

**The Spatial Distribution of the Conservation Reserve Program:  
A Political Economy Approach**

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The Conservation Reserve Program (CRP) – overseen and administered by the United States Department of Agriculture (USDA) – is the largest federal private-land retirement conservation program on the books, paying landowners approximately \$1.8 billion annually in rental payments for idling approximately 36.7 million cropland acres in 2006.<sup>1</sup> The program was authorized under Title 12 of the 1985 Food Security Act and has been renewed and amended in subsequent farm bills. As an agricultural support program, the CRP is a tool by which landowners can effectively reduce the uncertainty associated with agricultural production on marginal land while generating a reliable, annual income from the parcel.<sup>2</sup> Additionally, retiring marginal parcels from commodity production provides commodity price support and preserves soil productivity on retired parcels. As an environmental program, the CRP provides landowners with the opportunity to be good stewards of the land, incentivizing environmentally sound agricultural practices and the installment of land cover known to have wildlife benefits and to improve soil and water quality. As legislation for the 2007 Farm Bill was being drafted and amidst concerns over federal budget woes threatening to reduce spending on

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<sup>1</sup> Agents who wish to idle land in the CRP contract to do so with the USDA. The Farm Service Agency (FSA) branch of the USDA administers the program on behalf of the USDA Commodity Credit Corporation (CCC). From Signup 1 in 1986 through Signup 30 in 2004, the program had paid or committed to paying approximately \$36 billion in rental and maintenance payments.

<sup>2</sup> Landowners can choose to retire whole fields or partial fields, depending on the type of CRP enrollment under which they contract. Generally speaking, whole-field enrollments are “general-signup” whereas partial-field enrollments (such as riparian buffers, filter strips, contour strips, living snow fences, etc) are “continuous-signup” enrollments.

agricultural programs, Secretary of Agriculture Mike Johanns announced in January 2007 that CRP qualified participants would have the opportunity to re-enroll or extend their current CRP contracts. The announcement cited the importance of the CRP and the need to ensure continued soil, water, air, and wildlife benefits on the nation's agricultural lands, and served to underscore the federal government's commitment to this conservation policy.

The CRP – a complex policy with implications for both agriculture and the environment – has been an important piece of agricultural and conservation legislation since the mid-1980's and continues to occupy the agricultural and resource economics literature. In broad terms, the CRP-related literature investigates the bidding and contracting structure of the program, the extent to which the CRP provides “open space” and public amenities, its role in land-use decisions, and whether it is efficient in achieving its stated objectives. While many facets of the CRP have been empirically explored, to my knowledge there has been no empirical treatment of the program within a public choice framework. The CRP is a federal agricultural program which allocates funds to landowners on a perpetual basis, guided by statutes borne of congressional legislation, and administered in a political environment. As such, it is likely influenced by the political market. The objective of this paper is to utilize information about the CRP's temporal and spatial distribution and the underlying political structure concurrently to analyze the program from a political economy perspective.

## **Conservation Reserve Program**

Though a precursor to the CRP – the Soil Bank – aimed to provide farm income support by controlling commodity supplies through land retirement, today’s CRP is more conservation oriented, providing incentives and annual rental payments to landowners for contractually retiring environmentally sensitive land from production for 10 to 15 years.<sup>3</sup> The program’s “green” trend is evident in its changing objectives. In the 1980’s the program took a rather narrow focus of reducing soil erosion and, to that end, enrolled lands based on their ability to do so. In the 1990’s, the program’s focus shifted to include improvement and protection of water quality and soil productivity, reduced wind erosion, and creation of wildlife habitat. Reducing soil erosion remains an important target and is by default important to achieving the other stated objectives. This section covers basic institutional details of the program and presents program changes I believe to be important in establishing a role for political economy in the CRP.

### *Institutional Basics and the General Signup*

The standard scenario is one where a landowner submits a contract to the FSA/USDA under what is known as the “general signup” to idle cropland for a period of time, often

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<sup>3</sup> There is an important distinction to be made between the owner of the land and the operator of the land. Some agents are owner-operators while others are one or the other. It should be noted then that the land owner may not be the agent writing the contract in the case where the land is rented and farmed by an operator. For purposes here, the contracting agent idling land in the CRP will be referred to as the “landowner”, regardless of whether s/he is an owner, operator, or owner-operator.

ten to fifteen years.<sup>4</sup> In order to be eligible for enrollment, the parcel must have a history of cropping, be physically and legally capable of production, and meet erodibility and capability classifications.<sup>5</sup> If the contract is accepted by the USDA and enrollment granted, the landowner will receive annual rental payments over the life of the contract and, in some cases, cost-share assistance to offset the one-time costs of converting land to meet the contract criteria. Cost-share assistance is provided for landowners who convert their enrolled land to an approved cover such as native grasses, hardwoods, specific wildlife-enhancing covers, etc.<sup>6</sup> Contracts are evaluated and payment based in-part on the type of cover established. The amount paid on the contract is the rental payment: a per-acre annual rental payment paid to the landowner for retiring the land and maintaining conservation practices on it for the duration of the contract. Both the rental payment and the conservation-type contractual obligations are determined during the offering period just prior to enrollment. The periodic enrollment of land into the CRP is called a “signup”; there have been over 30 signups since 1986.

Not all contracts offered are enrolled. Each contract is evaluated on specific conservation and environmental factors identified by program administrators to help them meet the objectives of the CRP, which include reducing soil and wind erosion,

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<sup>4</sup> There are two types of enrollment – general and continuous – that will be described in turn. Historically speaking, the general signup type has been utilized more frequently than the continuous signup.

<sup>5</sup> Erodibility and capability classifications are determined by the NRCS. Generally speaking, land enrolled under the general signup in recent years must have an erodibility index (EI) greater than 8.0 or be classified as highly erodible land (HEL).

<sup>6</sup> The type of cover established may also be referred to as a “conservation practice”.

protecting and improving water quality and soil productivity, and creating habitat for wildlife. Balancing the objectives of this program, as with other multi-objective programs, involves the use of an index.<sup>7</sup> In the early days of the CRP, when soil erosion was the sole conservation objective, a parcel was eligible for enrollment if it was identified at or above a certain “land capability classification”, an index used to determine erosion hazard (Helms 1992).<sup>8</sup> Since 1990, an “Environmental Benefits Index” (EBI) is used to weight a parcel’s characteristics and potential environmental benefits while accounting for the cost of achieving such benefits. Under the EBI scheme, each general signup offering is evaluated on seven factors determined by the FSA and Natural Resources Conservation Service (NRCS). Six of the factors – referred to as N1 through N6 – are based on soil quality, soil type, erodibility measures, potential wildlife benefits, priority areas, and the conservation practices (i.e. cover types and special farming practices) to be installed.<sup>9,10</sup> The seventh factor (N7) upon which every

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<sup>7</sup> For an accounting of the USDA’s conservation programs and the way in which they address and balance objectives, see Cattaneo, et al (2006).

<sup>8</sup> Precisely how to classify lands for the purpose of writing legislation and operating programs such as the CRP remains an issue even today; however, once a classification is established, targeting and quantifying parcel factors for the purpose of determining eligibility and weighting program objectives is straightforward.

<sup>9</sup> Not everyone agrees that the CRP is targeting the “right” environmental factors and environmental benefits can mean very different things to different agents; however, the efficiency and effectiveness of the program can only be evaluated in terms of its stated objectives and its then-current targeting scheme.

offering is evaluated is cost – the annual, per-acre rental rate the landowner receives if the land is enrolled. Each environmental factor is numerically scored and the combined score for all the factors is the contract’s EBI. In a manner of speaking, the index can be thought of as a cost-adjusted measure of environmental benefit for the parcel. Once all contracts have been fully scored they are ranked by EBI in a nation-wide pool. The Secretary of Agriculture, having knowledge of acreage caps and budget constraints, decides the “cut-off EBI”.<sup>11</sup> It is a cut-off value in the sense that all contracts meeting or exceeding that EBI are accepted for enrollment and those below are rejected. Once accepted, the contract is binding for 10 to 15 years.

The general signup enrollment process as described above seems relatively straightforward and transparent. However, there are subtleties that warrant discussion. In preparing an offer, a landowner will often meet with a local FSA representative to determine which and how many acres to enroll and the “best” conservation practices to install with the goal of maximizing returns on the land. Concurrently, the landowner formulates a per-acre annual rental rate he is willing to accept for retiring the parcel for the contract term. The rental rate at which the landowner offers to enroll the parcel is the

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<sup>10</sup> In 1990 the FSA developed the EBI to rank offers. The EBI has been revised both in the component types it accounts for (a wildlife component was added in the mid-1990s) as well as in the weights assigned to components. Additionally, the weighting and scoring mechanisms were not initially made public.

<sup>11</sup> The CRP is a program that is mandated by enrolled acres, not spending limits, per se. However, there are implied budget constraints as well as some formulation of expectations about future enrollments that drive the Secretary’s decision of the appropriate cut-off EBI. The current enrollment cap is 39.2 million acres, established by the Farm Security and Rural Investment Act of 2002.

rate he receives, much like a simple auction. This offer amount figures into the cost factor (N7). The general signup is considered competitive in the sense that landowners submit a rate comparable to a minimum willingness to accept. All else equal, the lower the rate offered, the greater will be the N7 score and the more likely it is that the offer will be accepted.

Determining what rental rate to offer and how the rate might translate to the N7 factor score is complicated in two ways. First, each parcel offered has an underlying maximum rental rate (MRR) associated with it, determined by taking an average of the soil rental rates (SRR) for the parcel's predominant three soil types, weighted proportionally. The SRRs are determined by the NRCS and vary by soil type and location. The published SRR is based on the productivity of the soil in its best agricultural use and is intended to reflect an average local cash rental rate generally paid for cropped fields with the same soil type in that area.<sup>12</sup> A soil type may have a higher SRR in one region than another – even from one county to the next – and can be adjusted over time as the NRCS deems necessary. A landowner knows when submitting an offer that the lower is his offer relative to the associated MRR, the higher will be his N7 score. Second, the Secretary of Agriculture has discretion in determining how landowners' per-acre rental payment offers will be scored and the conversion is not decided and applied to

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<sup>12</sup> CRP SRRs are not intended to reflect non-agricultural land values. It is sometimes the case that a multiplier will be added to the base SRR in determining the MRR when landowners are reluctant to tie up their land for 10 years due to land-use and development pressures unique to densely populated areas.

the offers until after all offers for a signup have been received. This conversion can vary by signup.

### *Changes to the CRP*

Until 1995 land was enrolled solely via the general signup, which was similar to that described in the previous section except that landowners were given no information on how contracts were weighted, scored, or ranked during the pre-enrollment (offering) period. After collecting all offers nationally, the program administrators determined which contracts to accept based on the expected environmental benefits and cost. This early form of the general signup was conducted during 12 discrete enrollment periods (Signup 1 through Signup 12) from 1986 to 1992, enrolling approximately 36.4 million acres of cropland. In 1990 the Food, Agriculture, Conservation, and Trade Act established national and State conservation priority areas (CPAs) and other water priority areas in which certain conservation practices could be enrolled on environmentally sensitive land. These included the Chesapeake Bay, Great Lakes, and Long Island Sound regions as well as the EPA's wellhead protection areas and other high-priority water areas. In 1997 (Signup 15) the Prairie Pothole Region was added as a national CPA and in 1998 (Signup 18) the Longleaf Pine Region became a recognized national CPA. As of 2006, over 9.6 million acres of environmentally sensitive cropland within national CPAs

were enrolled in the CRP (USDA 2007).<sup>13</sup> National and State CPAs provide payment and re-enrollment advantages to those with land in the designated areas. In many cases, both general and continuous signup conservation practices may be enrolled and a landowner with agricultural land that meets the cropping requirements and is located in a priority area may enroll without participating in the competitive offering process of the general signup.

In 1995 the general signup was revised to give landowners full information, prior to offering a contract, about how the non-cost factors of a contract would be weighted and scored. This is the EBI as we know it today, implemented for Signup 13. The factor components of the EBI and the weights applied to each have changed over time as the program's administrators attempt to target specific environmental concerns.

The following year, 1996, the USDA conducted its first "continuous signup" CRP enrollment period – Signup 14. Continuous signup enrollments generally receive higher per-acre annual rental payments than the general signup presumably because the characteristics of the land eligible for enrollment in the continuous signup make it more environmentally sensitive or more prone to erosion risks. The continuous signup is more restrictive than the general signup in the sense that only certain conservation practices are allowed, making it more of a working-land conservation program compared to the general signup, which is analogous to conservation via land-retirement. One would

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<sup>13</sup> The states included in each national CPA are: Chesapeake Bay Region (DE, MD, NY, PA, VA, WV), Great Lakes Region (IL, IN, MI, MN, NY, OH, PA, WI), Long Island Region (CT, MA, NY), Prairie Pothole Region (IA, MN, MT, SD), and Longleaf Pine Region (AL, FL, GA, LA, MS, NC, SC).

likely not enroll an entire field in the continuous signup because the eligible conservation practices are things such as stream and field buffers and wind breaks, not practices that are appropriate for entire fields. In another sense, the continuous signup is less restrictive than the general signup because the land enrolled does not have to meet erodibility classifications. Practically speaking, the continuous signup is a way for landowners to enroll partial-field buffer practices – such as riparian buffers, filter strips, living snow fences, contour grass strips, and windbreaks – while still producing on the remainder of the field. Like the general signup, continuous signup commitments are for 10 to 15 years, cost-share assistance for installing conservation practices is available, and annual per-acre rental payments are made. However, the continuous signup differs from the general signup in notable ways: 1) the conservation practices targeted often result in higher per-acre annual rental payments, 2) enrollment is granted given that the eligibility and conservation criteria are met (non-competitive enrollment), 3) the landowner receives the MRR for the parcel, and 4) there are often one-time practice incentive payments (PIPs) and signup incentive payments (SIPs) which can add significantly to the financial benefit received by the landowner. There has been an observed shift in the location of the CRP within regions that has been anecdotally attributed to the introduction of the continuous signup, which targets different land than the general signup (Bucholtz 2004).<sup>14</sup>

In 1997 the FSA authorized the Conservation Reserve Enhancement Program (CREP) to address agriculture-related national and State environmental concerns. This

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<sup>14</sup> On a national scale CRP enrollments have not shifted substantially; however, the author points to shifts within regions.

program falls under the umbrella of the CRP and, more specifically, under the continuous-signup designation. The CREP joins state and federal conservation forces to bring targeted, environmentally sensitive land into the CRP. The state pays for a portion of the annual rental payments but a majority of the rental payment, as well as cost-share assistance and technical assistance, is paid by the federal government. There are currently 37 CREP programs and though in 2006 they only accounted for approximately 900,000 of the 36.7 million CRP acres (approximately 2.4% of enrolled acres), the proportion of total annual CRP rental payments that were CREP payments was approximately 5.6%. These figures do not include the SIPs, PIPs, and other CREP financial incentives. CREP enrollments have average annual rental payments of over \$120 per acre, compared to \$88 and \$43 for continuous (non-CREP) signup acreage and general signup acres, respectively (USDA 2007).

### **Political Economy and the CRP**

The process by which offers for enrollment of agricultural land into the CRP are made, scored, and ultimately contracted upon is quite well documented and does not appear to leave room for political finagling once the program's rules and eligibility requirements have been set. However, changes to the program's rules and statutes do not occur in a vacuum, but rather amidst and likely in response to political influence. The question is whether such changes are politically motivated or borne of a purely conservationist strategy. This section starts with a brief review of the public choice literature, describes the characteristics and administrative details of the CRP I believe make it susceptible to

political influence, and then discusses the possible channels of political influence able to affect the program.

### *Public Choice Theory and Applications*

The seminal papers on the theory of the relationship among political interest, political influence, legislation and economic policy are by Stigler (1971), Peltzman (1976), and Becker (1983). While each author's contribution is unique, their theories are similar along certain lines. All reject to a degree the idea that voter preferences translate directly to political activity. Stigler (1971) and Peltzman (1976) both recognized that there exists a political market in regulation and legislation and that within this market, there are interested groups who compete for political favor and wealth transfer. Becker (1983) posited that success in the market for political influence and favors depends on the effectiveness of interest groups in increasing their relative efficiency (relative to other groups), reducing free-riding (decrease marginal deadweight costs), and achieving an optimal size relative to the taxed so that the taxed group has little incentive to become informed and form alliances to fight the subsidy. All three admit a diminishing return to group size in politics. One of Becker's insights (1983) was to recognize that agricultural pressure groups have been successful in influencing farm subsidy programs because the group being subsidized (farmers) is small relative to the number of taxpayers paying the subsidy.

Empirical applications of public choice theory, while diverse in how they account for and model political influence, face a common obstacle: how to clearly represent the

role and direction of political influence when there exists a complex and sometimes innumerable set of inter- and intra-relationships between interest groups, legislators, and congressional functionaries. Stratmann (1998) applies the theories of regulation to the issue of whether political action committee (PAC) contributions are used to influence political elections or political voting behavior. In a natural experiment utilizing PAC contributions data during an election year and off-election year, the author matches daily campaign contribution data with legislative events of importance surrounding two farm bills and finds that there is a significant relationship between voting events and the timing of political contributions.<sup>15</sup> Gibbs, Gokcekus, and Tower (2002) observed Congressional Record entries regarding legislation surrounding the Steel Import Quota Bill of 1999 and discovered that the number of lines in the Congressional Record that legislators had devoted to supporting the bill was an increasing function of political contributions from interest groups representing the steel industry and unions. Cropper, et al. (1992) uses a similar strategy in the absence of observed voting behavior to analyze the role played by political influence on pesticide regulation. By observing comments made on record during the regulatory process by interest groups (both proponents and opponents), they found that intervention in the regulatory process by interest groups does influence the likelihood and structure of regulation. Their results support the idea of a “market” for

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<sup>15</sup> Stratmann contends that the farm bill – and farm legislation in general – is an appropriate target because the legislation has narrow focus, benefits are concentrated, and costs are dispersed. He posits that it is not complicated with issues of public goods and competition from many interest groups.

political influence and that groups are able to exert influence with varying degrees of success depending on their size relative to the size of their opposition.

The application of public choice theory to agricultural subsidy programs is represented in a variety of contexts. Gardner (1987) examines historic variations in the commodity price protection afforded producers by farm price-support programs and finds that redistributive efforts attempt to minimize the deadweight losses associated with commodity price subsidies. The factors of successful influence recognized by Peltzman (1976) and Becker (1983) – interest group size, costs of organizing, and minimizing deadweight losses (which depends on the commodity’s demand elasticity) – were found to be important. Muth, et al. (2003), inventoried the history of the honey market and honey subsidy program and reconciled exogenous shocks in the honey market to political responses that ultimately worked to restore an equilibrium subsidy program. Garrett, Marsh and Marshall (2006) analyzed U.S. agricultural disaster relief programs for evidence of political influence, finding membership on House and Senate Agriculture subcommittees with oversight resulted in significantly higher levels of disaster relief being funneled to the state represented on the committee.

### *The CRP as a Political Tool*

The primary objective of this paper is to analyze the CRP from a political economy perspective to see if there is evidence that political factors affect the distribution of program benefits. There are reasons to suspect political influence on the program. Based on what we know of how lands are enrolled into the CRP, one might argue that

enrollments into the program truly must represent the most “bang for our buck” in terms of improving the targeted environmental characteristics at the lowest cost. After all, the EBI is designed to allow program administrators to enroll contracts which represent the greatest environmental benefit per conservation dollar. However, there is a literature on the environmental efficiency of the CRP that challenges that view. Babcock et al. (1996, 1997) posit that the targeting tools used by the CRP result in environmental benefits obtained at a cost higher than required under “optimal” targeting schemes. Reichelderfer and Boggess (1988) suggest that though the CRP’s stated objectives included improved soil, water, and enduring benefits, performance in these areas could be improved, perhaps even at a reduced cost. It is conceivable that we observe “sub-optimal” enrollment in the CRP for the very reasons other federal subsidy and direct payment programs exhibit distributional effects associated with political factors: politics matters. To truly understand the CRP we will have to come to terms with how the CRP operates within and is influenced by the political economy. Towards that end, the interest of this section is to identify the ways in which the CRP may be used as a political tool, of sorts, to influence the distribution (or re-distribution) of program payments and enrollments.

*1. The rental rate*      The rental rate submitted/offered by a landowner is converted to the N7 component score of the EBI; the conversion is at the discretion of the Secretary of Agriculture and is not determined until all the enrollment offers have been received. The landowner knows that the lower is his offer relative to the MRR, the more likely it is that his land will be enrolled. It is unlikely that the conversion formula could be used to

target certain offers or enrollments in certain geographic regions; past formulas have been linear transformations of the offer price relative to the MRR. However, MRRs vary by region and are updated at the discretion of the NRCS, a service branch of the USDA. To the extent that the SRRs and MRRs subject to political scrutiny or control, they can be manipulated to favor enrollment in or direct monetary benefits to certain regions.<sup>16</sup>

Recall that MRRs are based on SRRs and, to the extent that landowners face development and other non-agricultural land-use pressures, the NRCS/USDA has the authority to apply a multiplier to obtain the MRRs to entice enrollment in the program. Loosely speaking, the higher is the MRR, the more likely it is that land will be enrolled in the program, all else equal. There has been no allegation that the NRCS or USDA uses their authority in this way, but it warrants consideration.

*2. EBI component factors and weights* The components of the EBI are weighted, by points, relative to each other. The weights given to each factor can change, as can the factors themselves. Points are awarded to an enrollment offer based on the type of conservation practice a landowner proposes to install and the characteristics of land being enrolled. The fact that EBI factors and their weighting can change becomes important when you consider that land is not homogeneous. For example, suppose there two landowners in different regions – Farmer A and Farmer B – that face the (realistic) production decision of how much native grass (a conservation practice) to contract to

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<sup>16</sup> The USDA and its branches are not part of the democratic Congress; however, the USDA plays a major role in CRP policy and administration.

produce on his land offered into the CRP. Both know that the installation of native grass equals one-fifth of the EBI points. Farmer A can produce native grass at a cost of \$x per acre while Farmer B faces a production cost of \$y per acre, where  $x < y$ . If due to a rule change in the CRP the value of native grass – value in terms of points assigned to native grass in the EBI – increases relative to all other production choices (other conservation practices) then for a given production schedule – or for a given EBI score – Farmer A can produce more native grass than Farmer B, thus increasing his probability of enrolling the CRP. Put differently, landowners with a relative advantage in producing native grass will benefit from a rule change that increases the weight given to native grass while other landowners will be hurt by the rule change. Further, a congressman from Farmer A's state may have an incentive to influence the CRP such that the enrollment factors for which his constituents have advantage are weighted most favorably in the EBI scoring system. This example shows how it may be possible to favor certain land types or agricultural regions via the scoring rules and, ultimately, influence the distribution of CRP acres and payments. Again, whether or not this actually happens has not been established but it is potential mechanism for influence.

3. *The continuous signup* Continuous signup enrollments offer greater financial incentives than general-signup enrollments and enroll conservation practices that bear higher per-acre rental rates. Because continuous-signup enrollments do not have to compete in a competitive, nation-wide pool and automatically receive the MRR, given they meet eligibility and conservation practice requirements. Additionally, continuous

signup enrollments are not whole-fields, in general. Agricultural production remains intact on most of the field while the marginal areas are retired to a conservation practice. For these reasons, the continuous signup seems a likely target for political influence wishing to direct monetary benefits to certain regions. As more acres are enrolled under the continuous signup and as we observe even a slight shift in the spatial distribution of CRP enrollments, one might wonder if such changes are being driven by political forces that seek to redistribute the monetary and enrollment benefits of the program.

*4. National and State CPAs* Much like continuous signup enrollments described above, a landowner in a designated CPA receives the established MRR and, as in non-CPA enrollments, may receive cost-share allowances. Further, there is no uncertainty associated with re-enrollment after 10 or 15 years.<sup>17</sup> Enrolling in a national or state CPA is not an opportunity faced equally by all landowners because there are currently four national CPAs designated under the CRP: Chesapeake Bay Region, Great Lakes Region, Long Island Sound Region, and Prairie Pothole Region. Presumably other regions of the country have important environmentally sensitive areas that could benefit from CRP conservation efforts on private agricultural land. The process by which these four were chosen requires further research; however, regardless of whether the designation of CPAs is done via congressional legislation or administrative rule-making, they provide an interesting contrast to other general signup enrollments.

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<sup>17</sup> Non-CPA enrollments often do not earn the maximum rental rate due to the competitive nature of enrollment selection and re-enrollment is not guaranteed.

5. *CREP* CREP pays higher per-acre rental rates than the continuous or general signups and states who wish to enter into a CREP agreement with the federal government do so through the legislative process. Some states have managed to secure three CREP agreements while other states have none. Is this because the other states do not have environmental concerns they wish to address on working agricultural lands or is it the outcome of the political market? Is it the case that states with CREP agreements managed to get them by amassing political influence on the CREP designation process? The underlying interest here is not to measure equity or fairness but to understand the role the political economy may play in the administration of the CRP.

#### *Channels of Influence and Political Agents*

It is natural to think of an agricultural payments program as being monetarily redistributive and therefore a likely candidate for influence from both the agents receiving the benefits as well as those bearing the burden of the cost – the taxed. I assert that special interests and groups in the political market gain access to the legislative and regulatory bodies which oversee the CRP – the U.S. Congress and the USDA – to influence the distributive nature of the program. Though there are likely many channels of influence working simultaneously, ultimately regulatory-influencing efforts are funneled through the legislative bodies in the House and Senate with program jurisdiction and the rule-making authorities within the USDA. It is an easy-sell to hypothesize that political factors are influencing the program and talk about ways it *could* happen.

However, it's a much more useful exercise, albeit difficult, to be very specific about the types of influence that come into play and the channels by which it operates.

Understanding the role political and economic agents take and how this particular program's process operates is an important first-step in establishing a viable political economy modeling strategy.

*Congressional Political Functionaries*      The legislative Acts in which the CRP was first authorized and subsequently re-authorized are where the major statutes governing the CRP are established and revised. The congressional authority for the program lies with House and Senate committees and subcommittees with jurisdiction over the program. In the House and Senate, the Agriculture Subcommittee of the Appropriations Committee has budgetary jurisdiction. The Environmental, Soil Conservation, and Forestry Subcommittee of the Agriculture Committee in the Senate and the Conservation, Credit, and Rural Development Subcommittee of the Agriculture Committee in the House have non-budgetary statutory jurisdiction.<sup>18</sup>

The committees with jurisdiction over the CRP are standing committees – permanent entities within Congress. The members of the committees; however, are not permanent and can change with each Congressional election. Committee assignments are made in a three-part step that begins with each party assembling a panel to review

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<sup>18</sup> The subcommittee with jurisdiction within the Agriculture Committee in both houses has changed names since 1985. However, the jurisdiction is traceable to a specific committee in each congress and is typically the “conservation” or “soil conservation” subcommittee.

members' committee requests and make assignments. Assignment lists for the various committees are then approved (or revised) by each party's caucus and, finally, there is a pro forma election by the full House and Senate (Davidson and Oleszek 1990).

Representatives in both houses know that committee membership matters in terms of reelection as well as influencing legislative outcomes. Evidence of this fact is that representatives will "campaign" within their house to be awarded membership to a committee (or subcommittee) on which they wish to serve.<sup>19</sup>

*Federal Government Agencies*      Undoubtedly representatives on the committees with oversight of the CRP (budgetary and statutory) have the ability to shape the program. However, these members are not alone in their ability to influence the program. Much of the fine-tuning of the CRP (conservation practice eligibility, payment structures, soil classifications, etc) is handled by the USDA via the FSA or NRCS. While USDA personnel are not political representatives, they often work closely with representatives and congressional staffers (who are, in practice, credited as being the actual writers of legislation) in the House and Senate. Program rule-change (or new rule) proposals can be brought by anyone and to the extent that those proposing a change have political influence, the rule may or may not make it to the person with decision authority and may or may not be adopted. For example, if the Farm Bureau – a powerful non-governmental organization that represents agricultural producers – requested on behalf of agricultural

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<sup>19</sup> Davidson and Oleszek (1990) provide a good description of how committees and subcommittees function (pages 195-204).

producers Iowa in alliance with the Iowa Farm Bureau that a particular rule be changed, it is very likely that the rule would be addressed. The Farm Bureau, because of its size, membership, and political influence, works closely with the FSA and USDA on behalf of producers. Once a rule is proposed, it enters a “comment period” where public comments are recorded as part of the Federal Register. Individuals, House and Senate Representatives, companies and interest groups may all submit comments on the proposed rule. At the end of the comment period, the rule is either adopted or not, at the discretion of the administrative authorities: the Secretary of Agriculture and the USDA.

The USDA first and foremost represents the Office of the President. To the extent that the Office has an agenda or direction for the program, the USDA will follow. But especially for rule or program changes that do not carry the interest of the Office, there is room for influence from all other political functionaries: State Representatives with constituent and election concerns, interest-groups and lobbying efforts, and so forth. For any given program change, there can be many interests represented that all have to be considered. As the public choice literature asserts, the interest that prevails will be the one that is most effective at exerting influence. Influence can be campaign contributions, future voting agenda promises and other political resources.

*Agribusiness* Agribusiness in general is vulnerable to the potentially negative impact of CRP enrollment and may have an incentive to work to reduce the number of CRP acres in their operating region or even nationally. Local enrollment in the CRP is not always well-received by agribusinesses that support agricultural production such as implement

dealers, fertilizer and seed companies, and agricultural processors that rely on agricultural output. Implement dealers and fertilizer and seed companies depend on landowners' demand for their products and the agricultural producers depend on the output of agricultural production. Reduced commodity supplies and agricultural production in general due to enrollment in the CRP means less inputs from agribusiness are needed and agricultural processors (ADM and Cargill, for example) must originate more expensive grain (commodity supply control in general results in higher commodity prices) from farther distances, resulting in increased production costs. Agribusiness represents a large and potentially powerful group with much to gain and lose at the hand of the CRP. Whether or not these firms, through membership on PACs or through other lobbying efforts, are able to exert pressure on the political process in such a way as to minimize the negative impact (or increase the positive impact) of the CRP on their operations is an interesting question. It has been suggested that the shift in the geographic distribution of CRP acreage may be a result of the continuous signup and other changes to the program (Bucholtz 2004). Perhaps it is the case that agribusinesses and groups who perceive themselves to be harmed or threatened by the CRP have been influential in shaping policy decisions that have essentially moved CRP out of their regions.

*Environmental, Conservation, and Wildlife Groups*      Environmental, conservation, and wildlife groups stand to benefit from increased CRP enrollments. Pheasants Forever and Ducks Unlimited are strong supporters of initiatives within the CRP that increase habitat for pheasants and ducks. Hunting associations would be in favor of certain CRP

practices that increase wildlife habitat, as would landowners who earn additional land rents from allowing others to hunt their land. Big businesses and federal agencies do not have sole rights to the political market; non-profit organizations and other associations have access to political forces as well.

### **The CRP in a Political Economy Model**

To understand how political forces have affected the spatial distribution of CRP enrollment acres and payments, a fixed effects model is applied to state-level CRP enrollment and payments data. This section describes the data and modeling. OLS estimates of political variables for modeling alternatives are presented. The paper concludes with a discussion of the direction of future analyses.

*CRP and Land Data* State-level CRP enrollments and rental payments data for Signup1 through Signup 30 – all general and continuous signups from 1986 through 2004 – are used.<sup>20</sup> The panel consists of the number of acres enrolled under new contracts as well as the total amount of rental and maintenance payments payable to the contracts for each signup and state.<sup>21</sup> Rental and maintenance payments are dispersed annually to

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<sup>20</sup> Ultimately this research will utilize contract-level CRP enrollments and payments data obtained from the USDA Freedom Of Information Act officers. Contract-level data will be aggregated to the congressional-district level to obtain a better resolution of and matching to political factors.

<sup>21</sup> Note that CRP payments are sent to the address of the person writing the contract. In some cases – in less than approximately 1/10<sup>th</sup> of 1% of preliminary contract-level observations – the landowner does not reside in the state where the land is located. Therefore, CRP enrollment acres to a state do not correspondence

landowners who idle land under the CRP and so the total amount of payments is the amount payable over the life of the contract – 10 to 15 years of annual rental payments. The payments data do not include cost-share amount received, SIPs, PIPs, or other allowances. In the case where a landowner is re-enrolling acreage under a new contract, the acres are considered newly enrolled. However, if the landowner is extending a contract, the acres are not counted as new acres because a new contract is not written.<sup>22</sup>

From the previous discussion of the CRP and the different types of enrollments, it should be clear that the general and continuous signup types are not only different from a landowner's perspective, but also potentially differ in the terms of their susceptibility to political influence. The continuous signup program generally offers higher rental rates per acre and greater financial incentives to enroll than the general signup and, in addition, enrolls CREP contracts as well. According to public choice theory, interest groups who favor the CRP have a greater incentive to influence the regulation of the continuous signup than the general signup. To account for this, a binary variable was created to use as an interaction term with the political variables. The binary variable, CONT, equals 1 if the signup is a continuous signup and zero otherwise. Interacting this with the political variables will allow for a test of statistical significance in the way political influence affects enrollments and payments to states under the two signup types.

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perfectly with CRP payments to a state. Just how large this discrepancy is will be verified upon acquiring the contract-level data from USDA FOIA officers.

<sup>22</sup> Contract extensions have been historically allowed for an additional one or two years beyond the original expiration date on the contract. This is handled at the discretion of the Secretary of Agriculture.

To partially account for the differences in size of agricultural land in each state, data from the National Agricultural Statistics Services (NASS) were collected on the number of farmland acres per state (USDA 2007). In the NASS data sets the series is called “land in farms, acres”. In general, land is eligible for CRP enrollment if it has a recent cropping history and, as a result, some states have a higher propensity to enroll because of their larger base of agricultural cropland.<sup>23</sup> Agricultural land data from the last four censuses – 1987, 1992, 1997, and 2002 – were collected and will be used in the empirical model to deflate CRP enrollment data for each state or be a right-hand-side control variable. The number of acres in farms, as reported by the USDA, includes land enrolled in the CRP and other conservation programs.

Land, enrollment, and payments data are utilized to construct dependent and independent variables. The objective of the analysis is to test whether political representation can help explain the distribution to states of CRP enrolled acres and CRP payments. CRP enrollment and CRP payments will both be used as dependent variables and land data is used in some cases to normalize the dependent variable and in others as an independent variable.

*House and Senate Committee Membership Data* There are two committees in each of the House and Senate with jurisdiction over the Conservation Reserve Program. In the

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<sup>23</sup> The rules on cropping history have changed slightly but are variations on having cropped the land in, for example, four of the last six years. Land that was previously enrolled in the CRP is also considered eligible as it would have had to meet the cropping criterion the first time it was enrolled.

Senate, these are the Agriculture, Nutrition, and Forestry Committee and the Appropriations Committee. The Agricultural, Rural Development, and Related Agencies Subcommittee of the Appropriations Committee has direct appropriations authority over the USDA and Commodity Credit Corporation (CCC). The Forestry, Conservation & Rural Revitalization Subcommittee of the Agriculture, Nutrition, and Forestry Committee has direct control of the CRP for issues not related to spending. The House counterparts to these committees and subcommittees are the Conservation, Credit, Rural Development and Research Subcommittee of the Committee on Agriculture and the Agriculture, Rural Development, FDA & Related Agencies Subcommittee of the Appropriations Committee.

Data on membership on these committees and subcommittees as well as Congressional majority, minority, and leadership data were collected from 1983 through 2004, covering the 98<sup>th</sup> through the 108<sup>th</sup> Congress. Each Congress commences in January and serves a two-year term. The 98<sup>th</sup> Congress convened in January, 1983. The apportionment of the House since before 1980 is 435 seats, divided between states based on the current census population at the time; each state has two Senators. Binary membership variables were constructed that indicate state representation on each of the relevant committees or subcommittees as well as whether a state's representative held a leadership position, such as chairman, vice chairman, ranking minority/majority member, or speaker. Non-binary variables were constructed that indicate the proportion of a state's delegation that serves on each committee. The proportion of a state's delegation on a committee might be a stronger indication of influence than simply knowing whether

or not a representative from a state sat on the committee. Presumably the more important agriculture and agribusiness is to a state, the greater proportion of its delegation will be on the House Agriculture Committee. In the House, the proportion-of-delegation variable is continuous over the range 0 to 1 while in the Senate, the variable is discrete at zero, 0.5 or 1.0.

Each new Congress convenes in January of alternating years; however, signups do not occur neatly on January 1 of each year, nor do they always occur the same time of year or correspond with congressional elections. Some signups last a few weeks while others last for several months and span fiscal years. In some years there are three signups while in others, none. The interest here is to test whether the political makeup of Congress influences the distribution of CRP payments and CRP enrollment. Therefore, a decision rule for matching the political variables with signup data is required.

Congressional representation and leadership variables corresponding to the congress in session when the signup started are designated as the political factors of interest.<sup>24</sup> A more precise strategy for correctly matching congressional data with signup data is to capture the structure of the congress at the time rule and/or statute changes that impact each signup are made. For example, if a rule or statute change while the 102<sup>nd</sup> Congress was in session in 1992 did not become effective until Signup 13 in 1995, the congressional variables as currently defined would not capture the information. Such

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<sup>24</sup> Lagged congressional membership data may also be appropriate dependent variables; however, absent a solid theoretical reason for doing so and specific knowledge that prior congresses may have in fact influenced signup statutes or rules, I have not yet included them.

matching will require a thorough review of the Congressional Record and Federal Register and will be incorporated in future iterations of this analysis. Examples of this strategy being implemented in previous political economy analyses includes Rucker, Thurman, Sumner (1995), Cropper, et al (1992), and Gibbs, Gokcekus, and Tower (2002).

The legislative branch is responsible for major statute changes while rule changes, purportedly also influential in the distribution of CRP benefits and enrollment, happen at the agency level: the USDA and NRCS. It has been suggested that rule changes occur more frequently than statute changes and are the main mechanisms by which the CRP is administered ongoing. Capture and modeling this influence, which I would argue is also a political channel of influence, is more difficult than constructing congressional variables because the USDA, FSA and NRCS are not elected officials or political representatives, per se. Accounting for this channel of influence will likely require the construction of an index to capture information on rule changes such as the number of comments (and length of comments) on record made by individuals, firms, interest groups, and political representatives, the timing of comments, and perhaps even measures of ideology.

### *The Model*

Variations of a fixed effects model are used to test the hypothesis that leadership in and representation on the House and Senate committees with jurisdiction over the CRP results in different levels of CRP enrollment in the Representative's state than states without

representation or than the same state when representation is absent. The data are organized as a panel of 30 signup observations for each of the 50 states; however, this analysis does not take advantage of the time-series component and instead uses a pooled cross-section approach where there are 30 observations for each state.<sup>25</sup> An OLS regression of CRP enrollment acres (and payments), in each state,  $i$ , during signup,  $t$ , on political membership variables and state binary variables, takes the general form:

$$y_{it} = \alpha + \delta A_{it} + \beta' x_{it} + \sum_{k=2}^{50} \gamma_k d_i^k + u_{it}, \quad i = 1, \dots, 50; \quad t = 1, \dots, 30$$

where  $y_{it}$  = new CRP enrollment or total rental payments

$A_{it}$  = farmland acres – existing CRP + expiring CRP

$d_i^k = 1$  when  $i=k$ ; 0 otherwise (state fixed effects)

$x_{it}$  = political variables, continuous signup interaction term

Though not utilized econometrically, the signup subscript,  $t$ , is included as a reminder that the political variables for each state differ over time (signups). The political variables,  $x$ , are indicators of membership on committees with jurisdiction over the CRP in the House and Senate, leadership variables, as well as the binary variable, CONT, which is interacted with all the political variables to account for the difference between general and continuous signups. The state dummy variables capture *time-invariant* variation in CRP enrollment and CRP payments as a result of the non-political heterogeneity of states. Some states have a higher propensity for CRP enrollment due to the structure of their economy (agrarian-dependent versus not) and for other innumerable reasons. Table 1 provides descriptions of the dependent and independent variables, excluding state

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<sup>25</sup> Future analyses will utilize the panel component of the data; this analysis is preliminary.

binary variables, used in the OLS regressions of CRP enrollment or CRP payments on state representation.

### *Modeling CRP Enrollment*

Variables indicating the acres enrolled in the CRP - ACRES, PCT\_CRP, and PCT\_PIE – are regressed as a function of farmland acres in a state available for enrollment (AVAIL) and political variables, with the continuous-signup binary variable, CONT, interacted with the political variables as the unrestricted model.<sup>26</sup> OLS regression estimates for the regression variations, labeled Model 1, Model 2, and Model 3, respectively, are provided in Table 2. Parameter estimates for the state binary variables have been omitted. For all three models, a test of multiple restrictions indicates a rejection of the null hypothesis of no statistically significant difference in political influence on continuous versus general signups.<sup>27</sup> That is, it appears that committee representation and congressional leadership influence the enrollment of CRP acres differently in continuous and general signups.

The regression of ACRES on political variables suggests, all else equal, that leadership in the House (MALH), membership on the House Ag Committee (PCT\_HAG), leadership on the House Appropriations Committee (HAPP\_CHAIR), and membership on the Senate Appropriations Committee results in lower CRP enrollment. However, those effects are reversed for continuous signups. For example, the estimates

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<sup>26</sup> ACRES is measured in thousands of acres to alleviate matrix inversion issues.

<sup>27</sup> The critical value of  $F_{12,\infty}$  at a 1% level of significance is approximately 2.3.

suggest that after controlling for state-fixed effects and a state's acres of farmland, a state represented by the Majority Leader of the House will enroll 102,100 fewer acres than the other states (there can only be one House Majority Leader per congress). However, during a continuous signup, the state represented by the same leadership position would enroll 119,800 more acres than under a general signup, netting 17,000 more acres enrolled in a continuous signup than general signup given that a state's representative is the House Majority Leader. For all statistically significant variables in Model 1, the net result of political representation during a continuous signup is to enroll more acres than in a general signup.

The regression of the percent of available farmland enrolled in the CRP (PCT\_CRP) on the same independent variables as in Model 1 yields estimates with similar signs as in Model 1, but the variables with statistical significance are different. A similar result is seen in Model 3, where the independent variable measures a state's CRP enrollment as a proportion of total CRP enrollment that signup. Essentially this captures the size of the piece of the pie each state received by signup. The general signup has historically enrolled more acres per signup than continuous signups do, even when CREP is included as part of the continuous signup. Unlike in Model 1 and Model 2, in Model 3 the OLS estimates of the interaction between the continuous signup dummy variable and political variables are negative and statistically significant for two of the political variables: PCT\_HAPP and PCT\_SAPP. I cannot explain this except to say that what is being captured in the dependent variable for all three models is different. Careful consideration will have to be given as to what is the most appropriate measure for

enrollment given estimation needs and data availability. It is very likely that the way I have currently matched congresses to signups is incorrect, thus generating noise in the current parameter estimates. Finally, I suspect a degree of endogeneity between political representation and the importance of agriculture in a state, which is partly captured in a state's farmland base. This will be accounted for in future analyses.

### *Modeling CRP Payments*

OLS estimates of a regression of total CRP payments to a state from each signup (TOT\_RENT) on political variables, acres of land in a state (LAND), and an interaction term to differentiate the effect of political factors on CRP payments in continuous versus general signups is given in Table 3. As with the regressions of CRP acres enrolled, the marginal affect of representation on committees with jurisdiction over the CRP as well as leadership positions in the House on CRP payments to a state are negative. However, the same political factors do not have a negative effect (or have a smaller negative effect) on continuous signup payments versus general signup payments. For example, all else the same, a state will receive \$3.3 million dollars less in CRP payments for a given signup when one of their House representatives is the House Majority Leader. However, in a continuous signup, having a House Majority Leader from your state increases CRP payments by \$3.4 million, netting the state approximately \$100,000. The net effect on the CRP rental payments received by a state for a continuous signup when their representative is the Chair of the House Appropriations Committee is approximately \$1.7

million less received than a state not represented in that leadership role during a continuous signup.

As with the CRP enrollment regressions, endogeneity is a concern, as is the imprecise matching of congressional and signup data. For both measures of CRP activity – enrollment and payments – it is not unbelievable that a state represented on the committees with jurisdiction over the CRP would receive fewer program benefits. The case was made earlier about the potential influence from agribusiness and other interest groups who would not necessarily favor CRP enrollment. If the results found here are accurate in terms of the sign on the parameter estimate, then it appears that those opposed to higher CRP enrollment in a state prevail to some degree.

#### *Other Modeling Options and Future Direction*

There are many other modeling specifications to be considered, of which some interesting opportunities include utilizing the time-series characteristics of the data, incorporating information from the Congressional Record or Federal Register as to the changes in program rules, and accounting for the effects of representative or interest-group ideologies.

This analysis will eventually be conducted at the congressional-district level. To my knowledge no work has been published with congressional districts as the base aggregation, likely because of the difficulty in doing so. Very seldom is agricultural data readily available for a congressional district and CRP data are no exception. Still, the congressional district analysis is interesting because it allows a direct correlation between

the political representatives in Congress – elected by congressional district in the House – and the outcomes of the program in terms of enrollment and benefits. It is also appealing from the standpoint of being able to define a congressional district as “agricultural-dependent” or not. States are generally large enough to have both urban and rural economies. California is a good example. Agriculture is important to the state of California, but if we were to observe information at the congressional-district level, the disparity between agriculturally-dependent districts and districts that are less agriculturally-dependent might be easier to quantify. Besides obtaining or constructing the data, the difficulty with using congressional districts as the base of aggregation is that some are very small while others are very large, encompassing entire states for some of the Plains states.

## **Conclusion**

The application of public choice theory to agricultural programs is not a new idea; however, to my knowledge it has not been explored empirically in the case of the CRP. This paper attempts to estimate the effect that representation on House and Senate committees with jurisdiction over the CRP has on the distribution of CRP acres and payments to states. There are theoretical and anecdotal reasons to think that the political market has a role in influencing the CRP and though the current analysis is preliminary, it seems to suggest that just as with other redistributive government programs, political forces may play a role in the CRP as well.

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**Table 1. Variables Used in State Fixed-Effects Model**

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| <b>Variable</b> | <b>Description</b>  |
|-----------------|---|
| ACRES           | <i>CRP acres enrolled for current signup</i>                      |
| LAND            | <i>farmland acres in the state</i>                                |
| PCT_CRP         | <i>percent of farmland acres in state newly enrolled in CRP</i>   |
| PCT_PIE         | <i>proportion of total signup enrollment allocated to state</i>   |
| TOT_RENT        | <i>total rental payments to state from signup</i>                 |
| PAYPLAND        | <i>total rental payments to state per farmland acres in state</i> |
| AVAIL           | <i>farmland acres - existing CRP acres + expiring CRP acres</i>   |
| CONT            | <i>=1 if a continuous signup</i>                                  |
| MALH            | <i>=1 if state has House majority leader</i>                      |
| MILH            | <i>=1 if state has House minority leader</i>                      |
| MALS            | <i>=1 if state has Senate majority leader</i>                     |
| MILS            | <i>=1 if state has Senate minority leader</i>                     |
| PCT_HAG         | <i>percent of state's delegation on the House Ag. Comm.</i>       |
| HAG_CHAIR       | <i>=1 if state has House Ag. Comm. Chair</i>                      |
| PCT_HAPP        | <i>percent of state's delegation on the House Appr. Comm.</i>     |
| HAPP_CHAIR      | <i>=1 if state has House Appr. Comm. Chair</i>                    |
| PCT_SAG         | <i>percent of state's delegation on the Senate Ag. Comm.</i>      |
| SAG_CHAIR       | <i>=1 if state has Senate Ag. Comm. Chair</i>                     |
| PCT_SAPP        | <i>percent of state's delegation on the Senate Appr.. Comm.</i>   |
| SAPP_CHAIR      | <i>=1 if state has Senate Appr. Comm. Chair</i>                   |

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**Table 2. State Fixed Effects Model Using State-Level CRP Enrollment by Signup**

|   | Model 1             |                     | Model 2            |                     | Model 3             |                     |
|---|---------------------|---------------------|--------------------|---------------------|---------------------|---------------------|
|   | ACRES (100,000s)    |                     | PCT_CRP            |                     | PCT_PIE             |                     |
|   | F-statistic = 13.2  |                     | F-statistic = 14.1 |                     | F-statistic = 6.4   |                     |
| Intercept                                   | -0.231<br>(0.393)   | 0.010<br>(0.378)    | 0.003**<br>(0.001) | 0.004**<br>(0.001)  | 0.008<br>(0.007)    | 0.007<br>(0.007)    |
| AVAIL                                       | 0.006*<br>(0.003)   | 0.002<br>(0.003)    | 0.000<br>(0.000)   | 0.000<br>(0.000)    | 0.000<br>(0.000)    | 0.000<br>(0.000)    |
| <i>Political Variables:</i>                 |                     |                     |                    |                     |                     |                     |
| MALH  | -0.012<br>(0.215)   | -1.021**<br>(0.328) | 0.000<br>(0.000)   | -0.001<br>(0.001)   | -0.007*<br>(0.003)  | -0.017**<br>(0.006) |
| MILH  | 0.108<br>(0.229)    | -0.229<br>(0.311)   | 0.000<br>(0.000)   | -0.001<br>(0.000)   | -0.005<br>(0.004)   | -0.013**<br>(0.005) |
| MALS  | 0.005<br>(0.175)    | 0.036<br>(0.254)    | 0.000<br>(0.000)   | -0.001<br>(0.000)   | -0.004<br>(0.003)   | -0.007<br>(0.004)   |
| MILS  | 0.071<br>(0.212)    | 0.309<br>(0.325)    | 0.000<br>(0.000)   | 0.001<br>(0.001)    | 0.001<br>(0.003)    | 0.004<br>(0.006)    |
| PCT_HAG                                     | 0.139<br>(0.248)    | -0.865**<br>(0.352) | 0.001*<br>(0.000)  | -0.002**<br>(0.001) | -0.007<br>(0.004)   | -0.010<br>(0.006)   |
| HAG_CHAIR                                   | 0.62**<br>(0.285)   | -0.776*<br>(0.415)  | 0.000<br>(0.000)   | -0.001<br>(0.001)   | -0.004<br>(0.005)   | -0.030**<br>(0.007) |
| PCT_HAPP                                    | 0.764<br>(0.582)    | 0.496<br>(1.147)    | 0.001<br>(0.001)   | -0.007*<br>(0.003)  | -0.010<br>(0.01)    | 0.065**<br>(0.021)  |
| HAPP_CHAIR                                  | -0.672**<br>(0.315) | -1.318**<br>(0.487) | 0.000<br>(0.001)   | 0.000<br>(0.001)    | -0.016**<br>(0.005) | -0.044**<br>(0.009) |
| PCT_SAG                                     | 0.125<br>(0.228)    | -0.517<br>(0.334)   | 0.000<br>(0.000)   | -0.001<br>(0.001)   | 0.007*<br>(0.004)   | 0.012*<br>(0.006)   |
| SAG_CHAIR                                   | 0.026<br>(0.287)    | 0.021<br>(0.459)    | -0.001<br>(0.000)  | -0.002<br>(0.001)   | -0.007<br>(0.005)   | -0.017**<br>(0.008) |
| PCT_SAPP                                    | -0.597**<br>(0.243) | -1.803**<br>(0.329) | -0.001*<br>(0.000) | -0.003**<br>(0.001) | -0.002<br>(0.004)   | 0.009<br>(0.006)    |
| SAPP_CHAIR                                  | 0.438<br>(0.303)    | 0.189<br>(0.459)    | 0.002*<br>(0.000)  | -0.001<br>(0.001)   | 0.009<br>(0.005)    | -0.001<br>(0.008)   |
| <i>Continuous Signup Interaction Terms:</i> |                     |                     |                    |                     |                     |                     |
| CONT*MALH                                   |                     | 1.198**<br>(0.325)  |                    | 0.001<br>(0.001)    |                     | 0.015**<br>(0.006)  |
| CONT*MILH                                   |                     | 0.436<br>(0.383)    |                    | 0.002<br>(0.001)    |                     | 0.012*<br>(0.007)   |
| CONT*MALS                                   |                     | 0.166<br>(0.291)    |                    | 0.003**<br>(0)      |                     | 0.005<br>(0.005)    |
| CONT*MILS                                   |                     | -0.101<br>(0.378)   |                    | 0.000<br>(0.001)    |                     | -0.003<br>(0.007)   |
| CONT*PCT_HAG                                |                     | 1.583**<br>(0.39)   |                    | 0.006**<br>(0.001)  |                     | 0.006<br>(0.007)    |
| CONT*HAG_CHAIR                              |                     | 2.202**<br>(0.5)    |                    | 0.002<br>(0.001)    |                     | 0.039**<br>(0.009)  |
| CONT*PCT_HAPP                               |                     | 0.138<br>(1.182)    |                    | 0.009**<br>(0.003)  |                     | -0.095**<br>(0.022) |
| CONT*HAPP_CHAIR                             |                     | 0.892<br>(0.583)    |                    | -0.001<br>(0.001)   |                     | 0.043**<br>(0.011)  |
| CONT*PCT_SAG                                |                     | 1.504**<br>(0.403)  |                    | 0.004**<br>(0.001)  |                     | -0.009<br>(0.007)   |
| CONT*SAG_CHAIR                              |                     | -0.296<br>(0.553)   |                    | 0.000<br>(0.001)    |                     | 0.018*<br>(0.01)    |
| CONT*PCT_SAPP                               |                     | 0.818**<br>(0.339)  |                    | 0.003**<br>(0.001)  |                     | -0.019**<br>(0.006) |
| CONT*SAPP_CHAIR                             |                     | 0.366<br>(0.56)     |                    | 0.004**<br>(0.001)  |                     | 0.018*<br>(0.01)    |

Notes: Standard errors of marginal effects in parentheses. Column headings indicate the dependent variable. Two (\*\*) and one (\*) asterisks are significant at the 5% and 10% levels, respectively. The F-statistic is the test of joint restrictions for the two regressions with the same dependent variables. Coefficient estimates for the state dummy variables have been omitted.

**Table 3. State Fixed Effects Model Using State-Level CRP Rental Payments by Signup**

|   | Model 4               |                       |
|---|-----------------------|-----------------------|
|   | TOT_RENT (\$100,000s) |                       |
|   | F-statistic = 4.83    |                       |
| Intercept                                   | 8.591<br>(12.482)     | 9.223<br>(12.366)     |
| LAND (100,000s)                             | 0.075<br>(0.117)      | 0.057<br>(0.116)      |
| <i>Political Variables:</i>                 |                       |                       |
| MALH  | -5.915<br>(6.145)     | -33.187**<br>(9.673)  |
| MILH  | -4.762<br>(6.545)     | -15.407*<br>(9.182)   |
| MALS  | -0.003<br>(5.006)     | -2.506<br>(7.504)     |
| MILS  | 12.632**<br>(6.043)   | 5.410<br>(9.590)      |
| PCT_HAG                                     | -8.046<br>(7.068)     | -19.533*<br>(10.374)  |
| HAG_CHAIR                                   | -0.506<br>(8.151)     | -31.124**<br>(12.254) |
| PCT_HAPP                                    | 14.927<br>(16.59)     | 36.835<br>(33.775)    |
| HAPP_CHAIR                                  | -31.063**<br>(8.990)  | -54.321**<br>(14.344) |
| PCT_SAG                                     | -6.337<br>(6.524)     | -6.606<br>(9.848)     |
| SAG_CHAIR                                   | -2.710<br>(8.198)     | -9.123<br>(13.525)    |
| PCT_SAPP                                    | -3.462<br>(6.934)     | -3.047<br>(9.671)     |
| SAPP_CHAIR                                  | 22.681**<br>(8.631)   | 10.014<br>(13.529)    |
| <i>Continuous Signup Interaction Terms:</i> |                       |                       |
| CONT*MALH                                   |                       | 34.370**<br>(9.573)   |
| CONT*MILH                                   |                       | 13.690<br>(11.289)    |
| CONT*MALS                                   |                       | 7.002<br>(8.585)      |
| CONT*MILS                                   |                       | 15.829<br>(11.137)    |
| CONT*PCT_HAG                                |                       | 19.474*<br>(11.504)   |
| CONT*HAG_CHAIR                              |                       | 48.411**<br>(14.735)  |
| CONT*PCT_HAPP                               |                       | -32.708<br>(34.812)   |
| CONT*HAPP_CHAIR                             |                       | 37.298**<br>(17.167)  |
| CONT*PCT_SAG                                |                       | 5.182<br>(11.87)      |
| CONT*SAG_CHAIR                              |                       | 7.050<br>(16.294)     |
| CONT*PCT_SAPP                               |                       | -0.259<br>(9.975)     |
| CONT*SAPP_CHAIR                             |                       | 21.594<br>(16.494)    |

Notes: Standard errors of marginal effects in parentheses. Column heading indicates the dependent variable. Two (\*\*) and one (\*) asterisks are significant at the 5% and 10% levels, respectively. The F-statistic is the test of joint restrictions between the two regressions with the same dependent variable. Coefficient estimates for the state dummy variables have been omitted.