

Examining Contemporaneous Farm and County Losses Using Farm Level Data

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Goal

- Evaluate proportion of farm losses systemic by larger geographical programs:
 - County
 - State
 - Nation

Farm Losses and Geographical Losses

Key for evaluating efficacy of several programs:

- Average Crop Revenue Election
- Revenue programs within farm bill drafts
- Group (County-level) revenue programs
- Supplemental Coverage Option

Literature

- Area insurances
 - Halcrow
 - Miranda, Mahul, Chambers and Quiggin,
Chambers and Quiggin
- Related line of weather insurances
 - Mahul
 - Turvey

Advantages of Area Approaches (non-farm specific)

- Significant reduction in moral hazard
- Significant reduction in adverse selection
- Lower administrative costs

Disadvantages of Area Approaches

- Less risk reductions associated with area versus farm-level plans
- Targeting: Missing some farms in need and getting providing others with funds that are not needed.

Data

- Illinois Farm Business Farm Management (FBFM)
 - Corn (for grain)
 - Soybeans
 - Wheat
- Kansas Farm Management Association (KFMA)
 - Corn (for grain)
 - Sorghum (for grain)
 - Soybeans
 - Wheat

Data, Cont.

- 1972 (Illinois) and 1973 (Kansas) to 2012
- Had to have six consecutive years
 - five prior years to calculate average (trend yield)
 - Current for yield
- Implies data is not continuous

Observations Per Year

	Minimum	Maximum
Illinois		
Corn	992 (1977)	3787 (2000)
Soybeans	774 (1977)	3692 (2000)
Wheat	64 (1977)	356 (2000)
Kansas		
Corn	159 (1984)	517 (2001)
Sorghum	124 (2012)	750 (1977)
Soybeans	238 (1980)	624 (2004)
Wheat	455 (2012)	1038 (1978)

Comparison to Census in 2007

	ACRES		YIELD	
	Mgt Assoc	Census	Mgt Assoc	Census
Illinois				
Corn	569	342	189	172
Soybeans	351	244	50	43
Wheat	118	95	56	53
Kansas				
Corn	464	328	125	136
Sorghum	263	231	84	77
Soybeans	415	196	29	32
Wheat	611	377	21	32

Results

- Nature of Losses
- Farm losses related to county, state, and national losses
- Evaluation of 90% county and state policies

Methodology: Description of Losses

Revenue loss for a “unit” =

max[0,

(1 – loss percent)

x ((projected price x trend yield)

- (harvest price x yield for respective unit))]

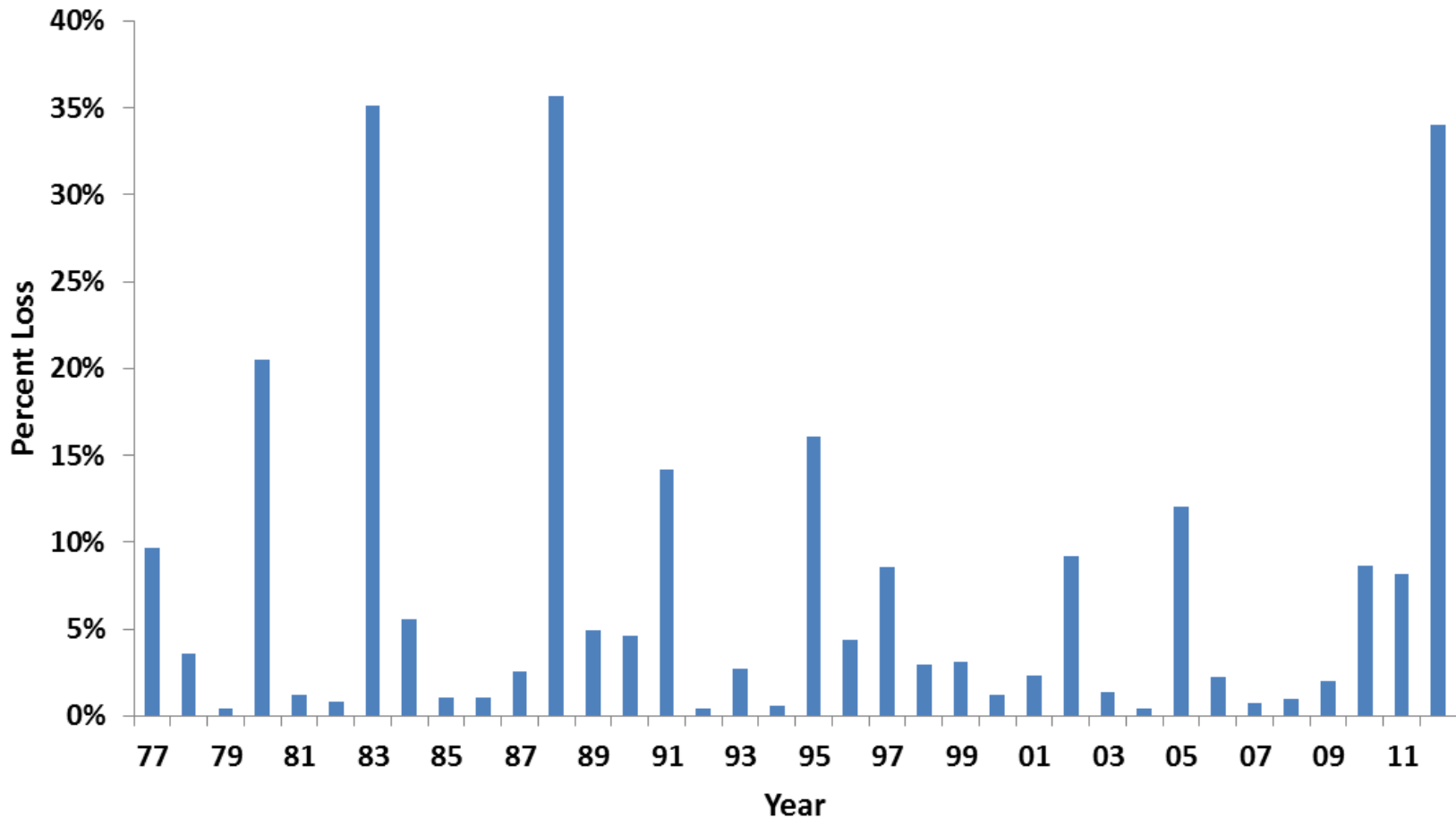
Revenue loss (as a percent of expected) =

(Loss for a unit / (projected price x trend yield)

Average Annual Loss (Loss percent = 0)

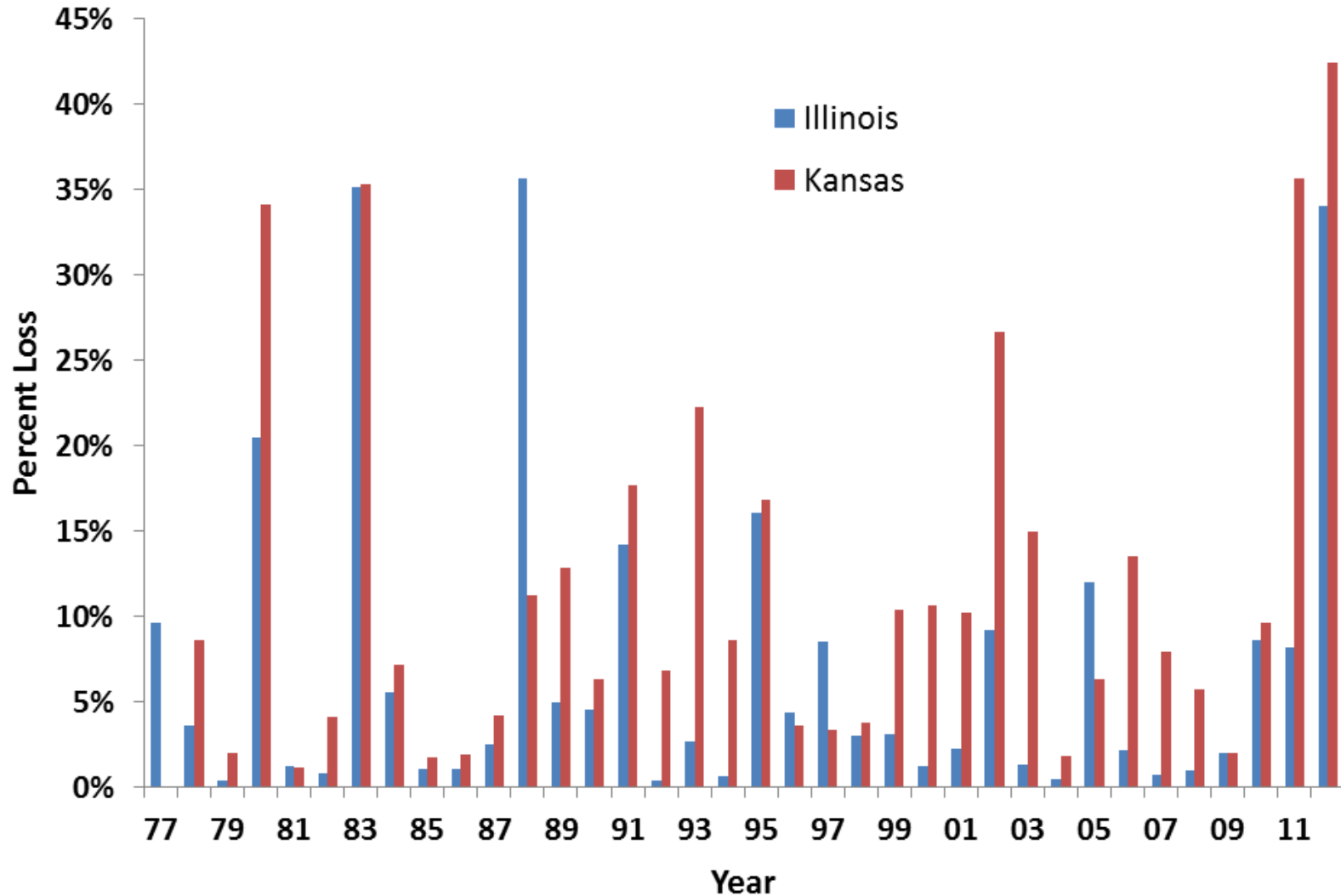
	Yield Loss	Revenue Loss
Illinois		
Corn	7%	10%
Soybeans	6%	8%
Wheat	9%	12%
Kansas		
Corn	12%	15%
Sorghum	15%	18%
Soybeans	17%	17%
Wheat	13%	14%

Yield Loss (% of Expected), Illinois, Corn



Yield Loss, Corn, Illinois and Kansas

Correlation coefficient = .66



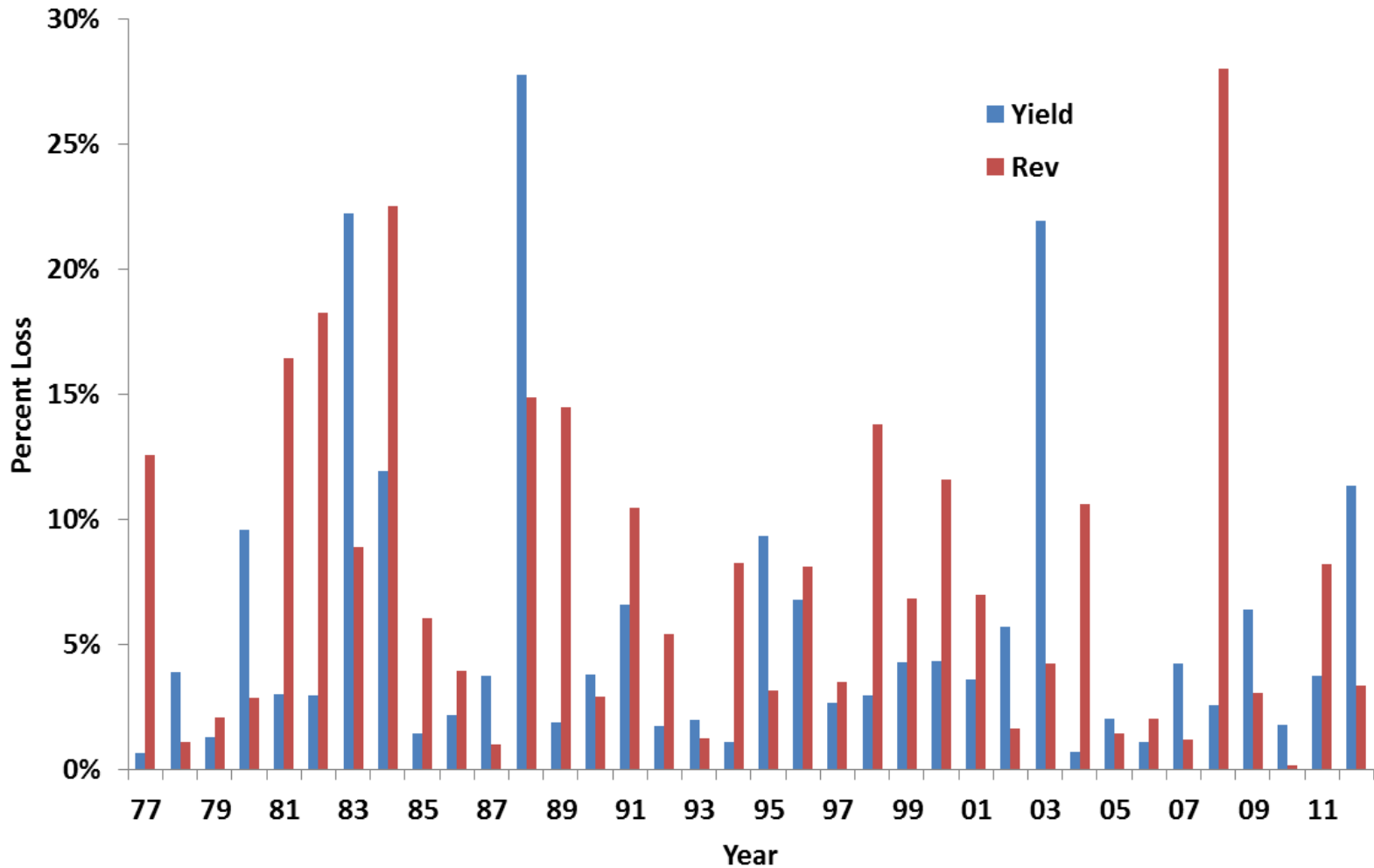
Yield Loss Correlations

	Ill – Corn	Ill Beans	Ill Wheat	Kan Corn	Kan Sorg	Kan Beans	Kan Wheat
Illinois							
Corn	1.00						
Soybeans	0.71	1.00					
Wheat	-0.12	-0.08	1.00				
Kansas							
Corn	0.67	0.41	-0.03	1.00			
Sorghum	0.52	0.24	-0.04	0.63	1.00		
Soybeans	0.47	0.49	0.09	0.68	0.80	1.00	
Wheat	-0.15	-0.17	0.14	-0.04	-0.11	-0.16	1.00

Correlation Coefficients Yield and Revenue Losses

	Correlation
Illinois	
Corn	.54
Soybeans	.20
Wheat	.61
Kansas	
Corn	.74
Sorghum	.84
Soybeans	.87
Wheat	.84

Illinois Soybean, Yield and Revenue Losses



Observations

- Losses higher in Kansas, more yield variability
- Losses are highly congregated into a few years
- Revenue losses are higher than yield losses

Systemic Loss Methodology: Loss for a County or State

Loss for a unit =

$$\begin{aligned} & \max[0, \\ & (1 - \text{loss percent}) \\ & \times ((\text{projected price} \times \text{trend yield}) \\ & - (\text{harvest price} \times \text{yield for respective unit}))] \end{aligned}$$

Calculate percent of farm yield covered by county or state

$$[\text{Minimum}(\text{farm loss}_{\alpha, t}, \text{area loss}_{\alpha, j, t}) / (\text{farm loss}_{\alpha, t})]$$

Revenue Losses Captured by County

Loss Percent Same for Farm and County

Loss Percent				
	0%	15%	30%	50%
Illinois				
Corn	62%	43%	29%	23%
Soybeans	59%	43%	15%	0%
Wheat	57%	51%	42%	10%
Kansas				
Corn	59%	48%	38%	27%
Sorghum	58%	48%	39%	29%
Soybeans	63%	56%	46%	29%
Wheat	56%	48%	43%	35%

Revenue Losses Captured by State

Loss Percent Same for Farm and State

	Loss Percent			
	0%	15%	30%	50%
Illinois				
Corn	48%	14%	0%	0%
Soybeans	48%	28%	0%	0%
Wheat	34%	43%	35%	0%
Kansas				
Corn	32%	11%	0%	0%
Sorghum	29%	28%	13%	0%
Soybeans	45%	31%	14%	1%
Wheat	29%	12%	6%	0%

Revenue Losses Captured by U.S. Loss Percent Same for Farm and U.S.

Loss Percent					
	0%	15%	30%	50%	
Illinois					
Corn	33%	6%	0%	0%	
Soybeans	44%	29%	10%	0%	
Wheat	27%	15%	9%	0%	
Kansas					
Corn	23%	3%	0%	0%	
Sorghum	29%	13%	0%	0%	
Soybeans	24%	6%	1%	0%	
Wheat	22%	6%	0%	0%	

Systemic Losses

- Systemic losses covered by larger regions decline as move from county, to state, to U.S.
- Little overlap at lower loss percentages
- Comparable performance in Illinois and Kansas (maybe less systematic in Kansas)

Percent of Losses Below a Farm Loss Percent Captured by a 90% Revenue County and State Trigger

	Farm Loss Percent			
	0%	15%	30%	50%
Illinois – Corn				
Percent Loss	9.6%	3.0%	.8%	.2%
County program	19%	34%	42%	52%
State program	8%	12%	15%	17%
Kansas -- Corn				
Percent Loss	14.8%	7.8%	3.8%	1.4%
County program	26%	35%	40%	41%
State program	11%	13%	14%	15%

Percent of Losses Below a Farm Loss Percent Captured by a 90% Revenue County and State Trigger

	Farm Loss Percent			
	0%	15%	30%	50%
Illinois – Soybeans				
Percent Loss	7.6%	2.2%	.4%	.1%
County program	13%	24%	29%	31%
State program	5%	9%	10%	12%
Kansas -- Soybeans				
Percent Loss	16.4%	9.7%	5.2%	1.8%
County	25%	33%	38%	41%
State	22%	27%	31%	34%

Percent of Losses Below a Farm Loss Percent Captured by a 90% Revenue County and State Trigger

	Farm Loss Percent			
	0%	15%	30%	50%
Illinois – Wheat				
Percent Loss	11.1%	5.4%	2.0%	.4%
County program	20%	27%	33%	43%
State program	12%	16%	19%	21%
Kansas -- Wheat				
Percent Loss	13.9%	7.6%	3.2%	1.5%
County program	25%	35%	42%	49%
State program	6%	7%	9%	9%

90% Comparisons

- Differences across crops
 - At low loss levels, corn more than wheat, more than soybeans
- Comparable performance across states

Summary

- Comparable performance across Illinois and Iowa
- Still sizable non-systemic exists