Renewable Diesel Boom: The Impact of Soybean Crush Plants on Local Soybean Basis

Shujie Wu, Mindy Mallory, and Teresa Serra

Suggested citation format:

Wu, S., M. Mallory, and T. Serra. 2025. "Renewable Diesel Boom: The Impact of Soybean Crush Plants on Local Soybean Basis." Proceedings of the NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management, Chicago, Illinois, April 14-15, 2025. [http://www.farmdoc.illinois.edu/nccc134/paperarchive]

Renewable Diesel Boom: The Impact of Soybean Crush Plants on Local Soybean Basis

Shujie Wu[1], Mindy Mallory[2], Teresa Serra[3][4]

Paper prepared for the NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management, 2025.

---

[1] Shujie Wu is a PhD student at the University of Illinois Urbana-Champaign. Questions or other correspondence can be directed to Shujie Wu at shujiew2@illinois.edu.
[2] Mindy Mallory is an Associate Professor and Clearing Corporation Foundation Endowed Chair in Food and Agricultural Economics at Purdue University. Email: mlmallor@purdue.edu.
[3] Teresa Serra is a Professor and the Hieronymus Distinguished Chair in Futures Markets at the University of Illinois Urbana-Champaign. Email: tserra@illinois.edu.
[4]This research is supported by a grant from the American Soybean Association.

Renewable Diesel Boom: The Impact of Soybean Crush Plants on Local Soybean Basis

Abstract: *The rapid expansion of renewable diesel production, driven by policies like the Renewable Fuel Standard, has spurred investment in new soybean crushing facilities. We investigate how six new facilities affect local soybean basis using elevator-level data from 2021-2025. Employing static and dynamic staggered difference-in-differences (DiD) models, we find that new soybean crush plants increase the local soybean basis by approximately 9.6 cents per bushel within a 50-miles radius. Dynamic analysis shows impacts grow during the first four months reaching up to 30 cents per bushel before declining. These results demonstrate biofuel policies' relevance in supporting rural economies, highlighting important implications for policy design.*

Key Words: renewable diesel, soybean basis, event study, clean energy policy

Introduction

The renewable diesel industry in the United States (US) has rapidly expanded in recent years driven by policies, including both the Renewable Fuel Standard (RFS) and the California Low Carbon Fuel Standard (LCFS). The RFS mandates blending renewable fuels into diesel and gasoline supplies, while the LCFS requires fuel producers in California to lower carbon intensity, driving demand for cleaner energy sources. As a result, demand for soybean oil — the dominant domestic feedstock for renewable diesel production — has been very strong, prompting significant investment in new soybean crushing facilities in the Midwest. These developments can reshape spatial price patterns as stronger new demand sources draw substantial volumes from local soybeans. When new crushing capacity comes online, it creates additional demand for soybeans in the surrounding area that could lead to higher local soybean prices for farmers, especially in areas with weak local price levels because they are far from end users or export infrastructure like the Mississippi river system. Understanding the implications of this transformation is crucial for farmers, investors in new crush facilities, and other agri-food supply chain participants.

While economic theory suggests that an increase in local demand should raise prices (all else being equal), the extent and spatial distribution of this effect is uncertain and depends on the volume of new demand and other concurrent supply and demand factors. The primary goal of this study is to investigate the magnitude and spatial extent of the impact that soybean crushing capacity has on the local soybean basis. The soybean basis—defined as the difference between the local cash price at grain elevators and the relevant futures price—is a key indicator of local supply and demand conditions. By analyzing changes in the soybean basis, we provide a clear picture of how the new crush plants have influenced local soybean markets and, by extension, the economic well-being of farmers in the surrounding area. To achieve that, we employ staggered difference-in-difference (DiD) models to estimate the average effect of several soybean crushing facilities that have been gradually established across the Midwest over the past two years. The staggered DiD framework retains the merit of the traditional DiD model for making causal inference, while additionally accommodating variation in treatment timing across different locations.

Though soybean crush capacity is experiencing a building boom reminiscent of corn-based ethanol from the mid 2000's, there has been no work examining the impact of renewable diesel and soybean crush facilities on local soybean markets. Most studies have focused on the broader national or global impacts of renewable diesel policies rather than the localized effects of new processing facilities.

Smith (2018) constructs a partially identified vector autoregressive model with USDA Central Illinois cash bids and suggests that the RFS2 raised the soybean prices by about 19% in 2006-2010. Moschini et al. (2017) find a 10.6% increase in national soybean prices under a projected 2022 RFS mandates scenario with a multi-market equilibrium model and USDA Oil Crops Yearbook data. Since these studies, several new soybean crushing facilities have come online, and new capacity has been added at existing facilities. We focus on the six new soybean crush plants that became operational between January 2023 and July 2024 in the US. Using daily elevator soybean price data, we find that the new soybean crush plants increase the local soybean basis by approximately 9.63 cents per bushel within a 50-miles radius, and 7.06 cents per bushel within a 100-miles radius. Dynamic analysis shows impacts grow during the first four months reaching up to 30 cents per bushel before declining.

These effects are consistent with new crush facilities creating concentrated local demand that draws soybeans from surrounding areas, reducing transportation costs for nearby farmers and increasing competition among buyers. The facilities also provide an alternative market outlet for farmers previously dependent on distant processors or export channels, strengthening their bargaining position.

The existing literature on the impact of ethanol production on agricultural markets provides important context for our study. Research shows that increased demand for corn for ethanol, can significantly affect local prices, but with probably smaller and more geographically limited effects than we observe for soybean crush plants. McNew and Griffith (2005) found ethanol plants increased corn prices by 12.5 cents with impacts extending up to 68 miles, while Behnke and Fortenbery (2011) estimated smaller effects of 0.425 cents within 50 miles. Our results show that soybean crushing plants may have larger basis impacts than ethanol plants and extend farther geographically suggesting that renewable diesel policy effects may be more spatially extensive than previously observed for biofuel industries. Building on this foundation, our study makes two key contributions to understanding policy-driven agricultural market impacts. First, we fill in a research gap by showing how the local impacts of the most recently established soybean crushing plants (2023 onward) on soybean basis evolve both temporally and spatially using staggered DiD models. Second, our findings offer a comparative perspective on two policy-driven renewable energy sources: ethanol and renewable diesel.

Our findings have important implications for different stakeholders. For local soybean farmers, the results demonstrate tangible economic benefits from renewable diesel expansion, particularly valuable given declining net farm income since 2022.[5] For investors, our results provide insights into the potential economic benefits of expanding renewable diesel capacity and the potential opportunity costs posed by alternative feedstocks that may displace soybean oil in the

[5] USDA Farm Income and Wealth Statistics: https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics

future, contributing to analyses of policies like the RFS and LCFS. For policymakers, this research deepens our understanding of how renewable energy policies shape economic outcomes in local agriculture and rural communities, particularly considering planned further expansion of soybean crush facilities.

Background

Renewable diesel production has surged since 2021, largely driven by federal and state policies like the RFS and LCFS (Gerveni et al., 2023; Miller et al., 2024). Figure 1 shows the daily U.S. renewable diesel nameplate production capacity from 2010 to 2023, and projected capacity for 2024 to 2025. Starting in 2022, annual capacity is color-coded to distinguish between capacity introduced in the current and previous years. Capacity gradually increased over the last decade, then it doubled from 2020 to 2021 to 56 thousand barrels per day, and is expected to reach 227 thousand barrels per day in 2025. The Renewable Fuel Standard (RFS) mandates an annual Renewable Volume Obligation (RVO), which sets the required amount of renewable fuel to be blended into the U.S. transportation fuel supply. To implement this, the Environmental Protection Agency (EPA) manages the Renewable Identification Number (RIN) system. Under this system, RINs are generated when qualified renewable fuels are produced and are used to track compliance once these fuels are blended into the fuel supply. RINs can be bought and sold on the secondary market, allowing obligated parties under the RFS—primarily refiners and fuel importers—to purchase RINs and submit them to the EPA to demonstrate compliance with their RVOs. RIN prices represent the marginal cost of complying with the renewable RVOs mandated by the EPA. Higher RIN prices indicate that the RVO is binding, creating stronger economic incentives for renewable fuel production and, consequently, increased demand for feedstocks like soybean oil. There are four categories of RINs, each corresponding to a specific type of biofuel (D3, D4, D5, and D6). Renewable diesel generates D4 RINs, which are designated for biomass-based diesel.[6]

Figure 2 illustrates the composition of renewable diesel feedstocks from 2011 to 2023. Soybean oil usage has rapidly increased since 2021 and reached 5.7 billion pounds in 2023, compared to about 2.1 billion pounds in 2021. Although demand for other feedstocks, such as yellow grease and canola oil, is also growing rapidly, domestic soybean oil use helps compensate for declining U.S. soybean exports, which are challenged by Brazilian competition and weakened Chinese demand since the 2018-2020 trade war between the U.S. and China (Adjemian et al., 2021; Dhoubhadel et al., 2023; O'Neil, 2024).

To meet increasing demand for soybean oil to produce renewable diesel, U.S. soybean crushing capacity is expanding rapidly. By late 2022, 13 new soybean crush facilities and 10 expansions at existing sites were announced (Gerlt, 2023). These expansions were expected to add 750 million bushels of nameplate crushing capacity annually. For context, the total domestic soybean crush was 2.2 billion bushels and soybean production was 4.3 billion bushels in the 2022/2023 soybean marketing year[7]. If completed, these expansions would represent a 34%

---

[6] D3, D5, and D6 RINs are cellulosic, advanced biofuels, and conventional biofuel RINs, respectively.
[7] USDA WASDE-647. https://downloads.usda.library.cornell.edu/usda-esmis/files/3t945q76s/0g3563734/0c4856877/wasde0424.pdf

increase in domestic crushing capacity and require 18% of 2022/2023 soybean production levels when in full-capacity operation. All else being equal, national soybean prices may rise as a result of this demand increase (Crowley, 2024). Locally, the price increase should be more pronounced for farmers and elevators near the new plants as these facilities alter the flow of grain by drawing in soybean supplies.

Meanwhile, the soybean crushing industry faces competition from alternative feedstocks, particularly yellow grease. Figure 2 reveals a quick expansion of yellow grease —made of waste fats and oils such as used cooking oil —that is comparable to soybean oil. Yellow grease offers renewable diesel producers two key advantages over soybean oil. First, it has a significant lower carbon intensity (CI) score than soybean oil in the production of renewable diesel. The CI score measures the net greenhouse gas (GHG) emissions over the fuel's production life cycle, and a lower CI score is rewarded more for compliance with the LCFS. The CI scores for soybean oil fall in the range of 50-60 g/MJ (grams per megajoule) while those of yellow grease are only about 15-25 g/MJ. We derive these intensities based on the current certified carbon intensity scores for existing plants using soybean oil and yellow grease, available from the California Air Resources Board.[8] With 2024 LCFS credit prices averaging $59 per metric ton of carbon dioxide reduction[9] and one gallon of renewable diesel generating about 129.65 MJ,[10] yellow grease captures an additional 27 cents in LCFS credits per gallon compared to soybean oil.[11] Second, yellow grease is more cost-effective. Recent Midwest soybean oil prices averaged about 45 cents per pound,[12] while Minnesota yellow grease averaged approximately 37 cents per pound.[13] Xu et al. (2022) reports 8.125 pounds of feedstock are needed to produce one gallon of renewable diesel, implying yellow grease is about 65 cents per gallon cheaper than soybean oil at current prices.

Yellow grease demand is primarily met through Chinese imports, but this supply faces increasing challenges. China recently eliminated its 13% export tariff rebate, increasing costs for US imports.[14] Additional uncertainties include potential US tariffs on yellow grease imports (Debnath & Whistance, 2022) and concerns about Chinese product purity that could trigger new import regulations[15][16]. Meanwhile, the California Air Resources Board (CARB) is facing calls to

---

[8] Current Fuel Pathways - carbon intensities for compliance with LCFS: https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities

[9] Stillwater Associates Insights. Weekly LCFS Newsletter Sample: https://stillwaterassociates.com/sample-publication-1/

[10] California Air Resources Board. Fuels: https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/dashboard/quarterlysummary/quarterlysummary_103119.xlsx&ved=2ahUKEwjavcOE7bmKAxXNlokEHZwkMjMQFnoECCMQAQ&usg=AOvVaw0r3Oq9ibf1u5ptjE0Ju_cL

[11] Yellow grease has a lower CI score (20g/MJ, the midpoint of the range provided) than soybean oil (55g/MJ), reducing emissions by an additional 35g/MJ compared to soybean oil. For each gallon of renewable diesel, this represents a 4,537.75g reduction (1 gal × 35g/MJ × 129.65MJ/gal), equivalent to 0.00454 metric tons. At $59/metric ton, yellow grease generates of $0.27 per gallon more in carbon credits per gallon than soybean oil.

[12] USDA. National Grain and Oilseed Processor Feedstuff Report: https://mymarketnews.ams.usda.gov/viewReport/3511

[13] USDA. National By-Product Feedstuff Report: https://mymarketnews.ams.usda.gov/viewReport/3510

[14] https://www.fas.usda.gov/data/china-uco-export-tax-rebate-terminated

[15] https://www.bloomberg.com/news/articles/2024-05-07/suspicious-frying-oil-from-china-is-hurting-us-biofuels-business

[16] https://www.reuters.com/business/energy/us-epa-says-it-is-auditing-biofuel-producers-used-cooking-oil-supply-2024-08-07/

update soybean oil's carbon intensity score, particularly its indirect land use change (ILUC) component, which relies on 20-year-old data (Scott, 2024). An updated assessment could reduce soybean oil's CI score by nearly 20 g/MJ, significantly enhancing its competitive position.

Methods

Since treatment timing varies across crushing plants, we employ both static and dynamic two-way fixed effects (TWFE) staggered DiD to help identify causal effects. The static TWFE staggered DiD regression specification is as follows (Baker et al. 2022):

$$y_{i,t} = \alpha_i + \lambda_t + \beta D_{it} + RIN_t + \varepsilon_{i,t}, \quad (1)$$

where $y_{i,t}$ is the local basis for elevator i at time t, α_i is the individual fixed effect, and λ_t is the time fixed effect. D_{it} is a dummy variable that denotes if elevator i is treated at time t, and β is the average treatment effect of the new plants on the treated elevators over time. RIN_t is the D4 RIN price which we use as a control variable. As D4 RIN prices rise, indicating more binding RVOs, the economic incentive to produce renewable diesel increases, driving up demand for soybean oil and potentially strengthening local soybean basis even absent new crushing capacity. $\varepsilon_{i,t} \sim N(0, \sigma^2)$ is a normally distributed error term. The elevator i is considered treated if a new crush plant became operational within X miles away from it, if not, it falls in the control group. We consider two thresholds $X = 100$ and 50 to investigate how the impact may change over distance.

Next, we use the dynamic TWFE staggered DiD to allow for dynamic treatment effects. The model is specified as follows (Baker et al. 2022):

$$y_{i,t} = \alpha_i + \lambda_t + \sum_{l=-K}^{-2} \beta_l D_{it}^l + \sum_{l=0,}^{L} \beta_l D_{it}^l + RIN_t + \varepsilon_{i,t}, \quad (2)$$

where $D_{it}^l = I[t - E_i = l]$ is a relative-time indicator for the treated elevator i during the treatment period E_i being l periods from the start time of treatment, β_l represents the difference-in-differences estimate of the outcome between treated and control elevators, l periods from the event time, relative to the difference in the reference period. The first summation of D_{it}^l captures the time periods leading up to the treatment event, and the second summation captures the periods following the event. $l = -1$ is omitted as the reference period which is right before the treatment. The data used to estimate our models is described in the next section.

Data

Daily elevator soybean basis data is retrieved from GeoGrain through Bloomberg, with a timespan from 2021/01/01 to 2025/02/28 for the US Midwestern States. The GeoGrain dataset uses nearby futures contract to calculate the basis and rolls the contract when its volume is surpassed by the next one. The data is filtered to only include elevators with at least 85% data completeness. Missing values are imputed with the previously available observation which comprise of 7.87% of the total observations. Data is then further aggregated to a monthly level, allowing us to smooth out daily volatility and focus on more permanent price relationships that develop over time. The D4 RIN prices are obtained from the EPA. Figure 3 shows the time series plots of the monthly elevator basis and D4 RIN prices. The soybean basis exhibits a seasonal pattern with peaks during the summer before harvest. Meanwhile, the magnitude of the peak aligns with the level of the D4 RIN prices, showing a strong correlation between the soybean prices and D4 prices.

We obtain the list of soybean crush plants from the American Soybean Association (ASA). Figure 4 shows the distribution of the existing soybean crush plants (shown in dark green) and soybean elevators (in light blue). While some existing plants are scattered along the East Coast, most plants and elevators are in the Midwest. Crush facilities have nameplate capacities ranging from 30,000 to 300,000 bushels per day, with the size of the green dots in the figure indicating their relative capacity as of September 2024. Most elevators in our dataset are relatively close to a crush facility, except for elevators in Wisconsin, North Dakota, Western Nebraska, and Western Kansas.

Six new plants became operational between January 2023 and July 2024. Table 1 presents the month each plant started accepting soybeans, their state, nameplate capacity, and the state-level nameplate capacity before the new plant started operating. Start dates are imprecise as they do not include data on volume of soybeans accepted. Appendix A contains news releases documenting these starting dates. Two new plants are in Iowa, two in North Dakota, one in Kansas, and one in Nebraska. Nameplate capacities range from 110,000 to 150,000 bushels per day. These additions represent significantly different proportional capacity increases by state—approximately 17% in Iowa (with pre-existing capacity of 1.3 million bushels daily) versus 675% in North Dakota (with just 40,000 bushels daily before expansion), nearly meeting the expansion projections by the end of 2022 (Gerlt, 2023). Figure 5 maps the new plants (red) alongside existing facilities (green), with dot size representing nameplate capacity. Geographically, the new facilities are concentrated in the western and northern Midwest regions.

In the next section we present the results from our staggered DiD analysis.

Results

Table 2 presents the estimation results from two specifications of Equation (1), along with the sizes of the treatment and control groups. Specification A uses a binary indicator for whether an elevator is treated by a new plant, capturing the average treatment effect on the treated (ATT). Specification B replaces this indicator with the nameplate capacity of each new plant to account for treatment intensity, measuring how much treatment each elevator receives based on the associated plant's processing capacity. Under a 100-mile treatment threshold, the ATT is estimated at 7.06 cents per bushel, indicating that, on average, a new plant strengthens the local soybean basis within a 100-mile radius by this amount. In addition, a one-cent increase in the D4 RIN price is associated with a 1.14-cent increase in the soybean basis. This demonstrates how the cost of compliance with the renewable fuel mandates affect soybean price changes. When the treatment threshold is narrowed to 50 miles, the ATT rises to 9.63 cents per bushel, while the D4 RIN effect slightly decreases to 1.07 cents. This pattern confirms that the impact of new crushing plants diminishes with distance but extends at least 100 miles—farther than what has been observed for ethanol plants. However, the effect of soybean crush plants is slightly smaller than what is found in previous studies on ethanol plants. In Specification B, the effect of processing capacity on the soybean basis is also distance-sensitive: within 100 miles, the basis increases by 0.04 cents per bushel for every additional 1,000 bushels of daily capacity; this effect doubles to 0.08 cents within 50 miles. The estimated effect of the D4 RIN price remains consistent with Specification A.

Figure 6 presents estimation results from the dynamic staggered difference-in-differences (DiD) model, focusing on a time window spanning four months before and six months after treatment, with error bars indicating 95% confidence intervals. The statistically insignificant estimates for the pre-treatment period suggest that the treated and control groups followed parallel trends for at least four months prior to treatment, supporting the validity of the DiD identification strategy. This parallel trend assumption is more strongly supported in the 50-mile graph, which shows a good pre-treatment fit, while the 100-mile graph only weakly satisfies this condition with one estimate significant, confirming that the effect is weaker or less consistent beyond the 50-mile range. During the month of treatment, the effect is still not significant, likely due to the imprecise opening date data. The positive and statistically significant post-treatment estimates indicate that the new crushing plants have caused the local soybean basis to strengthen. The effects gradually increase during the first four months and reach almost 30 cents per bushel, then decrease in the next two months to 15-20 cents per bushel. This suggests either a dissipating or fluctuating effect. While previous literature finds that ethanol plant effects eventually dissipate, our ability to study those is limited by our short sample period.

Conclusion

We investigate the local effects of new soybean crushing plants on the soybean basis, using both static and dynamic staggered DiD models to assess the magnitude and spatial extent of these effects. The recent rapid growth of renewable diesel production has increased demand for soybean oil, driving the expansion of existing facilities and the establishment of new soybean crush facilities across the Midwest. Our focus on localized impacts complements research on national or global impacts of biofuels on soybean prices (Smith 2018; Moschini et al. 2017).

New soybean crushing plants exhibit positive impacts on the local basis, strengthening the basis in elevators within a 100-miles range by 7.06 cents per bushel. The effect increases to 9.63 cents when we confine the range to 50 miles. The effect peaks in the fourth month after the new plant begins operations to almost 30 cents per bushel, but declines in the following two months to 15-20 cents per bushel, possibly indicating a dissipating or fluctuating pattern. The D4 RIN price, an indicator of how binding the biofuel policy is, is estimated to be positively associated with soybean basis, revealing how the incentives of renewable fuel policies are transmitted to soybean producers.

The findings of this study have important implications for policy, particularly in the context of renewable energy expansion and rural economic development. Our results suggest that crush facilities have a positive impact on local soybean prices, benefiting farmers near these plants. This is relevant for federal and state policies that promote renewable energy production, such as the Renewable Fuel Standard (RFS) and Low Carbon Fuel Standard (LCFS). By incentivizing the construction of new crush plants, these policies contribute to farm profitability and rural economic growth.

Potential second-order effects warrant further research. Increased crushing may benefit livestock producers as expanded soybean meal production could lower feed prices. Soybean oil competes with alternative feedstocks like yellow grease, canola oil, and tallow. Therefore, the renewable diesel boom may not fully mirror the ethanol boom. However, comparison of our results with previous research findings suggest that the biodiesel boom may have a larger impact on the basis compared to ethanol. Sustained effects depend on whether policies provide enough support for soybean oil as a primary feedstock. Changes in the international trade context may alter feedstock prices. As the US supply of yellow grease, canola oil and tallow relies heavily on imports, tariffs on Chinese imports of yellow grease and imports of canola oil from Canada and tallow from other countries could favor U.S. soybean producers.

References

Adjemian, M. K., Smith, A., & He, W. (2021). Estimating the market effect of a trade war: The case of soybean tariffs. *Food Policy*, *105*, 102152. https://doi.org/10.1016/j.foodpol.2021.102152

Behnke, K., & Fortenbery, T. R. (2011). The Impact of Ethanol Production on Local Corn Basis. *Proceedings of the NCCC-134*. NCCC-134 Applied Commodity Price Analysis, Forecasting, and Market Risk Managment, St. Louis, MO. https://legacy.farmdoc.illinois.edu/nccc134/conf_2011/pdf/confp11-11.pdf

Baker, A. C., Larcker, D. F., & Wang, C. C. Y. (2022). How much should we trust staggered difference-in-differences estimates? Journal of Financial Economics, 144(2), 370–395. https://doi.org/10.1016/j.jfineco.2022.01.004

Crowley, C. (2024). The Expanding Role of Renewable Fuel Policy as a Demand Driver in Agriculture. *Federal Reserve Board of Kansas City Economic Review*, *109*(6). https://www.kansascityfed.org/research/economic-review/the-expanding-role-of-renewable-fuel-policy-as-a-demand-driver-in-agriculture/

Debnath, D., & Whistance, J. (2022). The Biofuel Industry and Global Trade Nexus. In S. A. Bandh & F. A. Malla (Eds.), *Biofuels in Circular Economy* (pp. 303–319). Springer Nature. https://doi.org/10.1007/978-981-19-5837-3_16

Dhoubhadel, S. P., Ridley, W., & Devadoss, S. (2023). Brazilian soybean expansion, US–China trade war, and US soybean exports. *Journal of the Agricultural and Applied Economics Association*, *2*(3), 446–460. https://doi.org/10.1002/jaa2.71

Gerlt, S. (2023, January 3). *Soybean processing growth is crushing it*. https://www.iasoybeans.com/newsroom/article/isr-january-2023-soybean-processing-growth-is-crushing-it

Gerveni, M., Hubbs, T., & Irwin, and S. (2023). Biodiesel and Renewable Diesel: It's All About the Policy. *Farmdoc Daily*, *13*(27). https://farmdocdaily.illinois.edu/2023/02/biodiesel-and-renewable-diesel-its-all-about-the-policy.html

McNew, K., & Griffith, D. (2005). Measuring the Impact of Ethanol Plants on Local Grain Prices. *Applied Economic Perspectives and Policy*, *27*(2), 164–180. https://doi.org/10.1111/j.1467-9353.2005.00219.x

Miller, J., Clark, C. M., Peterson, S., & Newes, E. (2024). Estimated attribution of the RFS program on soybean biodiesel in the U.S. using the bioenergy scenario model. *Energy Policy*, *192*, 114250. https://doi.org/10.1016/j.enpol.2024.114250

Moschini, G., Lapan, H., & Kim, H. (2017). The Renewable Fuel Standard in Competitive Equilibrium: Market and Welfare Effects. *American Journal of Agricultural Economics*, *99*(5), 1117–1142. https://doi.org/10.1093/ajae/aax041

O’Neil, T. (2024). *U.S. Renewable Diesel Production Growth Drastically Impacts Global Feedstock Trade* (International Agricultural Trade Report). USDA Foreign Agricultural Service. https://fas.usda.gov/data/us-renewable-diesel-production-growth-drastically-impacts-global-feedstock-trade

Smith, A. (2018). *Effects of the Renewable Fuel Standard on Corn, Soybean and Wheat Prices*. University of California, Davis. https://arefiles.ucdavis.edu/uploads/filer_public/f1/4b/f14bb419-af5d-48f5-9032-4d966c759119/smith_-_effect_of_rfs_on_prices.pdf

Xu, H., Ou, L., Li, Y., Hawkins, T. R., & Wang, M. (2022). Life Cycle Greenhouse Gas Emissions of Biodiesel and Renewable Diesel Production in the United States. *Environmental Science & Technology*, *56*(12), 7512–7521. https://doi.org/10.1021/acs.est.2c00289

Tables

Table 1. New plants from 2023/01 to 2024/07

Name	Month when grain sourcing starts	Capacity (Kbu/day)	State	State Capacity (Kbu/day)
Platinum	2024-05	110	IA	1,305
Bartlett Grain	2024-02	125	KS	195
Norfolk	2024-06	110	NE	410
CGB	2024-07	120	ND	40
ADM	2023-11	150	ND	40
Shell Rock	2023-03	110	IA	1,305

Note: This table presents the name and month when the plant started to source grain (obtained from public news and the American Soybean Association – ASA), nameplate capacity (in thousand bushels per day), the state where the plant is located, and state-level capacity (in thousand bushels per day) before the opening of the new plant. Plant list comes from ASA.

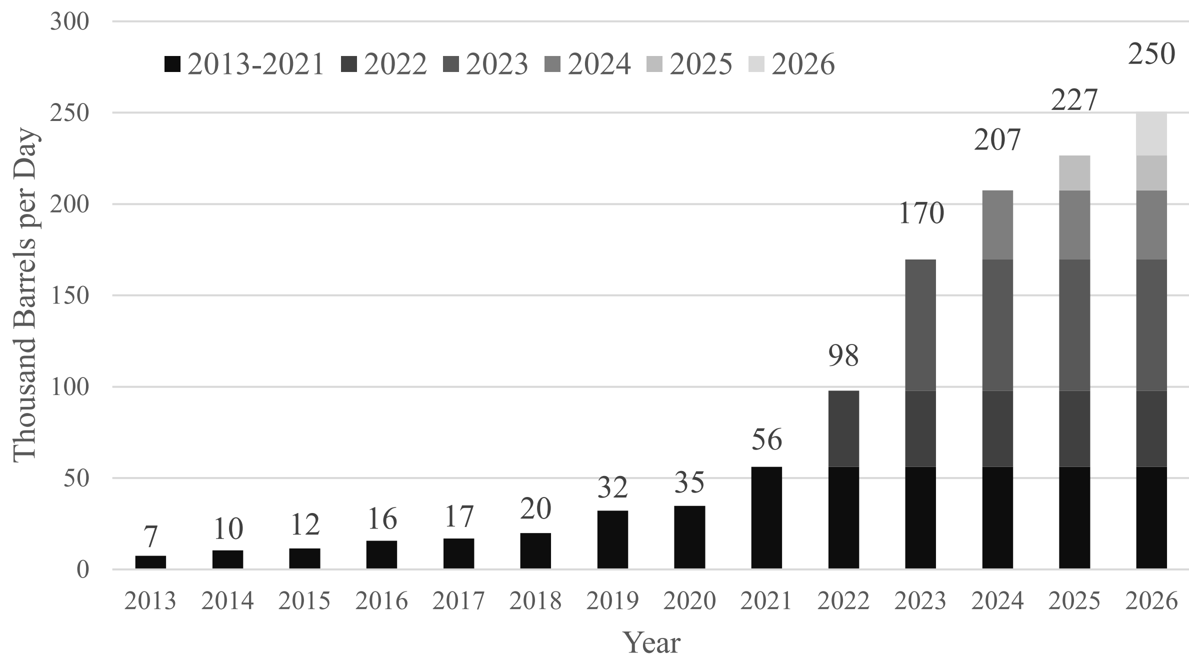
Table 2. Static staggered DiD regression results

	100 miles	50miles
Spec A		
ATT	7.057***	9.625***
RIN	1.140***	1.078***
Spec B		
Capacity	0.040***	0.079***
RIN	1.120***	1.074***
Counts		
# of treated	604	213
# of control	1,245	1,636

Note: This table presents the estimation results of the two specifications of the static staggered DiD with two distance thresholds of treatment, as well as the size of treatment and control groups. */**/*** indicate significance level at 10%/5%/1%.

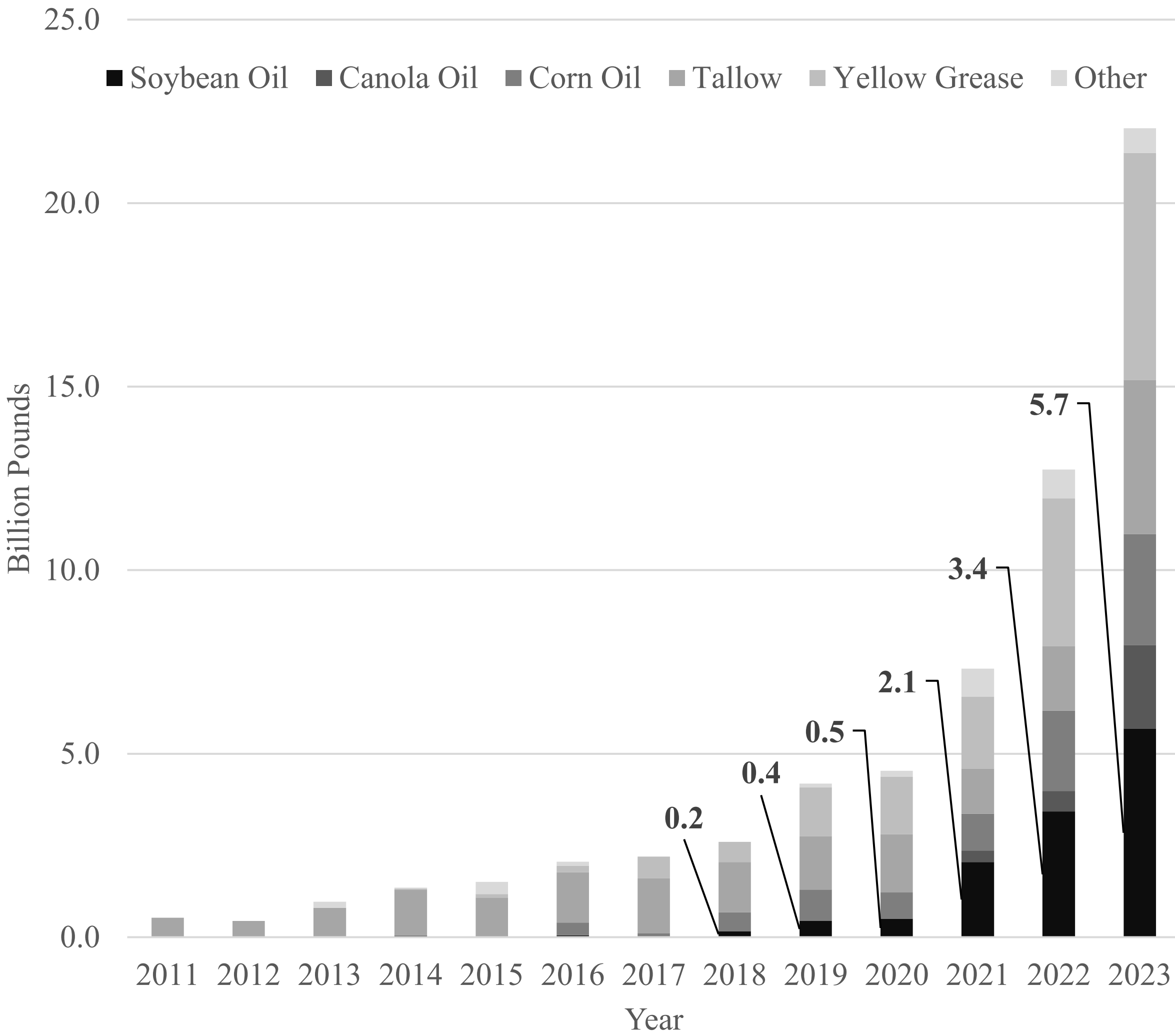
Figures

Figure 1. Daily U.S. Renewable Diesel Production Capacity, Actual for 2013-2023, and Projected for 2024-2025



Note: This figure shows daily renewable diesel production capacity, actual (2013 - 2023) and projected (2024 - 2025). Data were retrieved from the U.S. Energy Information Administration (EIA), Short-Term Energy Outlook (STEO), and accessed in June 2025. Colors represent the years when capacity was built. Starting in 2022, the capacity for each year is color-coded to distinguish between capacity introduced in the current and previous years.

Figure 2. Composition of Feedstock Usage for Production of U.S. Renewable Diesel by Volume and Major Feedstock Type, 2011 – 2023

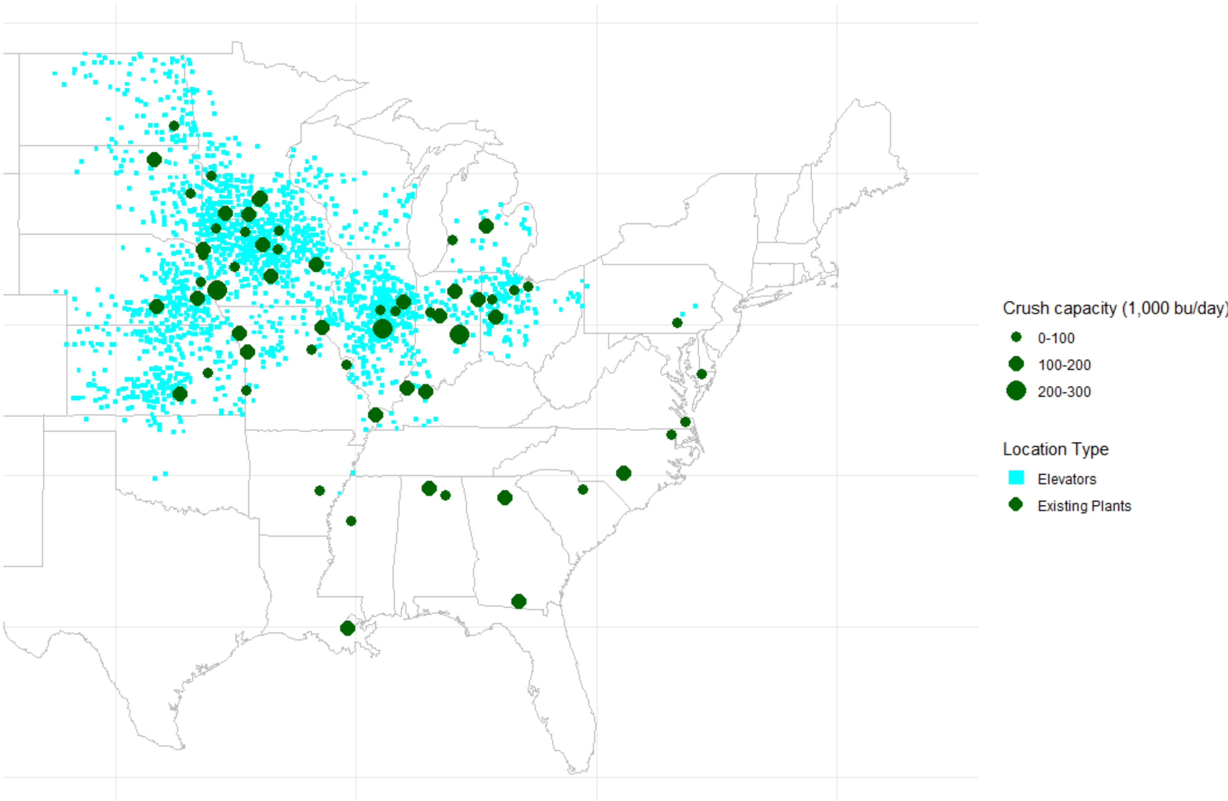


Note: This figure presents the yearly composition of feedstock for renewable diesel production from 2011 to 2023. Soybean oil usage (in billion pounds) is labeled for 2018 – 2023. Data are retrieved from Gerveni et al. (2024).

Figure 3. Monthly average soybean basis and D4 RIN prices

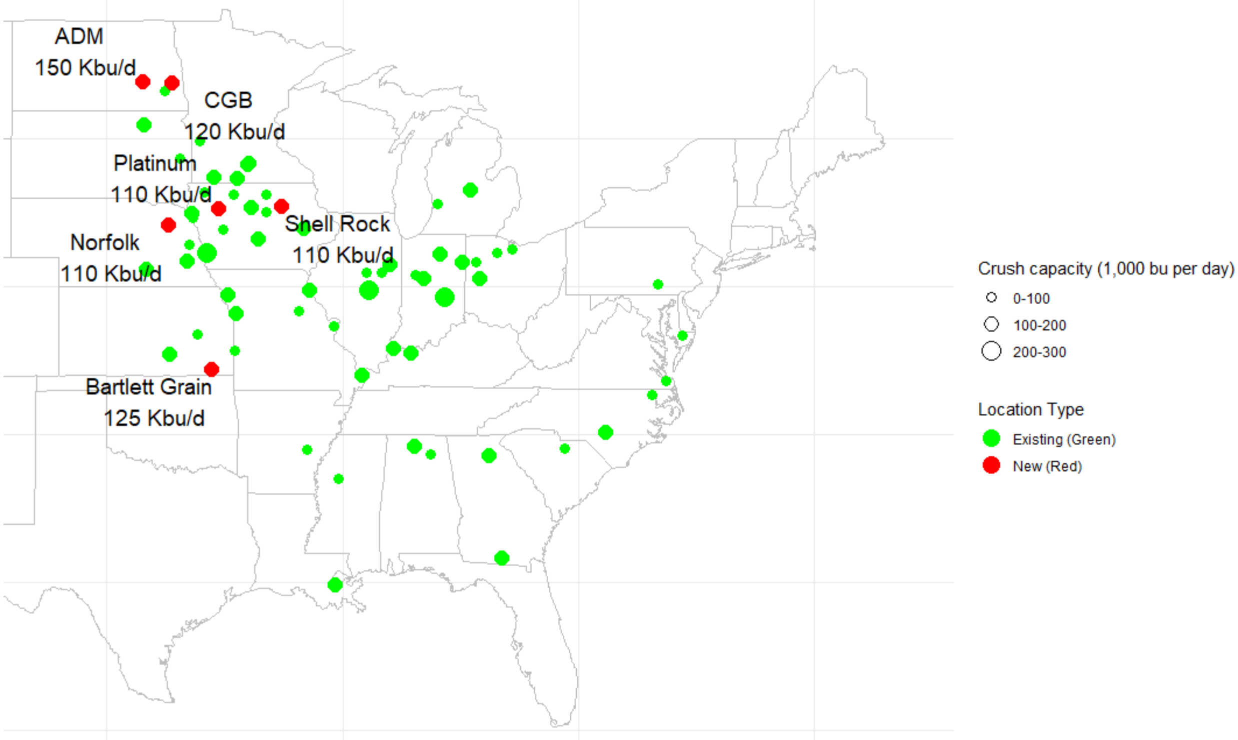
Note: This figure shows the monthly line plot of the average soybean basis of all elevators, and the D4 RIN prices

Figure 4. Map of existing plants and elevators, as of September 2024



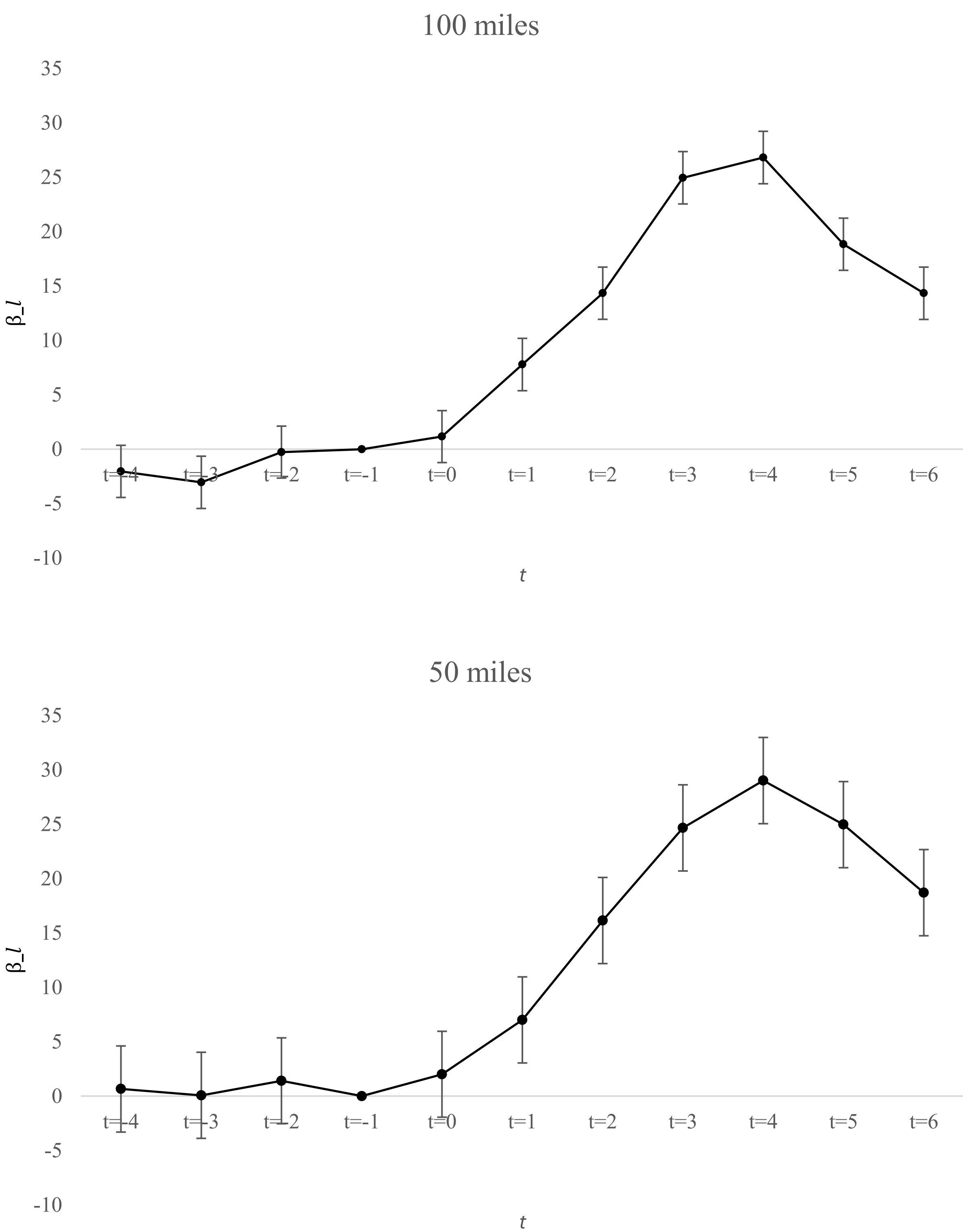
Note: This figure shows the distribution of the existing soybean plants (scaled by nameplate capacity) in greed dots and elevators in blue squares. The size of the green dots indicates plant capacity. GeoGrain and American Soybean Association (ASA) data.

Figure 5. Map of new plants and existing plants as of September 2024



Note: This figure shows the distribution of the new plants in red dots (nameplate capacity labeled in thousands of bushels per day) and existing plants in green dots. The size of the dots is scaled by nameplate capacity. The new plants are in the West part of the Midwest. Data are from the American Soybean Association (ASA).

Figure 6. Estimation results of dynamic staggered DiD



Note: This figure presents the estimation results from the dynamic staggered DiD, with error bars indicating 95% confidence intervals.

Appendix A. News links for operation of new crushing facilities

Platinum https://platinumcrush.net/
Bartlett Grain https://www.farmtalknews.com/news/bartlett-southeast-kansas-soy-crushing-facility-on-track-for-third-quarter-completion-beginning-grain-procurement/article_44d571e6-bf9c-11ee-b9b8-7f89ad4eb60e.html
Norfolk https://norfolkdailynews.com/select/norfolk-crush-plant-opens-for-business/article_73305980-2d87-11ef-947e-cfb4ed1c0484.html
CGB https://www.realagriculture.com/2024/07/north-dakota-crush-plant-receives-first-loads-of-soybeans/ https://www.agweek.com/crops/soybeans/north-dakota-soybean-processors-sets-grand-opening-as-operations-begin
ADM https://greatamericancrop.com/news-resources/article/2023/11/15/nd-soybean-crush-plant-enters-startup
Shell Rock https://shellrocksoyprocessing.com/home-1 https://www.communitynewspapergroup.com/waverly_newspapers/crushing-it-shell-rock-soybean-plant-celebrates-smooth-start-with-grand-opening/article_9cb67bfa-4d85-11ee-bd65-1f8694157184.html

Note: This table presents news links contains information about when the plants started to unload grains