Regenerative Agriculture and Farmer Profitability: Modeling Adoption of Scalable Climate Mitigation

Supplementary Appendix

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A Overview of Agricultural Emissions

Agricultural production is a significant source of global greenhouse gas emissions, contributing approximately 10–14 percent of worldwide anthropogenic emissions (Vermeulen et al., 2012; Crippa et al., 2021). Within the agricultural sector, emissions arise from three primary gases: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The relative contribution of each gas varies substantially by commodity type and production system.

Emissions by gas and source. Carbon dioxide emissions from agriculture stem primarily from land-use change (conversion of forests or grasslands to cropland), soil disturbance through tillage, and energy inputs (fuel for field operations, fertilizer manufacturing, and transportation). Methane emissions are dominated by livestock production, particularly from ruminant enteric fermentation and manure management. Nitrous oxide emissions arise from synthetic nitrogen fertilizer application, manure decomposition, and microbial processes in disturbed soils. The relative magnitude of each gas reflects their global warming potential: N_2O is approximately 265 times more potent than CO_2 over a 100-year horizon, while CH_4 is roughly 28 times more potent.

Commodity-specific emission profiles. Emissions intensity varies dramatically across agricultural commodities. Beef and dairy cattle production are the largest contributors

to agricultural emissions, driven by methane from enteric fermentation and associated land use. Row crops (corn, soybeans, wheat) contribute primarily through nitrogen fertilizer application and soil carbon depletion. Rice production generates significant methane from anaerobic decomposition in paddies. Specialty crops, vegetables, and orchards typically have lower per-acre emissions but may require intensive pesticide and fertilizer applications. Figure A.1 provides a detailed breakdown of supply-chain carbon emissions across these commodity categories.

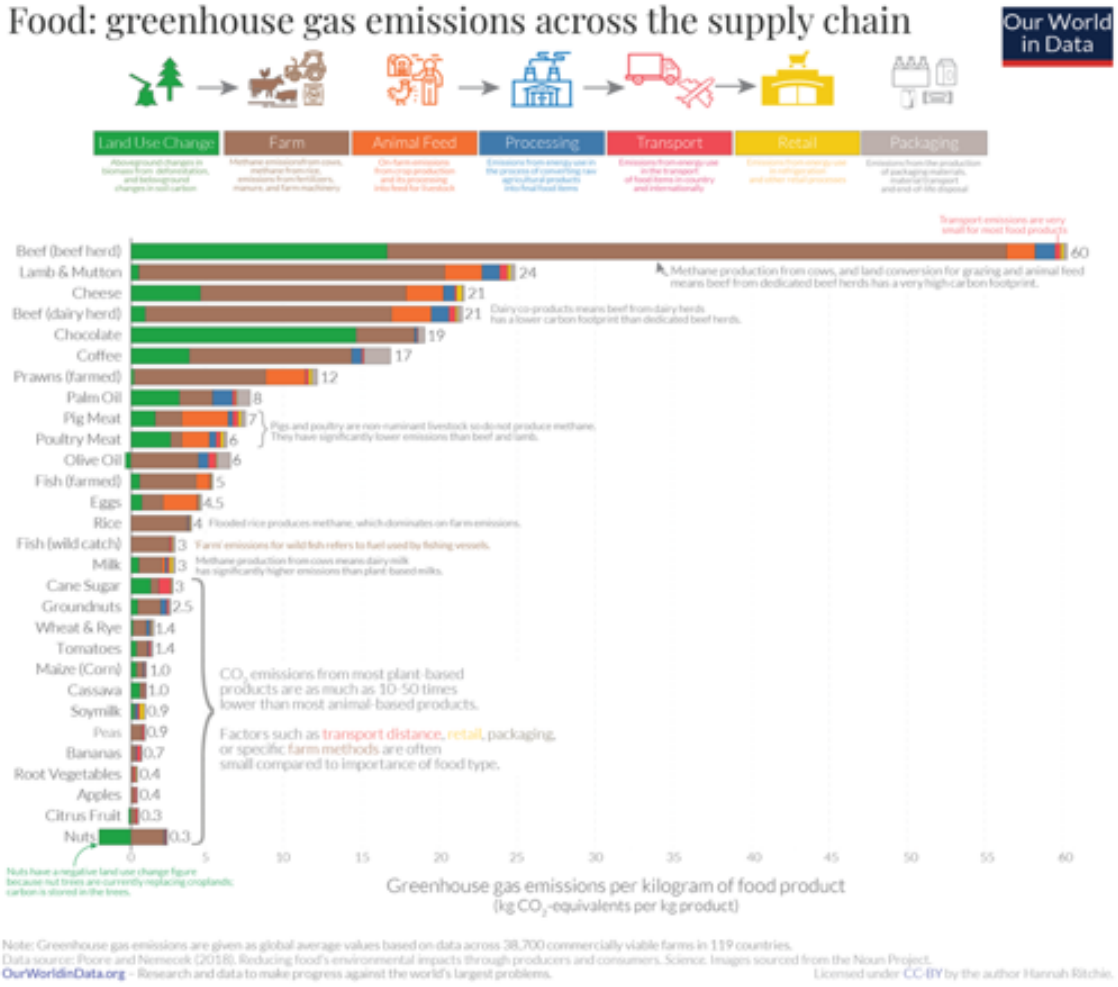


Figure A.1: Supply Chain Carbon Emissions by Agricultural Commodity

Note: This figure decomposes greenhouse gas emissions across major agricultural commodities, including emissions from production, processing, transport, and retail stages of the supply chain. Ruminant livestock (beef and dairy) dominate total emissions.

Agricultural emissions are poised to become an increasingly dominant source of global greenhouse gases under current trajectories. Figure A.2 illustrates projections showing that agricultural sector emissions could account for approximately half of all anthro-

pogenic emissions by 2050, making it the single largest sectoral source. This projection reflects both the absolute growth in agricultural production to meet rising global food demand and the shift in agricultural production toward more emission-intensive activities (particularly meat and dairy expansion in developing regions). Without significant changes in agricultural management practices and adoption of low-emission technologies, this trajectory threatens climate mitigation goals and necessitates urgent intervention through policy support and economic incentives for regenerative practices.

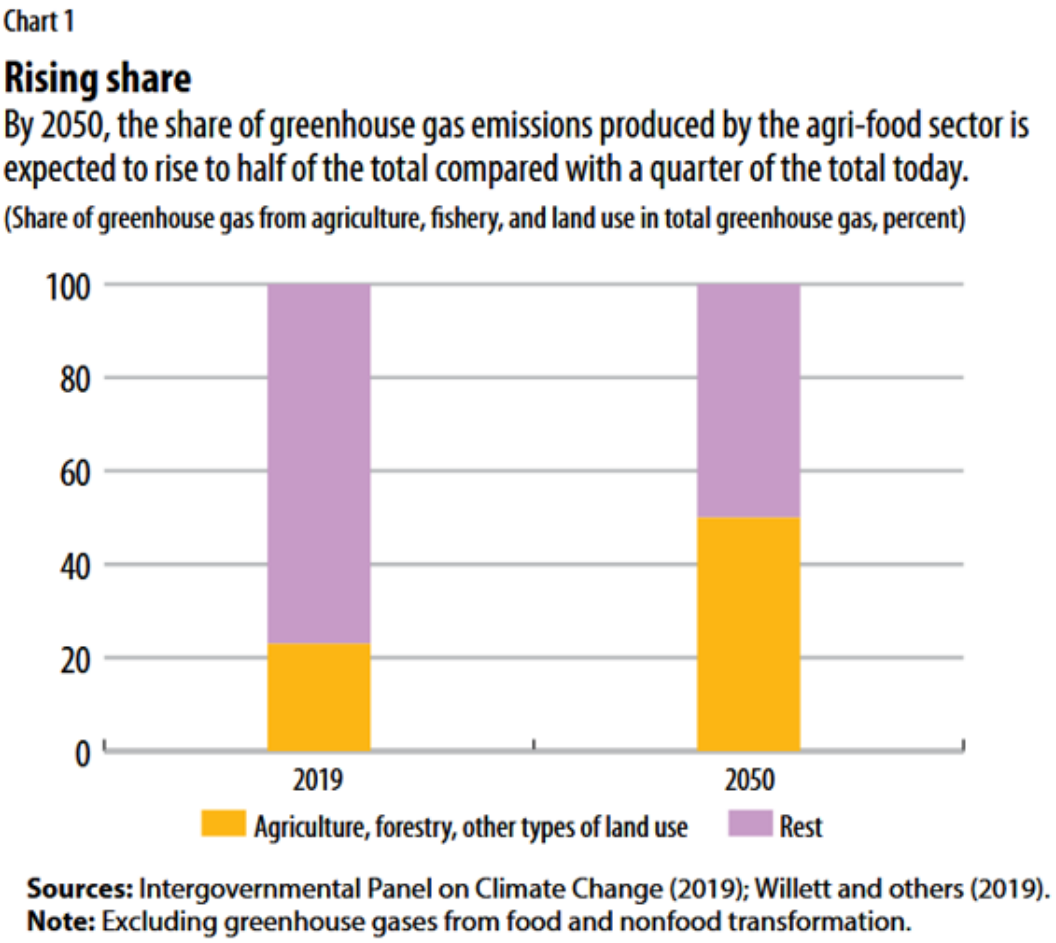
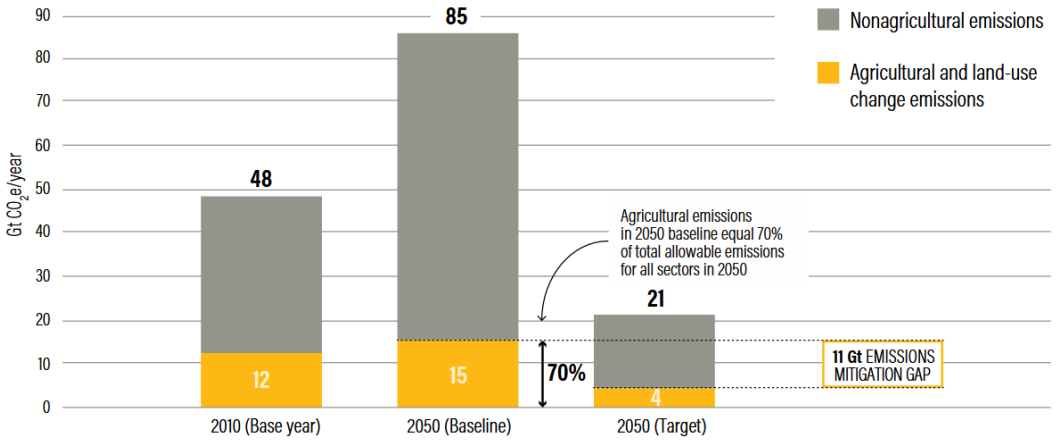


Figure A.2: Projected Share of Agricultural Emissions in Total Anthropogenic GHG, 2050

Note: This figure projects the share of global greenhouse gas emissions attributable to the agricultural sector, showing agriculture potentially accounting for approximately 50 percent of total anthropogenic emissions by 2050 under current production trends and management practices.

Figure 3 | **Agricultural emissions are likely to be ~70 percent of total allowable emissions for all sectors by 2050, creating an 11 gigaton mitigation gap**



Sources: GlobAgri-WRR model, WRI analysis based on IEA (2012); EIA (2012); Houghton (2008); OECD (2012); and UNEP (2013).

Figure A.3: Projected Allowable Emissions from the Agricultural Sector, 2050

Note: This figure projects the allowable emissions from the agricultural sector by 2050, indicating the level of emissions that would be consistent with climate mitigation targets under current production trends and management practices.

The urgency of this projection underscores the economic case for regenerative practices: if practices that improve soil health, reduce input intensity, and lower farm-level emissions can be made profitable or cost-competitive for farmers, they simultaneously deliver private benefits (improved net revenues, reduced yield volatility) and global public benefits (climate mitigation). This alignment of private and social incentives is the foundation of the policy analysis suggested by this analysis.

A.1 Constructing Land Intensity Table

Table 1 in the main manuscript was constructed by combining national production and acreage statistics from the USDA National Agricultural Statistics Service (NASS) Quick Stats API with per-pound greenhouse-gas emission factors from CarbonCloud product reports and other commodity-specific sources. The NASS series cover the Census of Agriculture years 1997, 2002, 2007, 2012, 2017, and 2022; survey series are used for selected commodities where the script requests survey rather than census data. For each commodity, the table reports the arithmetic mean across available years of harvested or bearing acres, converted to millions of acres. Land intensity is calculated within each year as acres divided by production converted to pounds, and the resulting annual ratios are then averaged. Production conversions use commodity-specific standard weights: for example,

56 pounds per bushel for corn and sorghum, 60 for soybeans and wheat, 2,000 pounds per ton, 112 pounds per hundredweight, and 480 pounds per cotton bale.

NASS reports livestock inventories in head rather than pounds of product. To put these observations on the table's per-pound basis, the I multiply each inventory by a representative animal weight drawn from the cited livestock references. Livestock acreage is not directly reported by species in the series used here, so total pasture or livestock acreage is allocated to each species in proportion to its share of livestock operations. Emissions are calculated by multiplying converted annual output by the commodity's emission factor and averaging across available years; pounds of CO_2e are then converted to millions of metric tons. Emission factors are reported in the final column as pounds of CO_2e per pound of output. For vegetables, the script constructs a composite factor from production shares and per-pound factors for eleven leading vegetable crops.

These estimates are descriptive cross-commodity comparisons, not estimates of the causal effect of agricultural practices. They combine emissions factors and land-use allocations from different sources and should therefore be interpreted as indicative rather than as a harmonized, complete life-cycle inventory.

B Variable Descriptions

B.1 Variable Definitions

This section defines the outcomes, treatment indicators, and controls used in the analysis. For each variable, I report whether the definition is taken directly from the FinBin codebook or constructed. Dollar-denominated outcomes are expressed per crop acre. Where FinBin reports a quantity for the whole enterprise, I divide by `NormalAcres`, the crop acreage entered by the farmer for that enterprise.

Outcomes. Table A.1 lists the outcome variables. Yield is total production divided by the acres attributable to the enterprise, which is `NormalAcres` scaled by the enterprise's share of production when the field is shared. Price is the per-bushel price reported by the farmer. Crop revenue is yield times the production share times the reported value per unit, plus the value of other products. Gross return is the value of the main product plus miscellaneous crop income, which includes crop insurance indemnities. Expense categories (seed and plants, fertilizer, crop chemicals, hired labor, overhead, and crop insurance premiums) are user-entered, and total expenses sum direct and overhead expenses. Net return is gross return less total expenses, and the net profit margin is net return divided by gross return, in percent.

Table A.1: Outcome Variable Definitions

Variable	Source	Definition
Yield (Bu/Acre)	Constructed	Total production / (`NormalAcres` × `ShareOfProduction`/100)
Price ($/Bu)	FinBin	Reported by the farmer
Crop Revenue ($/Acre)	Constructed	Yield × (`ShareOfProduction`/100) × `ValuePerUnit` + `OtherProductValue`
Crop Insurance Income ($/Acre)	Constructed	User-entered crop insurance income / `NormalAcres`
Gross Return ($/Acre)	FinBin	`MainProductValue` + `TotalMiscCropIncome`
Direct Expenses ($/Acre)	FinBin	Sum of user-provided direct expenses
Seed & Plants, Fertilizer, Crop Chemicals, Hired Labor, Overhead, Crop Insurance ($/Acre)	FinBin	User-provided expenses per acre
Labor Hours (Hours/Acre)	FinBin	User-provided labor hours per acre
Total Expenses ($/Acre)	Constructed	`TotalDirectExpenses` + `TotalOverheadExpenses`
Net Return ($/Acre)	Constructed	Gross Return − Total Expenses
Net Profit Margin (%)	Constructed	100 × Net Return / Gross Return
Insurance Coverage Rate (θ)	Constructed	Gross Return / (projected price × y_{APH})

Treatment and soil carbon. The regenerative treatment indicators are described in the section on farmer adoption. Soil organic carbon (SOC) is the county-level prediction from the machine learning model described in the soil data section. For estimates of imbalance across managment types, the regressions use its one-year lag so that soil carbon is measured before the growing season in which the outcome is realized.

Controls. Table A.2 lists the controls. Land-tenure variables follow the FinBin definitions, with one caution: `TotalAcreageOwned` includes farmstead and uncropped acres and is therefore not a measure of crop acres. Total crop acres is instead the sum of owned, cash-rented, and share-rented crop acres, and the owned share of crop acres is owned crop acres divided by total crop acres. The operator count follows the Minnesota farm business management closeout manual, in which an operator is one family relying on the farm for family income, so a married couple generally counts as one operator. Operator age and farming experience are calculated from the reported birth year and the year the operator started farming. Management indicators capture manure use, organic transition, and genetically modified seed (herbicide-tolerant and Bt traits), and previous-crop indicators are built from the FinBin crop codes. Weather controls are described below.

Table A.2: Control Variable Definitions

Variable	Source	Definition
Farm characteristics		
Farm Acres	FinBin	`NormalAcres`, user provided
Acres Owned	FinBin	`TotalAcreageOwned`; includes farmstead and uncropped acres
Crop Acres	Constructed	Owned + cash-rented + share-rented crop acres
% Crop Acres Owned	Constructed	Owned crop acres / Total crop acres
Planted on Own, Rented, or Share-Rented Land	Constructed	Tenure indicators for the enterprise
Ownership: Sole Proprietorship, Partnership	FinBin	Business organization indicators
Operator characteristics		
# Farm Operators	FinBin	Number of operators (one family relying on the farm for income)
Age of Primary Operator	Constructed	Calculated from `YearBornOperator1`
Experience of Primary Operator (Years)	Constructed	Calculated from `YearStartedFarmingOperator1`
Management decisions		
No Manure, Only Manure	Constructed	Manure use indicators
Organic Transition	FinBin	Organic system in transition
GMO Seed	FinBin	Seed uses genetically modified technology
Chemical Resistant Crop	FinBin	Herbicide-tolerant (e.g., Roundup Ready)
Insect Resistant Crop	FinBin	Bt genetics
Previous crop on the field		
Previously Planted: Corn, Soybean, Wheat, Prevented Planting	Constructed	Indicators from the FinBin `PreviousCrop` code
Growing conditions		
Growing Degree Days	Constructed	County-year, crop-specific, from PRISM (see below)
Killing Degree Days	Constructed	County-year, crop-specific, from PRISM (see below)
1 Year Lag SOC	Constructed	Machine learning prediction, lagged one year

Constructing Growing Degree Days (GDD) and Killing Degree Days (KDD). FinBin does not report weather, so I construct county-year temperature exposure from the PRISM Climate Group daily 4-km grids of minimum and maximum temperature. I download the daily rasters for 2000 to 2026 and, for each day, average the grid cells within each county of the FinBin states to obtain county mean, minimum, and maximum temperatures, converted to degrees Fahrenheit.

For each crop, I accumulate daily degree days over a crop-specific growing-season window: April 15 to September 30 for corn, May 15 to September 30 for soybeans, and April 1 to July 31 for wheat. Daily growing degree days follow the standard capped formula,

$$GDD_d = \max\left\{0,\ \frac{\min(T_d^{\max}, T^{cap}) + \max(T_d^{\min}, T^{base})}{2} - T^{base}\right\}, \tag{B.1}$$

and daily killing degree days measure extreme heat above a threshold,

$$KDD_d = \max\left\{0,\ T_d^{\max} - T^{kill}\right\}. \tag{B.2}$$

For corn and soybeans, $T^{base} = 50°\text{F}$ and $T^{cap} = 86°\text{F}$, the conventional USDA and NOAA values. For wheat, $T^{base} = 40°\text{F}$ and no cap is applied. The kill threshold is 86°F for all three crops. County-year GDD and KDD are the sums of the daily values over the window, and each FinBin crop observation is assigned the values for its own crop and county. Because the temperatures are county averages, they do not capture within-county variation in weather or farm-specific planting dates.

Crop	Season window	Base	Cap	Kill threshold
Corn	Apr 15 - Sep 30	50°F	86°F	86°F
Soybean	May 15 - Sep 30	50°F	86°F	86°F
Wheat	Apr 1 - Jul 31	40°F	None	86°F

Table A.3: Growing Degree Days (GDD) and Killing Degree Days (KDD) Parameters by Crop

B.2 Outcome Variation by Management Type

In this section, I examine the variation in outcomes such as profits, yields, and expenses by different management types. This describes clustering of outcomes based on management practices and highlights potential differences in performance across these groups.

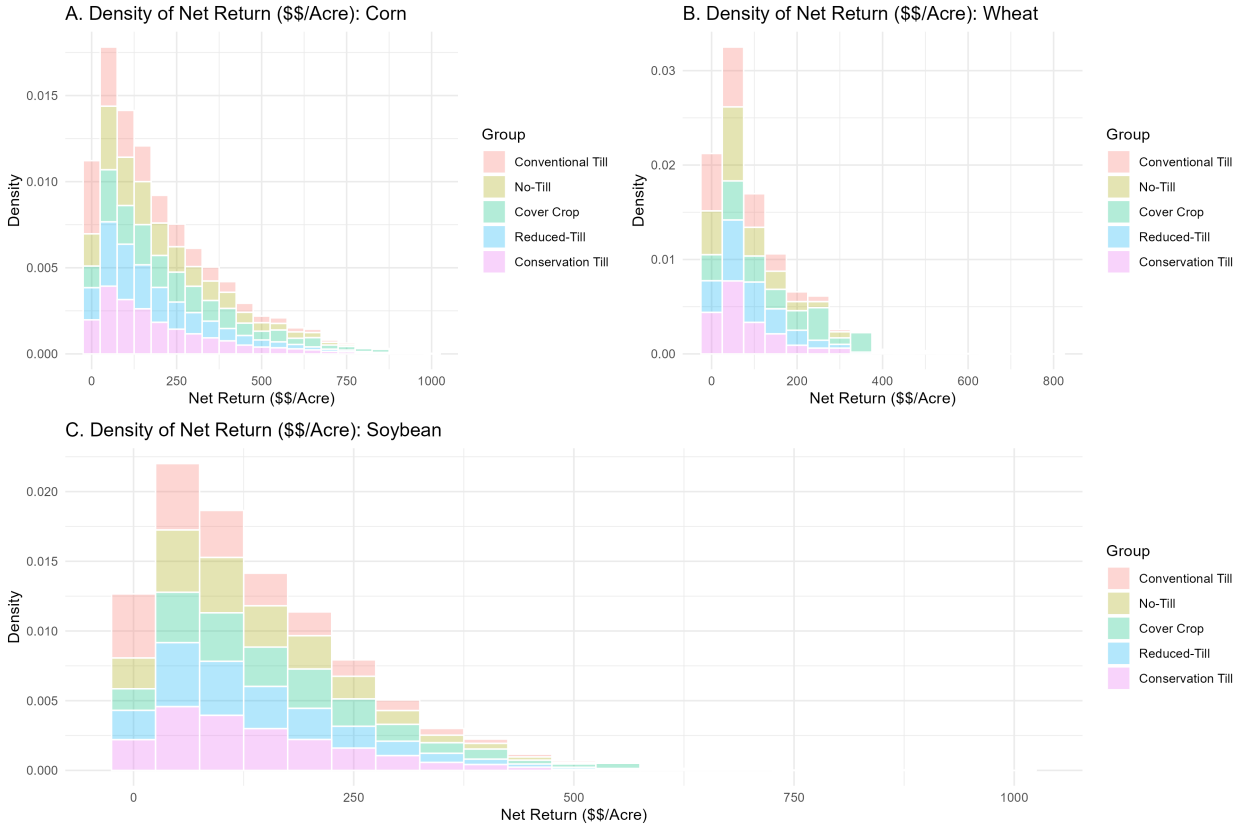


Figure A.4: Profit Density Panel

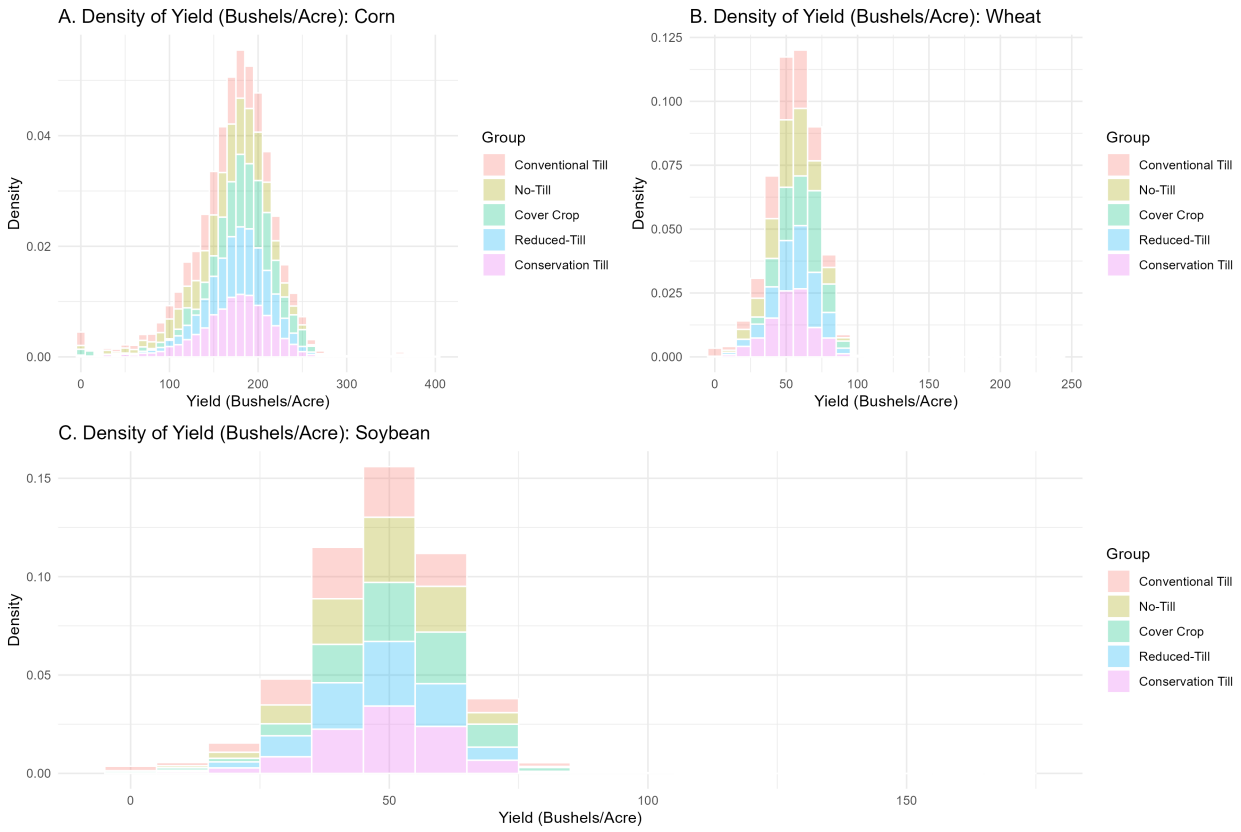


Figure A.5: Yield Density Panel

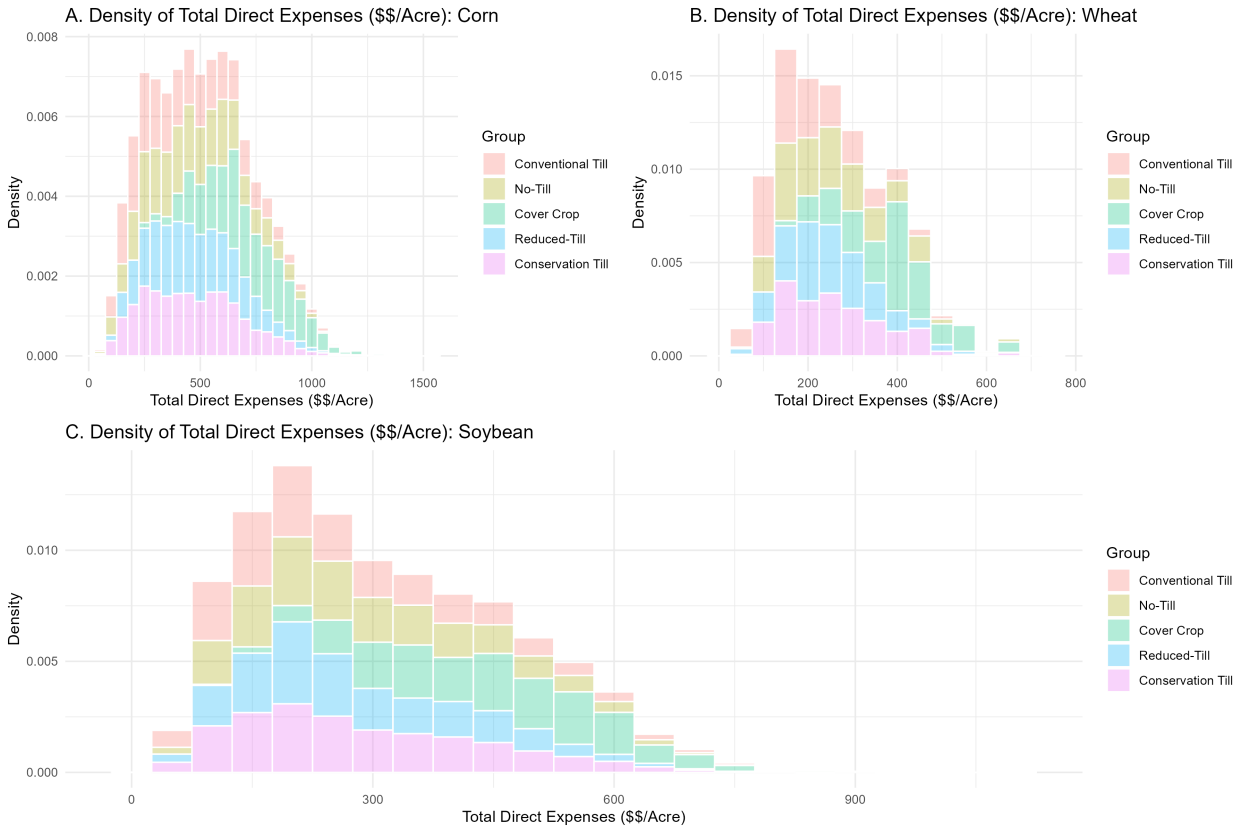


Figure A.6: Expenses Density Panel

B.3 Balance Tables

In this section, I present balance tables for the three commodities of interest across the different management types. This helps to assess whether the distribution of key covariates is similar across management groups, providing insight into the comparability of these groups for subsequent analysis. There is some evidence of statisticaly significant differences across management decisions on farm structure, farmer characteristics, and other concurrent considerations for production decisions. This suggests controlling for these imbalances on observables and motivates the doubly robust estimation approach.

Table A.4: Covariate Balance - Corn

	No Till				Any Cover Crop				Reduced Till				Conservation Till			
Covariate	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value
Farm Characteristics																
Farm Acres	145.701	113.860	-31.841	¡0.001	145.493	99.777	-45.716	¡0.001	136.601	156.659	20.058	¡0.001	146.019	129.304	-16.715	¡0.001
Acres Owned	344.394	388.167	43.773	¡0.001	345.367	308.921	-36.446	0.002	377.917	301.194	-76.723	¡0.001	346.240	323.915	-22.325	¡0.001
Crop Acres	1,057.619	960.878	-96.742	¡0.001	1,057.315	871.178	-186.137	¡0.001	1,100.900	995.940	-104.960	¡0.001	1,061.947	944.475	-117.472	¡0.001
% Crop Acres Owned	33.578	29.673	-3.906	¡0.001	33.525	31.865	-1.660	0.097	33.918	32.972	-0.946	¡0.001	33.766	28.765	-5.001	¡0.001
Planted on Own Land	0.358	0.324	-0.034	¡0.001	0.358	0.347	-0.011	0.465	0.345	0.375	0.030	¡0.001	0.359	0.329	-0.030	¡0.001
Planted on Rented Land	0.548	0.556	0.007	0.474	0.548	0.636	0.088	¡0.001	0.519	0.588	0.069	¡0.001	0.547	0.579	0.032	¡0.001
Planted on Share-Rented Land	0.061	0.119	0.058	¡0.001	0.062	0.017	-0.045	¡0.001	0.081	0.037	-0.044	¡0.001	0.060	0.091	0.031	¡0.001
Ownership: Sole Proprietorship	0.801	0.844	0.043	¡0.001	0.801	0.831	0.030	0.013	0.797	0.807	0.010	¡0.001	0.799	0.841	0.041	¡0.001
Ownership: Partnership	0.093	0.046	-0.048	¡0.001	0.093	0.052	-0.041	¡0.001	0.089	0.098	0.010	¡0.001	0.094	0.061	-0.034	¡0.001
Farmer Characteristics																
# Farm Operators	1.236	1.157	-0.078	¡0.001	1.234	1.342	0.108	¡0.001	1.241	1.226	-0.015	¡0.001	1.235	1.221	-0.014	0.034
Age of Primary Operator	49.876	50.233	0.356	0.157	49.872	51.275	1.403	0.002	49.306	50.653	1.347	¡0.001	49.829	50.880	1.051	¡0.001
Experience of Primary Operator (Years)	27.519	28.612	1.093	¡0.001	27.524	29.344	1.820	¡0.001	26.887	28.407	1.521	¡0.001	27.490	28.408	0.917	¡0.001
Management Decisions																
No Manure	0.162	0.304	0.142	¡0.001	0.164	0.213	0.050	¡0.001	0.048	0.319	0.271	¡0.001	0.154	0.351	0.197	¡0.001
Only Manure	0.018	0.014	-0.004	0.066	0.018	0.032	0.014	0.010	0.010	0.028	0.018	¡0.001	0.017	0.029	0.012	¡0.001
Organic Transition	0.003	0.004	0.001	0.526	0.003	0.001	-0.002	0.047	0.002	0.005	0.003	¡0.001	0.003	0.003	0.000	0.514
GMO Seed	0.435	0.762	0.328	¡0.001	0.439	0.548	0.109	¡0.001	0.154	0.823	0.670	¡0.001	0.421	0.800	0.379	¡0.001
Chemical Resistant Crop	0.302	0.456	0.154	¡0.001	0.306	0.000	-0.306	¡0.001	0.094	0.586	0.492	¡0.001	0.300	0.378	0.077	¡0.001
Insect Resistant Crop	0.273	0.416	0.143	¡0.001	0.278	0.000	-0.278	¡0.001	0.080	0.538	0.458	¡0.001	0.271	0.370	0.099	¡0.001
Previously Grown Crop on Field																
Previously Planted: Corn	0.099	0.112	0.013	0.050	0.100	0.092	-0.008	0.409	0.057	0.156	0.099	¡0.001	0.098	0.132	0.034	¡0.001
Previously Planted: Soybean	0.104	0.184	0.080	¡0.001	0.105	0.139	0.034	0.002	0.046	0.185	0.139	¡0.001	0.099	0.216	0.117	¡0.001
Previously Planted: Wheat	0.003	0.020	0.017	¡0.001	0.003	0.023	0.020	¡0.001	0.002	0.004	0.002	¡0.001	0.003	0.008	0.005	¡0.001
Previously Prevented Planting	0.001	0.000	-0.001	¡0.001	0.001	0.002	0.001	0.360	0.000	0.001	0.001	¡0.001	0.001	0.001	0.000	0.930
Growing Conditions																
Growing Degree Days	2,606.274	2,731.180	124.906	¡0.001	2,608.102	2,641.288	33.186	¡0.001	2,628.241	2,581.675	-46.566	¡0.001	2,604.708	2,676.603	71.895	¡0.001
Killing Degree Days	89.278	126.667	37.389	¡0.001	90.030	70.390	-19.640	¡0.001	104.971	69.707	-35.264	¡0.001	89.515	97.036	7.521	¡0.001
1 Year Lag SOC	2.267	2.185	-0.082	¡0.001	2.264	2.410	0.146	¡0.001	2.253	2.277	0.023	¡0.001	2.270	2.200	-0.070	¡0.001

Notes: All candidate covariates are retained. Difference = adopter minus control mean. p-values are from two-sided Welch t-tests using available observations for each covariate. – indicates an unavailable statistic.

Table A.5: Covariate Balance - Soybean

	No Till				Any Cover Crop				Reduced Till				Conservation Till			
Covariate	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value
Farm Characteristics																
Farm Acres	165.364	128.055	-37.309	¡0.001	164.337	99.988	-64.349	¡0.001	158.009	171.490	13.481	¡0.001	165.903	137.198	-28.706	¡0.001
Acres Owned	359.168	324.112	-35.055	¡0.001	358.439	267.482	-90.956	¡0.001	369.237	342.651	-26.586	¡0.001	361.230	312.617	-48.612	¡0.001
Crop Acres	1,212.677	942.253	-270.424	¡0.001	1,204.868	786.045	-418.823	¡0.001	1,257.427	1,128.451	-128.976	¡0.001	1,219.818	966.776	-253.042	¡0.001
% Crop Acres Owned	30.688	30.151	-0.537	0.160	30.666	30.683	0.018	0.987	29.964	31.586	1.621	¡0.001	30.849	28.300	-2.549	¡0.001
Planted on Own Land	0.316	0.320	0.004	0.582	0.316	0.337	0.021	0.209	0.293	0.347	0.054	¡0.001	0.317	0.313	-0.003	0.544
Planted on Rented Land	0.572	0.584	0.011	0.129	0.572	0.638	0.066	¡0.001	0.548	0.604	0.056	¡0.001	0.571	0.596	0.025	¡0.001
Planted on Share-Rented Land	0.078	0.093	0.016	¡0.001	0.079	0.025	-0.054	¡0.001	0.102	0.048	-0.054	¡0.001	0.078	0.089	0.011	¡0.001
Ownership: Sole Proprietorship	0.820	0.877	0.056	¡0.001	0.822	0.862	0.039	¡0.001	0.821	0.825	0.004	0.055	0.820	0.852	0.032	¡0.001
Ownership: Partnership	0.093	0.048	-0.045	¡0.001	0.091	0.034	-0.057	¡0.001	0.084	0.100	0.016	¡0.001	0.093	0.063	-0.030	¡0.001
Farmer Characteristics																
# Farm Operators	1.190	1.152	-0.038	¡0.001	1.188	1.249	0.061	0.005	1.199	1.175	-0.023	¡0.001	1.188	1.201	0.013	0.036
Age of Primary Operator	49.934	50.633	0.698	¡0.001	49.955	50.972	1.017	0.050	49.308	50.822	1.514	¡0.001	49.885	50.968	1.083	¡0.001
Experience of Primary Operator (Years)	27.571	28.417	0.846	¡0.001	27.604	27.894	0.290	0.622	26.921	28.504	1.584	¡0.001	27.533	28.541	1.007	¡0.001
Management Decisions																
No Manure	0.213	0.446	0.233	¡0.001	0.222	0.319	0.098	¡0.001	0.077	0.413	0.336	¡0.001	0.206	0.438	0.232	¡0.001
Only Manure	0.013	0.016	0.003	0.073	0.013	0.041	0.029	¡0.001	0.006	0.022	0.017	¡0.001	0.012	0.021	0.009	¡0.001
Organic Transition	0.002	0.002	0.000	0.724	0.002	0.005	0.003	0.178	0.001	0.002	0.001	¡0.001	0.002	0.002	0.001	0.162
GMO Seed	0.486	0.886	0.401	¡0.001	0.501	0.617	0.116	¡0.001	0.210	0.885	0.675	¡0.001	0.474	0.861	0.386	¡0.001
Chemical Resistant Crop	0.391	0.632	0.241	¡0.001	0.404	0.000	-0.404	¡0.001	0.159	0.717	0.558	¡0.001	0.390	0.545	0.155	¡0.001
Insect Resistant Crop	0.068	0.071	0.002	0.566	0.069	0.000	-0.069	¡0.001	0.018	0.135	0.118	¡0.001	0.068	0.080	0.013	¡0.001
Previously Grown Crop on Field																
Previously Planted: Corn	0.258	0.489	0.231	¡0.001	0.267	0.387	0.120	¡0.001	0.130	0.448	0.318	¡0.001	0.251	0.488	0.237	¡0.001
Previously Planted: Soybean	0.026	0.027	0.002	0.443	0.025	0.046	0.021	0.004	0.015	0.039	0.024	¡0.001	0.025	0.040	0.016	¡0.001
Previously Planted: Wheat	0.016	0.008	-0.008	¡0.001	0.016	0.013	-0.003	0.485	0.006	0.028	0.022	¡0.001	0.017	0.006	-0.011	¡0.001
Previously Prevented Planting	0.001	0.002	0.001	0.081	0.001	0.000	-0.001	¡0.001	0.000	0.001	0.001	¡0.001	0.001	0.002	0.001	0.053
Growing Conditions																
Growing Degree Days	2,405.009	2,460.345	55.336	¡0.001	2,406.759	2,472.763	66.004	¡0.001	2,429.763	2,377.763	-52.000	¡0.001	2,403.319	2,458.285	54.966	¡0.001
Killing Degree Days	88.833	92.148	3.315	0.017	89.106	71.293	-17.813	¡0.001	104.645	68.406	-36.239	¡0.001	89.070	87.654	-1.416	0.137
1 Year Lag SOC	2.449	2.244	-0.206	¡0.001	2.440	2.495	0.054	0.075	2.439	2.443	0.003	0.639	2.455	2.285	-0.170	¡0.001

Notes: All candidate covariates are retained. Difference = adopter minus control mean. p-values are from two-sided Welch t-tests using available observations for each covariate. – indicates an unavailable statistic.

Table A.6: Covariate Balance - Wheat

	No Till				Any Cover Crop				Reduced Till				Conservation Till			
Covariate	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value	Control	Adopter	Difference	p-value
Farm Characteristics																
Farm Acres	218.251	197.393	-20.858	0.282	218.372	121.069	-97.303	¡0.001	198.902	248.947	50.046	¡0.001	217.652	235.562	17.909	0.312
Acres Owned	584.444	332.095	-252.349	¡0.001	581.176	594.012	12.836	0.840	534.999	656.232	121.233	¡0.001	582.777	499.438	-83.340	0.038
Crop Acres	1,741.819	1,420.378	-321.441	¡0.001	1,737.880	1,698.207	-39.673	0.787	1,654.314	1,873.051	218.737	¡0.001	1,741.247	1,551.673	-189.574	0.001
% Crop Acres Owned	33.145	25.028	-8.117	¡0.001	33.072	25.437	-7.635	0.031	32.765	33.491	0.726	0.078	33.134	28.176	-4.959	¡0.001
Planted on Own Land	0.351	0.238	-0.113	¡0.001	0.350	0.278	-0.072	0.179	0.332	0.378	0.045	¡0.001	0.351	0.297	-0.054	0.032
Planted on Rented Land	0.565	0.736	0.171	¡0.001	0.567	0.639	0.072	0.211	0.556	0.585	0.029	¡0.001	0.565	0.682	0.118	¡0.001
Planted on Share-Rented Land	0.046	0.026	-0.020	0.060	0.046	0.083	0.038	0.255	0.051	0.037	-0.014	¡0.001	0.046	0.021	-0.025	0.001
Ownership: Sole Proprietorship	0.808	0.848	0.040	0.093	0.809	0.778	-0.031	0.530	0.806	0.813	0.007	0.213	0.809	0.819	0.010	0.627
Ownership: Partnership	0.115	0.082	-0.033	0.073	0.115	0.139	0.024	0.557	0.115	0.115	0.001	0.914	0.115	0.074	-0.041	0.005
Farmer Characteristics																
# Farm Operators	1.239	1.201	-0.038	0.309	1.239	1.215	-0.024	0.663	1.260	1.205	-0.055	¡0.001	1.239	1.219	-0.021	0.525
Age of Primary Operator	48.579	47.238	-1.341	0.075	48.552	50.958	2.406	0.102	47.716	49.934	2.218	¡0.001	48.572	48.033	-0.539	0.433
Experience of Primary Operator (Years)	26.040	27.238	1.198	0.138	26.041	29.750	3.709	0.014	25.054	27.680	2.626	¡0.001	26.032	27.282	1.250	0.105
Management Decisions																
No Manure	0.119	0.312	0.193	¡0.001	0.120	0.333	0.213	¡0.001	0.021	0.284	0.263	¡0.001	0.117	0.318	0.200	¡0.001
Only Manure	0.009	0.013	0.004	0.627	0.009	0.000	-0.009	¡0.001	0.004	0.018	0.014	¡0.001	0.009	0.021	0.012	0.138
Organic Transition	0.002	0.004	0.003	0.533	0.002	0.000	-0.002	¡0.001	0.002	0.001	0.000	0.579	0.002	0.003	0.001	0.654
GMO Seed	0.041	0.113	0.071	¡0.001	0.041	0.389	0.348	¡0.001	0.009	0.096	0.088	¡0.001	0.041	0.125	0.084	¡0.001
Chemical Resistant Crop	0.024	0.026	0.002	0.821	0.024	0.000	-0.024	¡0.001	0.002	0.058	0.055	¡0.001	0.024	0.024	0.000	0.988
Insect Resistant Crop	0.004	0.017	0.013	0.129	0.004	0.000	-0.004	¡0.001	0.001	0.010	0.009	¡0.001	0.004	0.012	0.008	0.198
Previously Grown Crop on Field																
Previously Planted: Corn	0.020	0.048	0.028	0.049	0.020	0.056	0.036	0.195	0.012	0.033	0.020	¡0.001	0.020	0.045	0.025	0.028
Previously Planted: Soybean	0.091	0.195	0.104	¡0.001	0.092	0.097	0.005	0.884	0.030	0.194	0.164	¡0.001	0.090	0.178	0.088	¡0.001
Previously Planted: Wheat	0.027	0.009	-0.019	0.003	0.027	0.028	0.001	0.974	0.012	0.052	0.040	¡0.001	0.027	0.009	-0.019	¡0.001
Previously Prevented Planting	0.001	0.000	-0.001	¡0.001	0.001	0.000	-0.001	¡0.001	0.000	0.001	0.001	0.026	0.001	0.000	-0.001	¡0.001
Growing Conditions																
Growing Degree Days	2,388.118	2,446.326	58.208	¡0.001	2,388.554	2,465.445	76.891	¡0.001	2,390.412	2,386.340	-4.072	0.262	2,388.115	2,428.168	40.053	0.002
Killing Degree Days	32.712	39.418	6.705	0.002	32.768	40.212	7.444	0.002	33.731	31.284	-2.447	¡0.001	32.667	39.711	7.044	¡0.001
1 Year Lag SOC	3.286	3.182	-0.103	0.272	3.283	3.482	0.199	0.059	3.237	3.329	0.093	¡0.001	3.289	3.105	-0.184	0.007

Notes: All candidate covariates are retained. Difference = adopter minus control mean. p-values are from two-sided Welch t-tests using available observations for each covariate. – indicates an unavailable statistic.

C Adoption Predictors

C.1 County Level Adoption

In these figures I present county level adoption of practices by commodity. This show the variation in adoption across counties and the steadiness of adoption levels over time. This is representative of farmers using the FinPack toolkit as opposed to a representation of county adoption for all farmers in the county.

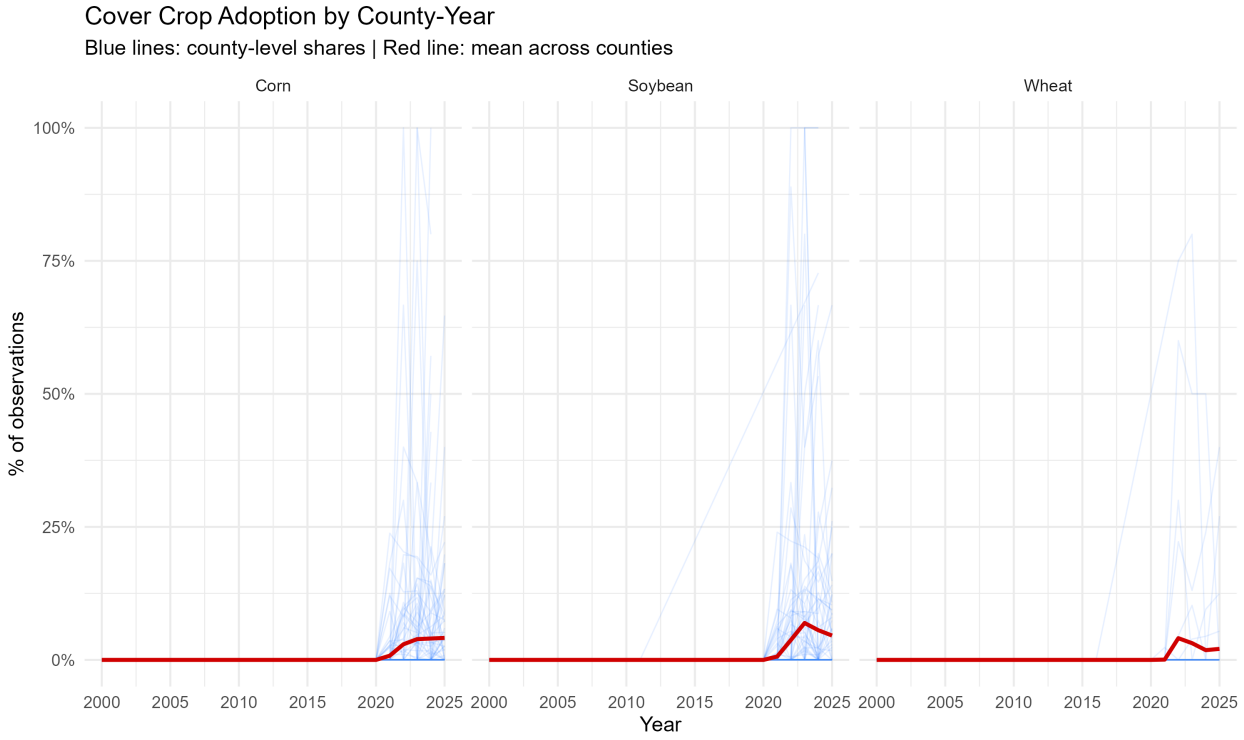


Figure A.7: County-level Adoption of Cover Cropping

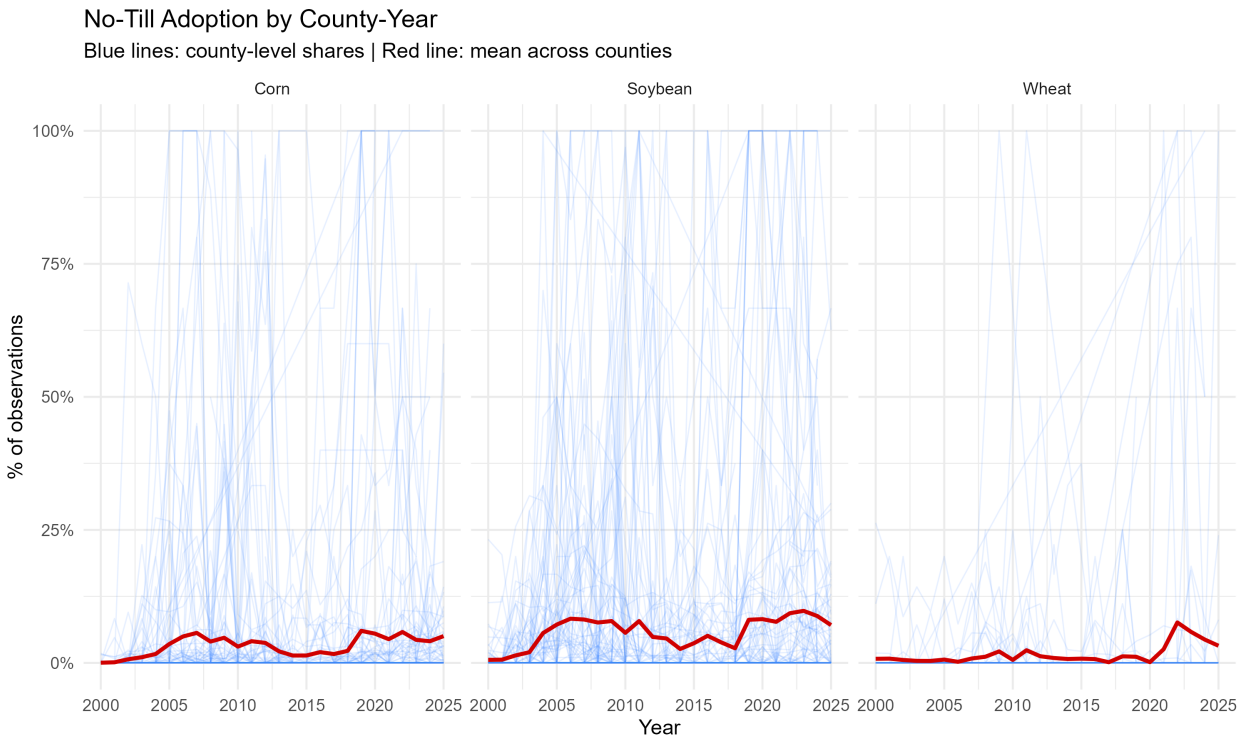


Figure A.8: County-level Adoption of No Till

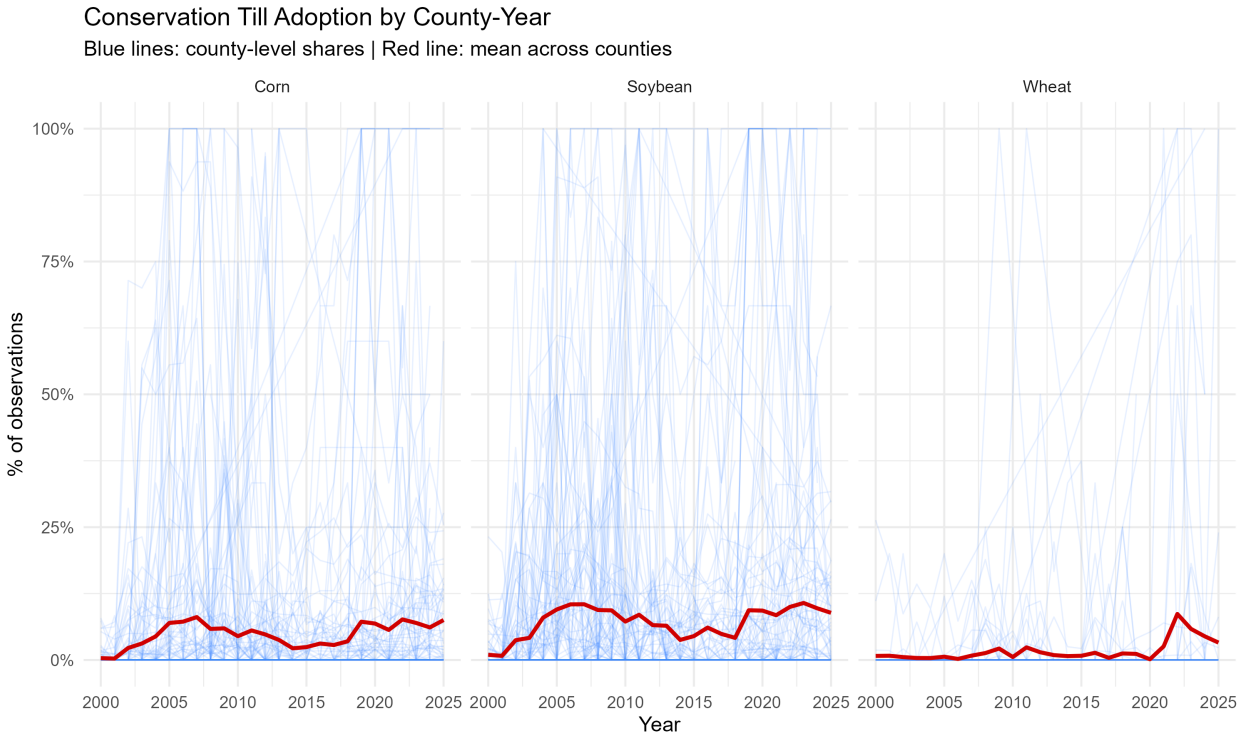


Figure A.9: County-level Adoption of Conservation Tillage

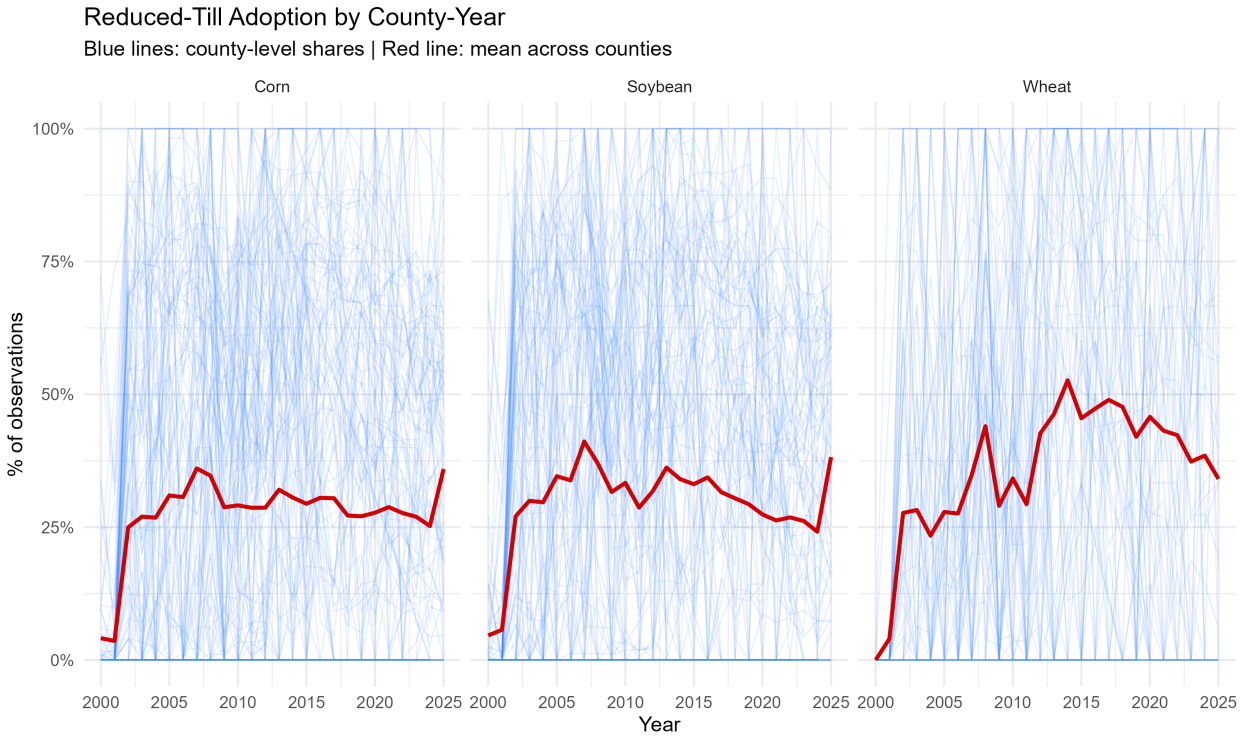


Figure A.10: County-level Adoption of Reduced Tillage

C.2 Logit Across all Periods

In these logit estimates, I consider all the time periods to compare likelihood of adoption across different management types. This includes both pre-treatment and post-treatment periods.

Table A.7: Adoption Logit Models - Corn

Covariate	No Till	Any Cover Crop	Reduced Till	Conservation Till
Farm Characteristics				
Acres Owned				0.0001*** (0.0000)
Planted on Own Land	2.8483*** (0.7987)		0.3849*** (0.0231)	2.6775*** (0.5104)
Planted on Rented Land	2.8443*** (0.7972)		0.3792*** (0.0231)	2.6807*** (0.5110)
Planted on Share-Rented Land	2.7997*** (0.7858)		0.4014*** (0.0250)	2.6077*** (0.4980)
Ownership: Partnership	-1.7864*** (0.5369)		0.1045*** (0.0232)	-0.5906*** (0.1616)
Farmer Characteristics				
Age of Primary Operator				0.0188*** (0.0049)
Experience of Primary Operator (Years)	0.0160** (0.0062)		0.0022*** (0.0004)	
Management Decisions				
No Manure			0.1070*** (0.0094)	0.0357*** (0.0132)
Only Manure			0.0761*** (0.0172)	0.1370*** (0.0365)
GMO Seed	0.1841*** (0.0544)		0.3850*** (0.0230)	0.3543*** (0.0654)
Chemical Resistant Crop				-0.0838*** (0.0181)
Insect Resistant Crop			0.0706*** (0.0064)	-0.0730*** (0.0181)
Previously Grown Crop on Field				
Previously Planted: Corn			0.0632*** (0.0063)	
Previously Planted: Soybean			0.0577*** (0.0058)	
Previously Planted: Wheat			0.2251*** (0.0514)	
Previously Prevented Planting	-1.5232*** (0.4183)	3.7747*** (0.0000)		
Growing Conditions				
Growing Degree Days				0.0001** (0.0000)
1 Year Lag SOC			0.0514*** (0.0097)	
Model Statistics				
N	4,957	3,511	43,154	10,922
Selected Predictors	7	1	13	12
Pseudo R2	0.3792	0.2420	0.5855	0.4949
Log-Likelihood	-1,501.7681	-1,436.5320	-11,846.7787	-3,447.7049
Wald F	1,678,741,436,654,421.5000	127,929,252,098,013,535,114,020,420,268,468.0000	409.4989	3,047,612,134,137.4731
Joint Wald p-value	¡0.001	¡0.001	¡0.001	¡0.001

Notes: Average marginal effects; heteroskedasticity-robust delta-method standard errors in parentheses. Farm and county fixed effects included. Backward elimination starts from all candidate covariates on a fixed full-model estimation sample. All retained logit coefficients have p ¡ 0.05; the eligible subset with the smallest joint Wald p-value along the path is reported. Subsets with singular joint-test covariance are excluded with a warning. Blank cells indicate predictors not selected for that model. Selection and inference are exploratory; p-values do not adjust for model selection. Fixed effects only are reported if no eligible subset exists; – indicates an unavailable statistic. * p ¡ 0.10; ** p ¡ 0.05; *** p ¡ 0.01 (AME tests).

Table A.8: Adoption Logit Models - Soybean

Covariate	No Till	Any Cover Crop	Reduced Till	Conservation Till
Farm Characteristics				
Crop Acres	0.0001** (0.0000)			0.0001** (0.0000)
% Crop Acres Owned	0.0014*** (0.0005)			
Planted on Own Land	0.0566** (0.0261)	1.6986*** (0.2872)	0.0282*** (0.0094)	0.1003*** (0.0273)
Planted on Rented Land	0.0492* (0.0252)	1.6929*** (0.2873)	0.0223** (0.0092)	0.0948*** (0.0264)
Planted on Share-Rented Land		1.6581*** (0.2879)		
Ownership: Sole Proprietorship	0.0995* (0.0562)			
Ownership: Partnership	-0.4644*** (0.1476)	1.3035*** (0.2452)		-0.3201*** (0.0843)
Farmer Characteristics				
Experience of Primary Operator (Years)	0.0108*** (0.0032)	0.0514*** (0.0118)		0.0123*** (0.0027)
Management Decisions				
No Manure	0.0577*** (0.0176)		0.1175*** (0.0084)	0.0577*** (0.0149)
GMO Seed	0.2736*** (0.0482)		0.3614*** (0.0141)	0.3755*** (0.0581)
Chemical Resistant Crop	-0.0666*** (0.0145)	-2.8183*** (0.4644)	0.0773*** (0.0064)	-0.1550*** (0.0234)
Insect Resistant Crop		-1.3057*** (0.2163)		
Previously Grown Crop on Field				
Previously Planted: Corn	0.0737*** (0.0180)		0.0950*** (0.0061)	0.0756*** (0.0158)
Previously Planted: Soybean			0.1174*** (0.0099)	0.0586*** (0.0196)
Previously Planted: Wheat			0.1620*** (0.0210)	
Previously Prevented Planting	0.4393*** (0.1102)			0.3333*** (0.1012)
Growing Conditions				
Growing Degree Days				0.0002*** (0.0001)
Killing Degree Days	-0.0005*** (0.0001)			-0.0005*** (0.0002)
1 Year Lag SOC			0.0893*** (0.0074)	
Model Statistics				
N	6,687	2,970	33,792	11,113
Selected Predictors	13	7	9	13
Pseudo R2	0.4230	0.4650	0.5753	0.4894
Log-Likelihood	-2,290.5194	-864.5198	-9,508.9123	-3,611.6976
Wald F	40.6999	894,821,578,634.8516	467.9089	87.0478
Joint Wald p-value	¡0.001	¡0.001	¡0.001	¡0.001

Notes: Average marginal effects; heteroskedasticity-robust delta-method standard errors in parentheses. Farm and county fixed effects included. Backward elimination starts from all candidate covariates on a fixed full-model estimation sample. All retained logit coefficients have p ¡ 0.05; the eligible subset with the smallest joint Wald p-value along the path is reported. Subsets with singular joint-test covariance are excluded with a warning. Blank cells indicate predictors not selected for that model. Selection and inference are exploratory; p-values do not adjust for model selection. Fixed effects only are reported if no eligible subset exists; – indicates an unavailable statistic. * p ¡ 0.10; ** p ¡ 0.05; *** p ¡ 0.01 (AME tests).

Table A.9: Adoption Logit Models - Wheat

Covariate	No Till	Any Cover Crop	Reduced Till	Conservation Till
Farm Characteristics				
Acres Owned		0.0254 (0.1025)		
% Crop Acres Owned		-0.0446 (0.1729)		
Planted on Own Land	2.1680*** (0.5214)	-8.7052 (35.2358)	4.9200*** (0.0102)	2.1281*** (0.3045)
Planted on Rented Land	2.1825*** (0.5264)	-8.8124 (35.6761)	4.8937*** (0.0188)	2.0801*** (0.2976)
Planted on Share-Rented Land		-8.8940 (35.9783)	4.7811*** (0.0305)	-1.8288*** (0.1471)
Ownership: Sole Proprietorship		-8.7276 (35.4379)		
Farmer Characteristics				
# Farm Operators		2.0198 (8.4557)		
Management Decisions				
Only Manure			5.1996*** (0.0171)	-1.9618*** (0.2664)
Chemical Resistant Crop		-1.0024 (4.2702)		
Insect Resistant Crop		0.5898 (2.4277)		
Previously Grown Crop on Field				
Previously Planted: Corn		-2.7386 (10.9102)		
Previously Prevented Planting				-1.5328*** (0.2162)
Model Statistics				
N	364	207	4,919	727
Selected Predictors	2	10	4	5
Pseudo R2	0.2104	0.6726	0.2854	0.3116
Log-Likelihood	-153.3313	-42.1788	-2,286.4026	-273.8318
Wald F	402.9084	214,444,300,244,808.4375	26,136,521,373,805,334,528.0000	295,784,202,937,656,960.0000
Joint Wald p-value	¡0.001	¡0.001	¡0.001	¡0.001

Notes: Average marginal effects; heteroskedasticity-robust delta-method standard errors in parentheses. Farm and county fixed effects included. Backward elimination starts from all candidate covariates on a fixed full-model estimation sample. All retained logit coefficients have p ¡ 0.05; the eligible subset with the smallest joint Wald p-value along the path is reported. Subsets with singular joint-test covariance are excluded with a warning. Blank cells indicate predictors not selected for that model. Selection and inference are exploratory; p-values do not adjust for model selection. Fixed effects only are reported if no eligible subset exists; – indicates an unavailable statistic. * p ¡ 0.10; ** p ¡ 0.05; *** p ¡ 0.01 (AME tests).

C.3 Logit for Pre-Treatment Period

In these logit estimates, I consider only the pre-treatment periods to compare likelihood of adoption across different management types before any treatment occurs.

Table A.10: First-Year Adoption Logit Models - Corn

Covariate	No Till	Any Cover Crop	Reduced Till	Conservation Till
Farm Characteristics				
Acres Owned				0.0004 (0.0017)
Crop Acres				0.0002 (0.0008)
Planted on Own Land				2.0470 (9.5809)
Planted on Rented Land				2.0602 (9.6398)
Planted on Share-Rented Land				2.0245 (9.4653)
Ownership: Partnership				-0.2382 (1.1314)
Farmer Characteristics				
# Farm Operators				0.2134 (0.9627)
Experience of Primary Operator (Years)	0.9934*** (0.0001)			0.0480 (0.2357)
Management Decisions				
Only Manure				0.1328 (0.5679)
GMO Seed				0.2619 (1.1296)
Chemical Resistant Crop				-0.2304 (0.9812)
Previously Grown Crop on Field				
Previously Planted: Corn				-0.0419 (0.1873)
Previously Planted: Soybean				0.0233 (0.1045)
Previously Planted: Wheat			4.4490*** (0.0000)	
Previously Prevented Planting	2.8399*** (0.0003)	3.2570*** (0.0000)		
Growing Conditions				
Growing Degree Days				0.0002 (0.0011)
Killing Degree Days				-0.0007 (0.0032)
Model Statistics				
N	1,019	2,081	3,391	3,373
Selected Predictors	2	1	1	15
Pseudo R2	0.7708	0.2181	0.1622	0.5782
Log-Likelihood	-79.4366	-723.2159	-1,799.3533	-584.3954
Wald F	11,694,313,484,639.9219	35,682,216,953,440,459,090,220,426,260,466.0000	85,238,821,313,849,579,618,662,620,208,488.0000	15,136,440,585,662.1523
Joint Wald p-value	¡0.001	¡0.001	¡0.001	¡0.001

Notes: Average marginal effects; heteroskedasticity-robust delta-method standard errors in parentheses. Farm and county fixed effects included. Backward elimination starts from all candidate covariates on a fixed full-model estimation sample. All retained logit coefficients have p ¡ 0.05; the eligible subset with the smallest joint Wald p-value along the path is reported. Subsets with singular joint-test covariance are excluded with a warning. Blank cells indicate predictors not selected for that model. Selection and inference are exploratory; p-values do not adjust for model selection. Fixed effects only are reported if no eligible subset exists; – indicates an unavailable statistic. * p ¡ 0.10; ** p ¡ 0.05; *** p ¡ 0.01 (AME tests).

Table A.11: First-Year Adoption Logit Models - Soybean

Covariate	No Till	Any Cover Crop	Reduced Till	Conservation Till
Farm Characteristics				
Farm Acres		0.0000		0.0000
Acres Owned		0.0018		0.0001
Crop Acres		0.0011		0.0001
% Crop Acres Owned		-0.0036		-0.0001
Planted on Own Land	2.5925 (1.9927)	-3.1984		0.5349
Planted on Rented Land	2.5710 (1.9759)	-3.2150		0.5336
Planted on Share-Rented Land	2.5258 (1.9407)	-3.2004		0.4719
Ownership: Sole Proprietorship		16.1320	-0.6379 (0.8061)	-0.1575
Ownership: Partnership		10.0075	1.2451 (1.5563)	-0.0077
Farmer Characteristics				
# Farm Operators		-0.6519		-0.1865
Age of Primary Operator		0.1995	0.0371 (0.0582)	-0.0707
Experience of Primary Operator (Years)		1.5898		0.1355
Management Decisions				
No Manure		0.0397		0.0024
Only Manure		-1.0869		0.0164
Organic Transition		3.5207		0.0149
GMO Seed	0.2453 (0.1988)	-0.0775	0.5757 (0.6716)	0.2152
Chemical Resistant Crop		-0.7744		-0.1394
Insect Resistant Crop		1.8001		0.0034
Previously Grown Crop on Field				
Previously Planted: Corn		-0.0209		0.0794
Previously Planted: Soybean		0.0099		0.0462
Previously Planted: Wheat	-1.5173 (1.2025)	-0.2447		-0.0422
Previously Prevented Planting		–		0.4133
Growing Conditions				
Growing Degree Days		-0.0028		0.0002
Killing Degree Days		0.0116		-0.0007
1 Year Lag SOC	0.2382 (0.2430)	-0.2975		-0.0903
Model Statistics				
N	2,137	1,768	2,325	3,672
Selected Predictors	6	–	4	–
Pseudo R2	0.2792	0.7747	0.7459	0.5924
Log-Likelihood	-636.4629	-181.7655	-386.5840	-617.0866
Wald F	41,591,433,346,479.3672	–	5,073,342,932,683,346.0000	–
Joint Wald p-value	¡0.001	–	¡0.001	–

Notes: Full-set exception (Any Cover Crop: Elimination-step 11 logit did not converge. Conservation Till: Full-model logit did not converge.): All candidate predictors are retained in these columns; selection was not possible. AMEs are descriptive only, without standard errors, stars, selected-predictor counts, or joint tests. – also marks nonestimable predictors. The following selection rules apply only to other columns. Average marginal effects; heteroskedasticity-robust delta-method standard errors in parentheses. Farm and county fixed effects included. Backward elimination starts from all candidate covariates on a fixed full-model estimation sample. All retained logit coefficients have p ¡ 0.05; the eligible subset with the smallest joint Wald p-value along the path is reported. Subsets with singular joint-test covariance are excluded with a warning. Blank cells indicate predictors not selected for that model. Selection and inference are exploratory; p-values do not adjust for model selection. Fixed effects only are reported if no eligible subset exists; – indicates an unavailable statistic. * p ¡ 0.10; ** p ¡ 0.05; *** p ¡ 0.01 (AME tests).

Table A.12: First-Year Adoption Logit Models - Wheat

Covariate	No Till	Any Cover Crop	Reduced Till	Conservation Till
Farm Characteristics				
Farm Acres	0.0000	-0.0002	0.0003	0.0000
Acres Owned	0.0000	0.0011	0.0008	0.0000
Crop Acres	0.0000	-0.0008	0.0006	0.0000
% Crop Acres Owned	0.0000	0.0059	0.0080	0.0000
Planted on Own Land	0.0000	-0.0174	0.0673	0.0000
Planted on Rented Land	0.0000	0.2293	-0.0655	0.0000
Planted on Share-Rented Land	–	–	-0.0727	0.0000
Ownership: Sole Proprietorship	–	–	–	0.0000
Ownership: Partnership	–	–	–	–
Farmer Characteristics				
# Farm Operators	–	-1.3534	-1.9160	0.0000
Age of Primary Operator	0.0000	0.2192	0.1242	0.0000
Experience of Primary Operator (Years)	–	–	–	–
Management Decisions				
No Manure	0.0000	-1.6696	-0.6283	0.0000
Only Manure	–	–	–	–
Organic Transition	–	–	–	–
GMO Seed	0.0000	0.2412	0.3717	0.0000
Chemical Resistant Crop	0.0000	-0.0470	–	0.0000
Insect Resistant Crop	0.0000	-0.2796	-0.2879	–
Previously Grown Crop on Field				
Previously Planted: Corn	0.0000	-0.5248	-0.1970	0.0000
Previously Planted: Soybean	0.0000	-0.0094	0.5604	0.0000
Previously Planted: Wheat	0.0000	-0.2666	-0.2040	0.0000
Previously Prevented Planting	–	–	0.0375	–
Growing Conditions				
Growing Degree Days	0.0000	-0.0023	0.0002	0.0000
Killing Degree Days	0.0000	0.0050	-0.0015	0.0000
1 Year Lag SOC	0.0000	–	0.0558	0.0000
Model Statistics				
N	50	120	349	193
Selected Predictors	–	–	–	–
Pseudo R2	1.0000	0.9223	0.9927	1.0000
Log-Likelihood	0.0000	-4.6660	-1.5328	0.0000
Wald F	–	–	–	–
Joint Wald p-value	–	–	–	–

Notes: Full-set exception (No Till: Full-model logit did not converge. Any Cover Crop: Elimination-step 12 logit did not converge. Reduced Till: Full-model logit did not converge. Conservation Till: Full-model logit did not converge.): All candidate predictors are retained in these columns; selection was not possible. AMEs are descriptive only, without standard errors, stars, selected-predictor counts, or joint tests. – also marks nonestimable predictors. The following selection rules apply only to other columns. Average marginal effects; heteroskedasticity-robust delta-method standard errors in parentheses. Farm and county fixed effects included. Backward elimination starts from all candidate covariates on a fixed full-model estimation sample. All retained logit coefficients have p ¡ 0.05; the eligible subset with the smallest joint Wald p-value along the path is reported. Subsets with singular joint-test covariance are excluded with a warning. Blank cells indicate predictors not selected for that model. Selection and inference are exploratory; p-values do not adjust for model selection. Fixed effects only are reported if no eligible subset exists; – indicates an unavailable statistic.

D Soil Organic Carbon (SOC) Prediction

D.1 Measurement of SOC using Ignition Tests

Soil organic matter (SOM) comprises all organic material in the soil, including plant residues, decomposed humus, and living microorganisms. Soil organic carbon (SOC) is the carbon portion of that material. Laboratories typically report SOM and convert to SOC using the conventional assumption that organic matter is about 58% carbon (SOC $= 0.58\times$ SOM, equivalently SOM $= 1.72\times$ SOC). I apply the same factor to convert predicted organic matter to SOC.

The most common routine test is loss-on-ignition (LOI). A technician weighs an oven-dried soil sample, heats it in a furnace, typically at 360–440°C for about two hours, and reweighs it. The heat burns off the organic material, and the percentage of weight lost is the estimate of organic matter (Figure A.11). Because LOI measures weight loss rather than carbon directly, it can also capture other combustible or volatile components, so SOC derived from LOI is an approximation of true carbon content. Improvements in spectrometry and other analytical techniques, such as near-infrared spectroscopy (NIRS), can provide more accurate and rapid estimates of SOC, but LOI remains a widely used and cost-effective method for routine soil testing.



Figure A.11: Example of Soil Test Procedure

The range of SOC values I work with follows from this procedure and from soil physical properties. SOC concentrations in agricultural topsoils typically fall between 1% and 3% (10 to 30 g/kg), with a broader baseline range of 0.5% to 5% depending on texture, climate, and management. Texture matters because clay particles chemically bind and protect organic matter, while sandy soils drain rapidly and lose carbon to microbial oxidation. Typical ranges are 0.4%–1.7% for sandy soils, 1.3%–2.7% for loamy soils, and 1.5%–3.3% for clayey soils. Differences in predicted SOC across counties therefore partly reflect soil texture rather than management alone, which is why the models include soil and climate covariates.

D.2 Ground Truth Data

The ground truth for training is the University of Wisconsin Soil and Forage Lab soil test summary (`https://uwlab.soils.wisc.edu/soilsummary/`), which reports aggregated results from submitted farm soil samples. Organic matter in these samples is measured by loss-on-ignition at 360°C for two hours. I use the aggregated county-year values as the training target and convert them to SOC with the factor above. Because the samples are submitted by farmers and consultants rather than drawn at random, they may not represent all cropland in a county, and the target is a county-level average rather than a field-level measurement.

The Wisconsin source contains 1,800 county-year organic matter (OM) records. After dropping one record for failing quality checks (missing or invalid values or a nonpositive sample count), 1,799 usable county-year observations remain. They represent 5,336,425 submitted soil samples, which are not necessarily distinct sites or farms. The data cover all 72 Wisconsin counties over 25 years from 1995 to 2019, or 99.9% of possible county-years, with 71 to 72 counties observed in each year and 24 to 25 years observed per county. Twenty-four retained county-year records are based on fewer than 10 samples.

County-year mean OM ranges from 0.10% to 21.80%, with an unweighted mean of 3.12%, a standard deviation of 1.10 percentage points, a median of 3.00%, and an interquartile range of 2.60% to 3.40%. Weighting by the number of submitted samples raises the mean to 3.23%, though this is not an area-weighted statewide estimate. The extreme values come from a handful of county-years and are far outside the interquartile range, so I treat them as possible measurement or reporting outliers rather than evidence of true soil conditions. These are measured OM values, not SOC measurements or predictions.

Figure A.12 maps the spatial pattern. Panel A shows each county's latest usable OM observation. Panel B shows $100 \times (\text{latest OM} - \text{first OM})/\text{first OM}$, which is a percent

change over the observed span rather than a percentage-point change or an annualized rate. Endpoint years can differ across counties, and the county coverage file reports them.

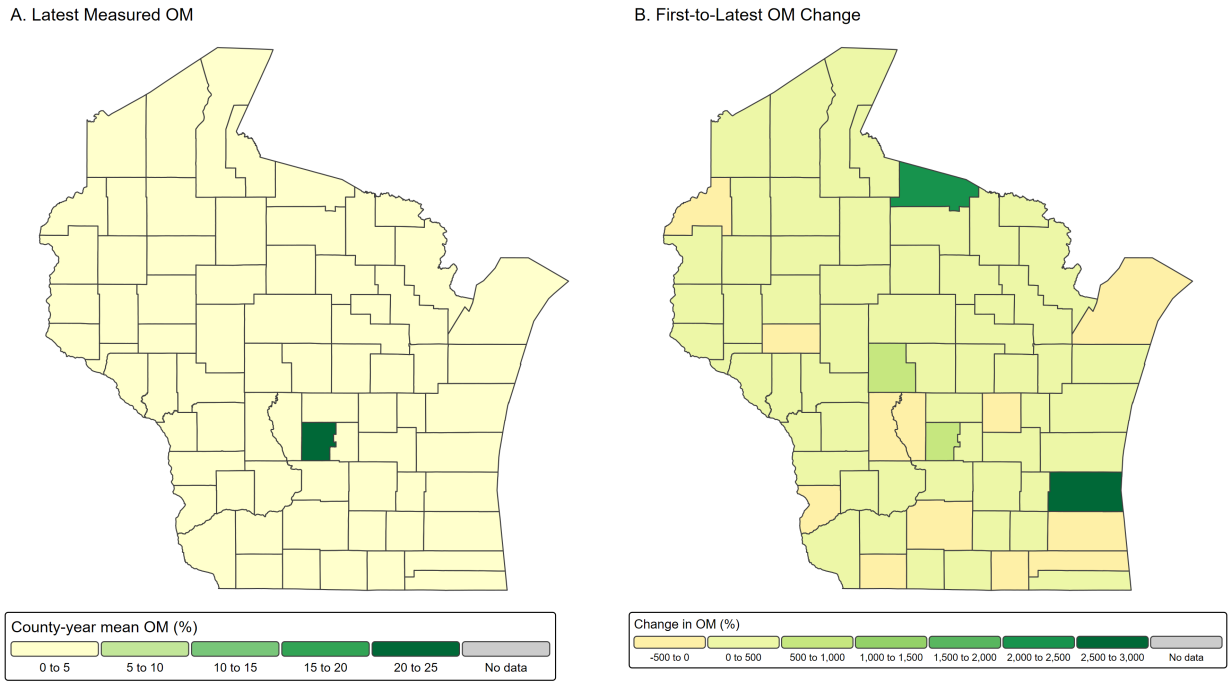


Figure A.12: Map of OM from UW-Madison Soil Sample Ground Truth Data. Panel A: latest usable county OM (%). Panel B: percent change from each county's first to latest observation.

An ideal alternative ground truth dataset could have derived from the University of Minnesota: Minnesota Office of Soil Health (MOSH). MOSH performs similar soil testing and aggregation for Minnesota counties, providing county-year summaries of organic matter and other soil properties that could serve as a complementary or comparative ground truth for model training and validation. This would be an improvement over the current ground truth measure as it samples directly from the core population in the FinBin data set. Unfortunately, despite repeated attempts to obtain this data from MOSH my efforts were unsuccessful.

D.3 Machine Learning Models

This section provides technical specifications for each machine learning model tested in the model comparison analysis. For all models, the objective is to predict a binary or continuous outcome y_i (e.g., adoption of regenerative practices, farm revenues, or yield

changes) based on a feature vector $\mathbf{x}_i = (x_{i1}, x_{i2}, \ldots, x_{ip})'$ comprising farmer and county characteristics, historical production, financial variables, and environmental conditions. Each model is estimated via 5-fold cross-validation on the training set, with performance evaluated on the held-out test set.

D.4 Base Case: Dummy Classifier

The dummy classifier serves as a trivial baseline that makes constant predictions regardless of input features. For binary classification tasks, it predicts the majority class in the training set with probability equal to its empirical frequency. Mathematically:

$$\hat{y}_i = \begin{cases} 1 & \text{if } P(y = 1) > 0.5 \\ 0 & \text{otherwise} \end{cases} \tag{D.1}$$

This baseline has no learnable parameters and provides a reference point to determine whether more sophisticated models add predictive value beyond class-frequency guessing. Any model with accuracy below the dummy classifier's performance on the test set fails to learn meaningful patterns.

D.5 Linear Models

D.5.1 Lasso Regression

Lasso (Least Absolute Shrinkage and Selection Operator) is a linear regression model that combines ordinary least squares with L1 regularization, which induces sparsity by shrinking some coefficients to exactly zero:

$$\hat{\boldsymbol{\beta}}^{\text{Lasso}} = \arg\min_{\boldsymbol{\beta}} \left\{ \frac{1}{2n} \sum_{i=1}^{n} (y_i - \mathbf{x}_i' \boldsymbol{\beta})^2 + \lambda \sum_{j=1}^{p} |\beta_j| \right\}, \tag{D.2}$$

where $\lambda \geq 0$ is the regularization strength. Lasso automatically performs feature selection, setting coefficients of weak predictors to zero. This is valuable for interpretability when the number of features exceeds the sample size or when correlation among predictors is high.

D.5.2 Elastic Net

Elastic Net combines L1 (Lasso) and L2 (Ridge) regularization, balancing sparsity with stability:

$$\hat{\boldsymbol{\beta}}^{\text{ElasticNet}} = \arg\min_{\boldsymbol{\beta}} \left\{ \frac{1}{2n} \sum_{i=1}^{n} (y_i - \mathbf{x}_i'\boldsymbol{\beta})^2 + \lambda \left(\alpha \sum_{j=1}^{p} |\beta_j| + \frac{1-\alpha}{2} \sum_{j=1}^{p} \beta_j^2 \right) \right\}, \tag{D.3}$$

where $\alpha \in [0, 1]$ controls the balance between L1 and L2 penalties. When $\alpha = 1$, Elastic Net reduces to Lasso; when $\alpha = 0$, it becomes Ridge regression. Elastic Net is particularly useful when many features are correlated, as it can select groups of related predictors together while shrinking their coefficients.

D.6 Tree-Based Ensemble Models

D.6.1 Random Forest

Random Forest is an ensemble method that builds multiple decision trees, each trained on a random bootstrap sample (with replacement) of the data and using a random subset of features at each split. The final prediction is the average (regression) or majority vote (classification) across all trees:

$$\hat{y}_i^{\text{RF}} = \frac{1}{B} \sum_{b=1}^{B} T_b(\mathbf{x}_i), \tag{D.4}$$

where $T_b(\cdot)$ is the prediction from tree b and B is the total number of trees. Random forests reduce overfitting through bootstrap aggregation (bagging) and feature randomization, capturing non-linear relationships and high-order interactions naturally.

D.6.2 Extra Trees (Extremely Randomized Trees)

Extra Trees extends Random Forest by randomizing split thresholds: at each split, the split point is randomly selected rather than optimized. The prediction rule is identical to Equation (D.4):

$$\hat{y}_i^{\text{ExtraTrees}} = \frac{1}{B} \sum_{b=1}^{B} T_b^{\text{rand}}(\mathbf{x}_i), \tag{D.5}$$

where T_b^{rand} indicates trees built with randomized splits. This additional randomization reduces variance at the cost of slightly higher bias, sometimes improving generalization on high-dimensional data and reducing computation time during training.

D.6.3 Gradient Boosting

Gradient Boosting builds an ensemble sequentially, with each new tree trained to predict the residuals of all previous trees. For a differentiable loss function $L(y, \hat{y})$, the prediction is:

$$\hat{y}_i^{\text{GB}} = \sum_{m=0}^{M} \gamma_m T_m(\mathbf{x}_i), \tag{D.6}$$

where γ_m is the learning rate (shrinkage) for tree m, and each $T_m(\cdot)$ is trained to minimize the negative gradient of the loss:

$$T_m(\cdot) = \arg\min_{T} \sum_{i=1}^{n} L\left(y_i, \hat{y}_i^{(m-1)} + T(\mathbf{x}_i)\right). \tag{D.7}$$

Gradient Boosting is highly flexible and typically achieves strong predictive performance by carefully building weak learners that correct previous errors.

D.6.4 Histogram Gradient Boosting

Histogram Gradient Boosting is an efficient variant of Gradient Boosting that discretizes continuous features into histograms before training, dramatically reducing memory usage and computation time while often maintaining or improving accuracy:

$$\hat{y}_i^{\text{HistGB}} = \sum_{m=0}^{M} \gamma_m T_m^{\text{hist}}(\mathbf{x}_i^{\text{binned}}), \tag{D.8}$$

where $\mathbf{x}_i^{\text{binned}}$ denotes binned features. This method scales to larger datasets with minimal loss of predictive power.

D.6.5 Extreme Gradient Boosting (XGBoost)

XGBoost adds second-order (Hessian) information to the gradient boosting framework, improving optimization precision. The objective function at each iteration is:

$$\mathcal{L}^{(m)} = \sum_{i=1}^{n} \left[g_i T_m(\mathbf{x}_i) + \frac{1}{2} h_i T_m(\mathbf{x}_i)^2 \right] + \Omega(T_m), \tag{D.9}$$

where $g_i = \frac{\partial L}{\partial \hat{y}_i^{(m-1)}}$ and $h_i = \frac{\partial^2 L}{\partial (\hat{y}_i^{(m-1)})^2}$ are the gradient and Hessian, and $\Omega(T_m)$ is a regularization term penalizing tree complexity. XGBoost also incorporates shrinkage,

column subsampling, and row subsampling for additional regularization and computational efficiency.

D.7 Support Vector Machines

D.7.1 Support Vector Machines (SVM)

SVMs find a hyperplane that maximizes the margin between classes (or minimizes regression error). For classification, the dual problem is:

$$\hat{y}_i^{\text{SVM}} = \text{sign}\left(\sum_{i=1}^{n} \alpha_i y_i K(\mathbf{x}_i, \mathbf{x}) + b\right), \tag{D.10}$$

where $\alpha_i \geq 0$ are Lagrange multipliers, $K(\cdot, \cdot)$ is a kernel function (e.g., radial basis function), and b is the bias term. SVMs are powerful for high-dimensional data and can capture non-linear relationships through kernel tricks. The regularization parameter C controls the balance between margin maximization and classification error minimization.

D.8 Neural Network Models

D.8.1 Multilayer Perceptron (MLP)

MLPs are feedforward neural networks with an input layer, one or more hidden layers, and an output layer. For a network with L hidden layers, the forward pass is:

$$\mathbf{h}^{(\ell)} = \sigma\left(\mathbf{W}^{(\ell)}\mathbf{h}^{(\ell-1)} + \mathbf{b}^{(\ell)}\right), \quad \ell = 1, \ldots, L, \tag{D.11}$$

where $\mathbf{h}^{(0)} = \mathbf{x}_i$, $\mathbf{W}^{(\ell)}$ and $\mathbf{b}^{(\ell)}$ are the weight matrix and bias vector for layer ℓ, and $\sigma(\cdot)$ is an activation function (e.g., ReLU). The output layer applies a task-specific function (linear for regression, softmax for classification):

$$\hat{y}_i^{\text{MLP}} = \mathbf{W}^{(L+1)}\mathbf{h}^{(L)} + \mathbf{b}^{(L+1)}. \tag{D.12}$$

MLPs learn hierarchical feature representations and can approximate arbitrary non-linear functions given sufficient hidden units. Training is via backpropagation and stochastic gradient descent.

D.8.2 Long Short-Term Memory (LSTM)

LSTMs are recurrent neural networks designed to capture long-range temporal dependencies by maintaining a cell state across time steps. The LSTM update equations at time step t are:

$$\mathbf{f}_t = \sigma(\mathbf{W}_f \mathbf{x}_t + \mathbf{U}_f \mathbf{h}_{t-1} + \mathbf{b}_f), \tag{D.13}$$

$$\mathbf{i}_t = \sigma(\mathbf{W}_i \mathbf{x}_t + \mathbf{U}_i \mathbf{h}_{t-1} + \mathbf{b}_i), \tag{D.14}$$

$$\tilde{\mathbf{c}}_t = \tanh(\mathbf{W}_c \mathbf{x}_t + \mathbf{U}_c \mathbf{h}_{t-1} + \mathbf{b}_c), \tag{D.15}$$

$$\mathbf{c}_t = \mathbf{f}_t \odot \mathbf{c}_{t-1} + \mathbf{i}_t \odot \tilde{\mathbf{c}}_t, \tag{D.16}$$

$$\mathbf{o}_t = \sigma(\mathbf{W}_o \mathbf{x}_t + \mathbf{U}_o \mathbf{h}_{t-1} + \mathbf{b}_o), \tag{D.17}$$

$$\mathbf{h}_t = \mathbf{o}_t \odot \tanh(\mathbf{c}_t), \tag{D.18}$$

where $\mathbf{f}_t$, $\mathbf{i}_t$, and $\mathbf{o}_t$ are the forget, input, and output gates respectively, $\mathbf{c}_t$ is the cell state, and $\odot$ denotes element-wise multiplication. The final prediction is $\hat{y}_i^{\text{LSTM}} = \mathbf{W}_y \mathbf{h}_T + \mathbf{b}_y$, where T is the final time step. LSTMs are particularly useful for sequential data, such as time-series of farm operations or multi-year adoption patterns.

D.9 Model Comparison and Cross-Validation

All models are trained and evaluated using 5-fold cross-validation, with hyperparameters tuned via grid search on the training folds. Performance metrics include root mean squared error (RMSE) for regression tasks and accuracy, precision, recall, and F1 score for classification tasks. The test set is held out throughout training and hyperparameter selection to provide an unbiased final evaluation.

D.10 Remotely Sensed Features

The soil prediction model combines remotely sensed observations with static soil and ecological attributes. These features are intended to capture persistent differences in soil-forming conditions, as well as year-to-year variation in vegetation, surface reflectance, and moisture that may covary with organic matter. Since the ground-truth target is a county-year mean, raster features are summarized over county boundaries; this aligns the spatial scale of the predictors with the outcome, but masks within-county and field-level heterogeneity.

Table A.13 summarizes the feature families, their sources, and the spatial and temporal scales used in constructing them. The full feature list contains 150 predictors including annual or lagged band/index summaries, distributional statistics, valid-pixel counts, data-availability flags, missingness indicators, static soil characteristics, ecoregion, and year terms. The satellite data are reduced to county-year (or, for Sentinel-2, county-season-year) features before estimation. Temporal coverage below describes source availability or the extraction window, not a balanced panel of observed values for every county-year.

Table A.13: Remote-Sensing and Spatial Feature Families for Soil Organic Matter Prediction

Source	Feature content	Examples in model	Spatial scale	Temporal coverage
EPA Level III Ecoregions	Broad ecological setting	Ecoregion code	County representative point assigned to a polygon	Static; 2017 map
Landsat Collection 2 Level-2	Surface reflectance bands and vegetation/surface indices	Blue, green, red, NIR, SWIR; NDVI-like index; annual and lagged summaries	240-m analysis grid; county-year summaries	Landsat archive; 1995–2019
MODIS MOD09A1	Eight-day surface reflectance	Bands 1–7; annual and lagged summaries, pixel counts and availability flags	500-m native grid; county-year summaries	From 2000; 1995–2019
Sentinel-2 Level-2A	Surface reflectance and vegetation/moisture indices	NDVI, EVI, SAVI, NDMI, NBR, NDRE, GCI, MSI; seasonal distribution summaries	120-m analysis grid; county-season-year summaries	2015 onward
SSURGO via USDA Soil Data Access	Mapped soil properties	Available water capacity, clay/sand/silt fractions, pH, mapped OM	Soil survey map units summarized to county	Static mapped attributes
GLDAS and GRACE-DA	Soil moisture, surface temperature, evapotranspiration, and terrestrial water storage	Candidate hydroclimate measures and missingness flags	Gridded products aggregated to county	Candidate products span roughly 2000–2023
MODIS land-surface temperature	Surface temperature proxy	Candidate LST and missingness flag	Gridded product intended for county aggregation	Candidate coverage from 2000
SRTM elevation	Topographic context	Candidate mean elevation	County summary; source product's nominal resolution is finer than the county unit	Static

The satellite predictors include raw reflectance and derived indices because plant cover, canopy development, surface moisture, and residue can jointly reflect local growing conditions and management associated with organic matter. Static SSURGO properties and ecoregion help account for baseline variation in soil texture, water-holding capacity, and ecological setting. These variables are predictive covariates, not direct measurements of soil carbon or identified causal effects of management.

E Power Calculation Graphs

In this section I report the power calculation graphs for each crop sample at the adoption rate for each of the management practices. The sample size N uses farm-level sample sizes by crop and uses the treatment ratio from management practice adoption within the sample. These graphs report the minimum detectable effect (MDE) across the range of potential statistical power (hedge against Type II error) at a $\alpha = 0.05$ statistical signficance. The standard 80% power threshold MDE is reported for each crop and management practice combination. The MDE is reported as Cohen's d which can be interperted as the standardized difference between treatment and control means (standard deviation changes from the control mean).

Note that the sample size is common across all Finbin outcomes provided by CFFM. For soil organic carbon (SOC) and insurance coverage (θ), I construct these outcome measures and therefore the sample sizes differ resulting in slightly different power calculations.

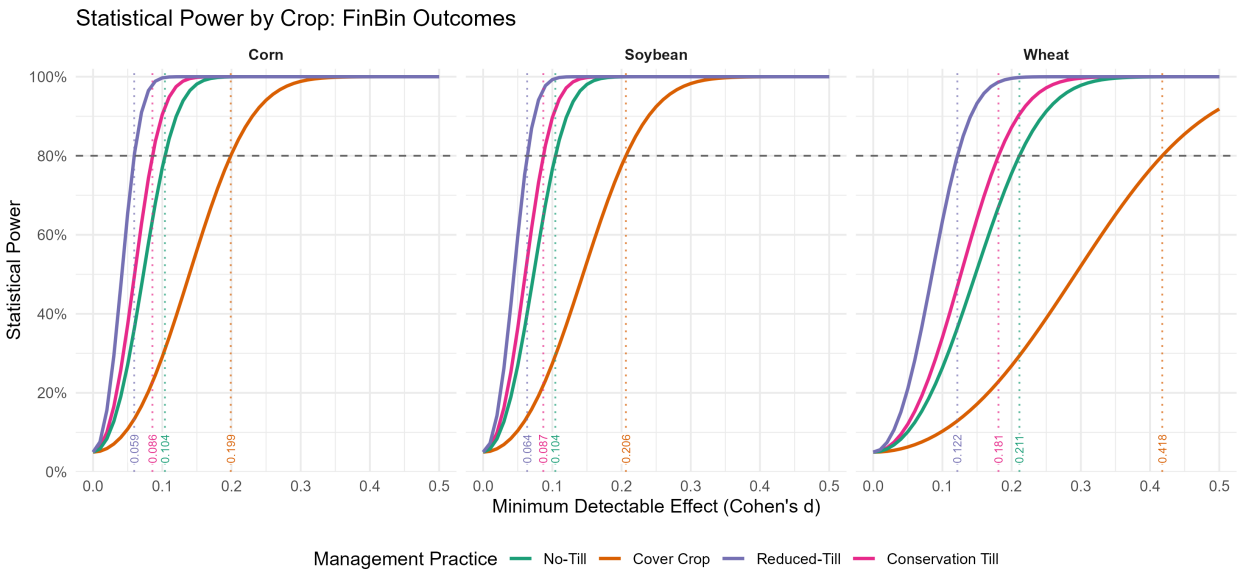


Figure A.13: Power Curve for FinBin Outcomes

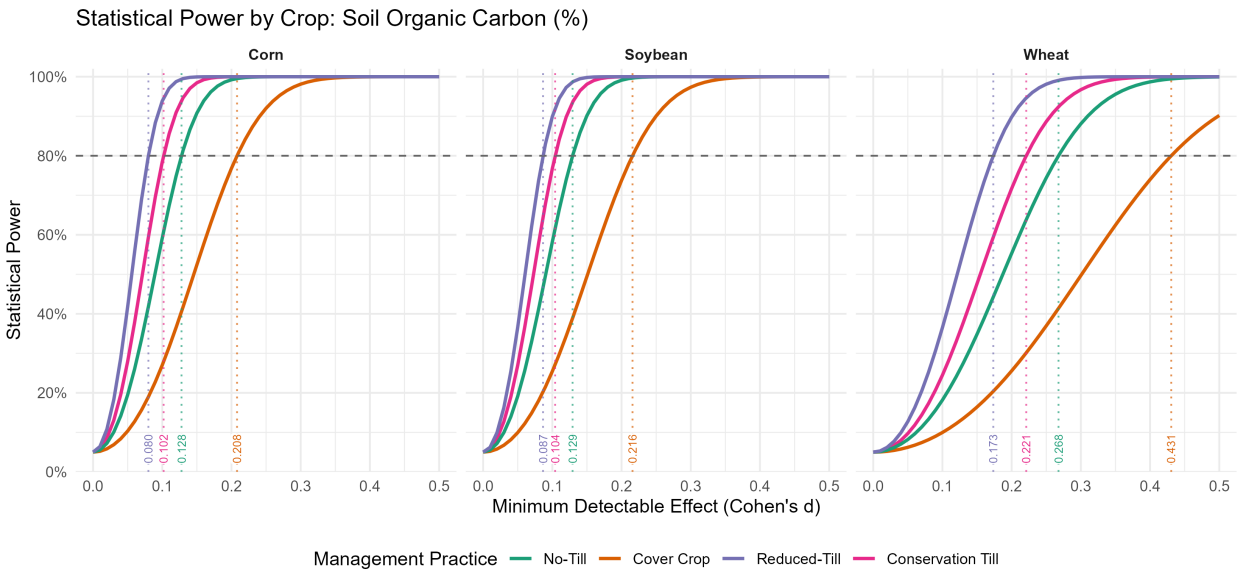


Figure A.14: Power Curve for SOC Predicted Outcomes

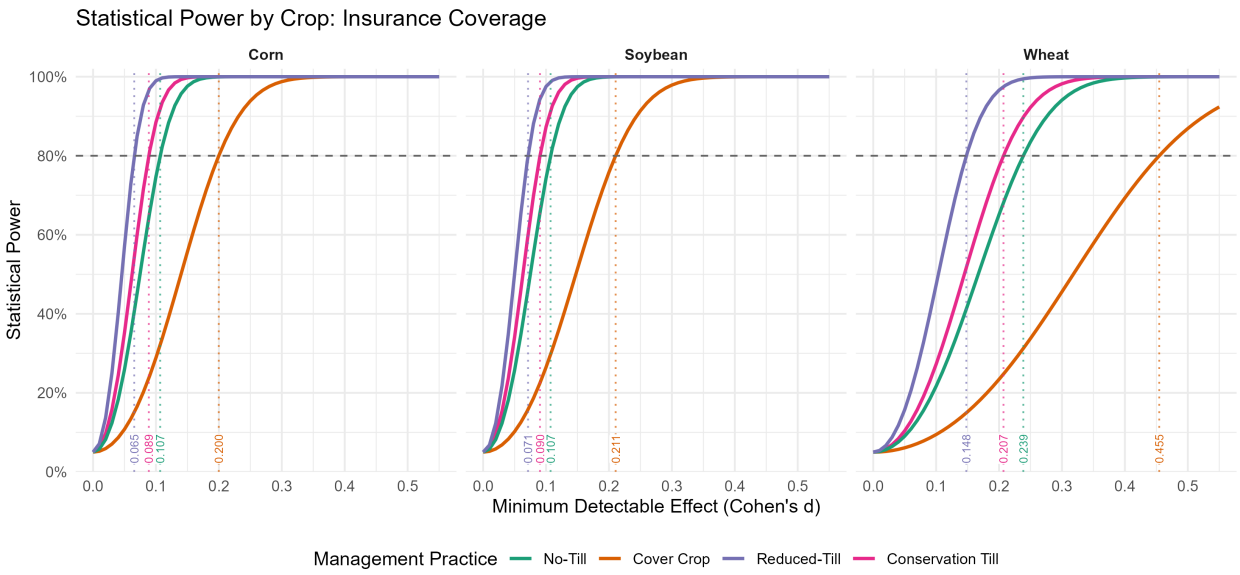


Figure A.15: Power Curve for Insurance Coverage (θ) Outcomes

F Difference-in-Differences Alternative Specifications

In this section, I present the alternative specifications for the difference-in-differences analysis, including two-way fixed effects, Callaway & Sant'Anna, and Sun & Abraham approaches.

F.1 Two-way Fixed Effects

Results: Tables

Table A.14: Two-way fixed effects DID summary for Net Return ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	72.248	10.384	17.519	10.939
	(14.848)	(5.582)	(3.574)	(5.265)
	[¡0.001]	[0.063]	[¡0.001]	[0.038]
N obs.	140744	138891	131425	136402
N farmers	8966	8966	8963	8965
Mean DV	90.289	90.531	89.593	90.216
R^2	0.388	0.387	0.380	0.386
Pretrend p-value	0.890	0.197	0.862	0.413
Anticipation p-value	0.790	0.155	0.584	0.168
Soybean				
ATT	19.343	-3.317	9.306	-1.354
	(9.751)	(3.706)	(2.592)	(3.413)
	[0.047]	[0.371]	[¡0.001]	[0.692]
N obs.	107987	106234	100461	104116
N farmers	7958	7959	7950	7956
Mean DV	82.672	83.124	80.631	82.929
R^2	0.450	0.451	0.448	0.454
Pretrend p-value	0.725	0.332	0.037	0.597
Anticipation p-value	0.543	0.317	0.190	0.172
Wheat				
ATT	4.436	-13.621	4.119	-9.334
	(26.155)	(8.292)	(3.909)	(6.825)
	[0.865]	[0.101]	[0.292]	[0.172]
N obs.	17922	17869	16561	17336
N farmers	2195	2190	2183	2182
Mean DV	36.698	36.831	37.133	35.771
R^2	0.830	0.830	0.843	0.833
Pretrend p-value	0.841	0.035	0.499	0.159
Anticipation p-value	0.280	0.186	0.931	0.307

Table A.15: Two-way fixed effects DID summary for Yield (Bu/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	13.820	3.186	3.104	2.757
	(5.715)	(2.737)	(2.276)	(3.070)
	[0.016]	[0.244]	[0.173]	[0.369]
N obs.	140685	138832	131371	136351
N farmers	8966	8966	8963	8965
Mean DV	243.279	243.998	242.722	244.082
R^2	0.353	0.352	0.355	0.355
Pretrend p-value	0.326	0.484	0.078	0.245
Anticipation p-value	0.305	0.946	0.348	0.632
Soybean				
ATT	0.081	-0.013	1.166	0.329
	(0.786)	(0.298)	(0.227)	(0.265)
	[0.918]	[0.965]	[¡0.001]	[0.214]
N obs.	107920	106167	100396	104059
N farmers	7958	7959	7950	7956
Mean DV	46.758	46.748	46.346	46.718
R^2	0.578	0.583	0.581	0.582
Pretrend p-value	0.713	0.058	0.278	0.685
Anticipation p-value	0.720	0.614	0.294	0.656
Wheat				
ATT	1.077	-0.215	1.741	-0.288
	(2.594)	(0.975)	(0.702)	(0.831)
	[0.678]	[0.825]	[0.013]	[0.729]
N obs.	17922	17869	16561	17336
N farmers	2195	2190	2183	2182
Mean DV	53.361	53.437	52.795	53.336
R^2	0.601	0.602	0.603	0.605
Pretrend p-value	0.255	0.070	¡0.001	0.014
Anticipation p-value	0.674	0.138	0.022	0.095

Table A.16: Two-way fixed effects DID summary for Crop Revenue ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	71.274	25.156	37.733	33.838
	(14.829)	(6.451)	(4.926)	(6.172)
	[¡0.001]	[¡0.001]	[¡0.001]	[¡0.001]
N obs.	140744	138891	131425	136402
N farmers	8966	8966	8963	8965
Mean DV	619.929	619.652	605.918	618.316
R^2	0.629	0.628	0.617	0.628
Pretrend p-value	0.710	0.003	0.839	0.042
Anticipation p-value	0.574	0.371	0.600	0.091
Soybean				
ATT	24.389	8.771	26.145	17.565
	(12.252)	(4.268)	(3.330)	(3.916)
	[0.047]	[0.040]	[¡0.001]	[¡0.001]
N obs.	107987	106234	100461	104116
N farmers	7958	7959	7950	7956
Mean DV	412.007	412.156	401.657	411.369
R^2	0.711	0.713	0.705	0.714
Pretrend p-value	0.896	0.040	0.250	0.713
Anticipation p-value	0.975	0.611	0.374	0.193
Wheat				
ATT	7.033	5.876	21.271	5.225
	(17.000)	(7.342)	(5.186)	(6.643)
	[0.679]	[0.424]	[¡0.001]	[0.432]
N obs.	17922	17869	16561	17336
N farmers	2195	2190	2183	2182
Mean DV	285.286	285.888	279.611	285.407
R^2	0.854	0.853	0.859	0.855
Pretrend p-value	0.392	0.084	0.006	0.076
Anticipation p-value	0.622	0.066	0.181	0.091

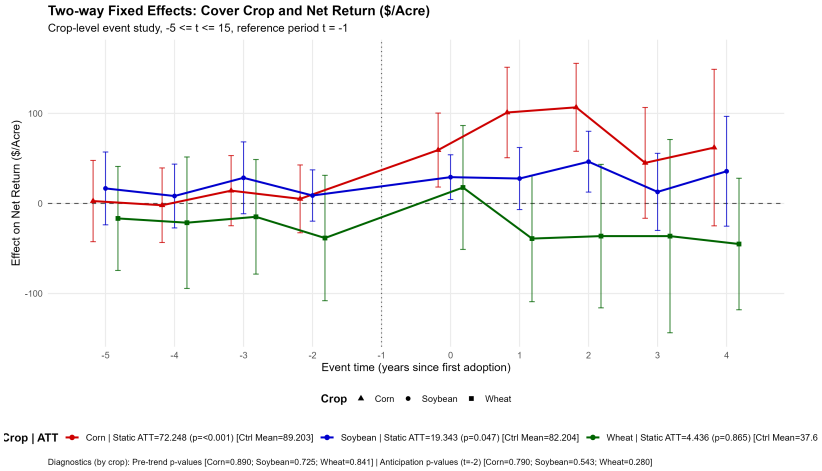
Table A.17: Two-way fixed effects DID summary for Total Expenses ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	4.615	16.194	17.225	24.671
	(12.349)	(5.619)	(4.315)	(5.090)
	[0.709]	[0.004]	[¡0.001]	[¡0.001]
N obs.	140744	138891	131425	136402
N farmers	8966	8966	8963	8965
Mean DV	562.255	561.671	548.108	560.582
R^2	0.775	0.774	0.773	0.776
Pretrend p-value	0.646	0.438	0.411	0.532
Anticipation p-value	0.732	0.636	0.205	0.418
Soybean				
ATT	13.617	14.122	15.646	20.210
	(8.690)	(4.034)	(3.071)	(3.536)
	[0.117]	[¡0.001]	[¡0.001]	[¡0.001]
N obs.	107987	106234	100461	104116
N farmers	7958	7959	7950	7956
Mean DV	353.320	352.957	343.969	352.336
R^2	0.739	0.740	0.739	0.742
Pretrend p-value	0.921	0.710	0.717	0.827
Anticipation p-value	0.843	0.903	0.166	0.998
Wheat				
ATT	8.412	20.467	17.866	15.096
	(19.393)	(7.994)	(4.267)	(6.984)
	[0.665]	[0.011]	[¡0.001]	[0.031]
N obs.	17922	17869	16561	17336
N farmers	2195	2190	2183	2182
Mean DV	268.793	269.148	261.867	269.984
R^2	0.806	0.806	0.796	0.805
Pretrend p-value	0.315	0.012	0.108	0.150
Anticipation p-value	0.117	0.239	0.042	0.122

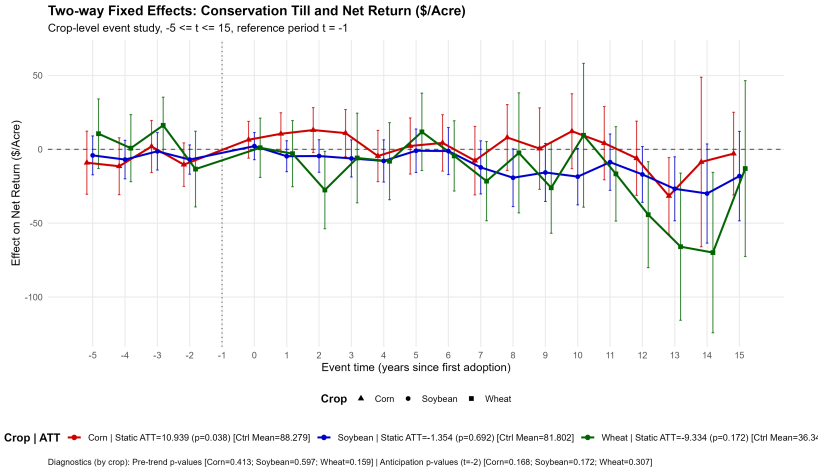
Table A.18: Two-way fixed effects DID summary for Soil Organic Carbon (%)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	-0.002	0.016	0.012	0.004
	(0.008)	(0.010)	(0.008)	(0.008)
	[0.752]	[0.110]	[0.158]	[0.591]
N obs.	75457	75021	67324	73609
N farmers	5357	5353	5346	5352
Mean DV	2.269	2.273	2.265	2.273
R^2	0.975	0.975	0.974	0.975
Pretrend p-value	0.344	0.462	0.084	0.153
Anticipation p-value	0.035	0.687	0.350	0.847
Soybean				
ATT	0.002	0.011	0.002	0.002
	(0.008)	(0.011)	(0.010)	(0.010)
	[0.754]	[0.336]	[0.834]	[0.798]
N obs.	56319	55898	49618	54679
N farmers	4742	4740	4731	4737
Mean DV	2.444	2.451	2.443	2.452
R^2	0.976	0.975	0.975	0.976
Pretrend p-value	0.817	0.240	0.261	0.313
Anticipation p-value	0.293	0.630	0.387	0.671
Wheat				
ATT	0.053	0.043	-0.038	-0.007
	(0.018)	(0.021)	(0.035)	(0.037)
	[0.003]	[0.045]	[0.288]	[0.861]
N obs.	8476	8534	7513	8343
N farmers	1206	1205	1201	1200
Mean DV	3.278	3.288	3.225	3.295
R^2	0.978	0.978	0.978	0.979
Pretrend p-value	0.030	0.001	0.876	0.117
Anticipation p-value	0.179	0.069	0.403	0.214

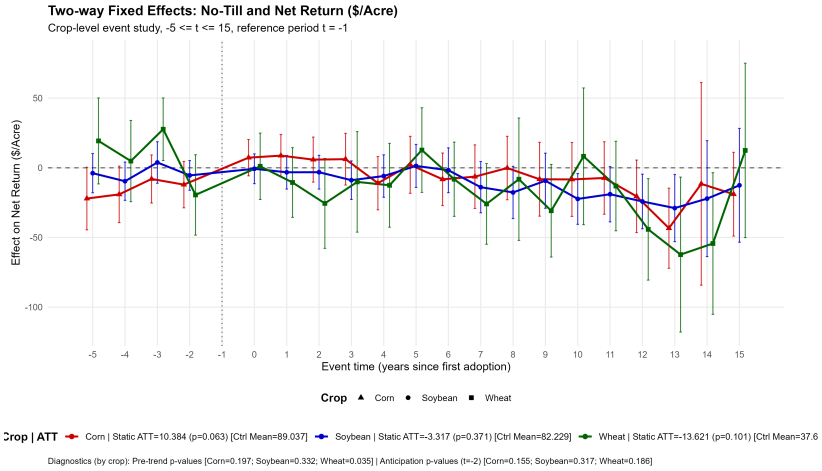
Results: Event Study Plots



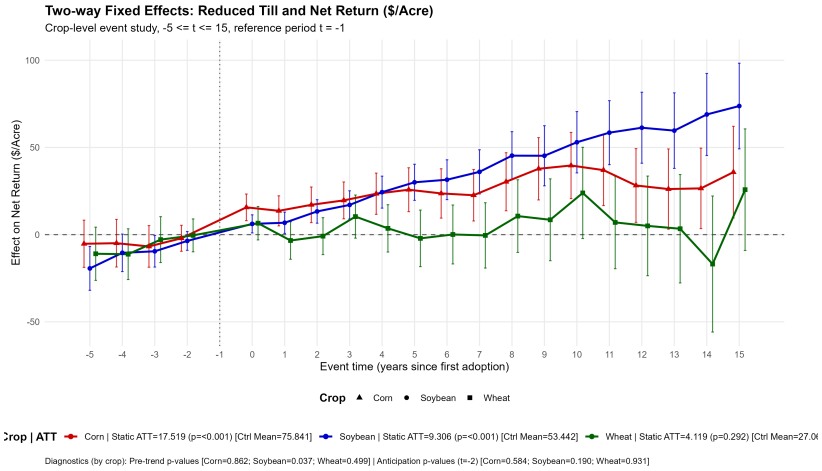
(a) Cover Crop



(b) Conservation Tillage

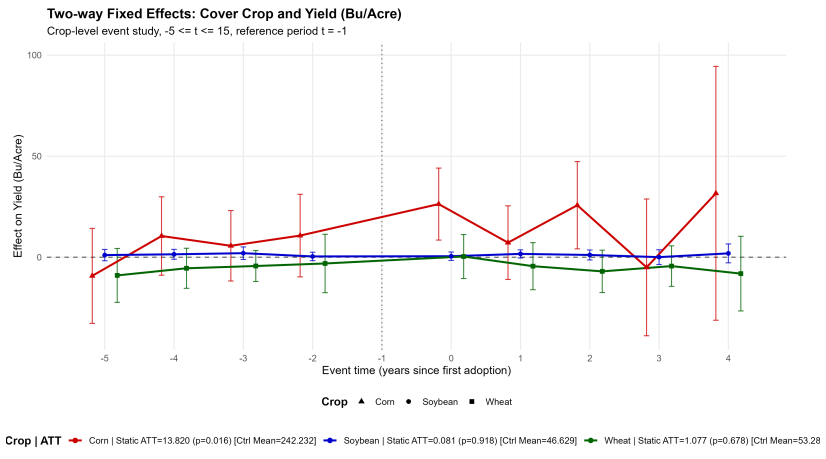


(c) No Till

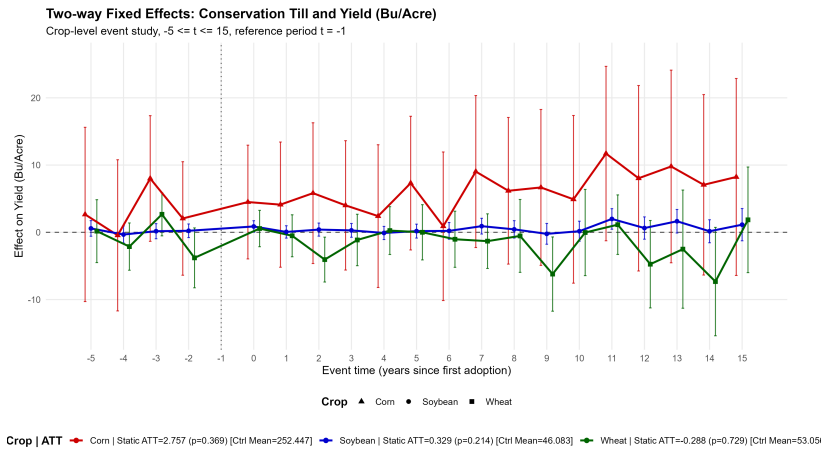


(d) Reduced Tillage

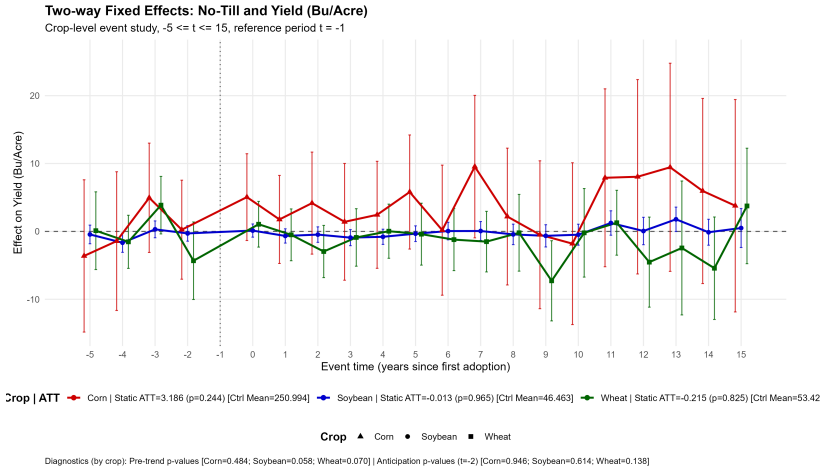
Figure A.16: Net-return event studies by regenerative practice.



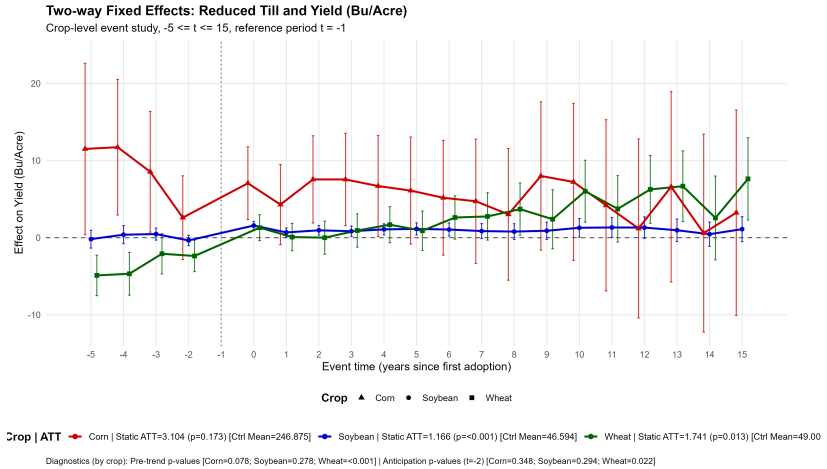
(a) Cover Crop



(b) Conservation Tillage

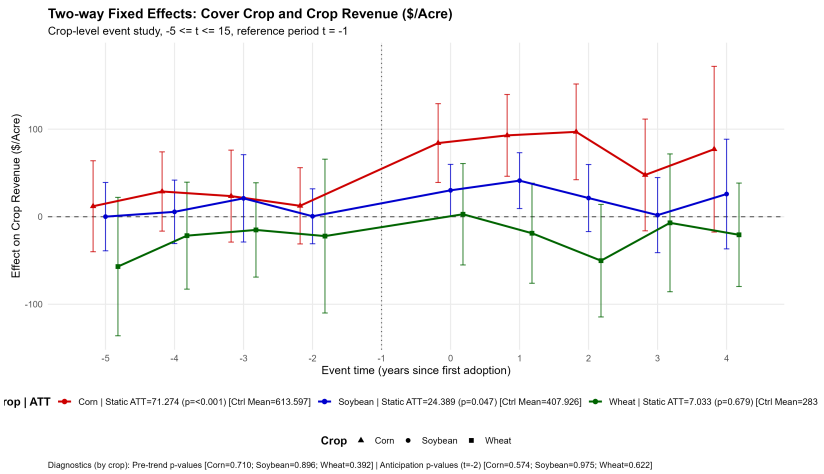


(c) No Till

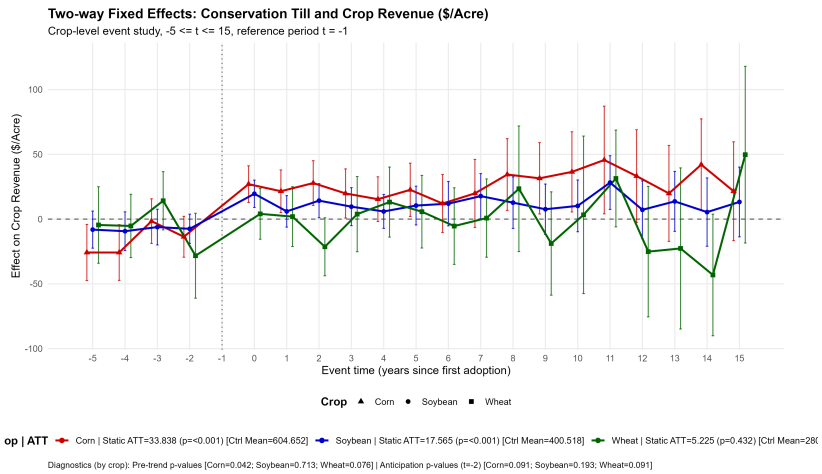


(d) Reduced Tillage

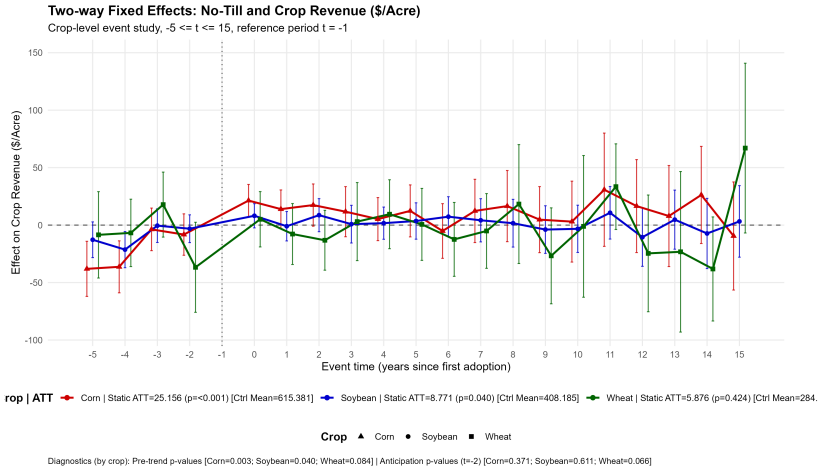
Figure A.17: Yield event studies by regenerative practice.



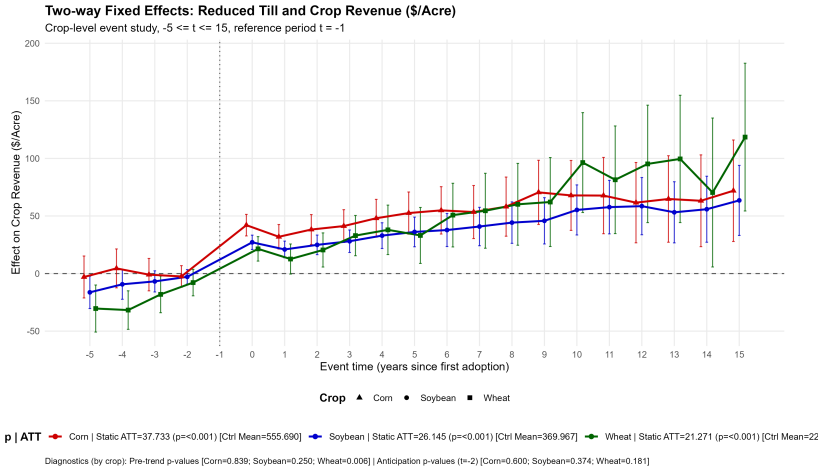
(a) Cover Crop



(b) Conservation Tillage

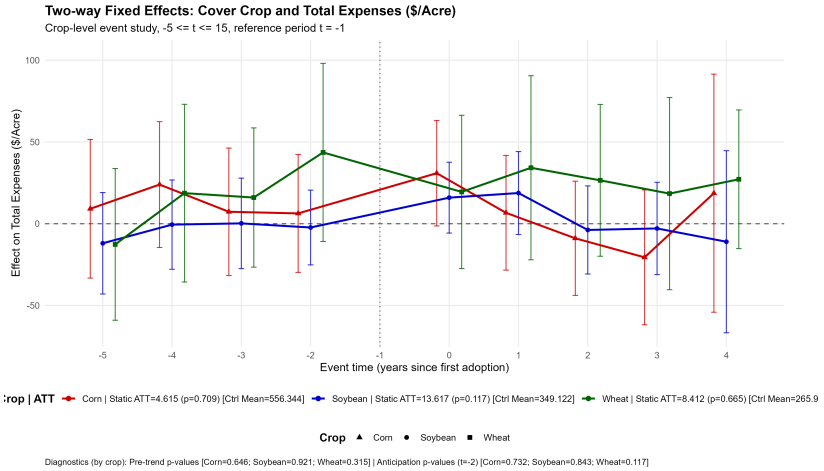


(c) No Till

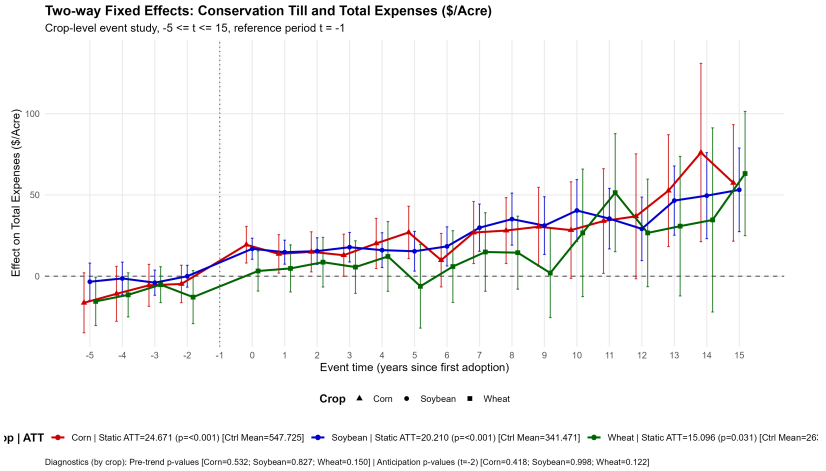


(d) Reduced Tillage

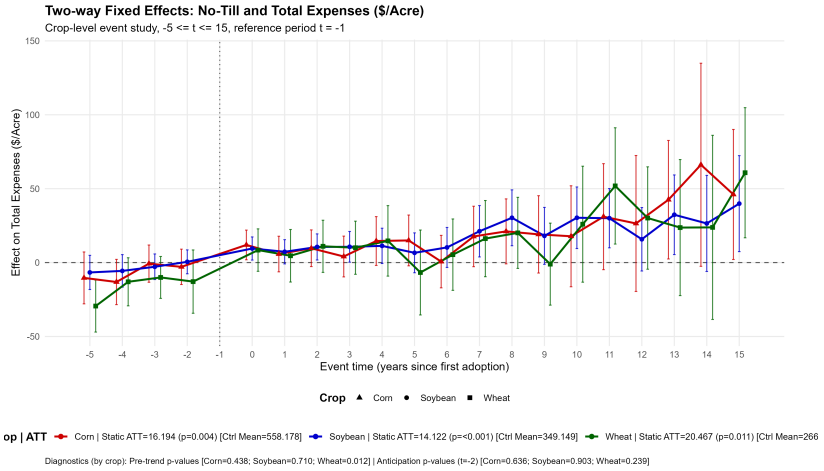
Figure A.18: Crop revenue event studies by regenerative practice.



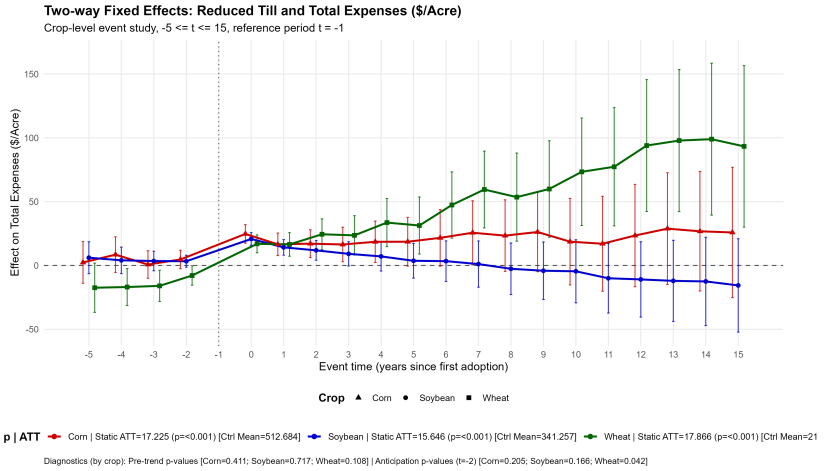
(a) Cover Crop



(b) Conservation Tillage

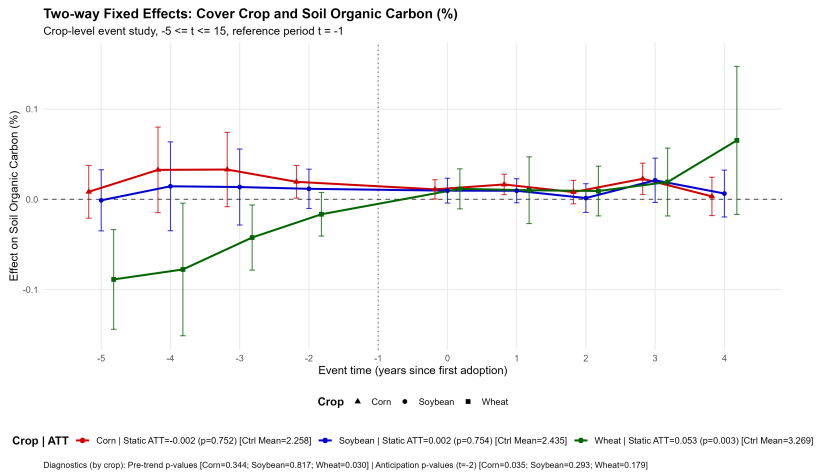


(c) No Till

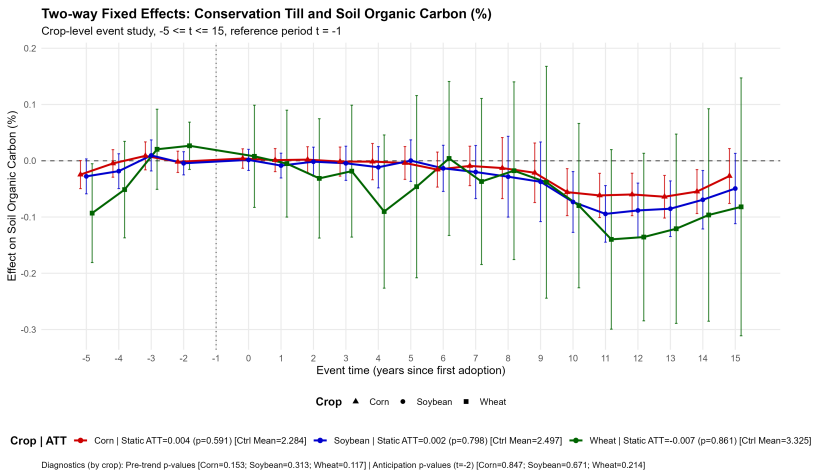


(d) Reduced Tillage

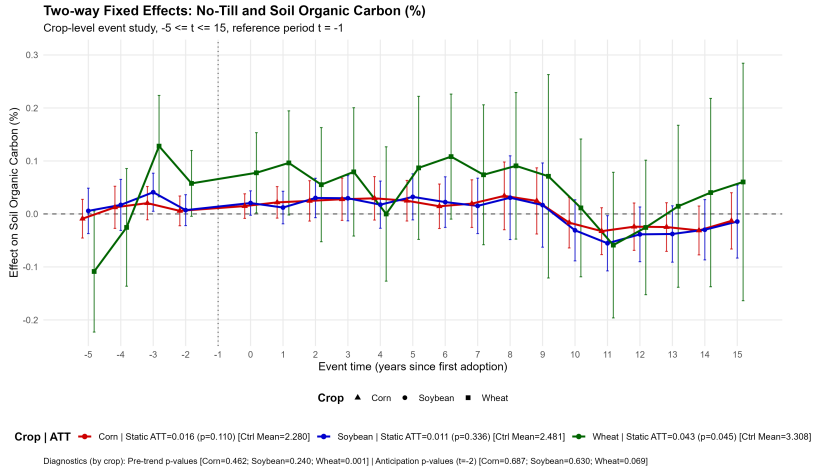
Figure A.19: Total expenses event studies by regenerative practice.



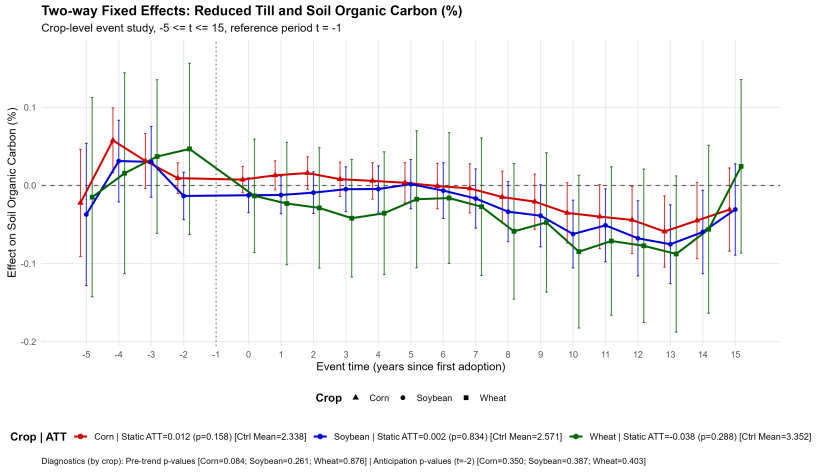
(a) Cover Crop



(b) Conservation Tillage



(c) No Till



(d) Reduced Tillage

Figure A.20: SOC event studies by regenerative practice.

F.2 Callaway & Sant'Anna

Table A.19: Callaway and Sant'Anna doubly robust DID summary for Net Return ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	79.396	-5.243	6.869	1.513
	(21.060)	(5.636)	(3.206)	(5.242)
	[¡0.001]	[0.352]	[0.032]	[0.773]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	88.576	88.867	89.087	88.661
Pretrend p-value	0.526	0.140	0.005	0.579
Anticipation p-value	0.788	0.094	0.260	0.570
Soybean				
ATT	23.594	-0.235	22.503	2.536
	(15.727)	(3.718)	(2.317)	(3.525)
	[0.134]	[0.950]	[¡0.001]	[0.472]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	83.280	83.639	82.001	83.522
Pretrend p-value	0.015	0.224	0.573	0.933
Anticipation p-value	0.995	0.325	0.948	0.584
Wheat				
ATT	31.458	0.780	-5.831	-1.838
	(32.188)	(5.861)	(5.530)	(5.579)
	[0.328]	[0.894]	[0.292]	[0.742]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	31.654	31.813	32.925	31.630
Pretrend p-value	0.960	0.024	0.682	0.506
Anticipation p-value	0.758	0.130	0.279	0.517

Results: Tables

Table A.20: Callaway and Sant'Anna doubly robust DID summary for Yield (Bu/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	9.924	3.554	-8.136	0.266
	(9.314)	(3.559)	(3.692)	(3.351)
	[0.287]	[0.318]	[0.028]	[0.937]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	227.464	228.523	228.125	228.747
Pretrend p-value	0.447	0.569	0.035	0.886
Anticipation p-value	0.815	0.412	0.152	0.525
Soybean				
ATT	0.560	1.126	1.364	1.553
	(1.254)	(0.457)	(0.358)	(0.406)
	[0.655]	[0.014]	[¡0.001]	[¡0.001]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	45.878	45.866	45.471	45.837
Pretrend p-value	0.065	0.683	0.055	0.711
Anticipation p-value	0.152	0.775	0.470	0.944
Wheat				
ATT	2.327	0.862	3.110	0.379
	(5.165)	(1.235)	(1.087)	(1.103)
	[0.652]	[0.485]	[0.004]	[0.731]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	51.950	52.025	51.528	51.987
Pretrend p-value	0.607	0.012	0.330	0.081
Anticipation p-value	0.701	0.496	0.094	0.659

Table A.21: Callaway and Sant'Anna doubly robust DID summary for Crop Revenue ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	105.622	13.974	73.715	29.339
	(27.755)	(7.805)	(5.678)	(7.476)
	[¡0.001]	[0.073]	[¡0.001]	[¡0.001]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	587.058	587.425	577.698	586.795
Pretrend p-value	0.699	0.052	0.429	0.041
Anticipation p-value	0.933	0.149	0.346	0.044
Soybean				
ATT	41.627	17.750	53.477	26.185
	(21.733)	(5.275)	(4.401)	(4.936)
	[0.055]	[¡0.001]	[¡0.001]	[¡0.001]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	395.343	395.691	387.569	395.290
Pretrend p-value	0.147	0.034	0.923	0.578
Anticipation p-value	0.518	0.149	0.527	0.233
Wheat				
ATT	-0.585	8.829	47.766	11.285
	(29.178)	(8.801)	(8.152)	(8.024)
	[0.984]	[0.316]	[¡0.001]	[0.160]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	276.893	278.028	272.795	277.825
Pretrend p-value	0.692	0.110	0.009	0.353
Anticipation p-value	0.344	0.205	0.138	0.502

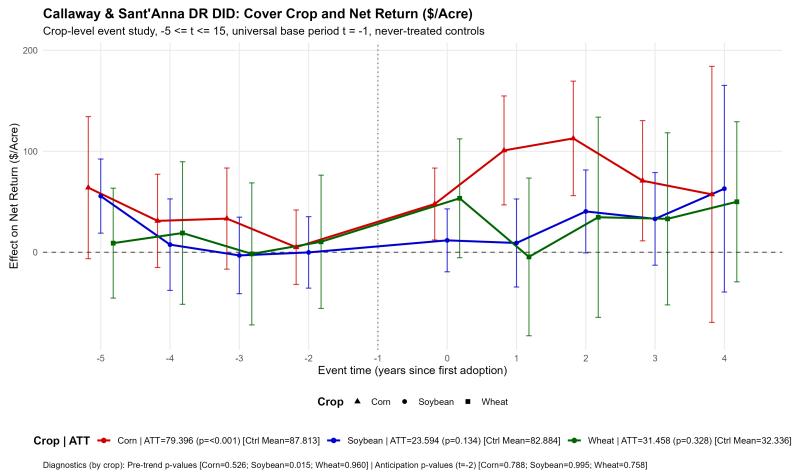
Table A.22: Callaway and Sant'Anna doubly robust DID summary for Total Expenses ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	21.832	19.516	67.372	29.523
	(19.794)	(6.662)	(5.142)	(6.173)
	[0.270]	[0.003]	[¡0.001]	[¡0.001]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	528.140	528.345	517.828	527.947
Pretrend p-value	0.092	0.555	0.433	0.350
Anticipation p-value	0.608	0.563	0.831	0.129
Soybean				
ATT	22.725	19.204	33.183	25.765
	(15.438)	(4.739)	(3.921)	(4.266)
	[0.141]	[¡0.001]	[¡0.001]	[¡0.001]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	334.285	334.358	327.168	334.105
Pretrend p-value	0.552	0.085	0.393	0.263
Anticipation p-value	0.328	0.423	0.765	0.236
Wheat				
ATT	-11.934	17.011	54.873	20.566
	(38.506)	(7.796)	(6.673)	(6.909)
	[0.757]	[0.029]	[¡0.001]	[0.003]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	267.995	268.845	261.385	268.886
Pretrend p-value	0.709	0.710	0.004	0.900
Anticipation p-value	0.492	0.408	0.327	0.361

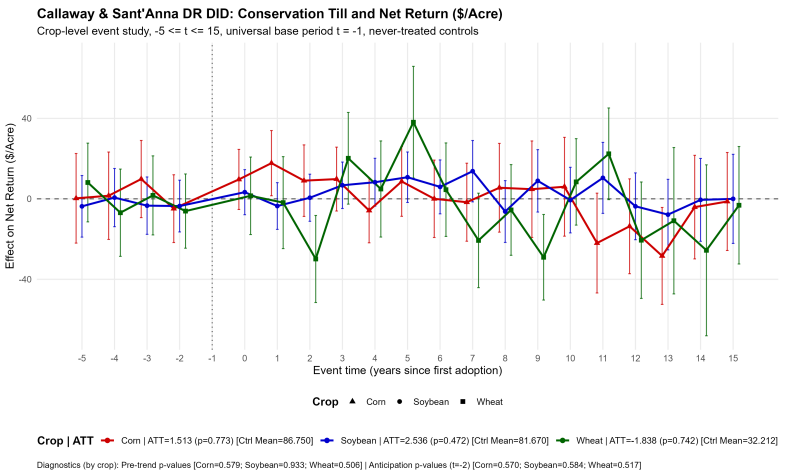
Table A.23: Callaway and Sant'Anna doubly robust DID summary for Soil Organic Carbon (%)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	-0.011	0.047	0.177	0.029
	(0.046)	(0.061)	(0.039)	(0.044)
	[0.817]	[0.441]	[¡0.001]	[0.507]
N obs.	28784	27021	15621	26213
N farmers	5357	5120	3642	5065
Mean DV	2.307	2.321	2.339	2.326
Pretrend p-value	0.056	0.719	0.692	0.833
Anticipation p-value	0.005	0.957	0.274	0.381
Soybean				
ATT	0.040	0.134	0.180	0.105
	(0.051)	(0.068)	(0.048)	(0.049)
	[0.433]	[0.048]	[¡0.001]	[0.031]
N obs.	25333	23585	12834	22819
N farmers	4742	4511	3139	4455
Mean DV	2.440	2.462	2.483	2.471
Pretrend p-value	0.008	0.629	0.095	0.352
Anticipation p-value	¡0.001	0.838	0.554	0.116
Wheat				
ATT	0.060	0.039	-0.246	0.134
	(0.142)	(0.113)	(0.139)	(0.118)
	[0.673]	[0.731]	[0.076]	[0.256]
N obs.	4978	4761	2441	4674
N farmers	1206	1149	730	1137
Mean DV	3.192	3.219	3.152	3.230
Pretrend p-value	0.519	¡0.001	¡0.001	0.027
Anticipation p-value	0.708	0.112	0.616	0.154

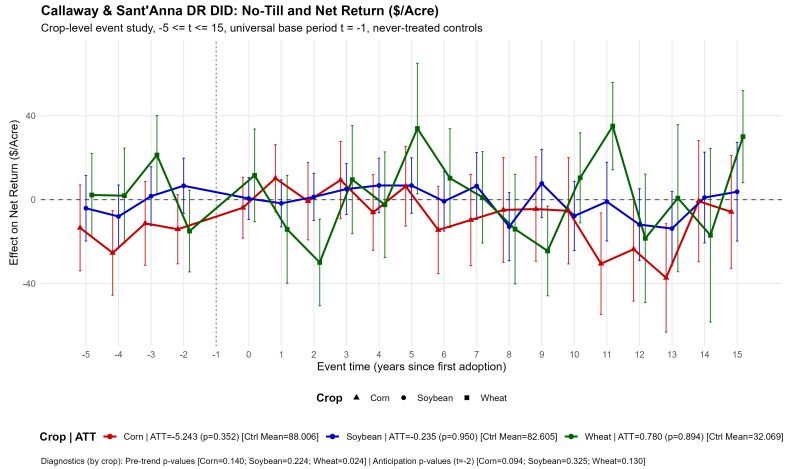
Results: Event Study Plots



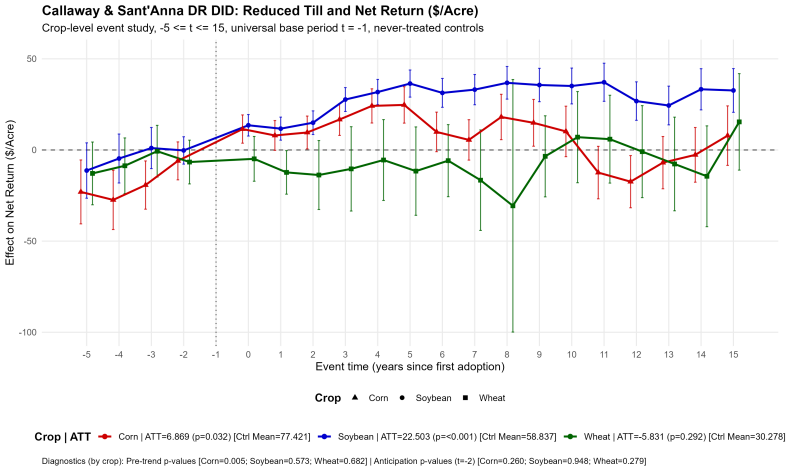
(a) Cover Crop



(b) Conservation Tillage

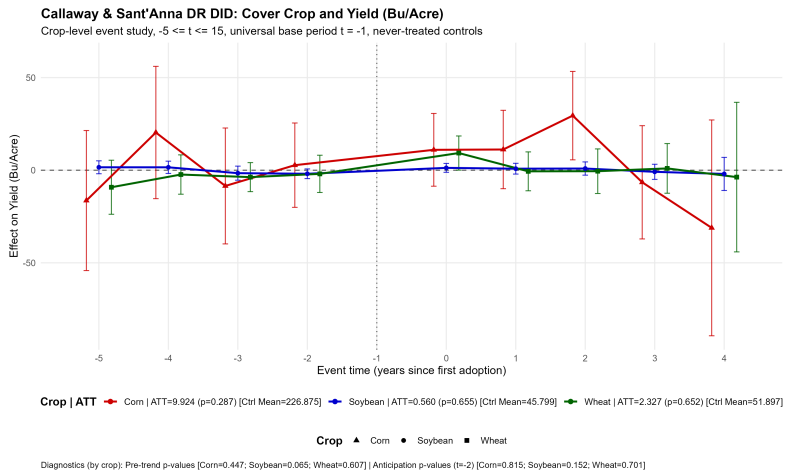


(c) No Till

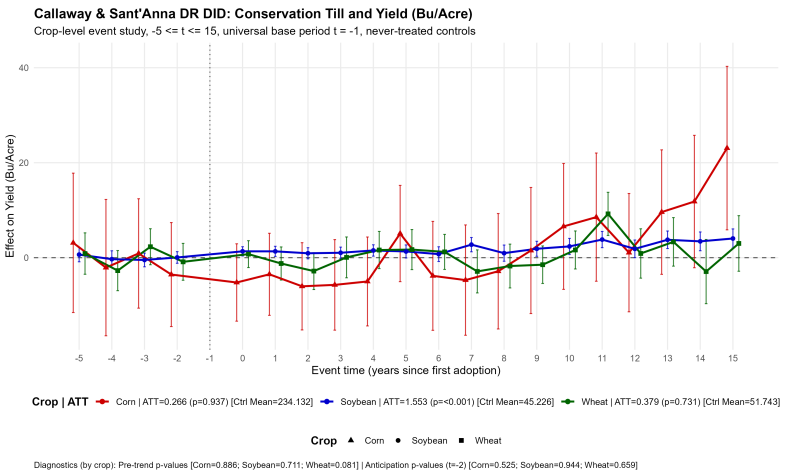


(d) Reduced Tillage

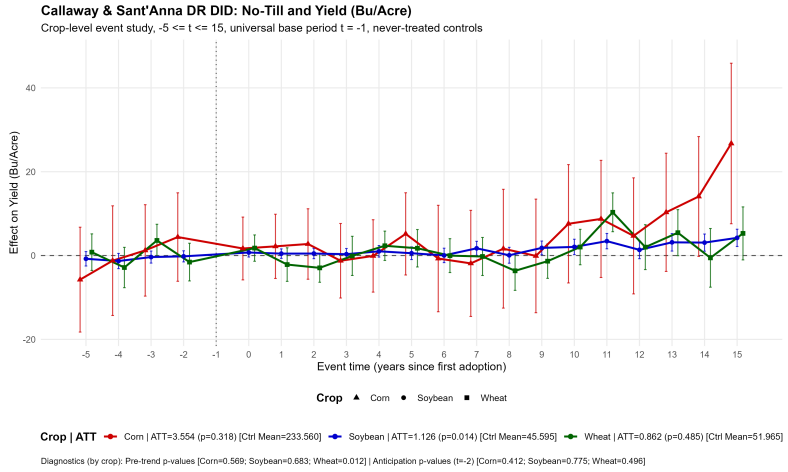
Figure A.21: Net-return event studies by regenerative practice.



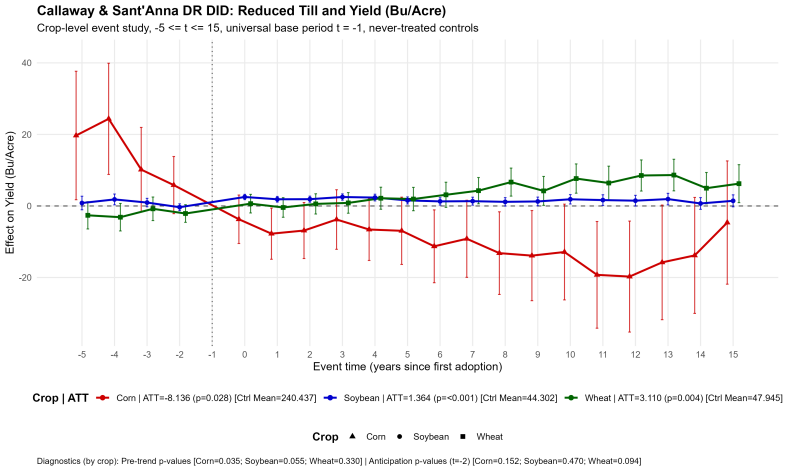
(a) Cover Crop



(b) Conservation Tillage

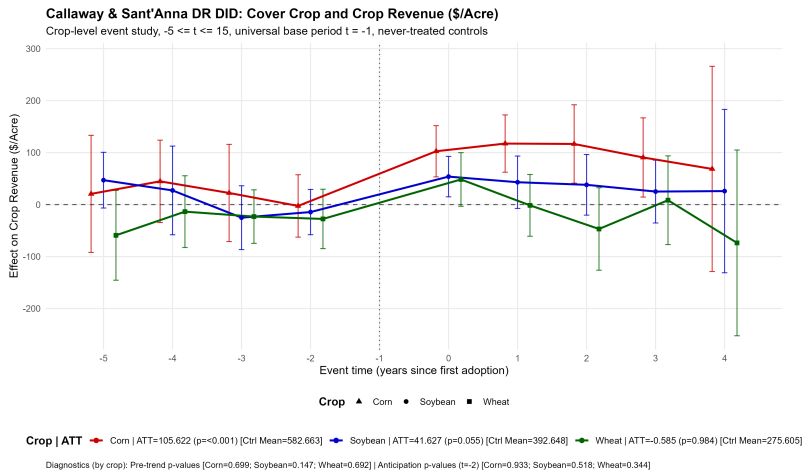


(c) No Till

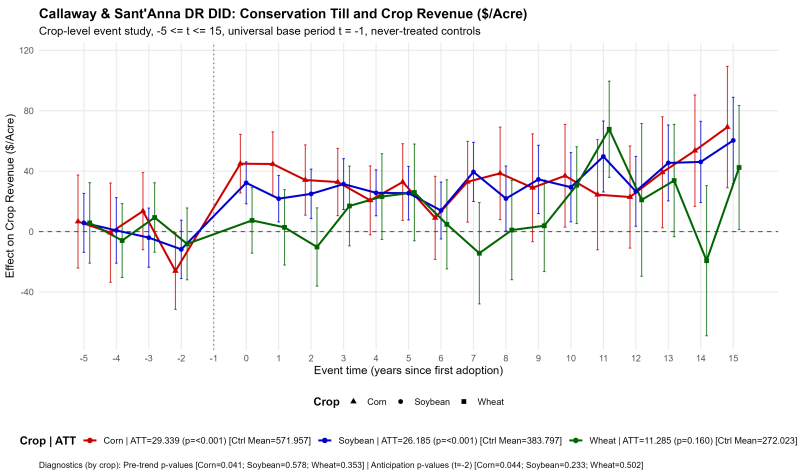


(d) Reduced Tillage

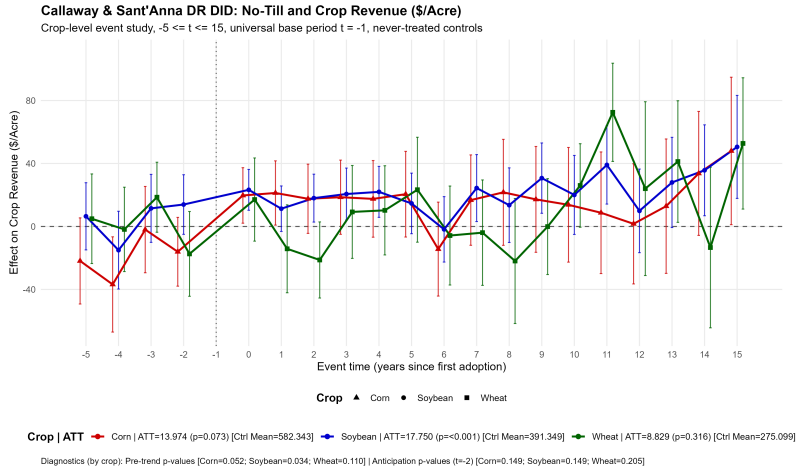
Figure A.22: Yield event studies by regenerative practice.



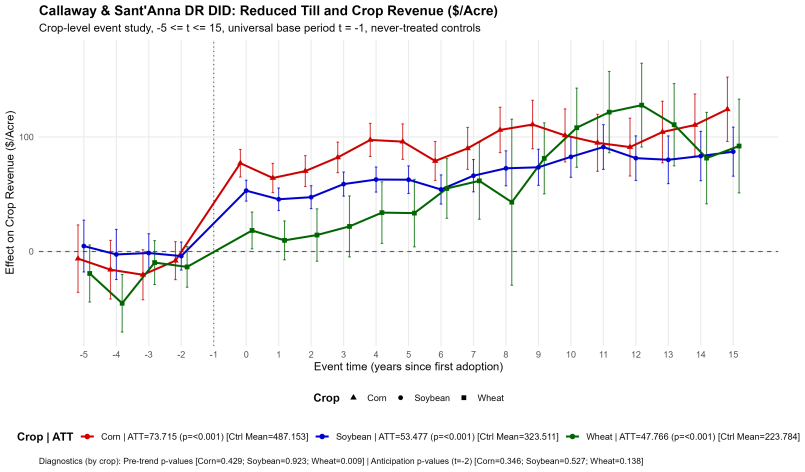
(a) Cover Crop



(b) Conservation Tillage

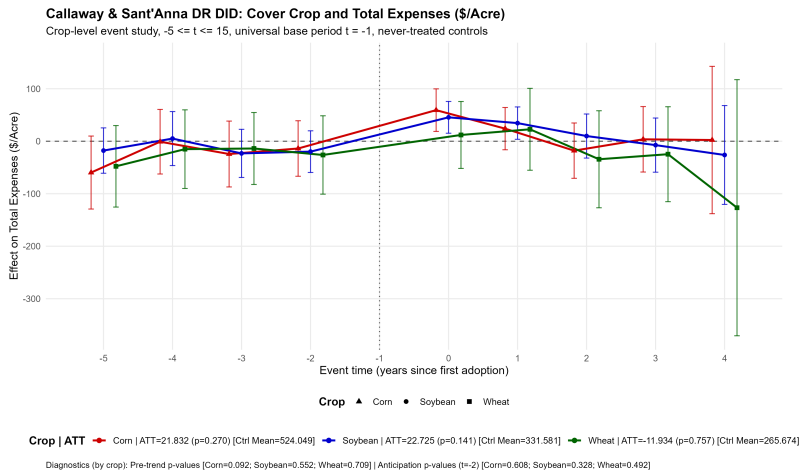


(c) No Till

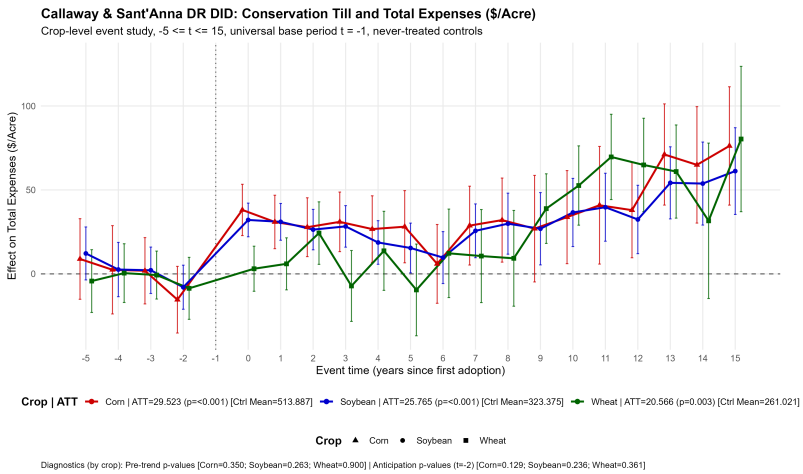


(d) Reduced Tillage

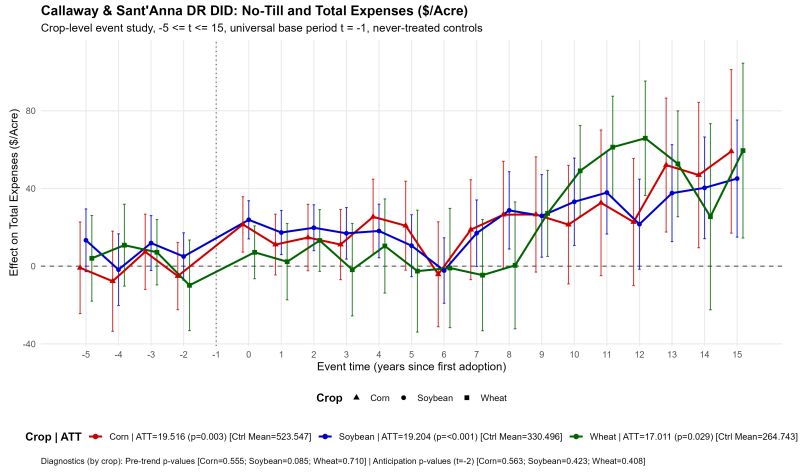
Figure A.23: Crop revenue event studies by regenerative practice.



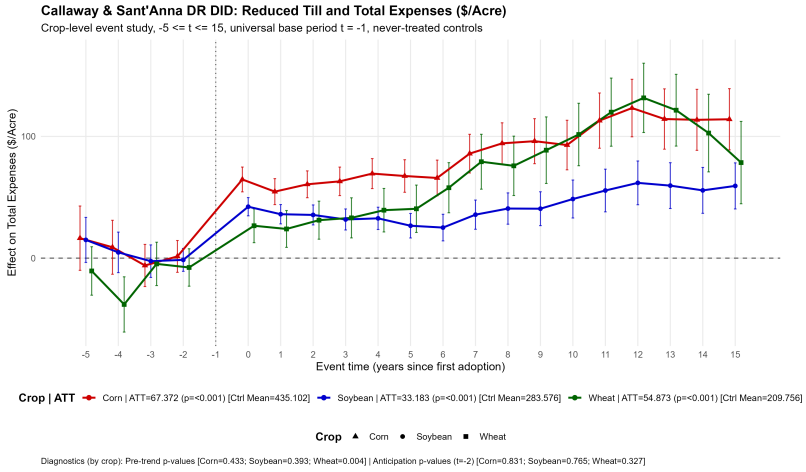
(a) Cover Crop



(b) Conservation Tillage

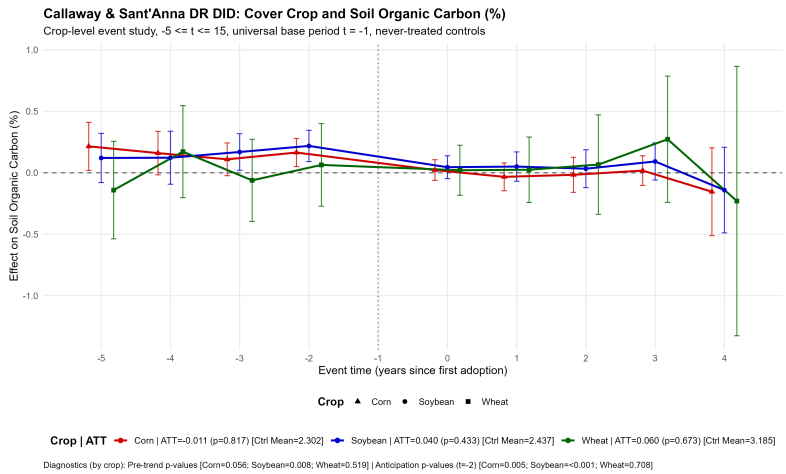


(c) No Till

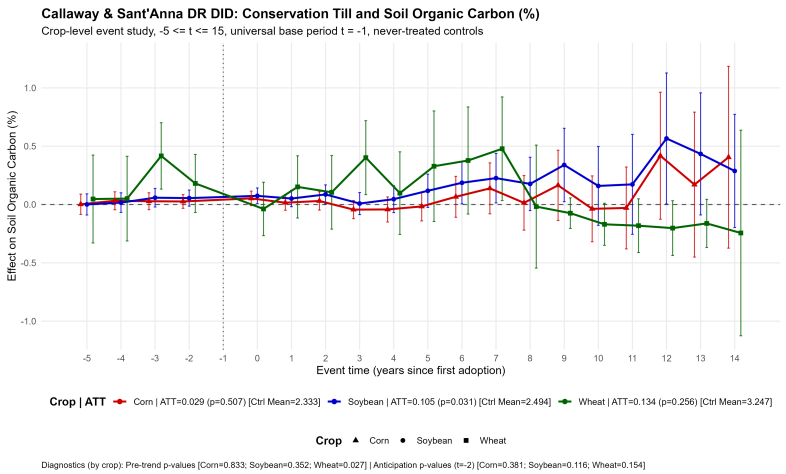


(d) Reduced Tillage

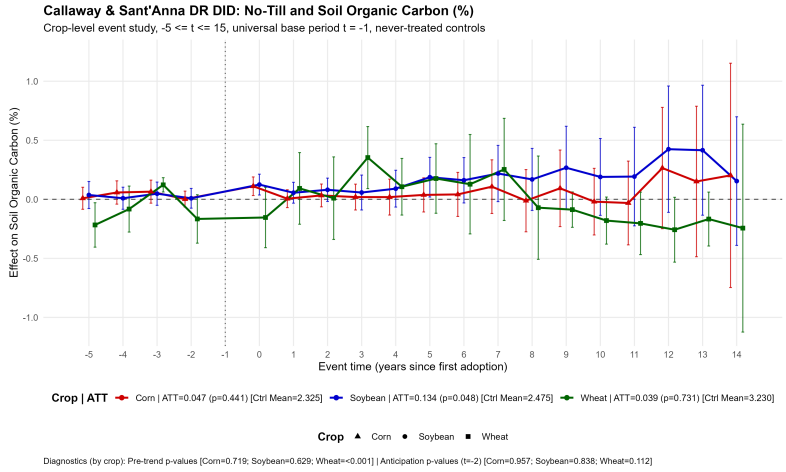
Figure A.24: Total expenses event studies by regenerative practice.



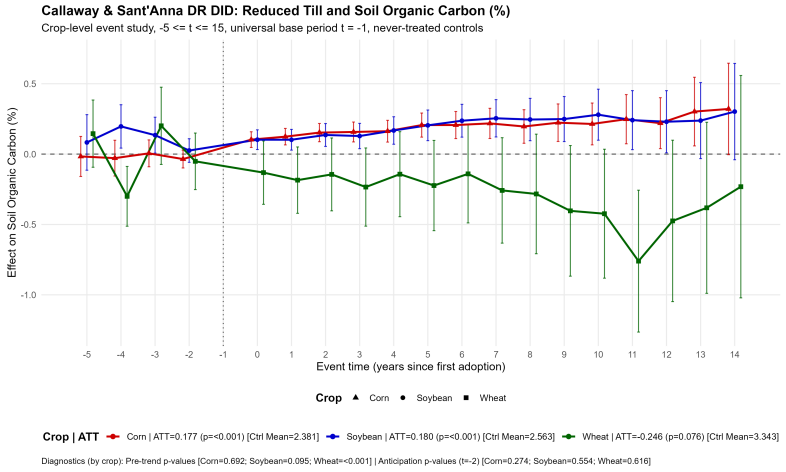
(a) Cover Crop



(b) Conservation Tillage



(c) No Till



(d) Reduced Tillage

Figure A.25: SOC event studies by regenerative practice.

F.3 Sun & Abraham

Specification Let G_i denote the first treatment period for unit i, and define event time $k = t - G_i$.

The interaction-weighted event-study specification can be written as

$$Y_{it} = \alpha_i + \lambda_t + \sum_g \sum_{\substack{k=-5 \\ k\neq -1}}^{15} \beta_{g,k} \mathbf{1}\{G_i = g\}\mathbf{1}\{t - G_i = k\} + \varepsilon_{it}.$$

Here, $\beta_{g,k}$ is the treatment effect for cohort g at event time k, relative to $k = -1$.

Sun and Abraham's key contribution is to avoid the problematic comparisons between different treatment cohorts that can arise in the conventional TWFE event study. The cohort-specific coefficients are then aggregated across cohorts.

The event-time effect is

$$\boxed{ATT^{SA}(k) = \sum_g w_{g,k}\beta_{g,k}, \qquad \sum_g w_{g,k} = 1.}$$

Thus, for my event window,

$$ATT^{SA}(k) = \sum_{g:G_g+k\leq T} w_{g,k}\beta_{g,k}, \quad k = 0, \ldots, 15.$$

The overall ATT over event times $0, \ldots, 15$, is equivilent to

$$\boxed{ATT^{SA}_{0:15} = \sum_{k=0}^{15} q_k ATT^{SA}(k) = \sum_{k=0}^{15} q_k \sum_g w_{g,k}\beta_{g,k},}$$

where

$$\sum_{k=0}^{15} q_k = 1.$$

With equal weighting across event times, $q_k = 1/16$.

Results: Tables

Table A.24: Sun & Abraham DID summary for Net Return ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	82.547	-3.420	19.119	3.056
	(20.310)	(5.696)	(5.209)	(5.547)
	[¡0.001]	[0.548]	[¡0.001]	[0.582]
N obs.	140744	138890	131424	136401
N farmers	8966	8966	8963	8965
Mean DV	90.289	90.531	89.593	90.216
R^2	0.389	0.391	0.385	0.391
Pretrend p-value	0.358	0.484	0.595	0.333
Anticipation p-value	0.826	0.001	0.073	0.004
Soybean				
ATT	30.638	-10.362	24.833	-8.722
	(12.484)	(4.438)	(4.340)	(4.429)
	[0.014]	[0.020]	[¡0.001]	[0.049]
N obs.	107987	106233	100460	104115
N farmers	7958	7959	7950	7956
Mean DV	82.672	83.124	80.633	82.931
R^2	0.450	0.459	0.457	0.461
Pretrend p-value	¡0.001	0.078	0.419	0.293
Anticipation p-value	0.874	0.077	0.292	0.698
Wheat				
ATT	-17.880	-11.149	2.611	-11.604
	(28.980)	(16297.763)	(2217.363)	(22717.713)
	[0.537]	[0.999]	[0.999]	[1.000]
N obs.	17922	17866	16560	17334
N farmers	2195	2188	2182	2181
Mean DV	36.698	36.848	37.138	35.785
R^2	0.831	0.837	0.854	0.840
Pretrend p-value	0.277	¡0.001	0.221	¡0.001
Anticipation p-value	0.109	¡0.001	0.004	0.001

Table A.25: Sun & Abraham DID summary for Yield (Bu/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	20.151	3.677	5.489	5.703
	(7.082)	(3.474)	(3.311)	(3.528)
	[0.004]	[0.290]	[0.097]	[0.106]
N obs.	140685	138831	131370	136350
N farmers	8966	8966	8963	8965
Mean DV	243.279	243.998	242.722	244.082
R^2	0.354	0.353	0.357	0.356
Pretrend p-value	0.403	0.746	0.731	0.274
Anticipation p-value	0.158	0.435	0.935	0.852
Soybean				
ATT	0.666	-0.242	1.140	0.173
	(0.785)	(0.417)	(0.334)	(0.363)
	[0.397]	[0.563]	[¡0.001]	[0.633]
N obs.	107920	106166	100395	104058
N farmers	7958	7959	7950	7956
Mean DV	46.758	46.748	46.346	46.718
R^2	0.579	0.588	0.587	0.587
Pretrend p-value	¡0.001	0.324	0.924	0.632
Anticipation p-value	0.622	0.272	0.431	0.118
Wheat				
ATT	-1.094	0.461	2.479	-0.421
	(4.891)	(2862.515)	(351.801)	(4040.458)
	[0.823]	[1.000]	[0.994]	[1.000]
N obs.	17922	17866	16560	17334
N farmers	2195	2188	2182	2181
Mean DV	53.361	53.436	52.795	53.336
R^2	0.604	0.614	0.628	0.618
Pretrend p-value	0.087	¡0.001	0.034	¡0.001
Anticipation p-value	0.012	¡0.001	0.126	0.010

Table A.26: Sun & Abraham DID summary for Crop Revenue ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	84.168	13.132	49.357	24.444
	(20.773)	(7.520)	(7.985)	(7.028)
	[¡0.001]	[0.081]	[¡0.001]	[¡0.001]
N obs.	140744	138890	131424	136401
N farmers	8966	8966	8963	8965
Mean DV	619.929	619.649	605.915	618.314
R^2	0.630	0.630	0.621	0.630
Pretrend p-value	0.721	0.052	0.006	0.033
Anticipation p-value	0.634	0.103	0.293	0.118
Soybean				
ATT	29.693	3.850	35.931	11.056
	(12.640)	(5.424)	(5.601)	(5.029)
	[0.019]	[0.478]	[¡0.001]	[0.028]
N obs.	107987	106233	100460	104115
N farmers	7958	7959	7950	7956
Mean DV	412.007	412.154	401.657	411.368
R^2	0.711	0.716	0.709	0.717
Pretrend p-value	¡0.001	0.135	0.264	0.154
Anticipation p-value	0.359	0.114	0.373	0.523
Wheat				
ATT	-24.217	10.010	48.226	3.613
	(25.546)	(20730.017)	(2210.502)	(28818.762)
	[0.343]	[1.000]	[0.983]	[1.000]
N obs.	17922	17866	16560	17334
N farmers	2195	2188	2182	2181
Mean DV	285.286	285.870	279.621	285.410
R^2	0.855	0.859	0.871	0.860
Pretrend p-value	0.170	¡0.001	0.118	¡0.001
Anticipation p-value	0.339	¡0.001	0.957	0.470

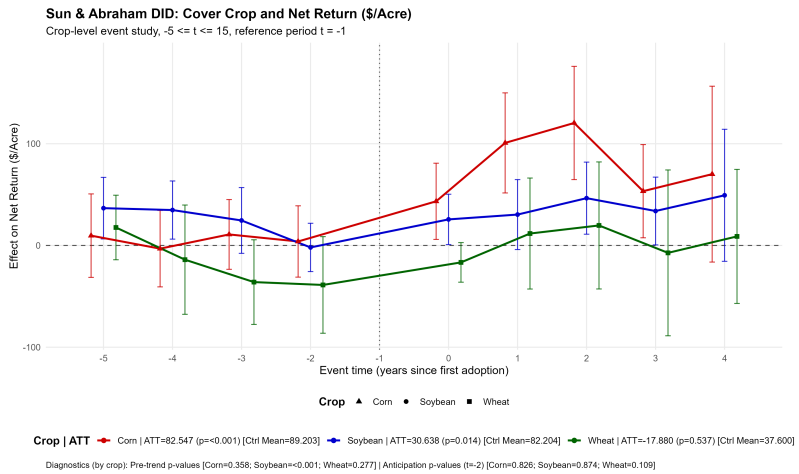
Table A.27: Sun & Abraham DID summary for Total Expenses ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	-0.740	17.488	25.830	23.373
	(13.105)	(6.255)	(7.804)	(5.724)
	[0.955]	[0.005]	[¡0.001]	[¡0.001]
N obs.	140744	138890	131424	136401
N farmers	8966	8966	8963	8965
Mean DV	562.255	561.669	548.106	560.580
R^2	0.775	0.776	0.777	0.778
Pretrend p-value	0.070	0.022	0.190	0.008
Anticipation p-value	0.804	0.487	0.213	0.859
Soybean				
ATT	9.245	17.451	9.774	22.300
	(9.916)	(4.717)	(6.038)	(4.236)
	[0.351]	[¡0.001]	[0.106]	[¡0.001]
N obs.	107987	106233	100460	104115
N farmers	7958	7959	7950	7956
Mean DV	353.320	352.954	343.966	352.334
R^2	0.740	0.743	0.743	0.745
Pretrend p-value	0.276	0.189	0.161	0.069
Anticipation p-value	0.674	0.231	0.370	0.851
Wheat				
ATT	28.902	20.718	46.487	13.517
	(28.273)	(19425.555)	(1705.045)	(20865.212)
	[0.307]	[0.999]	[0.978]	[0.999]
N obs.	17922	17866	16560	17334
N farmers	2195	2188	2182	2181
Mean DV	268.793	269.115	261.873	269.976
R^2	0.807	0.812	0.811	0.812
Pretrend p-value	0.963	¡0.001	0.018	¡0.001
Anticipation p-value	0.067	¡0.001	0.593	0.124

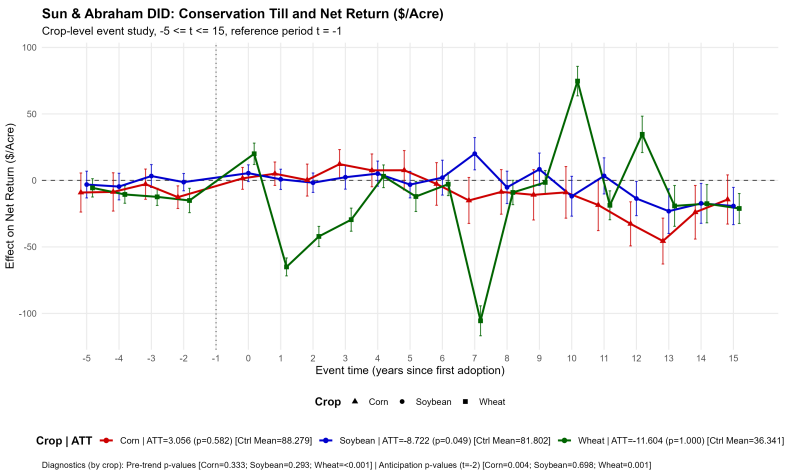
Table A.28: Sun & Abraham DID summary for Soil Organic Carbon (%)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	0.011	0.030	0.011	0.001
	(0.005)	(0.015)	(0.012)	(0.009)
	[0.019]	[0.056]	[0.340]	[0.918]
N obs.	75457	75020	67323	73608
N farmers	5357	5353	5346	5352
Mean DV	2.269	2.273	2.265	2.273
R^2	0.975	0.975	0.975	0.975
Pretrend p-value	0.017	¡0.001	0.009	0.064
Anticipation p-value	0.147	0.405	0.224	¡0.001
Soybean				
ATT	0.007	0.031	-0.014	-0.001
	(0.006)	(0.015)	(0.014)	(0.011)
	[0.261]	[0.038]	[0.324]	[0.896]
N obs.	56319	55897	49617	54678
N farmers	4742	4740	4731	4737
Mean DV	2.444	2.451	2.443	2.452
R^2	0.976	0.976	0.975	0.976
Pretrend p-value	0.021	¡0.001	¡0.001	0.015
Anticipation p-value	0.499	0.594	0.661	0.248
Wheat				
ATT	0.019	0.102	-0.073	-0.002
	(0.013)	(281.518)	(0.038)	(98.227)
	[0.149]	[1.000]	[0.054]	[1.000]
N obs.	8476	8531	7512	8341
N farmers	1206	1204	1201	1200
Mean DV	3.278	3.288	3.225	3.295
R^2	0.978	0.979	0.980	0.980
Pretrend p-value	¡0.001	¡0.001	¡0.001	¡0.001
Anticipation p-value	¡0.001	¡0.001	0.301	¡0.001

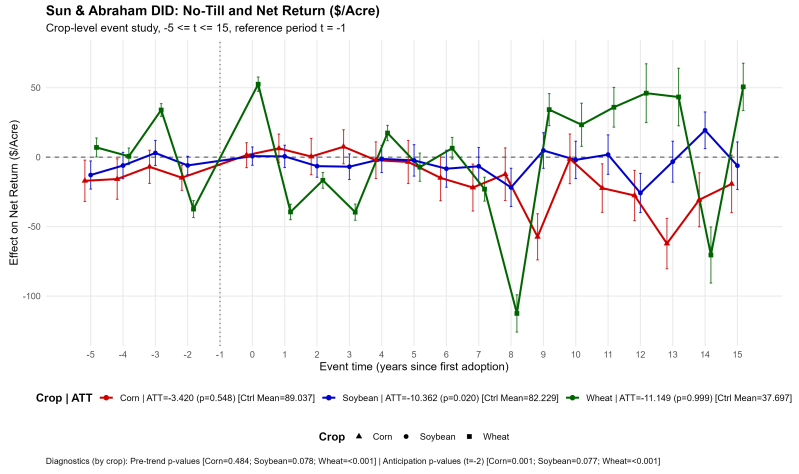
Results: Event Study Plots



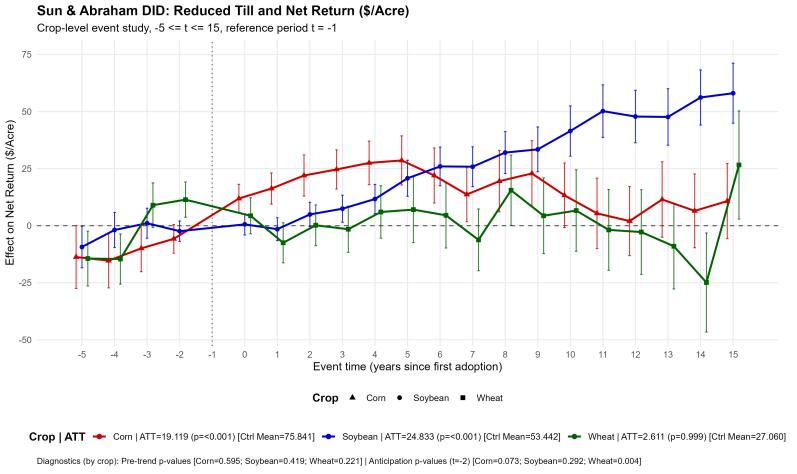
(a) Cover Crop



(b) Conservation Tillage

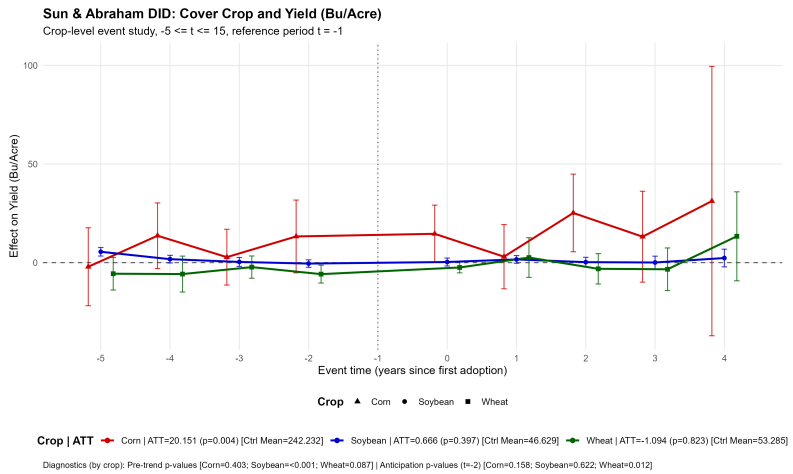


(c) No Till

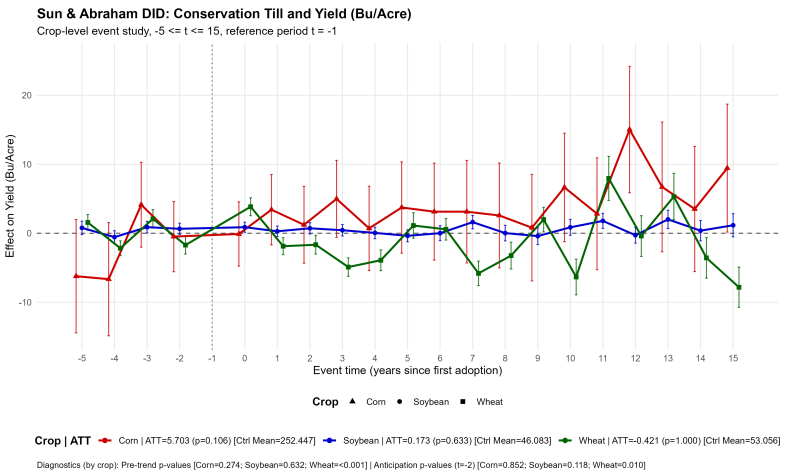


(d) Reduced Tillage

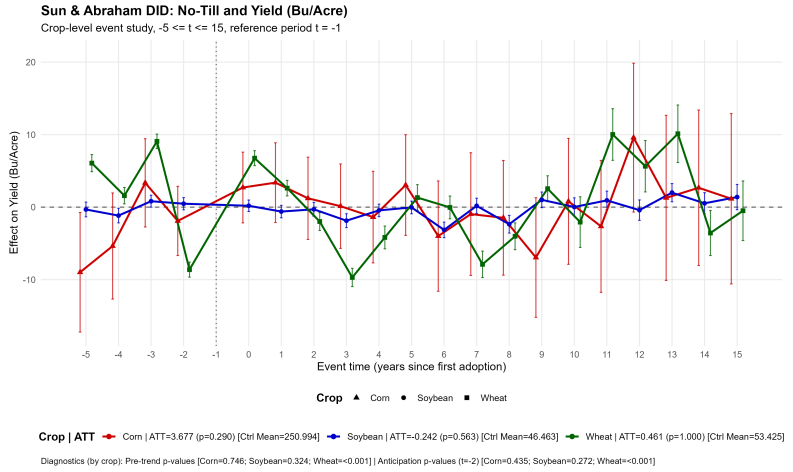
Figure A.26: Net-return event studies by regenerative practice.



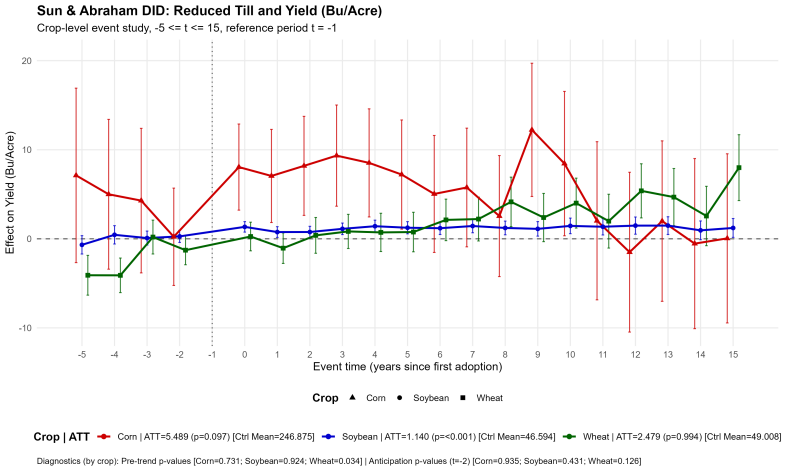
(a) Cover Crop



(b) Conservation Tillage

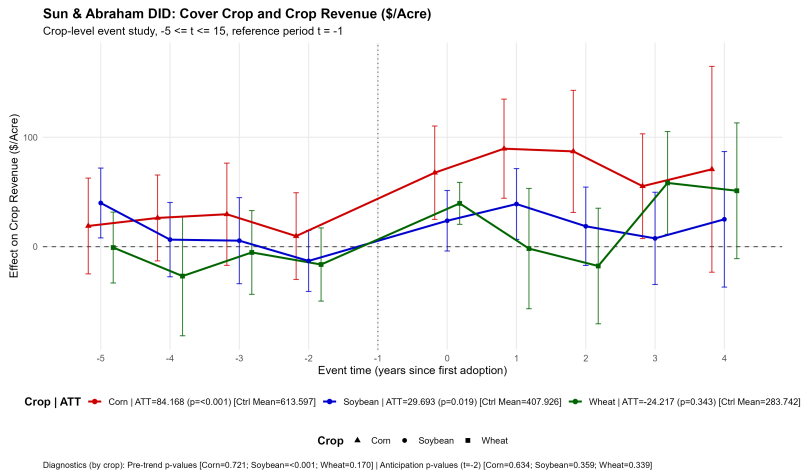


(c) No Till

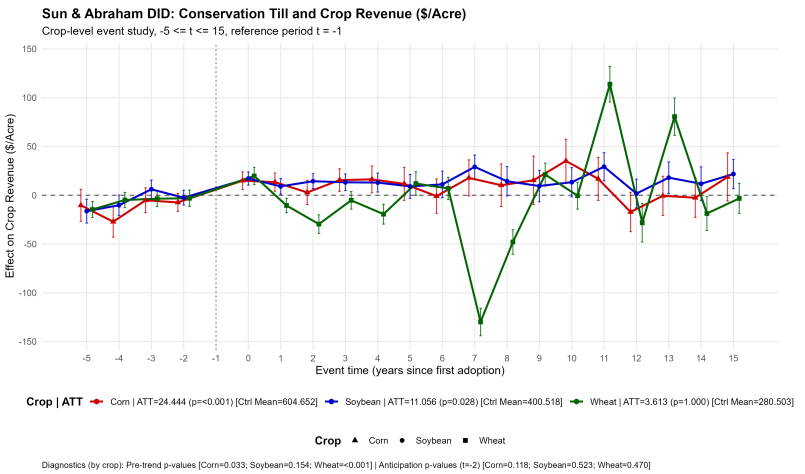


(d) Reduced Tillage

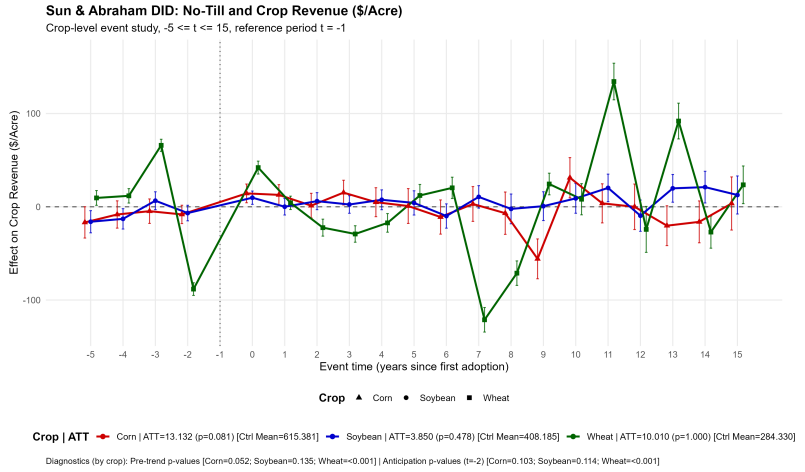
Figure A.27: Yield event studies by regenerative practice.



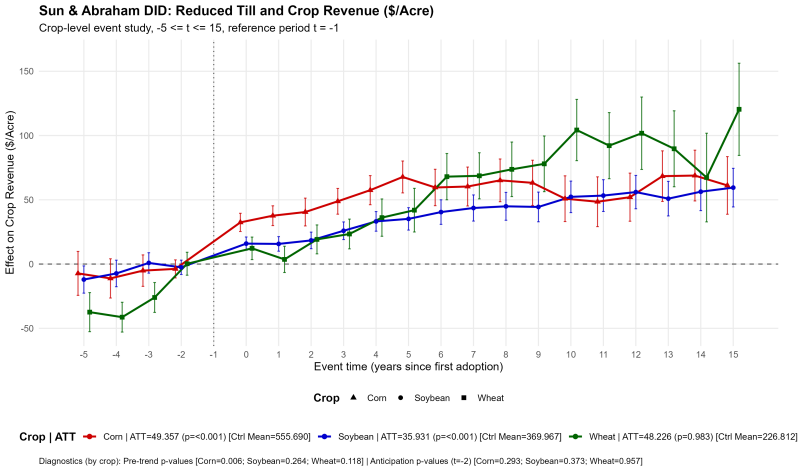
(a) Cover Crop



(b) Conservation Tillage

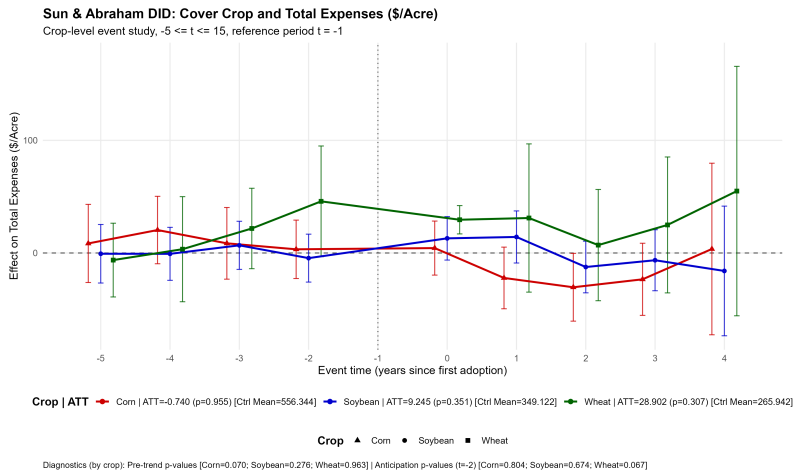


(c) No Till

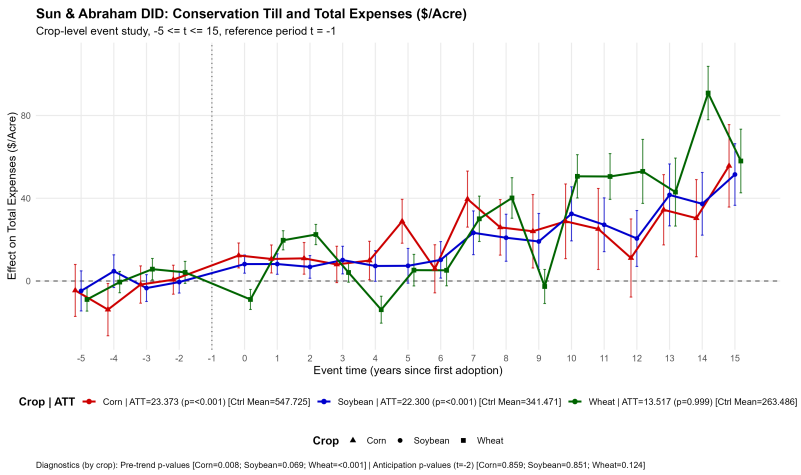


(d) Reduced Tillage

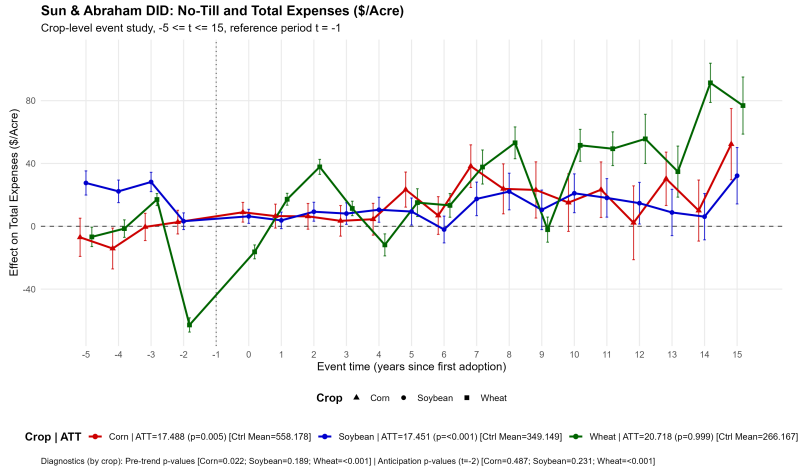
Figure A.28: Crop revenue event studies by regenerative practice.



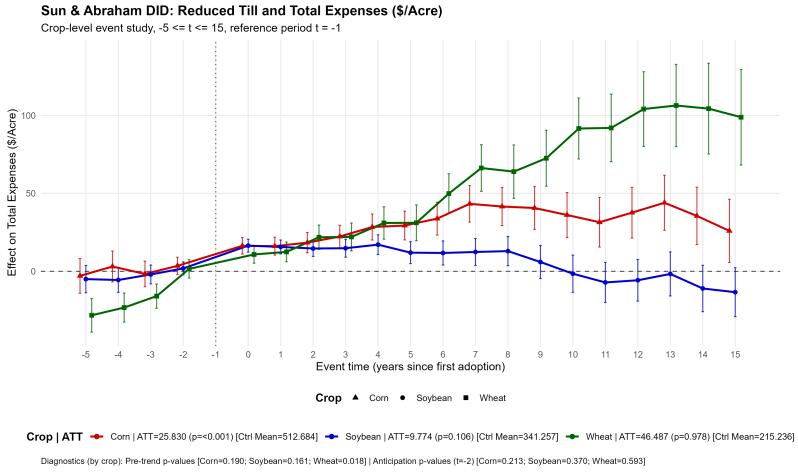
(a) Cover Crop



(b) Conservation Tillage

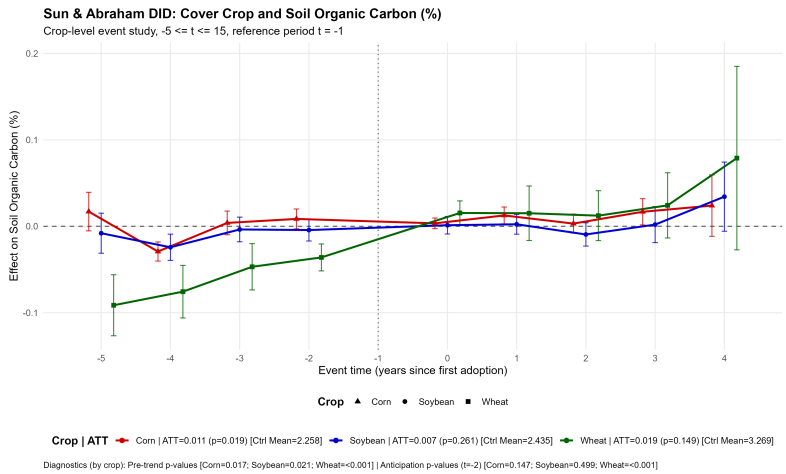


(c) No Till

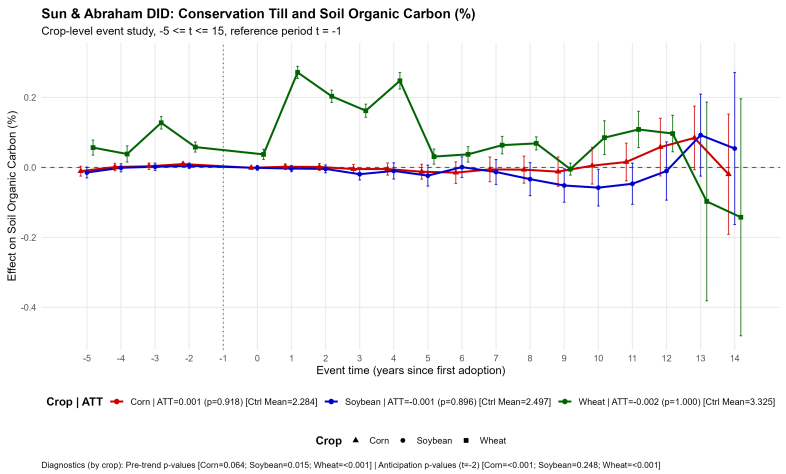


(d) Reduced Tillage

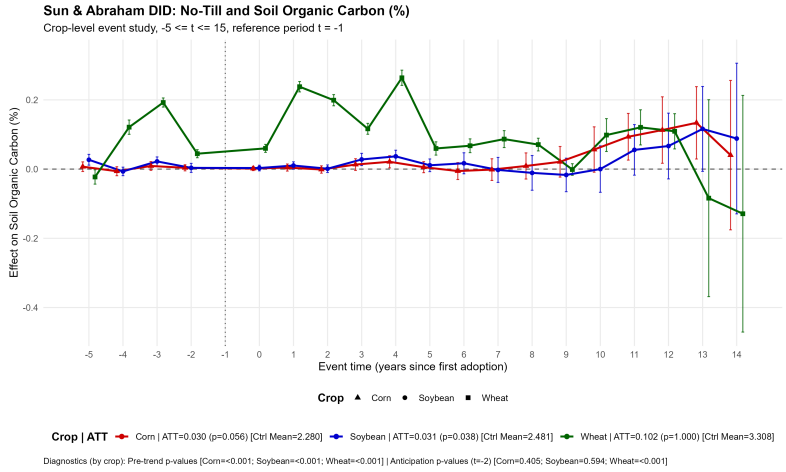
Figure A.29: Total expenses event studies by regenerative practice.



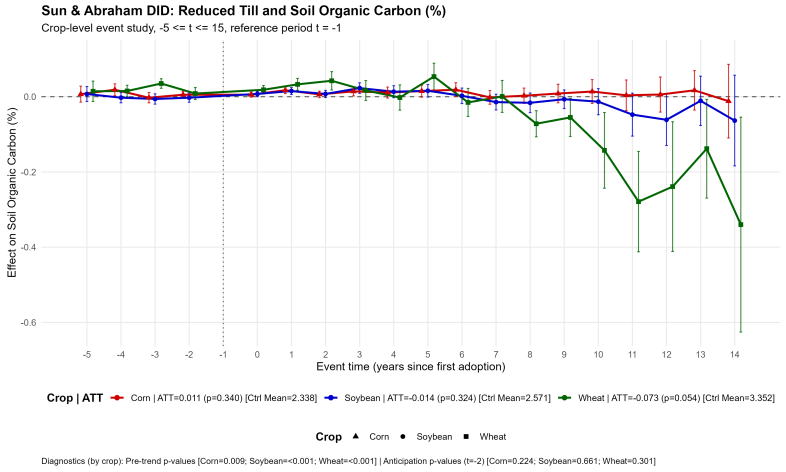
(a) Cover Crop



(b) Conservation Tillage



(c) No Till



(d) Reduced Tillage

Figure A.30: SOC event studies by regenerative practice.

G Secondary Outcomes

In this section, I report the results for secondary outcomes in my analysis. Specifically, I report on crop insurance coverage (θ), insurance payouts, direct expenses, and overhead expenses.

G.1 Callaway & Sant'Anna

Table A.29: Callaway and Sant'Anna doubly robust DID summary for Insurance Coverage (θ)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	0.045	-0.009	0.033	-0.003
	(0.021)	(0.009)	(0.008)	(0.008)
	[0.036]	[0.313]	[¡0.001]	[0.731]
N obs.	46723	46032	42510	45140
N farmers	7632	7609	7459	7585
Mean DV	0.644	0.642	0.641	0.641
Pretrend p-value	0.480	0.165	0.114	0.080
Anticipation p-value	0.856	0.026	0.059	0.004
Soybean				
ATT	0.011	0.003	0.030	0.007
	(0.025)	(0.009)	(0.009)	(0.008)
	[0.641]	[0.764]	[¡0.001]	[0.351]
N obs.	41370	40604	37353	39738
N farmers	6655	6630	6489	6607
Mean DV	0.754	0.754	0.756	0.753
Pretrend p-value	0.574	0.676	0.791	0.255
Anticipation p-value	0.892	0.324	0.315	0.041
Wheat				
ATT	0.030	0.011	0.094	-0.004
	(0.069)	(0.020)	(0.019)	(0.013)
	[0.666]	[0.575]	[¡0.001]	[0.780]
N obs.	8271	8166	7621	8012
N farmers	1565	1553	1546	1546
Mean DV	0.795	0.793	0.800	0.792
Pretrend p-value	0.226	0.096	0.549	0.025
Anticipation p-value	0.424	0.019	0.109	0.002

Results: Tables

Table A.30: Callaway and Sant'Anna doubly robust DID summary for Crop Insurance Income ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	-6.960	-0.044	2.282	0.878
	(9.896)	(1.523)	(0.869)	(1.336)
	[0.482]	[0.977]	[0.009]	[0.511]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	19.502	19.634	19.305	19.650
Pretrend p-value	0.832	0.285	0.120	0.336
Anticipation p-value	0.597	0.896	0.798	0.158
Soybean				
ATT	-1.517	0.264	2.009	0.463
	(5.279)	(1.043)	(0.583)	(0.990)
	[0.774]	[0.800]	[¡0.001]	[0.640]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	11.937	11.976	11.747	11.993
Pretrend p-value	0.213	0.869	0.520	0.607
Anticipation p-value	0.361	0.813	0.620	0.752
Wheat				
ATT	9.658	-0.592	2.722	-1.237
	(7.605)	(1.330)	(0.853)	(1.749)
	[0.204]	[0.656]	[0.001]	[0.479]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	7.157	7.234	6.788	7.324
Pretrend p-value	0.550	0.334	¡0.001	0.677
Anticipation p-value	0.913	0.082	0.124	0.271

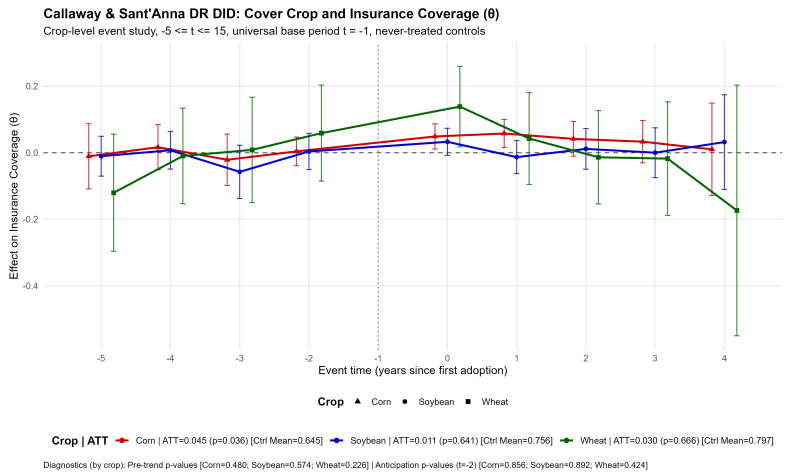
Table A.31: Callaway and Sant'Anna doubly robust DID summary for Direct Expenses ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	16.345	9.962	55.283	17.333
	(16.496)	(5.522)	(4.197)	(5.078)
	[0.322]	[0.071]	[¡0.001]	[¡0.001]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	417.970	418.125	410.390	417.832
Pretrend p-value	0.101	0.384	0.649	0.266
Anticipation p-value	0.857	0.877	0.922	0.093
Soybean				
ATT	15.535	10.795	26.859	15.959
	(12.330)	(4.024)	(3.140)	(3.565)
	[0.208]	[0.007]	[¡0.001]	[¡0.001]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	257.566	257.672	252.536	257.614
Pretrend p-value	0.615	0.020	0.252	0.298
Anticipation p-value	0.438	0.608	0.753	0.261
Wheat				
ATT	-4.012	11.876	39.023	12.367
	(31.260)	(6.476)	(5.656)	(5.896)
	[0.898]	[0.067]	[¡0.001]	[0.036]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	211.339	211.881	206.479	211.859
Pretrend p-value	0.787	0.027	0.008	0.659
Anticipation p-value	0.915	0.318	0.354	0.598

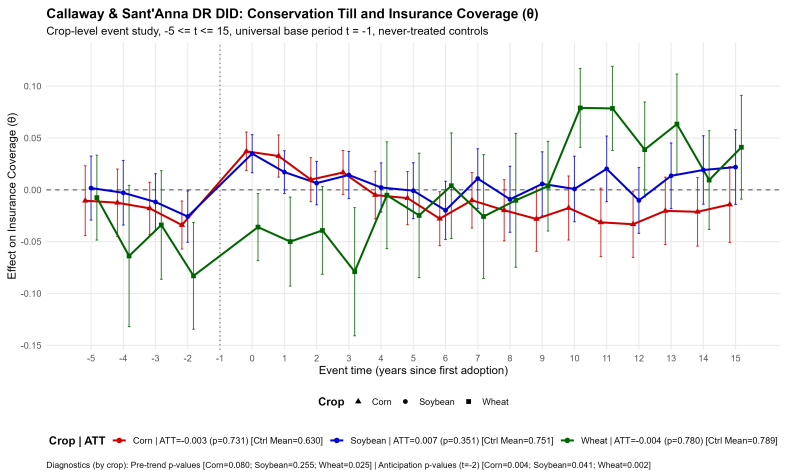
Table A.32: Callaway and Sant'Anna doubly robust DID summary for Overhead Expenses ($/Acre)

Statistic	Cover Crop	No-Till	Reduced Till	Conservation Till
Corn				
ATT	5.487	9.554	12.089	12.190
	(7.267)	(2.697)	(1.737)	(2.470)
	[0.450]	[¡0.001]	[¡0.001]	[¡0.001]
N obs.	51496	50774	47086	49831
N farmers	8967	8943	8787	8919
Mean DV	110.171	110.221	107.437	110.115
Pretrend p-value	0.129	0.804	0.049	0.141
Anticipation p-value	0.222	0.247	0.412	0.896
Soybean				
ATT	7.189	8.409	6.323	9.806
	(6.733)	(2.013)	(1.464)	(1.863)
	[0.286]	[¡0.001]	[¡0.001]	[¡0.001]
N obs.	45725	44936	41511	44019
N farmers	7958	7933	7783	7907
Mean DV	76.719	76.686	74.632	76.491
Pretrend p-value	0.621	0.288	0.134	0.351
Anticipation p-value	0.335	0.447	0.145	0.681
Wheat				
ATT	-7.922	5.135	15.850	8.198
	(14.425)	(3.560)	(1.931)	(3.189)
	[0.583]	[0.149]	[¡0.001]	[0.010]
N obs.	9840	9713	9124	9537
N farmers	2195	2181	2162	2169
Mean DV	56.657	56.964	54.906	57.028
Pretrend p-value	0.159	¡0.001	0.029	0.296
Anticipation p-value	0.017	0.941	0.549	0.379

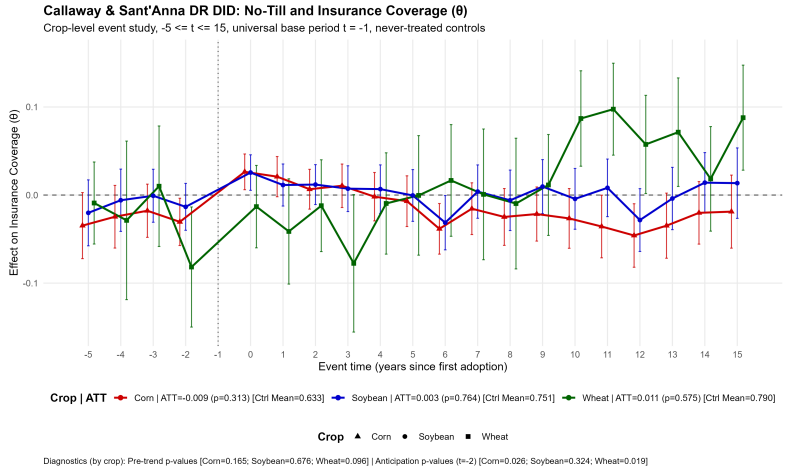
Results: Event Study Plots



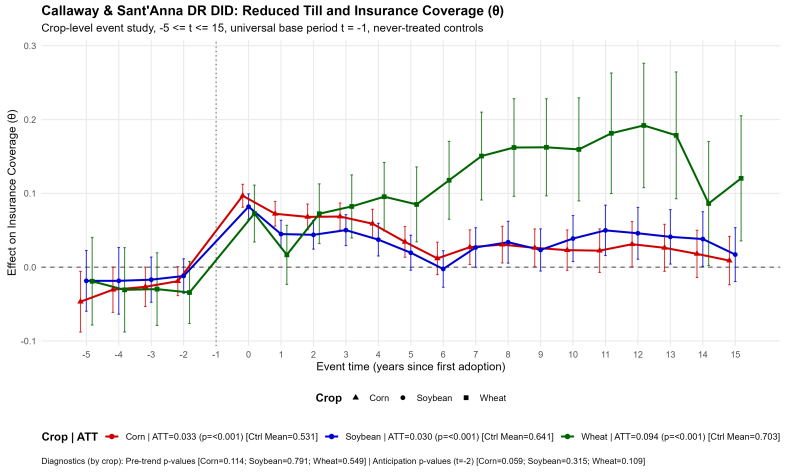
(a) Cover Crop



(b) Conservation Tillage

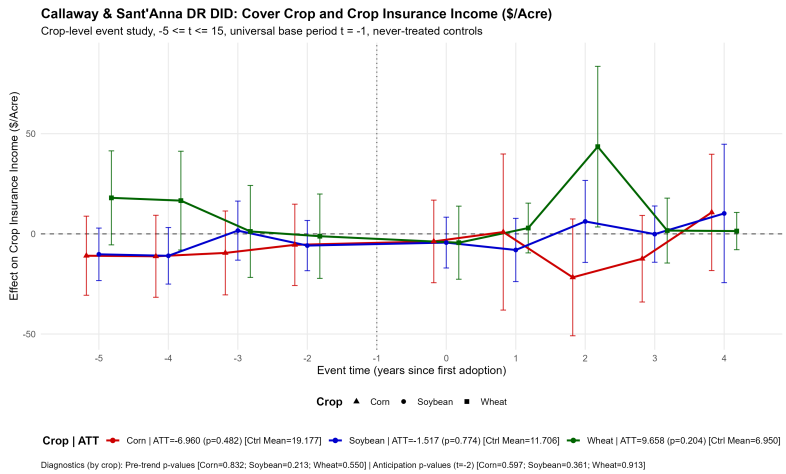


(c) No Till

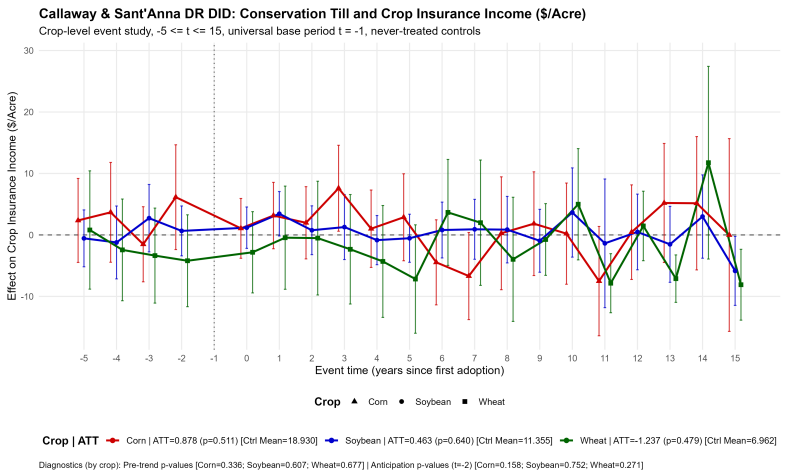


(d) Reduced Tillage

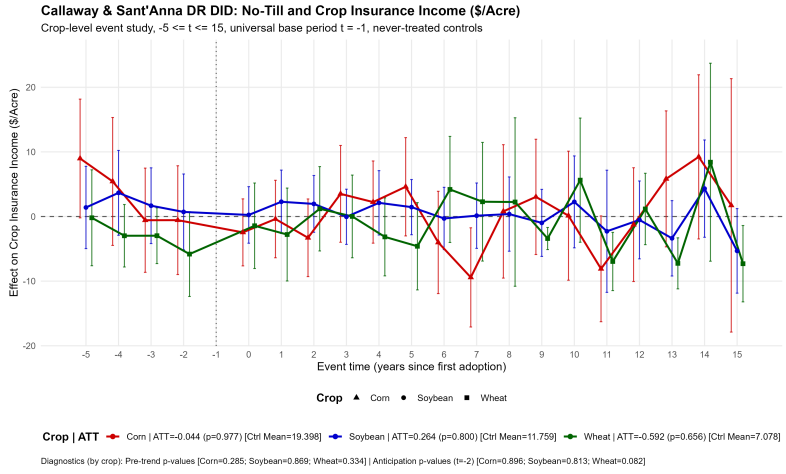
Figure A.31: Crop insurance coverage event studies by regenerative practice.



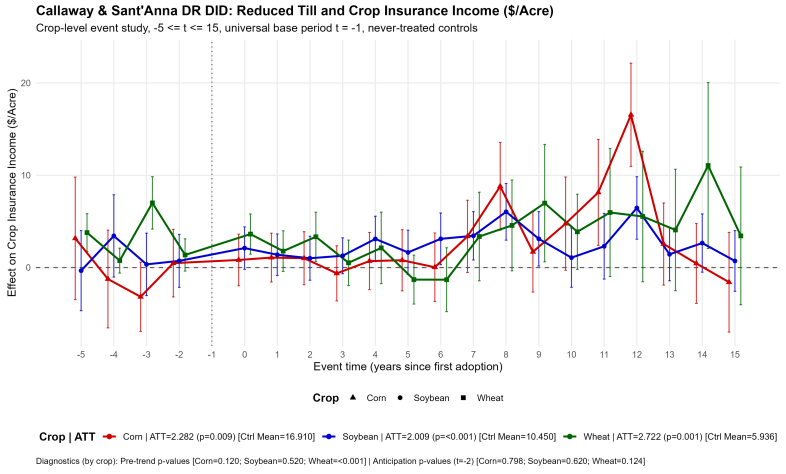
(a) Cover Crop



(b) Conservation Tillage

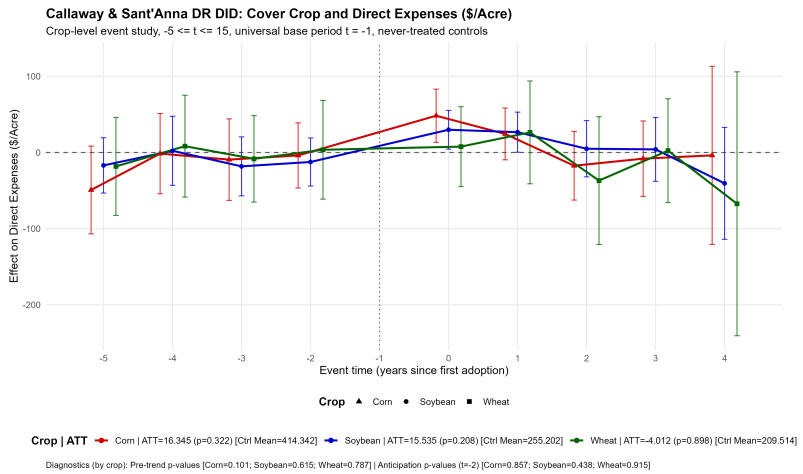


(c) No Till

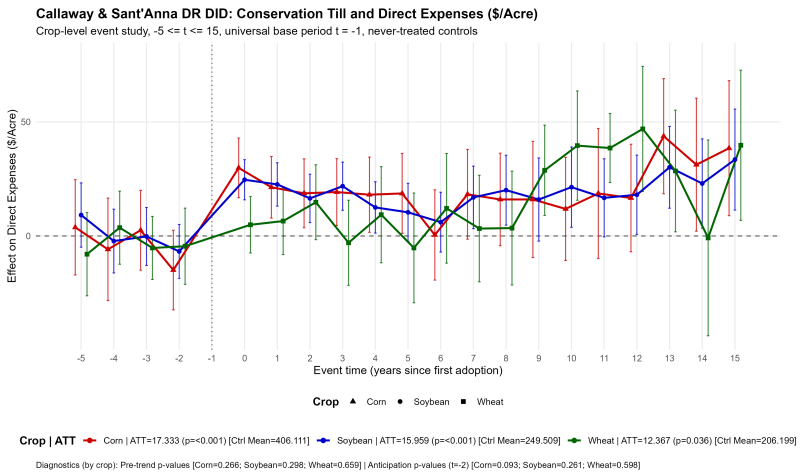


(d) Reduced Tillage

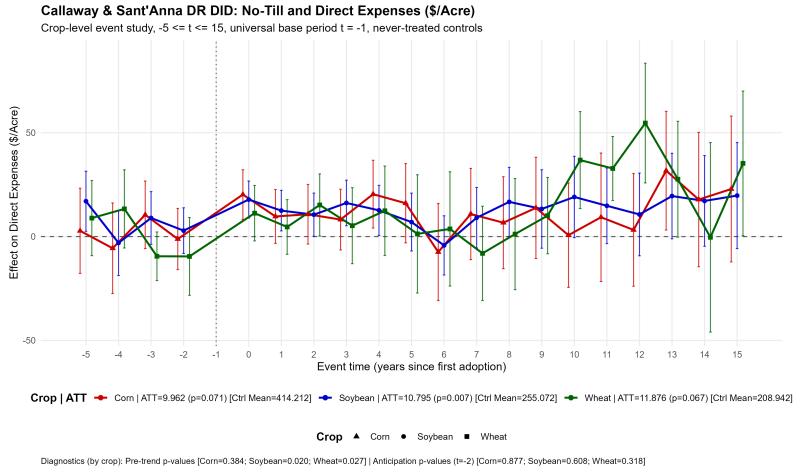
Figure A.32: Crop insurance payouts event studies by regenerative practice.



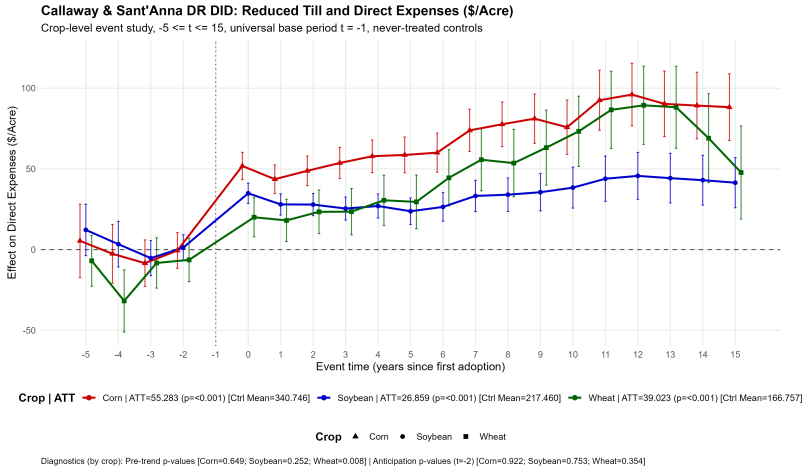
(a) Cover Crop



(b) Conservation Tillage

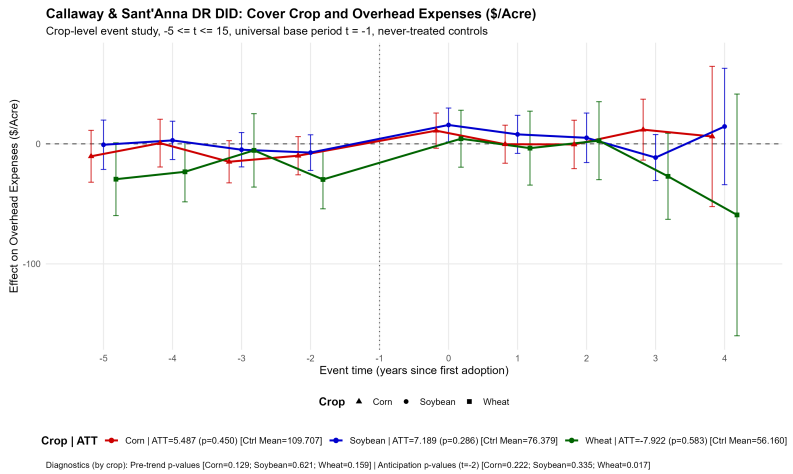


(c) No Till

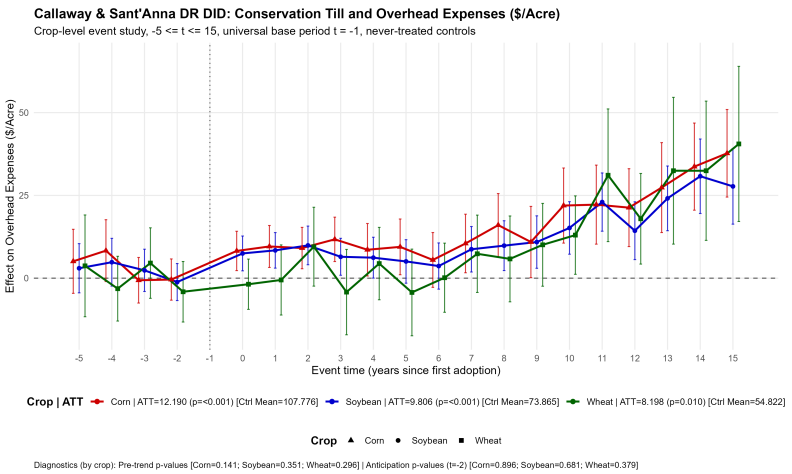


(d) Reduced Tillage

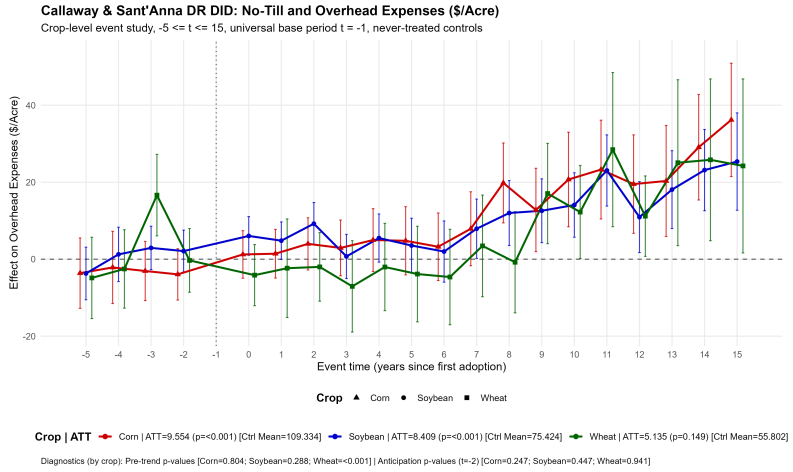
Figure A.33: Direct expenses event studies by regenerative practice.



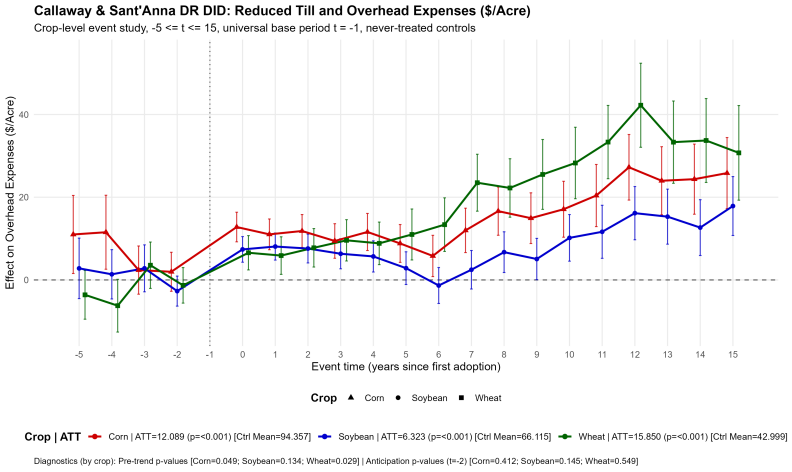
(a) Cover Crop



(b) Conservation Tillage



(c) No Till



(d) Reduced Tillage

Figure A.34: Overhead expenses event studies by regenerative practice.

References

Crippa, M., E. Solazzo, D. Guizardi, F. Monforti-Ferrario, and F. N. T. an A Leip (2021). Food Systems are responsible for a third of global antropogenic GHG emissions. *Nature Food 2*, 198–209.

Vermeulen, S. J., B. M. Campbell, and J. S. I. Ingram (2012). Climate Change and Food Systems. *Annual Review of Environment and Resources 37*, 195–222.