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The US Conservation Reserve Program: The evolution of an enrollment mechanism

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ABSTRACT

The United States Department of Agriculture's Conservation Reserve Program (CRP) has evolved from near open enrollment, to competitive enrollment, and now to a mixture of competitive and targeted enrollment. This paper reviews the history of the CRP and the evolution of its enrollment mechanism. I discuss the use of bid caps and the Environmental Benefits Index bid ranking mechanism in the "general" CRP; and the use of highly targeted, but non-competitive, "continuous" CRP. Possible challenges of these designs are discussed, and alternative auction mechanisms are considered that could be more cost effective.

1. Introduction

Created by the Food Security Act of 1985, the United States Department of Agriculture's Conservation Reserve Program (CRP) establishes contracts with agricultural producers to retire highly erodible and other environmentally sensitive cropland and pasture. Farmland accepted into the program for a 10–15-year contract period are converted to grass, trees, wildlife cover, or other vegetation that provide environmental benefits. By 1991, more than 12.9 million hectares (32 million acres) were enrolled in the program, with a peak enrollment of 14.9 million ha occurring in 2007. The Agricultural Act of 2014 extended the CRP, setting a maximum enrollment of 9.7 million ha in 2017. As of April 2015, the CRP enrolls 9.8 million ha at a cost of more than $1.8 billion per year (USDA FSA, 2015a).

The program has led to improvements in a variety of environmental services (Barbarika, 2011; Allen and Vandever, 2005), such as wildlife habitat (Allen and Vandever, 2012) and water quality (FAPRI, 2007). Benefit-cost analyses, although complicated by the range of outputs provided by the program, indicate aggregate benefits comparable to costs (Hansen, 2007; Ribaudo et al., 2001; Feather et al., 1998; USDA FSA, 2014a).

Over time the program's size and goals have evolved, with early emphasis on limiting erosion now complemented by wildlife, water and air quality, and other conservation goals (for detailed reviews of the CRP's history, see Ferris and Siikamaki, 2009; Stubbs, 2013; or Karousakis and Brooke, 2010). This evolution continues, driven by changes in legislative mandates, commodity markets, and environmental concerns. And as the program evolves, so has its enrollment mechanism.

As a voluntary program, the CRP needs an enrollment mechanism: a means to elicit offers, and to choose which offers to accept. The goals of any enrollment mechanism include minimizing program expenditures to achieve a targeted level of benefits, or maximizing benefits within a set budget; encouraging broad participation; inducing adoption of enhanced environmental practices; and minimizing impacts on production.

When designing an enrollment mechanism, the CRP's fundamental features need to be considered. These include optional participation, heterogeneous costs across different landowners, the capability of landowners to increase the environmental values of offered lands, and the limited informa-

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tion on the opportunity cost of the land available to the USDA.

This paper reviews the evolution of the CRP's enrollment mechanism. I start with a review of the status and trends in the CRP; in terms of acreage, costs, and offer rates. The next section discusses in detail the attributes of the CRP's enrollment mechanism. The paper then considers limitations of the current designs, and possible improvements.

2. CRP status and trends

The Conservation Reserve Program is not the first US agricultural land retirement program (Heimlich, 2003). From the 1930's until the mid-70s, several different programs led to the retirement of cropland. With a primary goal of production control, these programs fluctuated in size, and typically enrolled land in short periods (Ferris and Siikamaki, 2009). The modern CRP systematically differs from these earlier programs both in its focus on erosion and other environmental concerns, and in the time-span and management practices required.

Upon its inception the CRP was mandated to enroll 16.2–18.2 million ha by the end of the 1990. Enrollments started in 1986, and by 1989 enrollment was 13.6 million ha (33.6 million acres). Enrollment occurred during nine separate "general signups"; designated periods during which landowners with eligible cropland could offer fields they wished to enroll at a chosen rental rate. This essential feature, of enrollment occurring during general signups, has been maintained to the present. And, as dictated in the original legislation, the focus of the CRP has always been on land devoted primarily to crop production (USDA, 1985).

During this 1986–1989 time span, eligibility was determined by erodiblity; with about 41 million ha (of about 162 million ha) of cropland eligible. Payment was based on regional (multi county) Maximum Acceptable Rental Rates (MARR); any offer submitted by a farmer with a requested rental rate less than their MARR was accepted (Osborn et al., 1995). This mechanism was criticized as leading to higher program costs, as landowners within a region learned the likely MARR and bid accordingly (GAO, 1989). Furthermore, the focus on erodiblity led to enrollment of lands that did not necessarily benefit water quality, wildlife, and other environmental goods and services (Ribaudo et al., 2001).

The Food Agriculture, Conservation and Reform Act of 1990 extended the CRP, and emphasized the importance of goals other than erosion control. Over the next several years an additional 1.1 million ha were enrolled, and the enrollment mechanisms used were substantially modified. The MARR was replaced with a parcel-specific "Soil Rental Rate" (SRR), that was computed using parcel-specific soil productivity measures as well as county-level estimates of non-irrigated cropland rental rates (Osborn, 1997). Furthermore, each parcel was assigned a score calculated using a multi-factor Environmental Benefits Index (EBI). The EBI incorporated several factors beyond soil erodibility, including surface and ground water improvements as well as a parcel's location in a priority conservation area. Both of these concepts – "bid caps" based on soil specific rental rates (SRR) and offer rankings based on an EBI—continue to be part of the CRP's current enrollment mechanism.

However, this early version of a SRR and an EBI had unique features that were dropped in later years. First, the EBI was constructed as a benefit-cost ratio. Second, in signups 10, 11 and 12, SRRs were not revealed to landowners — these SRRs (like the MARRs they replaced) were similar to a blind reserve prices in a traditional auction. A large fraction of offers were rejected due to bids that exceeded this cap, possibly due to the expectation of landowners about acceptable bids formed when MARR's were used as bid caps. As a consequence of this high rejection rate, the EBI was not binding (implicitly, a minimum EBI score of 0 was used, so all bids below their SRR bid cap were accepted).

The CRP was re-authorized in the Federal Agriculture Improvement and Reform (FAIR) Act of 1996, which reduced the maximum program size to 14.7 million ha. Several changes occurred at the administrative level. Conservation Priority Areas, consisting of State and federally defined regions where cropland did not have to meet erodibility standards, were created or greatly expanded—leading to an estimated additional 39.2 million ha of cropland becoming eligible for the CRP. The EBI was overhauled, with a number of factors given explicit weights. In addition, cost was incorporated as a weight—it entered the function additively rather than being used to form a benefit-cost ratio (Heimlich, 2003).

That is, rather than a benefit-cost ratio, the EBI is better described as a *cost adjusted* measure that uses weights to capture the importance of a number of factors, including cost. The SRR continued to be based on estimates of county average non-irrigated cropland rental rates, with parcel-specific adjustments based on the soil productivity of a parcel's dominant soil type. However, it was revealed to farmers—they knew what their bid cap was. Fig. 1 shows the geographic distribution of Soil Rental Rates circa 2012.

The next few years also saw the expiration of the bulk of the original contracts. During the next several signups this "cost adjusted" EBI, along with parcel-specific SRRs, were core features of the enrollment mechanism. By 2000, over 10.5 million ha of land were enrolled (or re-enrolled) in the program under this mechanism.

This period also sees the advent of a different form of CRP: the continuous CRP. Continuous CRP is meant to enroll lands with high environmental benefits (including lands where the EBI does not do a good job of reflecting the parcel's environmental impact). Thus, its enrollment mechanism is substantially different from the general signup. As the name implies, continuous signup is open all year—eligible acres can be offered at any time. However, eligibility rules are more stringent then general signup, and there is no competition: if an offered parcel is eligible, it will automatically be accepted into continuous signup (and receives a fixed rental payment based on the parcel's SRR).

The next decade saw minor changes in the EBI factors and scoring, and changes in program eligibility (Hellerstein, 2006). Acreage enrolled under continuous signup steadily increased. This included initiatives (such as the Farmable Wetlands Program); and the Conservation Reserve Enhancement Program – a subset of continuous CRP comprising a number of state/Federal collaborations aimed at local concerns.

Enrollment reached a peak of 14.9 million ha in 2007. In the 4 years starting in 2007, 10.9 million ha of CRP contracts were to expire. For a variety of reasons, including the desire to smooth expirations over time, USDA instituted a re-enrollment and extension (REX) initiative. Based on its EBI score, parcels were offered automatic re-enrollment or 2–5 year extensions (re-enrollment was offered only to contracts in the top quintile of EBI scores). Approximately 82% of expiring acreage took advantage of this REX opportunity (USDA FSA, 2007). .

The Food, Conservation, and Energy Act of 2008 extended authorization for the CRP, but reduced program size to 12.9 million ha. The reduction in program size meant that the program could not re-enroll (or replace) all the acres set to expire in the years following 2010. Between 2010 and 2013, contracts containing 5.74 million ha expired, while contracts covering 4.7 million ha were issued (about 71% of which are reenrollments). Although overall acreage decreased, continuous signup acreage increased by 0.5 million ha (USDA FSA, 2013c). In addition, the data collection used to calculate SRRs was modified, with USDA instructed to conduct yearly surveys of county level non-irrigated cropland rental rates