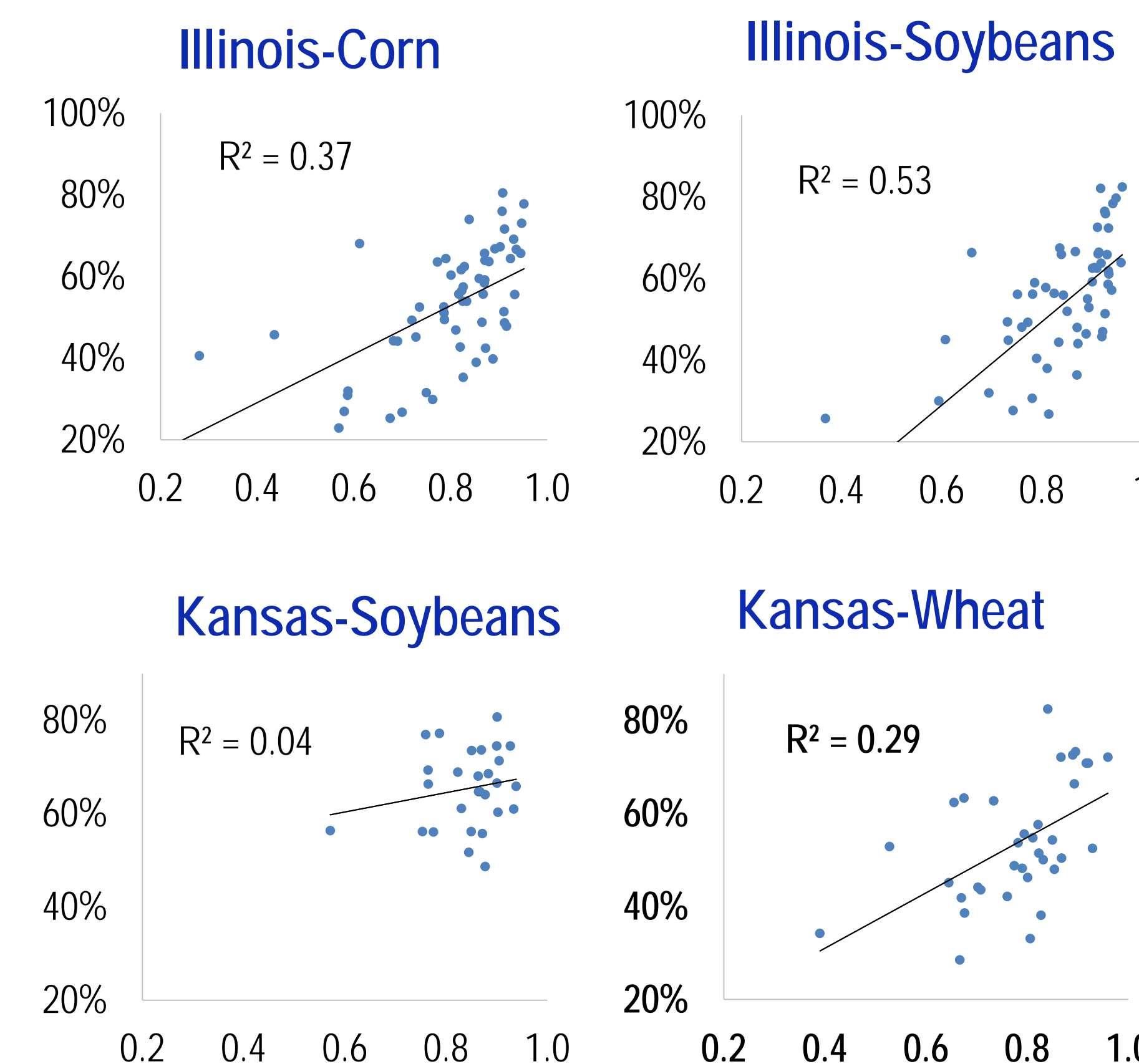
Range of Share of Farm Loss Systemic with County Loss, OMA5 Forecast, Illinois (IL) and Kansas (KS),1973-2012
Farm and County Losses Greater than 10%



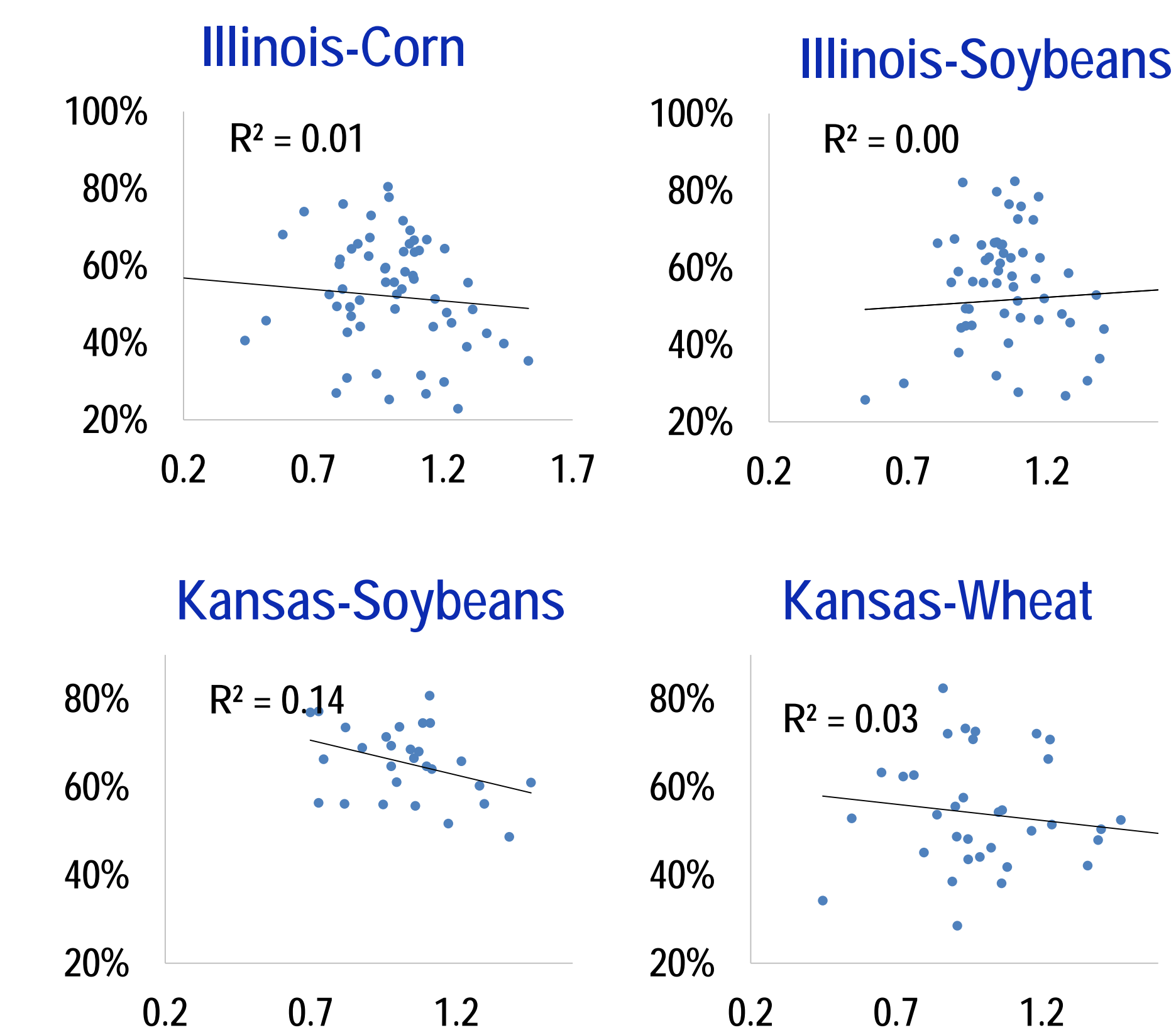
Range of Cumulative County Loss as Share of Cumulative Farm Loss, OMA5 Forecast, Illinois (IL) and Kansas (KS), 1973-2012, Farm and County Losses Greater Than 10%



Share of Farm Loss Systemic with County Loss (y-axis) vs. Correlation of Farm-County Revenue Deviations (x-axis) , OMA5 Forecast, 1973-2012



Share of Farm Loss Systemic with County (y-axis) vs. Beta of Farm - County Revenue Deviations (x-axis), 1973-2012



Pooled Regression of Association Between Share of Revenue Loss Systemic with County and Farm-County Correlation, Losses Greater than 10%, OMA5 Forecast, 1973-2012

	Yield		Revenue	
	(1)	(2)	(3)	(4)
Correlation Farm-County Deviations	1.23***	1.10***	0.59***	0.55***
IL Soybeans	0.28	0.40**	-0.38***	-0.32**
KS Soybeans	0.47	0.60**	0.43	0.49*
KS Wheat	0.43*	0.33	0.02	0.01
Correlation * IL Soybeans	-0.45*	-0.57**	0.43***	0.37**
Correlation * KS Soybeans	-0.57	-0.69*	-0.39	-0.45
Correlation * KS Wheat	-0.54*	-0.37	0.00	-0.00
Farm-to-County St. Deviation Ratio		-0.38***		-0.08
Farm-to-County Average Ratio		0.13		0.01
Average Acres Planted to Crop		0.00		0.00*
Square Miles in County		-0.00		0.00
Constant	-0.42**	-0.03	0.05	0.11
Number of Observations	185	185	185	185
R ²	0.450	0.601	0.475	0.500

Selected References

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