CHAPTER 2: The Impact of Discretionary Rental Rate Adjustments in the Conservation Reserve Program

Wesley Zebrowski. O'Neill School of Public and Environmental Affairs, Indiana University Bloomington

Introduction

At the start of 2021, existing enrollment in the Conservation Reserve Program (CRP)—an agricultural land conservation program aimed at supporting farmer incomes, conserving soil quality, and reducing water pollution—was at an all-time low since the program's initial implementation in the late 1980s. While the CRP saw early success in enrollment and the provision of environmental benefits (Dunn et al., 1993; Karlen et al., 1999), since 2007 the program has struggled due to a declining enrollment cap (from 2007 to 2018) and under-enrollment in response to high crop prices (Hellerstein & Malcolm, 2010; Secchi & Babcock, 2015). However, in April 2021 the Biden administration and United States Department of Agriculture (USDA) Secretary Vilsack announced a renewed effort to increase program enrollment through a rate increase and increased targeting of environmentally sensitive lands, coinciding with the 2018 Farm Bill's expansion of the enrollment cap to 27 million acres by 2023 (USDA, 2021). The administration has also broadened the program's narrative purpose to include greenhouse gas sequestration to address climate change, integrating it into broader federal efforts to reduce net US emissions. But the success of this CRP expansion will ultimately be contingent on understanding and optimizing its recently underperforming enrollment mechanism, to which this paper turns its attention.

The CRP pays farmers yearly rent in order to set aside farmland for 10-15 year contracts. The intended benefits of the program are: increase alternative income for farmers, reduced commodity production in order to support crop prices, and provide environmental benefits from

reducing production on marginal lands, specifically reducing erosion, reducing runoff, and increasing soil quality. Although not the stated benefits of the program, CRP acres also help enable regional biodiversity through increased wildlife habitat connectivity and reduced fragmentation (Dunn et al., 1993).

To achieve its objectives efficiently, the competitive enrollment of the CRP, the general signup, has to set rates that are competitive with market rental rates and/or production opportunity costs for cropland which would confer the greatest environmental benefit if enrolled. The CRP accepts general signup applications through a cost-informed reverse auction system based on the environmental benefit of accepting the easement, and it features a county-specific rate cap, called the soil rental rate (SRR), which limits the proposed rental payments in application bids. Since 2007, each county's SRR has been set at the mean cropland rental rate for that county as determined by an annual survey conducted by the USDA National Agricultural Statistics Service (NASS). However, the SRR cap can negatively impact the CRP's efficiency if county rates are set too low, discouraging participation relative to opportunity cost of farming or renting the land to other producers, or too high, resulting in overspending for environmental benefits (Cramton et al., 2021).

In setting rental rates, the CRP features a largely unexamined source of administrative discretion: a county's producer-elected Farm Service Agency (FSA) county committee can submit a request to adjust their county's SRR, resulting in an approved alternative rate change. Alternative rental rates can theoretically help CRP rents adapt to the local conditions and remain competitive by suggesting rates based on local information, but the incentives of local county committees may not line up with efficient outcomes. If counties are incentivized to adopt higher rates to benefit their county's farmers, then we should generally anticipate rates to be above

efficient levels and thus there will be a higher cost for the CRP's environmental benefits. Interestingly, while initial empirical estimates seemingly approximate the efficient market rental rate, county rate appeals have been frequently implemented *and* CRP has increasingly struggled to enroll acres since its inception.

In the case of the 2010 39th CRP general contract signup, the approval process for alternates rates failed to approve rates based on sound evidence and created a lasting impact on CRP rates (OIG, 2012). 686 of 687 state-proposed alternate county rates were adopted based on state-provided evidence, which the FSA evaluated as less than strong for 97% of cases (OIG, 2012). These changes led to an estimated increase of $12.7 million in rent payments annually across the 331 counties with awardees compared to baseline rates (OIG, 2012). For the 41st cohort, the FSA carried forward many of the alternate rates previously approved and approved an additional 150 alternate rates, 45 of which were *lower* rates than baseline rates (OIG, 2012). This occurrence exemplifies at the very least a procedural failure in alternative rate setting, and it further suggests both a willingness of counties to submit rates with poor backing evidence and an ability for such rates to get enacted.

The CRP also has an additional, understudied intersection with farmer equity: since SDA farmers tend to work more erodible, marginal lands, their land is likely more desirable and more competitive for CRP enrollment (Horst & Marion, 2019). However, counties with more marginalized farmers and marginal lands should also have lower SRRs since the market rental rates which determine the baseline will be lower for worse quality land, resulting in lower returns for SDA farmers participating in the CRP. This population might face additional problems with underrepresentation on county committees which make rate adjustment decisions (Havard, 2001).

This paper is the first to assess the role of alternative rates in CRP outcomes, filling one of the remaining gaps in the CRP literature. Specifically, this paper investigates which county committees are more likely to adopt greater alternative rate adjustments and what the impact of those rates are on CRP enrollment and rental payments. Additionally, while prior work has covered the legal role of county committees (Galperin, 2020) and one study has investigated their electoral dynamics (Simonovits et al., 2021), this is the first study to connect the role of county committees in CRP administration to program enrollment.

Background on the Conservation Reserve Program

First authorized by the Food Security Act of 1985 (Subtitle D), the Conservation Reserve Program (CRP) (administered by the FSA) provides annual rental payments to contracted producers who set aside land from production and plant some form of cover vegetation, with the purposes of reducing the environmental impacts of agricultural production and for reducing the oversupply of commodity crops (Stubbs, 2014). The CRP has a maximum amount of enrollment land which has shifted over time, peaking in 2007 (Figure 4). The program is limited by this cap on acreage, rather than a budgetary cap for implementation. Land is eligible for CRP if it was cropped a certain number of prior years (requirement varies by farm bill) in addition to meeting sub-program specific requirements where relevant. CRP contracts are typically 10 to 15 years in duration, after which the enrollee can exit and put land back into production, reapply, or occasionally receive a USDA-offered extension (Stubbs, 2014). Early termination of a CRP contract requires the repayment of all rental payments plus interest and possible liquidation damages, up to the Commodity Credit Corporation's discretion (7 CFR § 1410.32). CRP contracts may require the implementation of additional conservation practices (e.g. establishing wetlands, forest cover, etc.), which FSA assists with via a 50% cost-share for those which

establish permanent cover changes (Stubbs, 2014), although this cost-share has shifted over time and over specific programs to encourage or discourage participation.

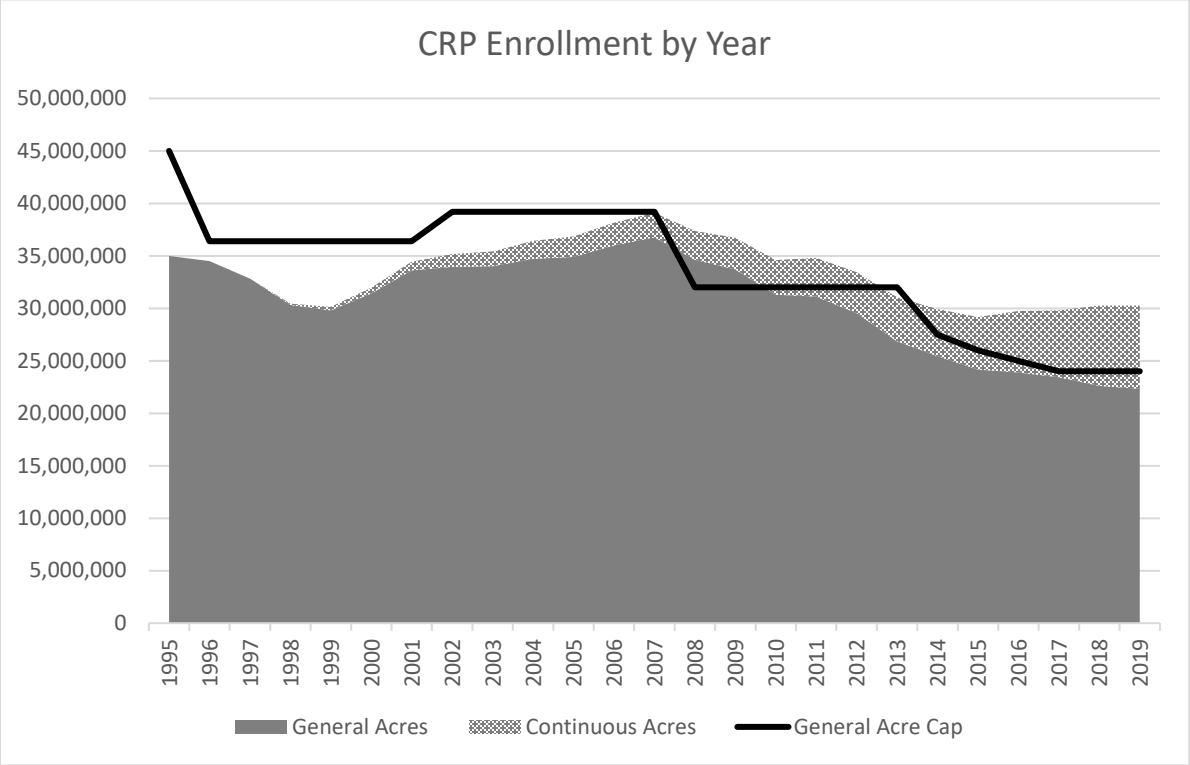

Figure 4. CRP Enrollment and Cap over Time. Data provided by FSA.

Enrollment in the CRP is optional and applicant based, and can be done via competitive general sign-up or continuous sign-up (Stubbs, 2014). Competitive general sign-up is available during specific enrollment periods, during which farmers submit applications. Annual rent payments average around $50 per acre (FSA, 2012; Stubbs, 2014). As of the 1990 farm bill, FSA accepts offers with the highest evaluated Environmental Benefit Index (EBI) in a reverse-auction based on FSA data collection and the farmer's application (Stubbs, 2014), practically implemented through establishing an EBI cutoff for accepting applications (Hellerstein, 2017). EBI is a cost adjusted measure which weighs the benefits of removing the land from production

and the cost of the proposed rental rate, although the index is not a cost-benefit analysis. The calculation of EBI criteria has changed with time, but as of 2013, criteria included (weights in parentheses) (FSA, 2013):

Wildlife Factor: expected wildlife benefits, based on cultivation of wildlife habitat (10 to 50 pts), wildlife enhancement (0, 5, or 20 pts), and overlap with geographic wildlife priority zones (0 or 30 pts).

Water Quality Benefits from Reduced Erosion, Runoff, and Leaching Point Score: location (0 to 25 pts), groundwater quality sensitivity and expected impact (0 to 25 pts), and erosion mitigation effects for surface water quality (0 to 45 pts).

Erosion Factor (0 to 100 pts): potential of land to erode due to wind or water, measured with the Erodibility Index (EI).

Enduring Benefits Factor (0 to 50 pts): likelihood of conservation practices to remain in use beyond CRP contract.

Air Quality Benefits Factor: potential to reduce airborne dust and particulates from wind erosion from cropland, including wind erosion impacts (0 to 25 pts), wind erosion soils (0 to 5 pts), location within air quality zones (0 or 5 pts), and potential for carbon sequestration (3 to 10 pts).

Since cost is a component of EBI and EBI is the criteria by which applications are evaluated, offering a lower rental rate in the application increases EBI by some degree and thus increases the chance of an application being accepted. However, the standardized EBI calculation and the implementation of a rate bid cap has largely reduced price competition between contracts.

Figure 5 illustrates the rate setting and bid process for the CRP. Rental rates are capped by county level soil rental rates (SRR); as of the 2018 farm bill, the maximum bid rate for general sign-up was set at 85% of the SRR and the maximum rate for continuous acres was set at 90% of the SRR, a decrease from 110% of the SRR under the 2014 farm bill. As of 2008, the FSA set SRR according to the average cropland and pastureland rental rate in the enrollee's county, based on the National Agricultural Statistics Service's (NASS's) annual survey of rental rates (Stubbs, 2014). SRR are generally updated each year there is a general signup period, however they still apply, even if out of date, to continuous signup acres which can enroll every year. When SRRs are updated, FSA county committees can request a change to their SRR from the FSA, who evaluates the request based on provided evidence. If a request is approved, the real rate is often a negotiated rate between the proposal and the baseline rate. These adjustments can also be extended for additional years. The FSA also adjusts SRR for counties for which they believe the underlying evidence is poor. CRP rental payments are locked in at the application's acceptance for the duration of the CRP contract, and as a consequence future changes to the SRR do not impact existing contracts. Despite these variety of mechanisms for ensuring rates for competitive applications, bids have been increasingly approaching SRR caps in more recent years, suggesting less rent price competition (Hellerstein, 2017). In this context where applicants increasingly bid at or right below the county SRR cap, setting that rate is likely quite consequential for program costs.

Continuous signup is targeted at the most environmentally sensitive land, and it does so through a series of major initiatives geared at specific conservation practices (Stubbs, 2014). Applications are rolling and non-competitive, unlike general sign-up, and thus are not contingent on EBI calculations. Additionally, continuous CRP contracts pay on average around $100 per

acre, more than double the annual rent of general sign due to targeting land that confers greater environmental benefit via enrollment (FSA, 2012; Stubbs, 2014). Starting in 2000 and expanded in 2008, some continuous sign-up programs are also accompanied by a per acre signing incentive payment (SIP) of $100 to $150 per acre at contract approval, depending on the length of the contract (FSA, 2012). The Practice Incentive Payment (PIP) was implemented for some continuous programs (largely overlapping with SIP coverage) in the same timeframe, and reimburses up to an additional 40% of the costs of implementing approved conservation practices, administered as a one-time payment after the practice is implemented (FSA, 2012).

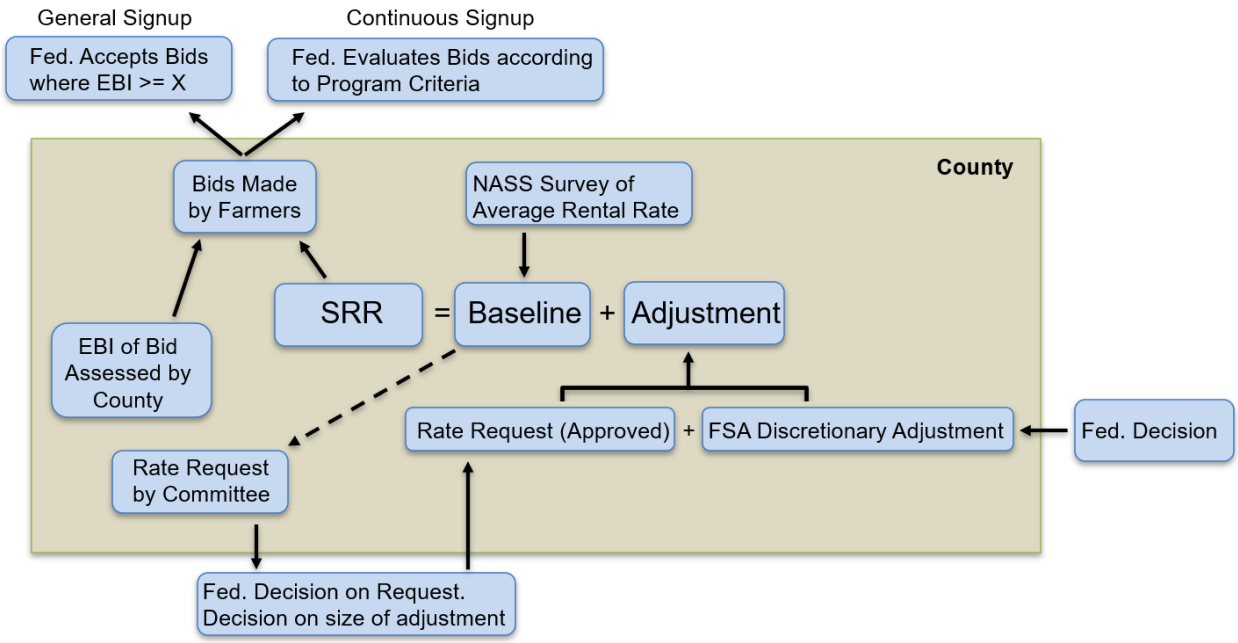

Figure 5. CRP Rate Setting and Bid Process.

FSA County Committees

FSA county committees were initially established in the 1935 farm bill (P.L. 74-46, 16 U.S.C. §590h(b)(5)) to help facilitate the local implementation of FSA policies, and in a modern context these committees share work with state and area committees. Most importantly for this

context, county committees are tasked with administering conversation programs, informing local farmers of FSA programs, serving as a two-way communication channel between the FSA and local farmers, reviewing local applications for programs, and appointing a county FSA executive (Feder & Cowan, 2013). FSA county committees are made up of producer-elected producers and have at least three and up to 11 members who each serve three-year terms up to a maximum of nine years served. The jurisdiction of a committee is either a county or less commonly a multi-county district, with election districts called local administrative areas (LAA). Currently there are approximately 7,700 elected farmers serving across committees (*County Committee Elections*, 2023). There is little to no academic research on who these committee members are, but I expect that they reflect the majority demographics of farmers: white, older men.

County committees have been a major component in programmatic discrimination over time (Hinson & Robinson, 2008). Since county committees evaluate local loan applications and are tasked with information distribution, they are a key, decentralized mechanism for systematic discrimination of farmer loans and other programs, as evidenced on the basis of race in *Pigford v. Glickman (1999)* and *Keepseagle v. Veneman (2011)*, Lantinx ethnicity in *Garcia v. Vilsack (2009)*, and gender in *Love v. Vilsack (2009)*. The power of county committees to discriminate has been historically maintained through a lack of racial representation and by essentially providing local elite farmers a governance authority to implement federal policy with minimal oversight (Daniel, 1994, 2013; Hinson & Robinson, 2008; U.S. Commission on Civil Rights, 1965). County committee elections did not include specific protections against discrimination until the 2002 and 2008 farm bills. A later rulemaking in 2012 allowed the USDA Secretary to appoint a voting member to county committees as needed to ensure fair representation of SDA

farmers (Selection and Functions of Farm Service Agency State and County Committees, 2012). For a more in-depth legal analysis of county committees, see Galperin (2019) and (2020). For an expansive cataloguing of individual stories of county committee discrimination, see Daniel (2013).

To my understanding, there has been no empirical policy or economic analysis of the role of county committees in the administration of the CRP or other programs. A lone empirical, non-causal study investigates the roll that program payments have on farmer participation in elections, tying FSA election data to FSA program payment data (Simonovits et al., 2021). The authors find that producers who received agricultural payments were more likely to vote, run, and win county committee elections, although this effect is potentially driven by the larger farmers both receiving greater payments and being more involved in county committee elections. The authors also find that conservation payments had a lesser impact on voting behavior compared to price support payments, indicating that the CRP may be less salient business in the eyes of producer voters compared to other programs which have more temporally dynamic payouts.

Theory and Hypotheses

There are at least two potential economic rationales for county rate adjustments. (1) County cash rent rates likely do not reflect changes in commodity prices. If so, then NASS baseline rates will not enable CRP rates which are robust to higher crop prices. (2) Baseline rates may be systematically estimated incorrectly. In either case, alternative rates could be more efficient than baseline rates, although these rates are subject to the expertise of county committees, as well as any biases and incentives they face. In the optimal scenario, alternative

rates are a failsafe against improperly specified rates. However, I theorize a number of potential biases that incentive rate adjustments towards inefficiency.

We may expect local counties to specify inefficient rates since they are not accountable for per-county CRP costs. Instead, they are limited by a rule that CRP land cannot exceed 25% of county cropland. The cost of providing higher than efficient rates is born by the federal government and is external to county benefits. Counties are theoretically encouraged to set a higher alternative rate to increase the number of enrolled acres up until the land cap, local farmer income transfers, and realized local environmental benefits.

County committees may also obtain benefit from the goodwill or fiscal success of farmers in their county. Since CRP rent constitutes an income transfer to participating farmers that depends on the county rate, the county agency can increase the maximum transfer and marginally increase the number of enrolled plot-farmers by specifying a higher rate. Since county committee members are farmers themselves, they may have a conflict of interest in setting CRP rates higher to enable higher payments for their own fields or fields of friends or family. Alternatively, county committee members may seek to lower CRP rates so that lesser CPR enrollment leads to a smaller distortion on land values, and thus they can purchase additional land more cheaply. Both positive and negative rate adjustments are present in the limited rate data published prior to this analysis (OIG, 2012).

H1: On net, alternative rates will raise rental rates above SRR rate estimates.

County committees may also be incentivized by organized farmer interests who exert pressure on them to enact a higher or lower CRP rate. These interests may offer bribes, side-payments, and pecuniary or non-pecuniary benefit in exchange for a rate change. Farmer

organizations could lobby for higher rates to increase CRP returns to their members, while businesses that serve farm production, such as input suppliers, could lobby for lower rates in order to marginally increase acres in production and thus the market for their services. Business influence could also be indirect through public messaging campaigns and advertising to farmers. Additionally, this may have equity concerns, as counties with more white male farmers may be able to better leverage their greater existing resources to accrue greater CRP benefits for farmers in their counties.

The potential for counties to appeal for lower rates, and past examples of this occurring, creates a situation in which county officials can hamper enrollment outcomes and reduce farmer alternate incomes. Lower rates may intersect with the historical underrepresentation of socially disadvantaged farming groups in governmental programs, wherein a comparative lack of resources/organization and potential rate disparities may result in adverse outcomes on aggregate for black, Hispanic, Asian-American, and/or Native American farmers. It is possible that SDA farmers are not well represented in county committees which make the alternative rate setting decision, which have historically been white-dominated (Havard, 2001). While the federal government has the authority to increase SDA representation through appointing an additional SDA committee member, the effectiveness of the solution require: (1) the federal government monitoring county representation, (2) actual usage of the provision, (3) the new board to be numerically representative of SDA farmers through a single appointment, and/or (4) the committee takes the appointed member's input seriously. Additionally, it is possible that socially disadvantaged farmers are concentrated in specific counties which also have lower average rents, which would lead SDA farmers to receive less payment per acre of conservation land.

H2: Counties with a higher proportion of white farmers will have a greater chance of having alternative rates above survey rate estimates.

Using the economic rational that higher rental rate offers will induce greater program uptake, I hypothesize:

H3: Alternative rates which are higher than survey rate estimates will increase CRP enrollment, all other determinants equal.

Methodology

Data

This paper will draw on yearly data on CRP rental rates, average market rental rates, CRP enrollment and payment data, FSA county committee elections, and county-level economic indicators from 2008-2022. I have obtained NASS's baseline SRR survey rates and county-level alternative rates from the FSA/ERS. The NASS survey was not conducted in the years 2015 and 2018, although this does not endanger the analysis as no general acres were enrolled or reenrolled in fiscal years 2016, 2016, 2018, or 2019. I also have data on which counties submitted alternative rate requests for 2015-2023, as well as the used rate and the rate adjustment, if approved. The quality and availability of rate request data prior to 2015 is poor. Additionally, I do not have data on the actual rate which was requested, and this request rate cannot be inferred from the data since the approved rate is often a negotiation between the request and the initial base rate. In addition to rate requests, I calculate the additive FSA discretionary rate adjustment by comparing the base rate, based off NASS's survey of county rental rates and FSA approximations of rental rates for non-surveyed counties, to the rate in use. For counties with alternative requests, I calculate this additive adjustment by subtracting the

negotiated rate from the rate in use. For 2008-2014 I do not have data on which counties submitted requests, but the difference between the base rate and rate in use is a combination of the alternative rate adjustments and FSA discretionary adjustments. Additionally, I have data on CRP entry, exit, and reenrollment data by county and by general vs continuous CRP contract type. Notably, calculations of CRP land flows from this data do not exactly match reported acres, perhaps due to uncaptured attrition or delayed entry to the program. Additionally, I have yearly data from the FSA for 2007 through 2019 on elections for county committees, which covers votes cast, eligible voters, and candidate breakdown by race, ethnicity, and gender at an aggregated state and national level. Missing from this data is a demographic breakdown of candidates and eligible voters by county, which could directly test the influence of demographic representation of committees on alternative rates. I am currently obtaining this demographic breakdown as well as election data for 2020-2022 via a FOIA request.

I include estimations of the number of eligible acres for enrollment in the CRP general signup by county, as provided by Seth Spawn of the University of Wisconsin Madison Global Land Use and Environment Lab. CRP eligibility changes over time and is defined in the most recently passed farm bill for each year. General acres must be planted in four of six prior crops years, a fixed time range set by the farm bill, and must also be classified as highly erodible land (HEL) (an Erodibility Index of 8 or higher), with the FSA providing a special layer of this classification. The main limiter for calculating eligibility is that relatively accurate estimations of cropland cover, the Cropland Data Layer, only go as far back as 2008. As a consequence, for signup years before the 2018 farm bill, I do not have sufficient data to fully calculate eligibility for multiyear grasses, which are excluded from eligibility if they have been planted for longer than 12 years. The estimations for 2019-2022 account for HEL, four of six years farmed from

2012 to 2017, and inclusive of multiyear grasses. Estimations for 2015-2018 account for HEL and four to six years farmed from 2008 to 2013, but do not include multiyear grasses. In a future appendix, I will present the sensitivity of different eligibility determination strategies.

I also account for programmatic payments and crop disaster assistance which might be related to CRP uptake. I include aggregate crop insurance payouts to farmers from the USDA's Risk Management Agency as the most comprehensive accounting of crop losses, including losses due to weather, wildlife, a decline in prices, etc. The remaining programmatic payment data is provided by the FSA, which details individual payments to farmers across a diversity of programs. I manually coded these programs into the following categories and aggregated by county: crop disaster payments for uninsured crops, decoupled/counter-cyclical payments, market fluctuation program payments, payments from COVID and 2019 trade war mitigation policies, disaster payments to diary/livestock (excluded), disaster payments for forestry (excluded), conservation payments (excluded), and miscellaneous payments (excluded). The included program payments help account for the impact of federal agricultural payments, including a quantification of crop loss.

Finally, I include the demographics for the primary producers of farms in each county, based on the 2017 census. I include the total number of primary producers as well as the percentage of primary producers that are black.

Research Design

All analysis was conducted in R (v4.2.3). First, I employ descriptive statistics in order to assess the characteristics of counties making rate requests, as well as the distribution of those rate changes themselves. Since rate requests are only available for years 2015-2022, my descriptive

analysis of 2008-2014 is limited. Additionally, I separately analyze descriptive for pseudo never-taker counties, or those counties which had no CRP acres prior to a rate request. To my understanding, this is the first presentation of the descriptive distribution of county alternative rates.

Second, I use coarsened exact matching (CEM) in order to causally compare counties with approved rate requests to similar counties without approved requests (Iacus et al., 2012). CEM matches observations along an *n*-dimensional matrix, where *n* is the number of matching variables. Matching variables are divided into bins, in my case using the Sturges' rule, which comprise the strata (cells) of the matrix. Strata which contain at least one treated and one control observation are keep, and those observations are output as pairs. For robustness, I use both many-to-many matching technique in which strata with any number of treated and control observations are used (so long as each has at least one) as well as a k-to-k matching technique (still matching on counties), in which strata are restricted to an equal amount of treated and control observations. Additionally, I run the CEM separately for positive and negative rate adjustments treatments in order to preserve a unidirectional influence. For each specification, I think take the average treatment effect on the treated (ATT) of the outcome variables: the number of CRP offers made by applicants (*offers*), the total enrollment across both general and continuous signup acres (*enroll, all*), the total enrollment of general signup acres (*enroll, gen*), the total enrollment of continuous signup acres (*enroll, cont*), the total number of reenrolling acres (*reenroll, all*), and the total number of newly added acres (*newly added, all*). I match on the following variables: baseline rate (before adjustment), number of general CRP acres in the past year, number of continuous CRP acres in the past year, number of acres expiring this year, estimated number of acres eligible for CRP enrollment, estimate number of acres in agricultural

field crop production (excluding orchards and forestry), summed of decoupled/counter-cyclical payments, crop disaster payments, compensation payments for COVID-19 and international trade disputes, number of primary producers in 2017, and percentage of black primary producers in 2017. I specify a binary bin for percentage of black primary producers[1] and a bin structure for baseline rate which increases in bin size as rate size increases.[2]

A limitation of the above CEM method is that it computes an ATT for a binary treatment, and thus the effect is on having an approved rate request regardless of size. Within each strata output by the CEM process, I construct manual pairs where counties are more tightly matched on their baseline rates, relative to coarsened matching. I employ two criteria for manually matching within strata: (1) the difference between the treated and control baseline rates must not exceed in absolute value 30% and (2) the real rate of the treatment county exceeds the real rate of the control county by at least 1. I then divide the treatment effect for each treated unit by the real rate difference between treated and control counties, resulting in an average marginal treatment effect (AME) on the treated, per dollar of rate adjustment. Notably, this method assumes a linear supply response function within strata.

Additionally, I test differences in the racial composition of counties by approved alternative rate requests. To do so beyond descriptive statistics, I rerun the CEM model and omit the percentage of black producers from the matching variable. I then estimate the effect of having an approved alternative rate on the counties percentage of black producers.

[1] Black primary producer break points: 0, 0.05, 0.5

[2] Base rate breakpoints: 5, 10, 20, 30, 45, 60, 80, 100, 130, 170, 220, 280, 330, 385.

Descriptive Results and Discussion

Trends in Alternative Rates over Time

Descriptive analysis of CRP rates shows clear deviations in the setting of rates over time (Figure 1), which includes both positive and negative rate adjustments. I differentiate between three types of rents: "baseline" rates which match NASS rates ("nass_base"), alternative rates which differ from baseline rates and start in the given year ("new_alt"), and carryover rates which are rates which are held over from the prior year and differ from the current year's baseline rate ("carryover"). The data generally exhibits a cyclical change in rates, which reflects that rates are generally updated prior to a general signup, but sometimes are updated in years which only have continuous signups (Table 1). Carryover rates have a higher occurrence in years where rates are not updated but are still present in years in which rates are updated. However, these carryover rates are still consequential because they affect the payment rate for continuous sign-up acres, which have yearly rolling admission. By extension, while rate setting can match cleanly to yearly data for general sign-ups, continuous signups often face differing rates in a given year before and after the rate adjustment for the coming general sign-up. However, starting with the Trump administration in 2017, carryover rates which differ from the NASS estimates mostly disappear.

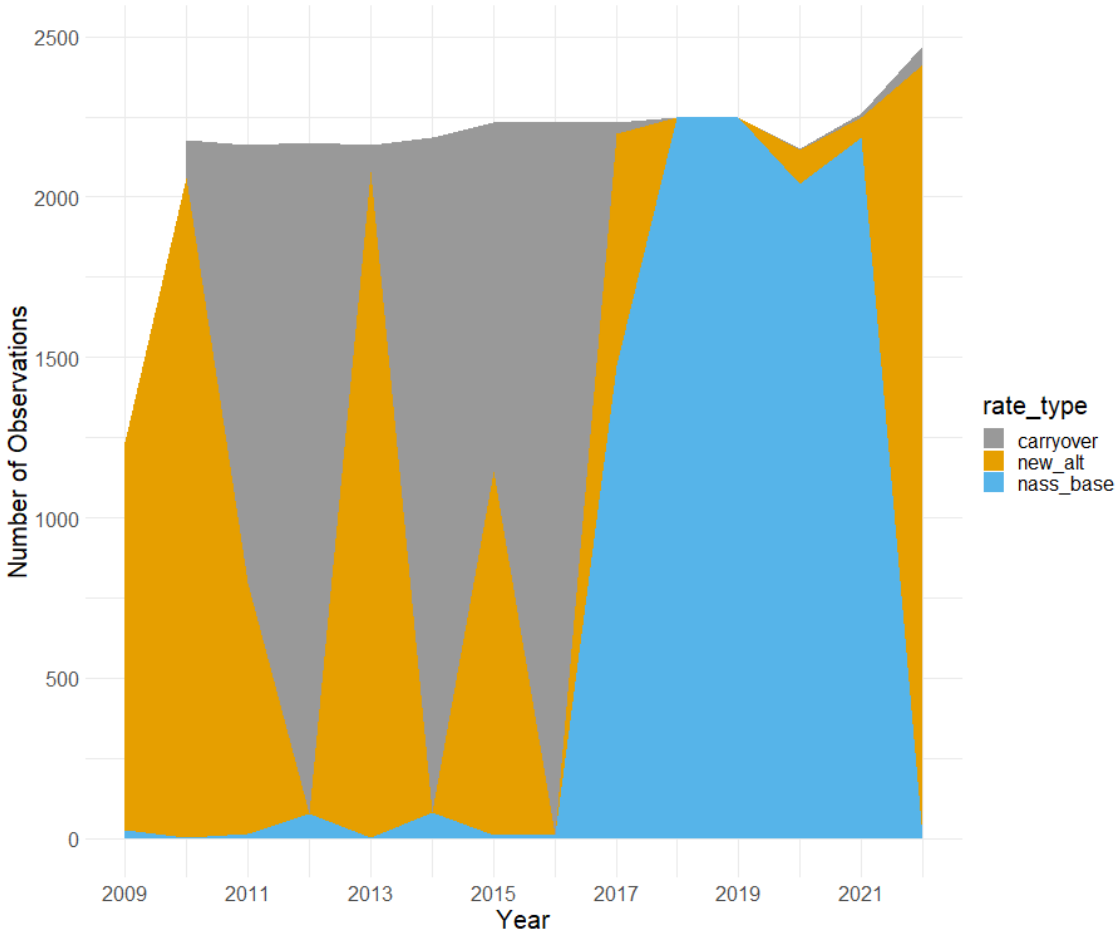

Figure 1. Change in Proportion of Rate Type by Year

Table 1. Rate Adjustment and General Sign-Up Dates, since 2009

Year	Sign-Up	General Sign-Up Dates	Date of Rate Adjustment	Requests Made	Requests Approved	Approval Rate
2009		---	9/3/2009	N/A		
2010	39	8/2/10-8/27/10	7/29/2010	687	686	99.9%
2011	41	3/14/11-4/15/11	3/5/2011	No data available		
2012	43	3/12/12-4/13/12	---	N/A		
2013	45	5/14/13-6/14/13	5/11/2013	No data available		
2014		---	---	N/A		
2015		---	---	N/A		
2016	49	12/01/15-2/26/16	6/1/2015	103	103	100%
2017		---	10/23/2017	N/A		
2018		---	6/3/2018	N/A		
2019		---	---	N/A		
2020	54	12/09/19-2/28/20	12/2/2019	168	96	57.1%
2021	56	1/4/21-2/12/21	12/1/2020	178	140	78.7%
2022	58	1/31/22-3/11/22	1/31/2022	301	300	99.7%
2023	60	2/27/23-4/07/23	[Unknown]	432	419	97.0%

During the Obama Administration (2008-2016), there are less than a 100 instances of matching NASS survey rates. This indicates that the Obama administration routinely and with great quantity approved county alternative rates and/or the FSA altered rates at their discretion without county input. This large adoption is in part reflected in the initial implementation of the alternative rate process in the 39th signup, which saw 687 rate requests and 686 approvals. The 39th signup was the first general signup under the 2008 farm bill's new rate system, with the first NASS survey conducted in 2008 and applied to rates in 2009 (Table 1). Under this administration, the NASS estimations were functionally a baseline and rarely the final rate in themselves. The 49th signup is the first sign-up under the Obama administration for which we have reliable data, and for it the FSA approved all 103 rate requests. In contrast, the Trump administration entertained no rate requests until late 2019 with the 54th signup and late 2020 for the 56th signup, which had 168 (57.1% approved) and 178 requests (78.7% approved) respectively. Additionally, the Trump administration oversaw a number of FSA discretionary

rate changes in late 2017, without a general signup, which were then reverted to baseline rates for 2018 and most of 2019. The Biden administration has overseen both an increasing number of requests and request approvals over time, with approvals at 300 in 2022 and 419 in 2023.

Next, I turn to a peculiar feature of rates prior to 2017: initially positive adjustments become negative in subsequent years. A "carryover" rate results when a rate change away from the NASS base rate is enacted in one year and then is used for one or more of the following years. Many carryover rates occur because there is not a general signup every year and thus the FSA does not update rates yearly. In years where rates are not updated, new NASS estimations of the baseline rates are not implemented, and the FSA does not allow counties to make alternative rate requests. Figure 2 plots the distribution of initial rate adjustments and carryover rates, including (indistinguishably) both alternative requests and FSA discretionary adjustments. Figure 3 plots the same data but only for rate adjustments which are positive in the initial year. Although rate adjustments are typically positive and modest in magnitude, 2480 initially positive rate adjustments result in carryover rates that become negative adjustments in at least one subsequent year (34.1% of all new rates, 35.8% of all new positive rates), considering the new NASS estimations of the baseline rate. As a consequence, rate adjustments intended to increase benefits for farmers applying for general CRP acres may effectively penalize the next year's applicants for predominantly continuous CRP acres in some counties, where baseline rate changes surpass the alternative rate's adjustment. Notably, counties without a rate deviation from the NASS baseline also do not update during off-years, meaning they face an effective adjustment equal to the difference in the current NASS baseline and the NASS baseline of the last rate setting period. Such rates are not included in Figures 2 and 3.

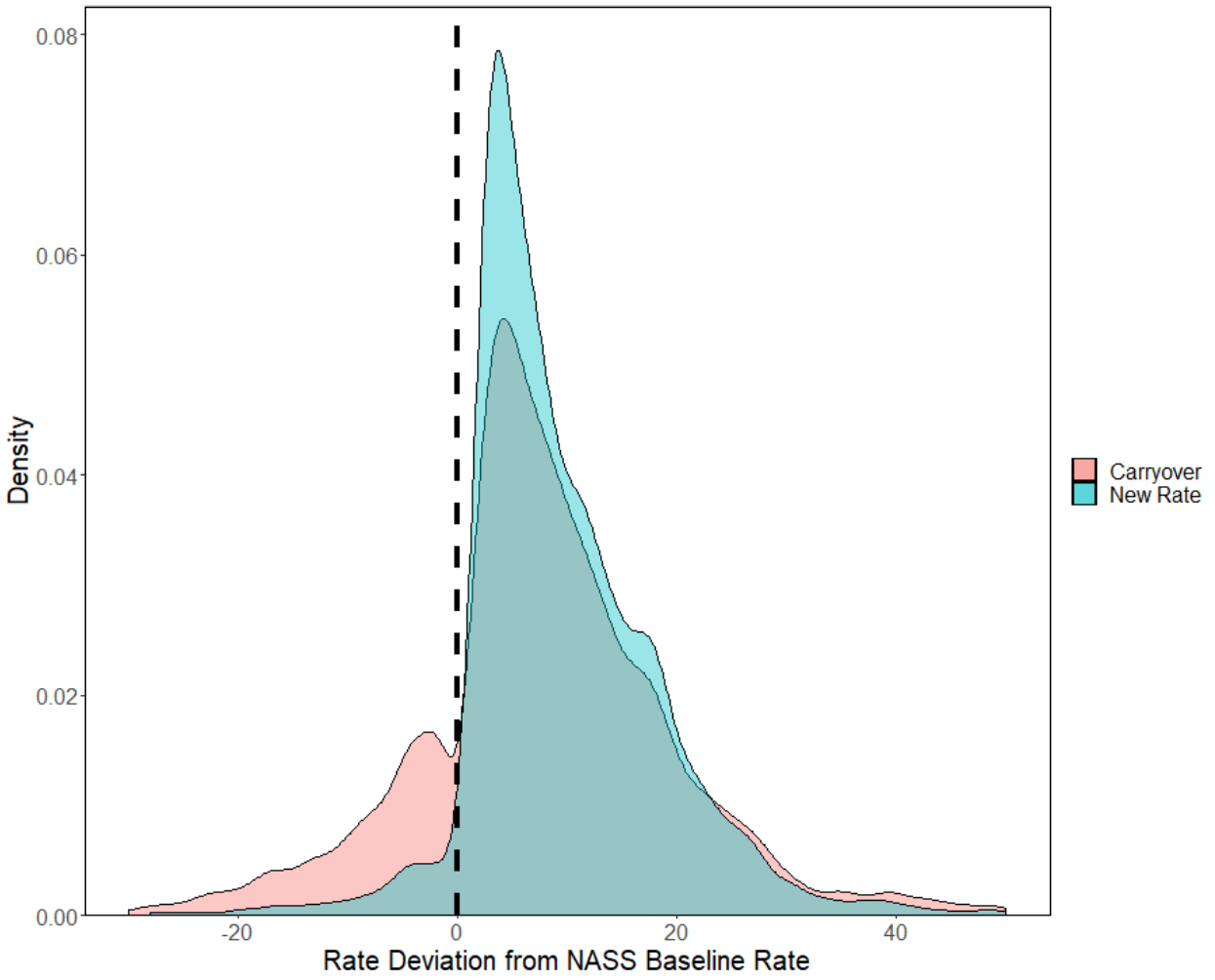

Figure 2. Histogram Distribution of New Rate Adjustments and Carryover Rates, 2009-2016, on County-Year Observations. Rate change tails below -30 and above 50 are trimmed for visualization.

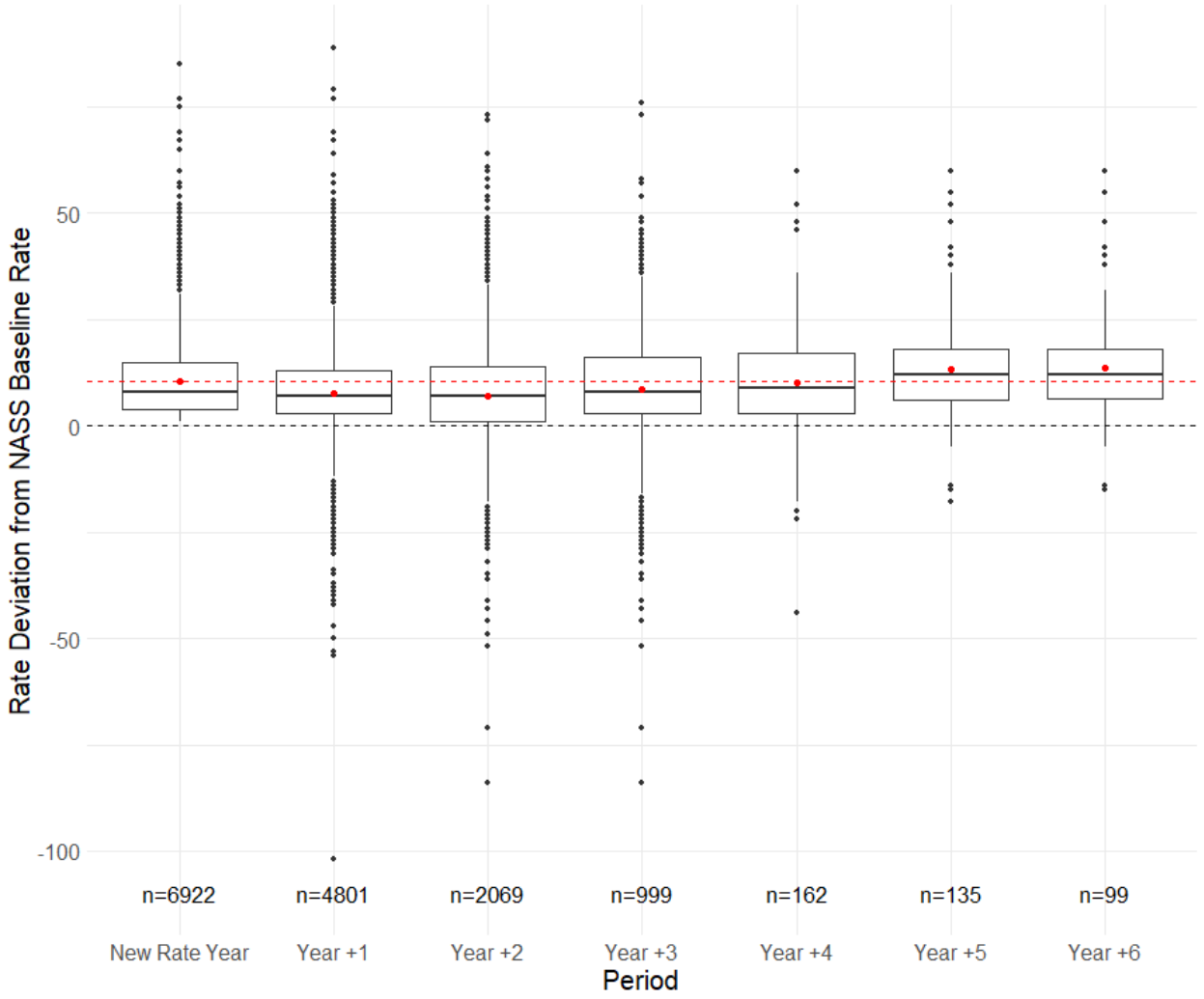

Figure 3. Boxplot Distribution of New Rate Adjustments and Carryover Rates, 2009-2016, for County-Years with Initially Positive New Rate Adjustments. Red dots show the mean of each period, and the red dotted line indicates the mean of the first period.

Descriptive Trends in Rate Requests

Next, I turn attention to one potential explanation for rate requests: counties may request rates in order to increase participation in the counties which do not participate in the CRP. For 2015-2021, a total of 100 county-years had both a rate request and no CRP acres in the prior year. 85 of these 100 requests were approved (85%), and all were positive except for three

adjustments at -109 (-87% change). Figure 4 plots the absolute change in rates due to the rate request and Figure 5 plots the percentage change in rates. Despite large rate changes—both in absolute and percentile terms—for a number of counties, only a single county had subsequent CRP offers. The sole county offered 70.7 acres and had all acres accepted into the program.

After subsetting to only county-years with some participation in the CRP, I observe 414 requests from 2015-2021. 327 of the 414 rates were accepted (79.0%) and 37 were negative adjustments (8.9%). Figure 6 plots the absolute change in rates due to the rate request and Figure 7 plots the percentage change in rates. These rate distributions indicate that most adjustments are small in real and percentile terms, a number of rate adjustments greatly exceed the baseline rates. Positive rates adjustments that add between 25% and 100% of the baseline rate are prevalent, indicating that there is sizable rate variation which could translate to CRP enrollment effects.

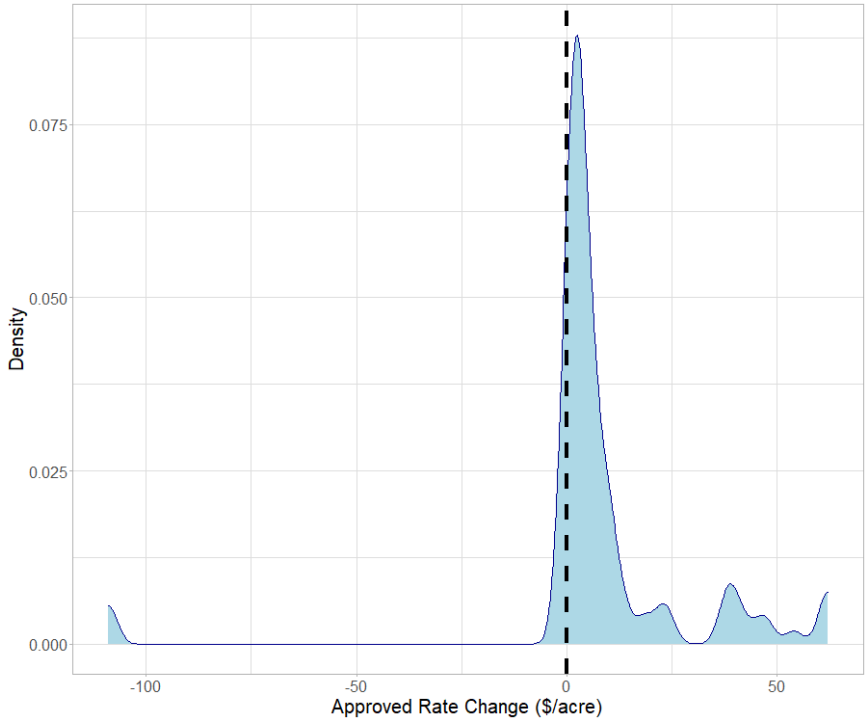

Figure 4. Distribution of Approved Rate Changes for Counties with No Prior CRP enrollment, absolute. 0s not included as approved rate changes.

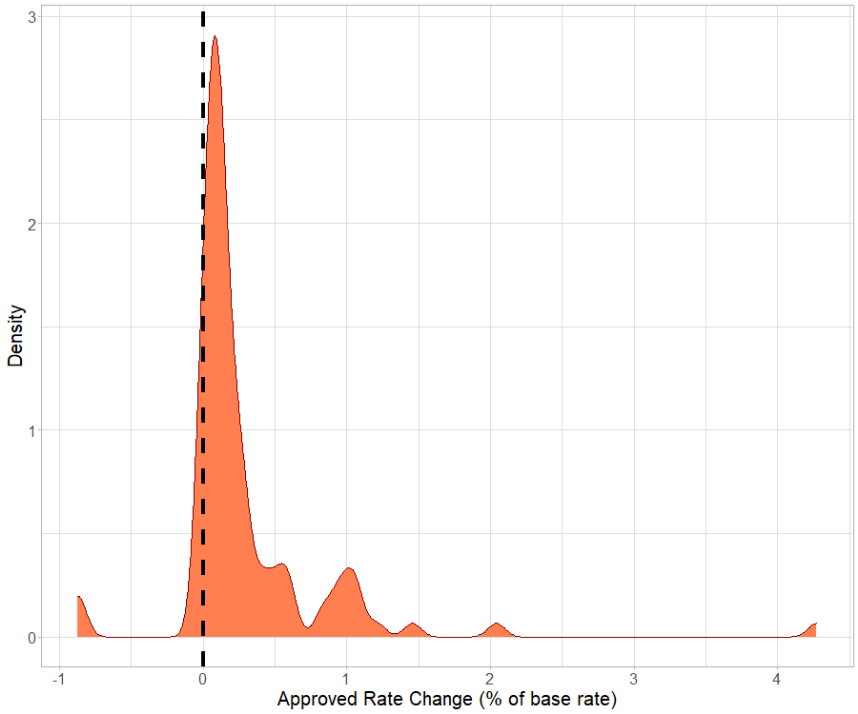

Figure 5. Distribution of Approved Rate Changes for Counties with No Prior CRP enrollment, percentile. 0s not included as approved rate changes. 1 means +100% change (apologies, I will change the scale in the next draft).

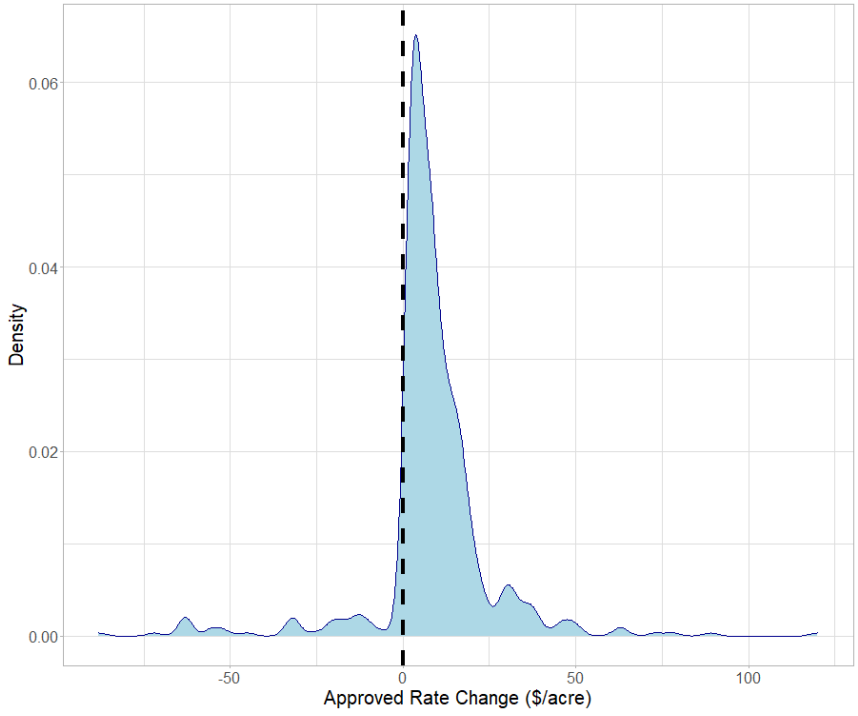

Figure 6. Distribution of Approved Rate Changes for Counties with Prior CRP enrollment, absolute. 0s not included as approved rate changes.

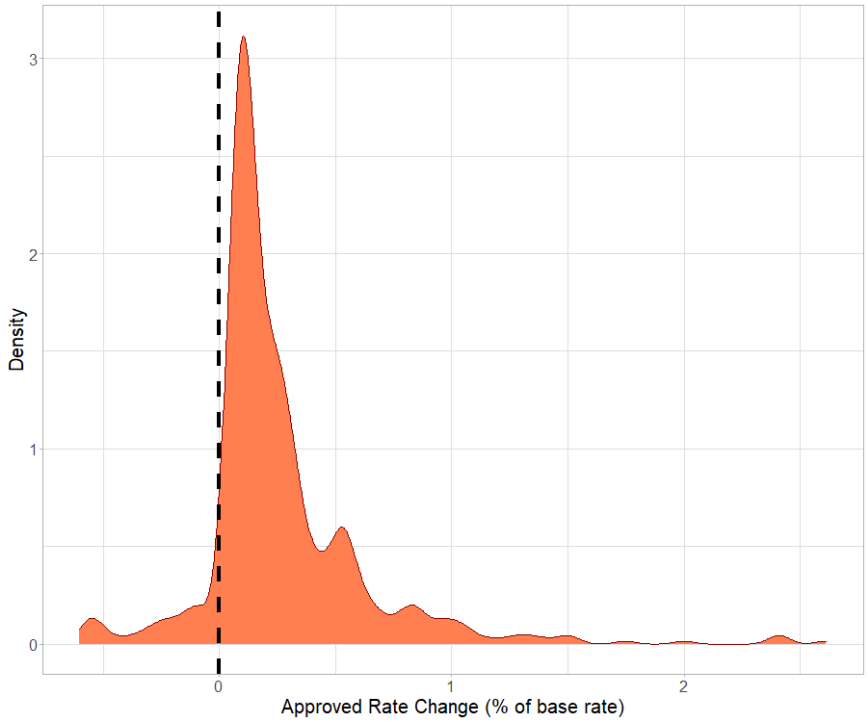

Figure 7. Distribution of Approved Rate Changes for Counties with Prior CRP enrollment, percentile. 0s not included as approved rate changes. 1 means +100% change (apologies, I will change the scale in the next draft).

Descriptive Differences Between Counties Based on Request Status

As the first step in understanding which counties apply for rates and what the impact of those rates are, I calculated the means for a number of variables of interest across counties based on if that county: did not submit a request, did submit a request, and if that county had an approved request. Table 2 displays the difference in means. In order to narrow the sample down to a more comparable subgroup, I apply the prior subsample where I only include counties with some prior CPR participation, specifically where "CRP Acres All, lag" was nonzero. Additionally, I remove 12 states in which no county ever requested an alternative rate (AK, CT, DE, FL, HI, LA, MA, NV, NJ, OK, SC, WV), Washington DC, and the US territories.

In interpreting this table, it is first important to point out that the number of CRP eligible acres is largely balanced across categories, indicating that rate requests are likely not driven by how many acres could be enrolled in a given county. Similarly, the number of producers is relatively balanced, as were the number of acres enrolled in continuous CRP were relatively balanced. Rather, those counties with greater participation in CRP general signup appear to be more likely to make requests and have those requests approved.

In this coarse descriptive table, counties with greater numbers of agriculture acres (and a history of CRP participation) are likely driving the results. These counties tend to have lower real base rates and participate more in general signup. Evidence for this is seen in the higher program payments values across program types. While CRP eligibility is relatively balanced, there is perhaps a countervailing force in that counties with lower more marginal production will tend to have a higher % of acres eligible. Additionally, counties who made rate requests had a much higher likelihood of submitting past requests and getting past requests approved.

For the other variables, we see that both counties that make a rate request and counties with an approved rate request have on average a lower proportion of black primary producers. In terms of outcomes, we see that counties with requests and/or approved requests receive more CRP offers and specifically more general signup offers. In contrast, continuous signups do not appear to be as sensitive to rate requests and changes. Election variables appear to be balanced across rate request status, although I currently only have election data for the 2015/2016 and 2020 signup periods and thus the election data only covers approximately 23% of the rate request data.

Table 2. Summary Statistics by Alternative Rate Request Status, means reported. Data for 2016, 2020, 2021, and 2022. For all counties with prior CRP acreage >0 and states with at least 1 alternative rate request in the time period.

	No Request	Request	Approved Request	Used in CEM
CRP Acreage (acres)				
CRP Acres All, lag	7,565	17,478	18,694	
CRP Acres Gen, lag	4,385	13,308	14,452	✓
CRP Acres Cont, lag	3,053	4,041	4,092	✓
CRP Acres Expiring All, lag	779	2,852	3,073	✓
CRP Acres Expiring Gen, lag	613	2,674	2,897	
CRP Acres Expiring Cont, lag	166	177	176	
CRP Acres New All, lag	281	575	644	
CRP Acres New Gen, lag	85	387	432	
CRP Acres New Cont, lag	196	188	213	
CRP Eligible Acres (Approx)	45,622	46,367	45,462	✓
Cropland, lag (acres)	383,177	566,168	557,235	✓
Other Program Payments (total $)				
Crop Disaster Payments (uninsured)	383,177	566,168	557,235	✓
Crop Insurance Payments	3,271,558	5,188,055	5,061,218	✓
Decoupled/Counter-Cyclical Payments	2,101	696	775	✓
Market Fluctuation Program Payments	1,612,046	2,145,723	2,004,161	✓
COVID/Tradewar Payments	4,804,222	4,541,751	4,080,005	✓
Demographics				
# of Primary Producers	1,141	1,107	1,106	✓
% of Primary Producers Black	1.11%	0.68%	0.56%	✓
Outcomes (acres)				
CRP Offers	900	3,425	3,790	
Added CRP Acres: Gen (Excluding 2022)	617	2,045	2,351	
Added CRP Acres: Cont (Excluding 2022)	383	494	497	
Rate ($/acre, annual)				
Base Rate	92.3	56.1	53.5	✓
Used Rate	96.7	65.0	63.7	
Election Data, LAA Avg by County (2016 and 2019 only)				
Number of Elections, Lag	0.91	0.93	0.92	
Avg Number of Candidates Per Election, lag	1.57	1.59	1.58	
Sum of Votes, lag	70.96	63.76	62.75	
Vote Share for Winning Candidate, Avg, lag	0.65	0.71	0.71	
Past Requests				
Request Last Year	3.02%	24.95%	25.59%	
Request Any Prior Year	8.98%	38.34%	39.87%	
Approved Request Last Year	2.03%	20.80%	21.11%	
Approved Request Any Prior Year	7.52%	33.45%	34.54%	
N	8120	650	562	

CEM Matching

I run four CEM models estimating the difference in county-level CRP offer and enrollment outcomes by alternate rate request status (Table 3). The full CEM and k-to-k models consistently estimate that a positive rate adjustment has a positive ATT for offers, enrollment across categories, reenrollment, and new acres for the following signup. In each of these models, 2022 is included only for offers. These models indicate that the binary effect of having an approved positive rate request has a greater impact on general acres (309.87; $p<0.001$) vs continuous acres (42.27; $p<0.001$) and a greater impact on reenrollment (266.08; $p<0.001$) than new acres (86.26; $p<0.001$). I report the distribution of the treatment effects on enrollment in Figure 8, which demonstrates that many counties have no treatment effect or a slight negative one. This top heavy distribution is likely due to the pseudo never-taker counties analyzed previously and the general trend that CRP enrollment is clustered in a minority of agricultural counties. Broadly, I do not find an impact of having a negative rate adjustment on CRP outcomes, with the exception of an increased number of offers. However, these estimates are derived from a small population size when compared to positive adjustments (22 compared to 355) and thus are much more susceptible to bias from outlier observations. Additionally, within the CEM process it is possible for the treated county to have a higher real rate than the control, even though it receives a negative adjustment. Nevertheless, it is possible that this result indicates a bias from an omitted balancing variable.

Table 3. Average Treatment effect on the Treated (ATT) and Average Marginal Effect for receiving an approved positive rate request. 2022 data is included in the Offers outcome only, due to data availability.

	CEM	CEM k-to-k	CEM	CEM, Rate Matched
Type	ATT	ATT	ATT	AME
Adjustment Sign	+	+	-	+
Offers	323.68***	301.71*	404.41*	96.21***
	(53.36)	(117.36)	(144.24)	(12.45)
Enroll, All	352.34***	343.01*	118.21	78.49***
	(53.39)	(133.67)	(224.01)	(13.67)
Enroll, Gen	309.87***	291.92*	185.41	73***
	(52.42)	(133.05)	(140.62)	(13.69)
Enroll, Cont	42.47***	51.09*	-67.2	5.49***
	(9.18)	(19.41)	(123.19)	(1.3)
Reenroll, All	266.08***	267.4*	141.65	60.22***
	(48.17)	(117.22)	(191.52)	(11.66)
Newly Added, All	86.26***	75.61	-23.44	18.27***
	(12.46)	(39.85)	(62.04)	(4.29)
Treated, Matched	355	350	22	307
Control, Matched	4701	350	375	TBD
Strata	7435	7435	7322	4902

*p<0.05, **p<0.01, ***p<0.005. Standard Errors in Parentheses

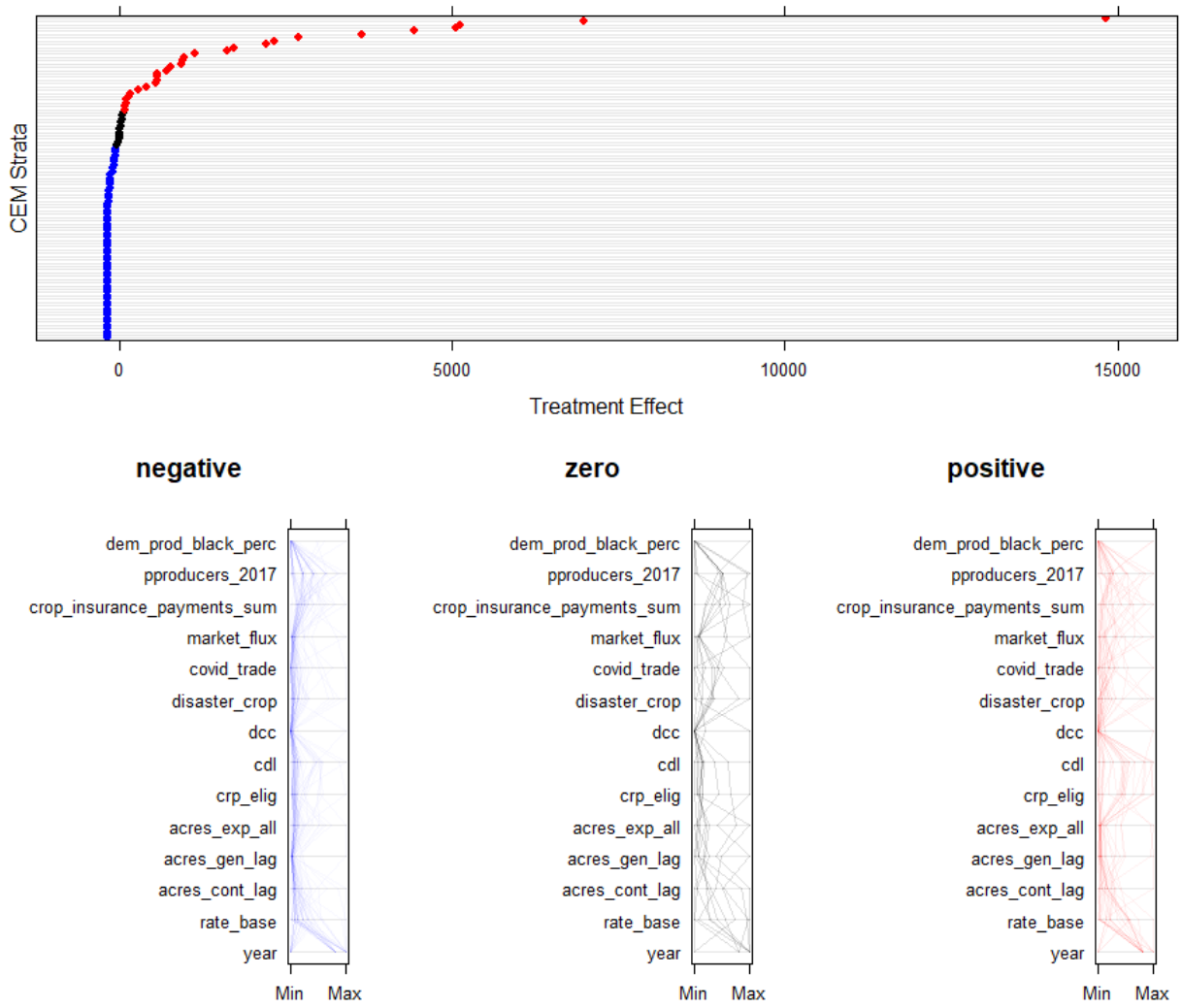

Figure 8. Map of Treatment Effects by Strata from CEM Regression: Positive CEM, Enroll All.

For the final CEM model I more closely matched on baseline rates and produced the average marginal effect (AME) for a single dollar raise in the county's rental rate. This analysis finds that each additional dollar increase in rental rate increases CRP enrollment by 78.49 acres ($p<0.001$). The treatment effect is positive across subcategories of enrollment, with the effect being strongest for general acres (73; $p<0.001$) compared to continuous acres (5.49, $p<0.001$) and reenrolled acres (60.22; $p<0.001$) compared to newly enrolled acres (18.27, $p<0.001$). The enrollment effects are slightly less than the impact on offers (96.21; $p<0.001$). Notably, this difference may in part be driven by the inclusion of 2022 in offers data but not enrollment data.

Also note that all of the AME estimates are for all matched, treated counties, many of which had no treatment effect. As a consequence, the marginal effect is heterogenous. If a county with a greater likelihood of CRP enrollment, regardless of rate change, receives an approved positive rate request, the effect size would likely be larger. In the future, I will re-estimate the marginal effect for only counties with prior CRP participation to estimate the effect of the treatment on taker counties specifically.

Race Difference in Rate Requesting Counties:

Next, I reran the binary CEM model and did not account for the proportion of black farmers. I then estimated the effect of the binary treatment on the treated county's black farmer proportion of primary producers. The results find that counties with approved alternative rate requests had a 0.5 percentage point lower proportion of black primary producers ($p=0.028$). While this effect seems small in absolute, it is large compared to the average proportion of black farmers in the analysis counties: 1.1%.

Discussion

The current system of infrequent CRP rate updates appears to generate inefficiencies for continuous acre enrollment in off-years. While the current system updates rates typically for every general sign-up, a reasonable counterfactual would be that rates automatically update to the NASS standards each year regardless of general sign-ups. The existing rate setting practice takes significant labor on the part of the national FSA, as they have to both evaluate county alternative requests and decide on a suite of discretionary rate adjustments. The advantage of this process is that it accounts for potential errors in the NASS baseline rate survey and in the best case can set more effective and even efficient rates, but carryover rates show the consequences of

this process when general signups do not occur every year. When rates are not updated, my analysis demonstrates that roughly a third of all rate adjustments flip from an initial positive adjustment to a negative one. This means that the while the process allowed for a positive improvement to applicant farmers for one year, that adjustment was eroded by the intermittent nature of rate updates. These consequences are specifically borne by farmers seeking to enroll in continuous acre contracts during non-general sign-up years, which are also the acres with the greatest expected environmental benefits. As a consequence, the intermittent nature of rate updates disincentivizes enrolling those acres which provide the greatest environmental benefit, and this structure is not being eliminated but the current discretionary scheme.

Descriptive results suggest that county CRP rate requests are not well-targeted on the basis of eligible acres, as the mean of eligible acres is relatively equal across rate request status. Rather, CRP adoption appears to be primarily clustered in a number of counties with historically high amounts of CRP acres and higher amounts agricultural acres, regardless of eligibility. Although I assess differences on multiple other variables, the observed differences are naturally correlated with higher agricultural production. Since the number of producers is relatively balanced across request status, the higher number of acres in agriculture also indicates that counties who request and potentially adopt alternative rates have a greater degree of agricultural concentration. One potential explanation for this trend is that larger farms, and thus counties with larger farms, have a higher marginal propensity to produce CRP acre than counties with smaller farms. Counties which have a greater number of agricultural acres may have a greater degree of participation in county committees who in turn can have a larger impact when adjusting rates or otherwise implementing FSA programs, compared to other counties. Theoretically, larger producers also have marginally more acres to put into CRP and the loss of a production acre is

marginally less costly to production for larger farmers than for small farmers. Higher opportunity costs due to small farm size may also help explain why black farmers have lower participation in the CRP (Jones, 1994). CRP participation, regardless of rate adjustments, may also be contingent on buy-in from local county committees and executives who help promote the program and advise farmers on the CRP. The 85 counties who received positive rate adjustments and had no prior CRP participation demonstrate that simply raising the SRR alone is not necessarily sufficient for inducing CRP participation in a county.

Positive rate adjustments lead to a causal increase in CRP enrollment across categories, which indicates intuitively that higher CRP rates do result in greater CRP enrollment. The return is disproportionally higher for general acres than for continuous acres, with continuous acres comprising only 7.0% of the per dollar effect. In contrast, continuous acres comprise 35.1% of all signups for 2016, 2020, and 2021. The heterogeneity of the effect indicates that the supply of general acres is much more price elastic than continuous acres, with the later, on average, providing greater value in environmental benefits. As a consequence, rate adjustments effectively target enrollment of lands with lower environmental benefits. However, a countervailing force is that a greater number of general acre offers increases the overall pool and should have a marginally positive effect on the FSA's choice of an EBI evaluation cutoff. In the worst case scenario, the EBI cutoff will be the same—such as if all induced offers are of poor quality—and the total environmental benefits of the enrolled CRP land will be identical but at a higher cost to the FSA. Since the CRP is funded through mandatory funding, these costs impact the federal government's overall budget and are not limited by budgetary allocations to the FSA.

To explore the implications of this effect over 2016-2021, I calculate a series of back of the envelope calculations. Positive rental rate adjustments increased general acre signups by a

total of approximately 283,532 acres, costing an additional total of between $198.8 mil and $298.2 mil for all general enrollment for their full 10 to 15 year contracts (respectively), excluding any rare post-contract rate changes. For continuous acres, positive adjustments result in approximately 38,083 additional acres, costing an additional total of between $36.9 mil and $55.4 mil for all continuous enrollment. These estimates put enrollment derived from alternative rates are approximately 321,615, or roughly 1.2% of the 2023 acreage cap. These are an underestimates of the total costs of acres induced by alternative rates, as it does not include cost-share and other monetary incentives for those acres.

A key limitation in the CEM means analysis is that I cannot distinguish between the marginal effect of an additional $1 in alternative rate adjustment, $1 in higher rates due to the base rate, and $1 in higher rates due to FSA discretionary adjustments, although I do estimate these effects only for counties treated with alternative rates. Assuming a linear supply function of bids, it doesn't matter where an additional dollar adjustment comes from. However, in reality the supply function of bid acres is unlikely to be linear, so the actual effect of rate changes on enrollment will depend on the supply curves of individual counties. As a consequence, the marginal impact of alternative rates will likely be greater than that of FSA adjustments.

Lastly, the finding that counties with approved rate requests happen to be more white poses a concerning equity concern for county committees. It is not clear that county boards are using CRP adjustments to discriminate against black farmers in a county who may not be represented by that board, such as by imposing a negative rate. If this were the case, this penalty would additionally impact white farmers in the county, who would have to use the same rate for their CRP application. Rather, it is more likely that black farmers are less represented on county committees and are thus less able to advocate for a rate request for their county which would

benefit their CRP applications. This result in part may explain why black farmers earning conservation payments receive approximately 50% less than white, Latinx, and women farmers (NASS, 2022). This is especially concerning since black farmers, due to a history of racial discrimination, are more likely to operate marginal land which would theoretically be more desirable for CRP enrollment (Taylor, 2018). However, it is also worth noting that despite the causal matching estimation, a number of factors may complicate the validity of this result. Black farmers are regional clustered in southern agricultural states and in general have low variation across counties. Additionally, black farmers are probably less likely to own large grain farms who have both increased economic power and more acres to enroll, although my matching method does account for farm size.

Conclusions and Policy Recommendations [work in progress]

This paper demonstrates that county committees have the power to significantly influence CRP enrollment outcomes in their county by adjusting county-level CRP bid caps. This discretionary power is contingent on both the decision-making of county committees, which is theoretically accountable to local farmer through elections, and the evaluation decisions of the federal FSA. I argue that the high budgetary and enrollment impact of county committee decisions means that this process should be characterized by transparency, scrutiny, and accountability.

Based on my analysis, I recommend that the FSA update its county CRP rates every year regardless of whether or not that year has a general sign-up. While the FSA has held a general sign-up for years 2020-23, future years may not hold a general sign-up, especially if the CRP cap were to be lowered in the 2023 farm bill or if CRP enrollment approaches the current limit. I additionally recommend that the FSA create a systematic and transparent process for the

evaluation of rate requests and the enactment of discretionary rate changes outside of rate requests. This more systematic process will additionally reduce the administrative labor required to update rates every year. Additionally, the FSA should publicly disclose both the rates that counties request and the rates that are approved. This informational disclosure would serve to better inform local farmers of how their elected committee representatives are behaving with respect to the CRP and bring additional attention to the relatively unknown roll that committees play in the rate setting process.

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