Pasture, Rangeland, and Forage Insurance and Conservation Reserve Program

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Outline

Introduction

- Pasture, Rangeland and Forage Index Insurance (PRF)
- 3 Conservation Reserve Program (CRP)
- PRF vs CRP (Yu, Goodrich, and Graven)

6 Concluding Remarks

Table of Contents



- 2 Pasture, Rangeland and Forage Index Insurance (PRF)
- 3 Conservation Reserve Program (CRP)
- 4 PRF vs CRP (Yu, Goodrich, and Graven)
- Concluding Remarks

Background

Two key themes of the US farm policy are:

- Risk Management
 - Federal Crop Insurance Program (FCIP)
 - I For crops: Yield and revenue insurance products
 - **②** For pasture: Pasture, Rangeland and Forage Index Insurance (PRF)
 - **②** Commodity Programs shifted to "risk management" programs
- ② Conservation: Conservation Reserve Program (CRP)

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Land use decision: Cropland

What are the options for cropland?

- Continue cropping
- ② Convert to pastureland and produce hay and/or graze
- Operation Programs:
 - Conservation Reserve Program (CRP): Cannot produce hay and/or graze
 - Grassland Reserve Program (GRP)/Grassland CRP/Agricultural Conservation Easement Program (ACEP): Can produce hay and/or graze

FCIP is available for all options but CRP.

Land use decision: Pastureland

What are the options for pastureland?

- Convert to cropland
- Ontinue producing hay and/or graze
- Operation Programs:
 - Conservation Reserve Program (CRP) only if eligible: Cannot produce hay and/or graze
 - Grassland Reserve Program (GRP)/Grassland CRP/Agricultural Conservation Easement Program (ACEP): Can produce hay and/or graze

Again, FCIP is available for all options but CRP.

Table of Contents

Introduction

Pasture, Rangeland and Forage Index Insurance (PRF)

Conservation Reserve Program (CRP)

PRF vs CRP (Yu, Goodrich, and Graven)

Concluding Remarks

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ >

Pasture, Rangeland and Forage Index Insurance (PRF)

- In 2007, the Risk Management Agency (RMA) launched a pilot program to provide insurance for pasture, rangeland, or forage acres.
- RMA developed insurance based on rainfall and vegetation indices which would serve as proxy measures for forage yields (vegetation index program is no longer available).
- PRF has been gradually expanded across counties.
- Both Rainfall Index pilot (PRF-RI) and Vegetation Index pilot (PRF-VI) do not insure individual yields: "Index"-based and "area"-based - there exists "basis" risk.
- Similar to the other crop insurance programs, premium is highly subsidized.

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PRF Pilots in 2007

Pasture Rangeland Forage Pilot Programs - 2007



Source: RMA, USDA

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PRF Pilots in 2009

In 2009, PRF was offered to Kansas farms for the first time (Vegetation Index).



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PRF Pilots in 2010

Starting 2010, PRF-RI has been offered instead of Vegetation Index.



Source: RMA, USDA

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PRF Pilots in 2013

2013 and Succeeding Crop Years - Pasture, Rangeland, Forage Availability



Source: RMA, USDA

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Currently, only PRF-RI program is being offered (starting 2016)

All contiguous 48 states are eligible.



Source: RMA, USDA

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How PRF-RI works

- An operator chooses coverage level (70%-90%), which is a share of historical average rainfall for the grid that operator is located, and assigns dollars to several 2-month intervals to be covered by PRF-RI.
- If the rainfall index falls below the guarantee for some 2-month intervals the operator chose, the operator gets paid proportional to the value he assigned to those intervals.
- Farms pay a portion of fair premium: Premium is highly subsidized (ranges from 51 to 59%).

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Decision Support Tool https://prodwebnlb.rma.usda.gov/apps/prf

Location Inform	ation										0
State		County			Grid ID			Search By Grid ID			
Kansas -		Riey	Riley •		23233 •		OR	Enter Grid ID		Search	
Protection Information 🕜			Protection Table						Lexport to CSV		
Intended Use	Grazing -		Index Interval	Percent of Value (%)	Policy Protection Per Unit	Premium Rate Per \$100	Total Premium	Premium Subsidy	Producer Premium	Actual Index Value	Estimated Indemnity
Irrigation Practice	Please Select +		Jan-Feb	25	\$177	23.38	\$41	\$21	\$20	20.5	\$136
Organic Practice	Please Select -		Feb-Mar	N/A	\$0	20.80	\$0	\$0	\$0	91.3	\$0
Coverage Level	90% -		Mar-Apr	NA	\$0	14.65	\$0	\$0	\$0	89.6	\$0
Productivity	150% -		Apr-May	25	\$177	13.05	\$23	\$12	\$11	128.9	\$0
Factor	1000		May-Jun	N/A.	\$0	11.20	\$0	\$0	\$0	N/A	N/A
Interest	100%		Jun-Jul	25	\$177	14.04	\$25	\$13	\$12	N/A	N/A
Insured Acres	10		Jul-Aug	N/A.	\$0	16.41	\$0	\$0	\$0	N/A	N/A
Sample Year	2022 •		Aug-Sep	N/A.	\$0	15.28	\$0	\$0	\$0	N/A	N/A
	N. Malerana		Sep-Oct	NA	\$0	17.93	\$0	\$0	\$0	N/A	N/A
Policy Informati	Policy Information		Oct-Nov	25	\$177	17.59	\$31	\$16	\$15	N/A	N/A
County Base Valu	\$52.30		Nov-Dec	N/A.	\$0	25.16	\$0	\$0	\$0	N/A	N/A
Dollar Amount of Protection	\$70.61		Per Acre	N/A	N/A	N/A	\$12.01	\$6.13	\$5.80	N/A	\$13.63
Total Insured Acres	10		Total	10	\$706	N/A	\$120	\$61	\$58	N/A	\$136
Total Policy \$706 Protection			E Calculate			This tool is using insurance data from 2022. This tool is for illustration purposes only. Your actual information may differ.					
Subsidy Level	51.0%		ALL THE	1. 9. 9. 1	State Car	1100000	A STATE	C. C. S. S. S.		CALL PROPERTY	ALCONT OF

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PRF and CRP

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Things to consider

- Basis Risk: See Yu et al. (2019) for the assessment of "basis risk" of the PRF-RI in Kansas and Nebraska.
- Which Two-Month Intervals to Choose?: See Goodrich et al. (2020) for the common participation patterns in Kansas and Nebraska (not a recommendation)

Table of Contents

Introduction

2 Pasture, Rangeland and Forage Index Insurance (PRF)

3 Conservation Reserve Program (CRP)

PRF vs CRP (Yu, Goodrich, and Graven)

Concluding Remarks

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Conservation Reserve Program (CRP)

https://www.fsa.usda.gov/programs-and-services/conservation-programs/ conservation-reserve-program/

CRP participants voluntarily cease agricultural production on portions of their land which has been deemed "environmentally sensitive" in exchange for rental payments from the government.

- General sign-up period: limited application window with a competitive bidding process
- Continuous sign-up period: for land that is particularly important for certain environmental concern

Once an offer is accepted, the CRP land cannot be put back into agricultural production until the contract expires (usually 10 - 15 years).

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Conservation Reserve Program (CRP)

Share of CRP enrollment: 2006



Overall average: 6.15%

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Conservation Reserve Program (CRP)

Share of CRP enrollment: 2015



Overall average: 4.88%

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CRP rental rate: 2006



CRP rental rate, Kansas: 2006



CRP Rental Rate, 2006

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CRP rental rate: 2015



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CRP rental rate, Kansas: 2015



CRP Rental Rate, 2015

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Table of Contents

Introduction

- 2 Pasture, Rangeland and Forage Index Insurance (PRF)
- Conservation Reserve Program (CRP)
- PRF vs CRP (Yu, Goodrich, and Graven)

Concluding Remarks

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PRF vs CRP

Competing Farm Programs: Does the Introduction of a Risk Management Program Reduce the Enrollment in the Conservation Reserve Program?

Jisang Yu (KSU), Brittney Goodrich (UC Davis), and Atticus Graven (Ambrook)

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Research questions

Do two main priorities of the US farm policy, risk management and conservation, compete?

More specifically, does availability of a new risk management program **crowd out** the participation in a conservation program?

What do we do

- We estimate the effect of the availability of a new insurance product, Pasture, Rangeland, and Forage Index Insurance (PRF), on the CRP participation.
- PRF roll-out is "staggered" across counties we use the variation in the introduction timing to identify the effect of the insurance availability.
- We utilize a new development in the difference-in-differences literature (Callaway and Sant'Anna, 2021).

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PRF vs CRP

Acreage enrolled in CRP is not eligible for PRF as CRP prohibits grazing/haying. Thus, the question we are asking is

Does the availability of PRF discourage CRP participation?

Less new land offered to enroll in CRP

Expiring CRP contracts not re-enrolled and converted to pasture/hay acreage

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Incentives from PRF

- Risk reduction in grazing/haying
- (Implicit) Subsidies (Goodrich et al., 2020)

Thus, we expect that because of these incentives, there would be **higher opportunity cost** in participating in CRP once PRF is available.

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Differential timing of the PRF introduction across counties



We exclude Groups 2011 and 2012 from the analyses as the CRP cap was reduced in those years.

Data

- The share of acres enrolled in CRP over the total cropland acres (FSA, 2019; NASS, 2002)
- Interpretation of PRF-RI (RMA, 2018)
- Additional control variables: historical weather variables, i.e. temperature and precipitation (Schlenker and Roberts, 2009), the historical share of pastureland over the total cropland and the total cropland acreage (FSA, 2019; NASS, 2002)

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Summary Statistics

	Full sample			
	Mean	SD		
Share of cropland enrolled in CRP	0.06	0.09		
Availability of PRF in county	0.39	0.49		
Historical Avg. Temperature (Degree Celsius)	19.97	3.17		
Historical Avg. Precipitation (mm)	566.51	156.92		
Share of cropland that is pastureland, 2002	0.21	0.19		
Total cropland acres, 2002	145,549	142,591		
No. of Counties	1,972			
No. of Obs.	19,720			

Note: Historical averages are 10-year averages and measured as of 2006. For the weather variables, the growing season is defined as April - September.

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Difference-in-differences with multiple treatment periods

The key idea of Callaway and Sant'Anna (2021) is to estimate the group-time specific Average Treatment Effect on Treated (ATT) :

$$ATT(g,t) = E(y_{it}(g) - y_{it}(0)|G_{gi} = 1)$$
(1)

where g and t are group and year subscripts, $y_{it}(g)$ is the potential (and observed) outcome of county i in year t with the treatment defined by group assignment g, and G_{gi} is the indicator on whether county i belongs to group g where g = 2007, 2008, 2009, Control.

Average Treatment Effect on Treated (ATT) estimation

Thus, we employ the doubly-robust group-time-specific ATT estimation of Callaway and Sant'Anna (2021):

$$A\hat{T}T(g,t) = E\left(\left(\frac{G_g}{E(G_g)} - \frac{\frac{p_g(X)C}{(1-p_g(X))}}{\frac{E(p_g(X)C}{(1-p_g(X)))}}\right)$$
$$(y_t - y_{g-1} - E(y_t - y_{g-1}|X, C = 1))\right)$$

where G_g is the indicator for group g, $p_g(X)$ is the propensity of being in group g as a function of the vector of additional control variables, X, and C is the indicator for the control group.

Group-time specific ATT



Note: Whisker plots represent 95% confidence intervals constructed from bootstrapped standard errors with 1,000 iterations

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Aggregation

One of the features of Callaway and Sant'Anna (2021) is that there is a flexibility in aggregation of ATTs:

- Simple aggregation: the weighted sum of ATT(g, t) across g and t with the weight proportional to group size
- Oynamic aggregation: the weighted sum of the exposure-specific aggregated ATT across exposure levels

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Aggregated ATT by length of exposure



Note: Whisker plots represent 95% confidence intervals constructed from bootstrapped standard errors with 1,000 iterations

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Controlling for CRP Rent

As an additional control variable, we consider the historical average CRP rent.

However, this results in a selection of counties that had any CRP acres prior to 2006.

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Controlling for CRP Rent Group-time ATT



Note: Whisker plots represent 95% confidence intervals constructed from bootstrapped standard errors with 1,000 iterations

Controlling for CRP Rent

Aggregated ATT by length of exposure



Note: Whisker plots represent 95% confidence intervals constructed from bootstrapped standard errors with 1,000 iterations

Summary of the results



Note: Bootstrapped standard errors (ATTs, iteration=1,000) and cluster robust standard errors (TWFE, clustered at the county level) are reported in the parentheses.

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Summary

Do CRP and PRF compete?

We find that the availability of PRF discourages the CRP participation by 0.8 - 0.9 percentage point (roughly 13 - 16% of the average CRP share).

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Table of Contents

Introduction

- 2 Pasture, Rangeland and Forage Index Insurance (PRF)
- 3 Conservation Reserve Program (CRP)
- PRF vs CRP (Yu, Goodrich, and Graven)

6 Concluding Remarks

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Concluding Remarks

- Land use decisions are complex: Government programs do affect the decisions.
- Farm support programs (e.g., commodity programs/risk management and crop insurance) do compete with conservation programs.
- Profitability is still key in terms of land use decisions: Yet, we do need to consider the options related to government programs.

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