

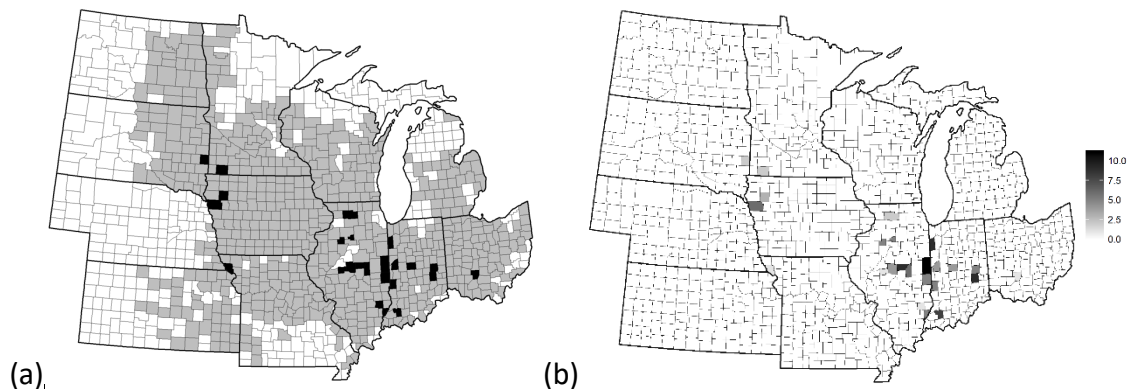
## APPENDIX

### A1. Adjusting Cropland Values Using Cropland Data Layer (CDL)

In the CDL webpage, the Metadata section describes the categories of crop and land use in the CDL. The county-level values for the CDL are provided from the FAQ section in the CDL webpage ([https://www.nass.usda.gov/Research\\_and\\_Science/Cropland/sarsfaqs2.php](https://www.nass.usda.gov/Research_and_Science/Cropland/sarsfaqs2.php)). Given that the data do not cover our entire data period, we choose to use the values in 2010, from which the sub-grids is 30m, down from 56m, to calculate the ballpark area for other crops. We consider the other crops as all crops except for corn and soybeans, including fallow/idle cropland (where idle cropland includes the area under the conservation reserve program).

There are 113 data points in 24 counties for which the total cropland from NASS survey data is larger than the sum of corn and soybean acreages from the official NASS estimates. Panel (a) in Figure A1 shows those counties in black, while panel (b) shows the intensity of having the unmatched data points within the county. In panel (b), the scale from 1 to 11 is described by degree of darkness. For those unmatched points, we first add the CDL other crop acreage to their corn and soybean acreages to obtain a new total cropland. Then we replace the unmatched total cropland values with the new values for those 113 data points. If there are multiple unmatched cases within a county, we choose the largest total cropland and replace others with it. Since we are maintaining the assumption that total available cropland is fixed during the analyzed period, the replacement within county does not affect the estimates as long as the county-specific heterogeneity is controlled.

**Figure A1. Counties Having Unmatched Total Cropland Values**



**Table A1. Five Major “Other Crops” (% within all crops in 2010 reported in parentheses)**

	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>
IL	Winter wheat (0.78)	Alfalfa/hay (0.65)	Sweet corn (0.05)	Sorghum (0.05)	Fallow/idle (0.05)
IN	Winter wheat (1.63)	Alfalfa/hay (0.98)	Pop/ornamental corn (0.24)	Fallow/idle (0.03)	Tomatoes (0.03)
IA	Alfalfa/hay (1.75)	Oats (0.22)	Winter wheat (0.01)	Pop/ornamental corn (0.01)	Sod/grass seed (0.01)
KS	Winter wheat (32.77)	Sorghum (7.97)	Alfalfa/hay (2.72)	Fallow/idle (2.56)	Cotton (0.14)
MI	Alfalfa/hay (15.66)	Winter wheat (9.30)	Dry beans (4.04)	Sugarbeets (2.26)	Fallow/idle (1.40)
MN	Spring wheat (7.64)	Alfalfa/hay (2.76)	Sugarbeets (2.31)	Dry beans (0.66)	Sweet corn (0.53)
MO	Winter wheat (3.15)	Cotton (1.09)	Rice (0.49)	Sorghum (0.11)	Fallow/idle (0.07)
NE	Alfalfa/hay (1.44)	Winter wheat (1.23)	Fallow/idle (0.41)	Sorghum (0.01)	Oats (0.01)
ND	Spring wheat (26.11)	Dry beans (5.81)	Alfalfa/hay (3.37)	Sunflower (2.28)	Sugarbeets (1.69)
OH	Winter wheat (7.11)	Alfalfa/hay (3.57)	Fallow/idle (0.17)	Pop/ornamental corn (0.10)	Oats (0.06)
SD	Alfalfa/hay (16.57)	Spring wheat (6.56)	Winter wheat (4.53)	Sunflower (1.66)	Fallow/idle (0.53)
WI	Alfalfa/hay (25.10)	Winter wheat (20.10)	Oats (2.29)	Dry beans (0.65)	Sweet corn (0.55)

*Note:* The portion is calculated by “each crop area/total crop area × 100” based on Cropland Data Layer dataset for the analyzed 686 counties in 12 states in 2010 (base year for the other crop price index).

**Table A2. Estimated Coefficients under Alternative Dynamic Models**

Variables	Dynamic model 3: Level OLS		Dynamic model 4: Within-groups		Dynamic model 5: Difference OLS	
	Corn	Soy	Corn	Soy	Corn	Soy
	(1)	(2)	(3)	(4)	(5)	(6)
Corn revenue	0.22*** (0.006)	-0.18*** (0.006)	0.28*** (0.005)	-0.26*** (0.005)	0.30*** (0.005)	-0.28*** (0.005)
Soy revenue	-0.18*** (0.006)	0.20*** (0.009)	-0.26*** (0.005)	0.30*** (0.008)	-0.28*** (0.005)	0.30*** (0.007)
Other revenue	-0.04*** (0.004)	-0.02*** (0.005)	-0.02*** (0.003)	-0.04*** (0.004)	-0.02*** (0.003)	-0.02*** (0.004)
Lagged corn share	0.94*** (0.003)	0.04*** (0.003)	0.27*** (0.010)	0.24*** (0.007)	-0.25*** (0.010)	0.06*** (0.008)
Lagged soy share	0.04*** (0.003)	0.95*** (0.004)	0.24*** (0.007)	0.33*** (0.010)	0.06*** (0.008)	-0.30*** (0.010)
Palmer index in Mar	-0.005*** (0.0002)	0.002*** (0.0003)	-0.004*** (0.0002)	0.002*** (0.0002)	-0.002*** (0.0001)	0.001*** (0.0001)
Palmer index in Apr	-0.002*** (0.0002)	0.001*** (0.0002)	-0.001*** (0.0001)	0.001*** (0.0001)	-0.002*** (0.0001)	0.001*** (0.0001)
Palmer index in May	-0.003*** (0.0002)	<-0.001 (0.0002)	-0.003*** (0.0001)	<-0.001 (0.0001)	-0.002*** (0.0001)	<-0.001*** (0.0001)
Trend	-0.002*** (0.0002)	0.002*** (0.0001)	<0.001 (0.0001)	0.002*** (0.0001)	0.001*** (0.0003)	0.004*** (0.0003)
Constant	-0.018*** (0.002)	0.029*** (0.002)	0.178*** (0.008)	0.168*** (0.008)		
Cross correlation in residuals		-0.14		-0.14		-0.22

*Note:* Standard errors are in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

## A2. Robustness

**Table A3. Estimation Results for Corn and Soybean Yields (SUR Model) when Trend is Represented by a Linear Spline with Two Knots**

Variables	Without price		With price	
	Corn yield (1)	Soy yield (2)	Corn yield (3)	Soy yield (4)
Corn price			-1.507** (0.145)	
Soy price				-0.068** (0.019)
Growing degree days	0.008** (0.001)	0.007** (>0.001)	0.007** (0.001)	0.007** (>0.001)
Over degree days	-0.300** (0.004)	-0.070** (0.001)	-0.299** (0.004)	-0.070** (0.001)
Palmer index in May	-1.030** (0.048)	-0.364** (0.013)	-1.029** (0.048)	-0.366** (0.013)
Palmer index in Jun	-0.584** (0.052)	-0.184** (0.014)	-0.505** (0.052)	-0.178** (0.014)
Palmer index in Jul	1.719** (0.050)	0.187** (0.014)	1.649** (0.050)	0.182** (0.014)
Palmer index in Aug	0.762** (0.050)	0.686** (0.014)	0.776** (0.050)	0.692** (0.014)
Palmer index in Sep	-0.406** (0.049)	-0.024* (0.014)	-0.459** (0.050)	-0.026* (0.014)
Trend 1971-1985	1.457** (0.033)	0.493** (0.009)	1.233** (0.039)	0.478** (0.010)
Trend 1986-2000	1.555** (0.026)	0.362** (0.007)	1.424** (0.029)	0.342** (0.009)
Trend 2001-2015	2.059** (0.030)	0.497** (0.009)	2.111** (0.031)	0.505** (0.009)
Constant	80.693** (3.206)	11.947** (0.896)	95.430** (3.693)	13.266** (0.967)
R <sup>2</sup>	0.77	0.76	0.77	0.76
Cross correlation of residuals		0.56		0.56
Own price elasticity			-0.063** (0.006)	-0.021** (0.006)

Notes: Standard errors are in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. For elasticities, standard errors are obtained by delta method.

**Table A4. Estimated Coefficients under Dynamic and Statics Models (expected revenues use expected yields estimated from the spline model with two knots of Table A3)**

Variables	Dynamic model 1: One-step diff GMM		Dynamic model 2: Two-step diff GMM		Static model: Two-step diff GMM	
	Corn	Soy	Corn	Soy	Corn	Soy
	(1)	(2)	(3)	(4)	(5)	(6)
Corn revenue	0.28*** (0.007)	-0.26*** (0.007)	0.29*** (0.007)	-0.26*** (0.007)	0.35*** (0.006)	-0.33*** (0.007)
Soy revenue	-0.26*** (0.007)	0.29*** (0.009)	-0.26*** (0.007)	0.28*** (0.009)	-0.33*** (0.007)	0.36*** (0.007)
Other revenue	-0.03*** (0.005)	-0.03*** (0.006)	-0.03*** (0.005)	-0.03*** (0.006)	-0.02*** (0.003)	-0.03*** (0.003)
Lagged corn share	-0.11 (0.164)	0.26* (0.150)	-0.04 (0.144)	0.32** (0.134)		
Lagged soy share	0.26* (0.150)	-0.19 (0.140)	0.32** (0.134)	-0.14 (0.128)		
Palmer index in Mar	-0.002*** (0.0002)	0.001*** (0.0002)	-0.002*** (0.0002)	0.001*** (0.0002)	-0.003*** (0.0002)	0.001*** (0.0002)
Palmer index in Apr	-0.002*** (0.0001)	0.001*** (0.0001)	-0.002*** (0.0001)	0.001*** (0.0001)	-0.002*** (0.0001)	0.001*** (0.0002)
Palmer index in May	-0.002*** (0.0004)	-0.001** (0.0003)	-0.003*** (0.0003)	-0.001*** (0.003)	-0.003*** (0.0001)	<-0.001 (0.0002)
Trend	<0.001 (0.0007)	0.003*** (0.0006)	<-0.001 (0.0006)	0.003*** (0.0005)	<0.001 (0.0002)	0.004*** (0.0002)
Cross correlation in residuals		-0.17		-0.13		-0.29
p-value of Hansen’s J statics				0.44		0.51

Note: Standard errors are in parentheses and clustered by counties. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Figures in red indicate values that differ from the analogous Table 3 in the manuscript.

**Table A5. Elasticities at Overall Means Based on the Parameters of Table A4**

	Corn price	Soy price	Other price	Input price	$\eta_T$
DYNAMIC: SHORT-RUN					
Corn acreage	0.50 <sup>***</sup> (0.013)	-0.31 <sup>***</sup> (0.009)	-0.03 <sup>***</sup> (0.005)	-0.16 <sup>***</sup> (0.004)	0.04 <sup>***</sup> (0.007)
Soy acreage	-0.51 <sup>***</sup> (0.014)	0.38 <sup>***</sup> (0.012)	-0.03 <sup>***</sup> (0.007)	0.16 <sup>***</sup> (0.004)	
Other acreage	-0.05 <sup>***</sup> (0.009)	-0.03 <sup>***</sup> (0.007)	0.07 <sup>***</sup> (0.011)	0.02 <sup>***</sup> (0.003)	—
DYNAMIC: LONG-RUN					
Corn acreage	0.39 <sup>***</sup> (0.034)	-0.22 <sup>***</sup> (0.011)	-0.07 <sup>*</sup> (0.037)	-0.10 <sup>***</sup> (0.009)	0.06 <sup>*</sup> (0.031)
Soy acreage	-0.32 <sup>***</sup> (0.032)	0.26 <sup>***</sup> (0.014)	-0.01 (0.015)	0.07 <sup>**</sup> (0.030)	
Other acreage	-0.11 <sup>*</sup> (0.060)	-0.01 (0.014)	0.09 <sup>**</sup> (0.043)	0.04 <sup>*</sup> (0.021)	—
STATIC					
Corn acreage	0.61 <sup>***</sup> (0.010)	-0.39 <sup>***</sup> (0.008)	-0.02 <sup>***</sup> (0.004)	-0.19 <sup>***</sup> (0.003)	0.03 <sup>***</sup> (0.003)
Soy acreage	-0.65 <sup>***</sup> (0.013)	0.48 <sup>***</sup> (0.010)	-0.04 <sup>***</sup> (0.004)	0.21 <sup>***</sup> (0.004)	
Other acreage	-0.03 <sup>***</sup> (0.006)	-0.04 <sup>***</sup> (0.004)	0.06 <sup>***</sup> (0.005)	0.01 <sup>***</sup> (0.002)	—

*Note:* Standard errors are obtained by delta method and displayed in parentheses. <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> indicate significance at the 1%, 5%, and 10% levels, respectively.  $\eta_T$  is the responsiveness of total acreage allocated to corn and soybeans w.r.t. same scaling changes in both prices. Figures in red indicate values that differ from the analogous Table 4 in the manuscript.