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Disparity in yields from NASS and RMA: Implication for ARC-CO Program

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Disparity in yields from NASS and RMA: Implication for ARC-CO

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Introduction

- The Agricultural Act of 2014 created a county-revenue triggered Agricultural Risk Coverage Program. The county triggered program, which has by far the most participation, relies upon county yields from the National Agricultural Statistics Service (NASS).
- NASS regularly reports county yields but does not do so for all counties. Moreover, NASS county yield data are estimated from a sample of random survey data. This casts doubt on the validity of using NASS data in the counties where the sample size of farmers is small.
- Farm Service Agency (FSA) determines those county yields by incorporating county yield data from Risk Management Agency (RMA). RMA regularly collects yield data from individual coverage policies. But participation is not uniformly high in all counties and the yield characteristics of non-insured farms are largely unknown.

Objective

- This paper investigates the disparities in yields from NASS and RMA and sheds light on the potential payments of ARC-CO using different county yield data. Particular research objectives are as follows:
  1) Is there a systemic bias in county yields from NASS and RMA?
  2) Does spatial pattern in county yields from NASS and RMA differ?
  3) Will county yields from NASS and RMA lead to significant different payments of ARC-CO program?

Data

- We look at various data sources that might be used for triggering the ARC program:
  1) NASS planted acre yields,
  2) RMA yield data aggregated to the county level from individual coverage policies. These data series cover 1991-2015.
  3) Data used by FSA since the ARC-CO program has been implemented for 2014 and 2015.
- We mimic ARC-CO program to derive the payments using county yields from NASS and RMA, which would need to be paid, if ARC-CO program would have started from 1991.

Empirical Results

Comparison of Means and Variance

Crop		Number of Counties in %		
		RMA>NASS*	RMA=NASS	RMA<NASS
Corn	Mean	34.4%	63.2%	2.3%
	Variance	4.1%	95.7%	0.2%
Soybean	Mean	7.5%	89.5%	3.0%
	Variance	0.5%	98.5%	1.0%

*One-tailed t test and F test are used to examine the equal mean and variance of yields from RMA and NASS. We reject the null hypothesis at 5% significance level.

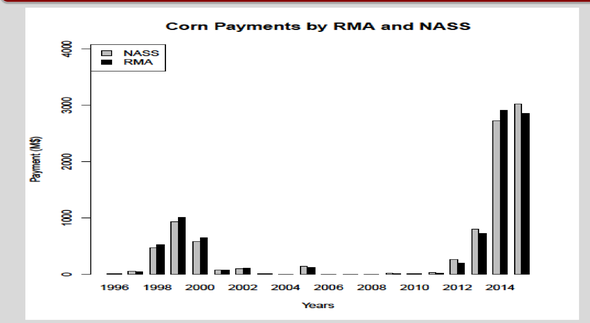
- In general the RMA and NASS yield mean and variance are not statically different.
- But if the two are different, RMA are more frequently higher than NASS than the opposite.

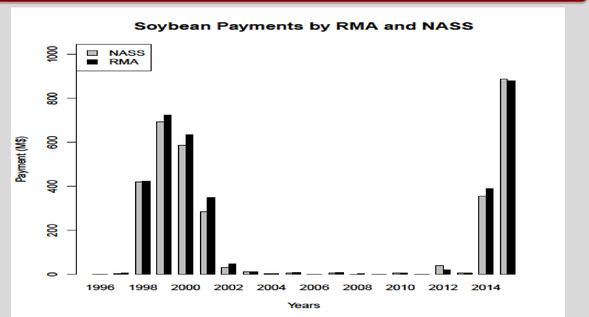
Comparison of Spatial Smoothness of Yields

Average Correlation		1991-2015		2001-2015	
		NASS	RMA	NASS	RMA
Corn	Yield	0.889	0.912	0.873	0.910
	Payment	0.821	0.858	0.825	0.866
Soybean	Yield	0.891	0.888	0.878	0.897
	Payment	0.808	0.833	0.791	0.825

- We calculated the correlation of yields and ARC payments for each county and its nearest neighbor.
- Measurements using RMA data are somewhat spatially smoother or more correlated, but the differences are not large.

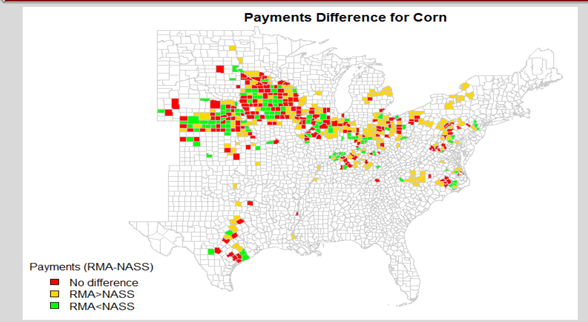
Aggregated ARC Payments

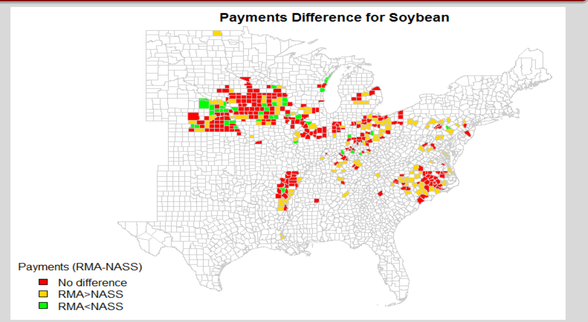




- For both corn and soybean, significant payments are made in the late 1990s and in the most recent years. In general the differences in aggregate payments are small and not consistently larger for one data series than another.

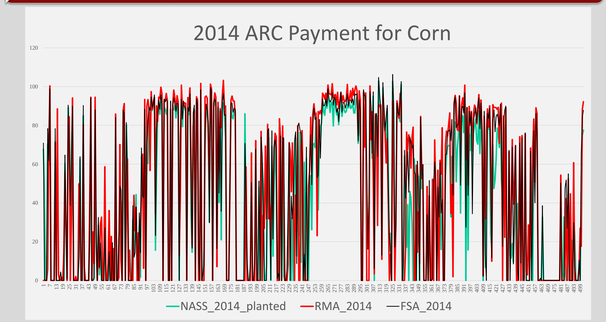
Spatial Pattern of ARC Payments

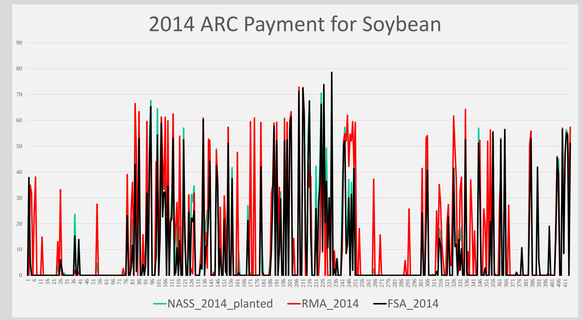




- For both corn and soybean, the spatial patterns of differences in payments from using RMA versus using NASS data observed are quite random. The patterns suggest that one data series would not be favored in a particular region versus another.

ARC Payments across Data Sources





- There is substantial overlap but one can observe when a particular series stands out from the others. Using RMA yield data generally leads to higher payments in 2014 compared to NASS and FSA data. FSA seems to use multiple sources of data, the payments of which tend to lie between those from RMA and NASS.

Conclusion

- In most cases mean and variance of RMA and NASS data are similar with some instances of RMA having a higher mean..
- Some differences in ARC payments occur if RMA data is used but the results are largely random.
- RMA data is slightly more likely to see yields in nearby counties be similar, but additional statistical techniques would be needed to further smooth across counties.
- We will end by reminding readers that U.S. county designations were not created with farm programs in mind and that soils and other agronomic conditions are not consistent. Building more uniform program ‘areas’ may be possible with better geographical data identification.

Acknowledgement

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