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ESTIMATES OF THE INCIDENCE OF AGRICULTURAL SUBSIDIES USING SOIL-CLIMATIC REGIMES

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Selected Poster prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, San Francisco, CA, July 26-28.

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ESTIMATES OF THE INCIDENCE OF AGRICULTURAL SUBSIDIES USING SOIL-CLIMATIC REGIMES

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INTRODUCTION

- Economists have long recognized that the incidence of government subsidies differs from the initial recipient of such subsidies. In particular, even though farm operators may receive the subsidy, nonfarm landowners may adjust rental rates to capture the benefits of the subsidies.
- Standard economic theory predicts that nonfarm landowners capture all of a purely decoupled subsidy but only capture a portion of a purely coupled subsidy (i.e., a subsidy directly tied to production).
- Nonfarm landowners may not capture all of the benefits of direct payments due to family relationships in the rental agreement, market power, rigidity in contractual arrangements, and direct payments are not purely decoupled.
- We exploit the fact that cotton and rice receive substantially higher direct payments per acre than other field crops. Intuitively, our empirical strategy compares cash rental rates in counties that have similar market returns, but who grow a different set of crops because the soil and climate of the region are relatively better suited for that set of crops.

RESEARCH OBJECTIVE

Econometrically estimate the portion of direct payments in the U.S. that accrue to nonfarm landowners through adjustments in the cash rental rate.

DATA

- County-level data on cash rental rates and average direct payments per acre
- Calculate expected market returns for each county as the 2008-2012 average across major crops using a trend crop yield estimated from NASS yield data, NASS state-level prices, and total cost of production (excluding cash rent) for each crop obtained from ERS, USDA
- Restricts the analysis to the following four Farm Resources Regions: Northern Great Plains, Heartland, Prairie Gateway, and Mississippi Portal

MODELS

Second-stage Regression:

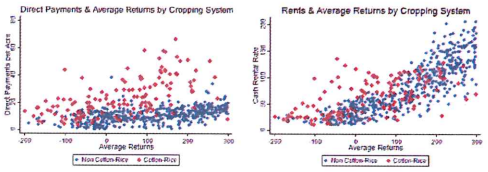
$$rent_i = \beta_0 + \beta_1 \widehat{gov}_i + f\left(Ereturns_i\right) + \varepsilon_i \quad (1)$$

where $\widehat{gov}_i$ is the predicted direct payment obtained from the first stage regression.

First-stage Regression:

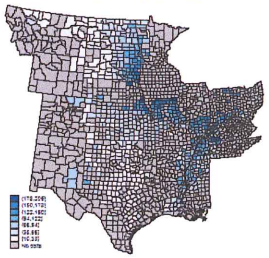
$$gov_i = \alpha_0 + \alpha_1 CottonRice_i + g\left(Ereturns_i\right) + u_i \quad (2)$$

SCATTER PLOTS

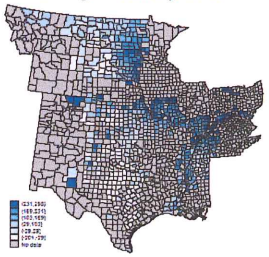


PAYMENTS, RETURNS & RENTS

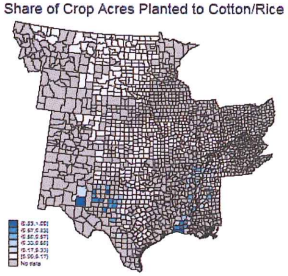
Cash Rental Rate



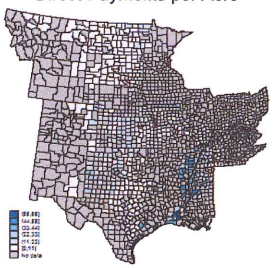
Average Returns per Acre



Share of Crop Acres Planted to Cotton/Rice



Direct Payments per Acre



ECONOMETRIC RESULTS

OLS Bivariate Results

	Coefficients	Std Errors
Direct Payments	1.595**	0.209
Intercept	53.018**	2.947

R^2 = 0.102, * p < 0.10, ** p < 0.05 and N = 681

OLS Results

	Linear	Quadratic	Cubic
Direct Payments	0.665**	0.686**	0.676**
	(0.162)	(0.150)	(0.152)
Average Returns	0.302**	0.190**	0.197**
	(0.010)	(0.010)	(0.015)
Eret2 × Eret2		0.001**	0.001**
		(0.000)	(0.000)
Eret2 × Eret2 × Eret2			-0.000
			(0.000)
Intercept	35.896**	31.412**	30.707**
	(1.854)	(1.730)	(1.720)
R^2	0.680	0.719	0.720

Standard errors in parentheses, * p < 0.10, ** p < 0.05 and N = 681

Instrumental Variable Results

	Linear	Quadratic	Cubic
Direct Payments	0.753**	0.558**	0.523**
	(0.264)	(0.238)	(0.249)
Average Returns	0.300**	0.193**	0.201**
	(0.011)	(0.011)	(0.017)
Eret2 × Eret2		0.001**	0.001**
		(0.000)	(0.000)
Eret2 × Eret2 × Eret2			-0.000
			(0.000)
Intercept	34.887**	32.886**	32.363**
	(2.737)	(2.588)	(2.405)
R^2	0.680	0.718	0.719

Standard errors in parentheses, * p < 0.10, ** p < 0.05 and N = 681

- Bivariate OLS estimates are substantially biased upward as expected.
- Controlling for expected returns decreases the incidence estimate.
- IV estimates when using quadratic or cubic controls for expected returns are the smallest suggesting OLS still biased.
- IV estimates indicate that nonfarm landowners capture a majority of the subsidy in the long run.

KEY FINDING

The results show that roughly $0.55 of every dollar of direct payment on rented land accrues to landowners in the long run.

ACKNOWLEDGMENTS

This material is based upon work supported by National Science Foundation Grant: From Crops to Commuting: Integrating the Social, Technological, and Agricultural Aspects of Renewable and Sustainable Biorefining (I-STAR); NSF Award No.: DGE-0903701.