Online Appendix

The Unintended Beneficiaries of Farm Subsidies

David Boussios, Office of the Chief Economist, USDA
Marcelo Castillo, Economic Research Service, USDA
Brady Brewer, Purdue University

The findings and conclusions in this publication are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy. This research was supported in part by the intramural research program of the U.S. Department of Agriculture, Economic Research Service.

A.1. Base acre enrollment and payments by commodity, program, and region.

The Midwest region includes the following states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. Payments calculated by authors from program data obtained directly from the Farm Service Agency.

Table A.1. Base Acres and Payments by Commodity, Program, and Region

	National		Midwest	
Base Acres (millions)	**ARC-CO**	**PLC**	**ARC-CO**	**PLC**
Corn	89.8	7.3	77.4	4.2
Soybeans	54.2	2.0	44.0	1.4
Wheat	34.7	29.0	21.5	8.8
Sorghum	2.8	6.5	2.1	2.4
Oats	1.3	0.7	1.0	0.3
Sunflowers	0.7	0.9	0.7	0.8
Barley	1.1	3.9	0.5	1.1
Other Crops	0.8	9.7	0.3	2.0
Payments ($ billions)				
2015	4.4	0.8	3.9	0.1
2016	5.8	1.9	4.8	0.4
2017	3.7	3.2	2.8	0.8

Note: The Other Crops category includes the following commodities: Rice, peanuts, sunflowers, canola, dry peas, lentils, flaxseed, safflower, chickpeas, mustard, sesame, rapeseed, and crambe. Generic acres (cotton) were allocated to program realized acres. Source: Base acres from Farm Service Agency (2018).

A.2. Results from a repeated-cross section

While variations in subsidy payments across counties allow for identifying the subsidy incidence with only cross-sectional data, we further test the robustness of our results by constructing a pseudo-panel or repeated cross-section from 2015, 2016, and 2017 ARMS surveys, using counties as the cohort unit. Since Deaton (1985), repeated cross-sections have been used in a variety of research (e.g., McKenzie, 2004; Bellemare, Fajardo-Gonzalez, and Gitter 2018), and the county cohort unit fits naturally to studying the ARC-CO subsidy program since payments are distributed evenly across base acres within a county.

To construct the repeated cross-section, we averaged farm-level subsidy payments and rental rates for all farms within each county each year, using the farm's survey weights for calculating the county average. Since AR and BR are at the county level, these are left unchanged from prior specifications. Aggregating the farm-level data to county cohort units aggregates the unobserved farm-level variables that could confound our prior estimates. By approximating the county average farm rental rate, we are also approximating the county average base acres, which is observed.

Observing multiple observations for the same cohort-unit allows us to identify the subsidy incidence by the variation in payments across years after controlling for county-level fixed effects, year dummy variables, and county AR and BR Instead of identifying the incidence by the cross-sectional variation of payments of farms across counties after controlling for country and farm characteristics, the panel cohort adds the dimension of variation in payments for a unit over time. We find a subsidy incidence of 0.44 using the repeated cross-section (presented in Table A1). Benchmark revenue is not statistically different from zero, somewhat an expected result after including time and county dummy variables. In this panel approach, BR only measures changes

across time to the five-year Olympic average revenue, which by construction provides only small changes each year. Actual revenue is positive and statistically different from zero.

The subsidy incidence from the repeated cross-section is slightly smaller than that found in the body of this manuscript. We speculate the difference could be due to an improved ability to control for individuals over time, as the subsidy effect is partially identified by the variation in payments across years. We do, however, partially caution the interpretation of results because the pseudo-panel approach assumes any difference within a cohort over time is uncorrelated with subsidy payment levels. This assumption might hold asymptotically, however, for county cohorts with few observations each year, there is potential the variation is due to differences in within county-level samples across years.

Table A.2. Results from Repeated Cross-Section of County-Cohorts using 2015-2017 ARMS Surveys

ARC-CO Payments	0.44**
	(0.22)
Benchmark Revenue	0.13
	(0.09)
Actual Revenue	0.09**
	(0.04)
2016	-13.69*
	(7.88)
2017	-9.68**
	(4.26)
Constant	22.20
	(57.81)
R-squared	
Within	0.01
Between	0.19
Overall	0.13
Observations	4,688
Number of counties	2,035

Note: The results are from a repeated cross-section of 2015, 2016, and 2017 ARMS surveys using a fixed-effect specification with yearly time dummy variables. The 2016 and 2017 variables are year specific dummy variables. Farm-level data were aggregated up to the county by averaging farms within a county by their respective weights. Standard errors, presented in parentheses, are calculated with survey weights and clustering at the county-level. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1