Behavioral nudges in competitive environments: a field experiment examining defaults and social comparisons in a conservation contract auction[1]

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Abstract

Governments and nongovernmental organizations are increasingly applying insights from behavioral economics to influence human behaviors. Governments in both the US and the UK have established Behavioral Insight Teams (also known as "nudge squads"), and the U.S. Department of Agriculture recently created the Center for Behavioral and Experimental Agri-environmental Research (CBEAR). Empirical studies have supported claims that behavioral economics-based interventions can cost-effectively change short-term behavior. That evidence, however, comes exclusively from the context of consumer (individual) choices rather than producer choices—in other words, utility-maximizing agents rather than profit-maximizing agents. An open question is whether behavioral nudges affect agents that are profit-maximizers in competitive environments. Some studies (e.g., List, 2006) have found evidence suggesting that well-functioning competitive markets can mitigate various forms of anomalous behavior.

This study explores this question through a field experiment in which farmers from Texas, Delaware, and Maryland compete in an auction of conservation contracts that require them to adopt practices that reduce nutrient run-off. The competition consisted of bids submitted as the percentage cost-share offered by the farmers toward the total cost to implement the practice. The farmers were informed that up to $40,000 was available to implement nutrient management practices on their lands. They were randomized into four treatment arms in a 2x2 design that varied by (1) the presence or absence of social priming and (2) a default cost-share status quo of 0% or 100%. We find that bids under the 100%-cost-share status-quo default were substantially higher than (and statistically different from) bids under the 0% cost-share status-quo default. The social priming information did not significantly affect the value of bids made, but did influence the likelihood of placing a bid, especially the low desirability priming, which

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lowered the likelihood of placing a bid. These result shows that behavioral nudges can be effective in competitive environments that involve profit-maximizing agents.

JEL Codes: C9, Q1, Q2

Keywords: Field experiments, agri-environmental programs, nudges, defaults, social priming

Research highlights:

1. Research testing if nudges can affect farmers in competitive environments
2. Field study of agricultural landowners in Delaware, Chesapeake, and Galveston Bay watersheds
3. Incentives up to $40,000 to implement nutrient management practices
4. A 100% default cost share led to larger cost-share bids
5. Social priming affected likelihood of entry into reverse auctions, especially low desirability ratings which reduced likelihood of entry.

Introduction

Efficiently promoting environmental quality and conservation by incentivizing farmers and ranchers to adopt best management practices (BMPs) or offering payments for environmental services (PESs) can be extremely difficult because of information asymmetry. While the program administrators who offer incentive payments design these programs from a federal or state perspective, agricultural producers have hands-on experience with how much a practice will actually cost to implement, including the cost of lost productivity. This information asymmetry can lead to windfall gains for producers (informational rents) – payments considerably greater than the amount necessary to induce them to participate. For instance, Kirwan et al. (2005) estimated that this type of informational rents to farmers comprise roughly 30–40% of annual payments made by the U.S. Department of Agriculture's (USDA's) Conservation Reserve Program (CRP).

In efforts to reduce externalities from agriculture, USDA and its partners depend on a variety of incentive payment programs (e.g., the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP)). When addressing water quality, the programs encourage producers to adopt nutrient management practices that reduce run-off from agricultural lands. Agricultural activities have been cited as a major source of phosphorus and nitrogen in aquatic ecosystems, and excesses of those elements have been identified as the leading cause of contamination of U.S. surface waters (Carpenter et al., 1998). The phosphorous and nitrogen in fertilizer run-off increases growth of algae and aquatic "weeds" that can prohibit or restrict use of contaminated water sources for drinking, agriculture, and recreation. Algal blooms also cause hypoxia, a reduction of oxygen levels in water that negatively affects populations of fish and other wildlife. One of the watersheds analyzed in this study drain into the

Gulf of Mexico, which suffers from hypoxia ("dead zones") and is a national priority for remediation. Fertilizer run-off also leads to eutrophication (an excess of organic and/or inorganic nutrients). Dodds et al. (2009) estimated that eutrophication in U.S. fresh water sources cost the economy approximately $2.2 billion annually despite using a model that ignored or underestimated a variety of relevant costs, such as the long-term effects of eutrophication on biodiversity and human health.

As shown in the Table 1, USDA and its partners spend more than $4.2 billion annually on conservation payment programs. Given the important role that asymmetric information seems to have played in reducing the cost-effectiveness of these programs (e.g., Kirwan et al., 2005), savings from reducing information rents by even a few percentage points would add up to tens of millions of tax dollars per year, funds that could be used to further expand those programs or to fund other social priorities.

Government agencies and nongovernmental organizations are increasingly applying insights from behavioral economics to influence or "nudge" people to change various behaviors as part of efforts to improve public welfare, including financial savings, resource conservation, organ donation, and investment in preventative health care (Thaler and Sunstein, 2008; Shafir, 2013). Various government agencies in both the United States and the United Kingdom have established Behavioral Insight Teams (also known as "nudge squads"), and USDA recently created the Center for Behavioral and Experimental Agri-environmental Research (CBEAR). Empirical evidence so far, often from randomized controlled trials, supports the claims that behavioral economics-based interventions can change short-term behaviors and be cost-effective.

Although studies have shown that behavioral nudges affect behavior in noncommercial contexts, few studies have examined their impacts in commercial settings such as agriculture. All of the studies that have been completed used consumer (individual) choice models rather than producer choice models—in other words, utility-maximizing agents rather than profit-maximizing agents. An open question is whether behavioral nudges, such as setting default for offers in reverse auctions and providing social priming and comparison information affect agents that are best characterized as profit-maximizers in competitive environments. Some studies (e.g., List, 2006) have found evidence that well-functioning, competitive markets can mitigate various anomalies in behavior associated with controlled laboratory experiments of individual choice.

To draw credible causal inferences about the impacts of behavioral nudges, we implement two types of nudges in the context of a randomized controlled trial with farmers and ranchers (hereafter referred to as producers) who interact with an existing conservation payment program for nutrient management practices. Randomized controlled trials have strong internal validity, allowing one to make accurate assessments of causal relationships. When conducted in naturally occurring contexts (e.g., an active conservation program), they also have strong external validity: they appeal to policymakers who may distrust results of laboratory-based economic experiments that often involve undergraduate college students making decisions based on induced values for relatively small monetary stakes ($10–$15) in situations where they have relatively little experience (Levitt and List, 2007).

To explore the effect of behavioral nudges, we placed economic agents who had substantial experience operating in competitive markets in a competitive auction for well-defined, economic activities. We conducted a field experiment in which producers competed in an auction of conservation contracts worth up to $40,000 to adopt practices that reduce nutrient run-off from their farms. Producers in this auction bid a cost-share percentage, indicating what fraction of the total cost of the practice they were willing to pay with their own money (cost-share programs are common in the agricultural policy context).

Some producers were randomly assigned to a treatment in which the default starting bid was set at 100% in the reverse auction (from which bidders could decrease the bid level and submit it) while others had their default starting bid set at 0%. Producers with a default of 100% bid substantially higher than (and statistically different from) producers whose starting default bid was 0%. The decision whether to make a bid, however, was not affected by the default cost-share.

Prior to bidding, all farmers were asked how desirable they found the practice on a one to nine scale. As a second experimental treatment, some producers received information on how other producers had scored the practice. Provision of this priming information affected the likelihood that a producer placed a bid, as low social desirability scores from other producers led them to reduce their likelihood of entering the auction.

Our results suggest that behavioral nudges can be effective in programs aimed at influencing profit-maximizing agents in competitive environments. In the specific context of agri-environmental programs, program administrators could make inexpensive changes to decision environments to generate greater environmental benefits under limited budgets and encourage greater participation in the programs.

II. Literature Review

Rent seeking in conservation markets

There is an extensive literature on investigations of incentives in government procurement settings. Usually, incentive problems arise because the government purchaser of goods or services cannot observe private information about the seller/provider, creating either an adverse selection problem in which low-cost producers have an incentive to mimic high-cost producers or a moral hazard problem in which the producer has no incentive to adopt cost-cutting measures once the contract is awarded. Laffont and Tirole (1993) analyzed many such cases. Several recent studies have looked at incentive problems within the context of agri-environmental programs, such as Wu and Babcock (1996), Arnold, Duke, and Messer (2013), Smith (1995), Ferraro (2008), and Canton, De Cara, and Jayet (2009).

One way of addressing some of these incentive challenges is the use of reverse auctions, which have multiple sellers (landowners) and one buyer (the conservation program). For environmental and land conservation, auctions may seem preferable to fixed payments because they "solve" some information problems by paying heterogeneous owners what they offer and because auctions conserve scarce financial resources by forcing owners to compete for part of a limited budget. Although the rent-reducing powers of auctions may be reduced through repetition (Schilizzi and Latacz-Lohmann 2007, Cason and Gangadharan, 2004), studies have demonstrated that they can reduce information rents in comparison to fixed-price contract allocation mechanisms (Horowitz, Lynch, and Stocking, 2009).

Defaults

Thaler and Sunstein (2008) give the moniker "choice architecture" to the design of options while being conscious of the influence that contexts can have on choices and outcomes. An important tool for a choice architect is selection of the status quo since people tend to display biased preferences for the status quo (the default option) over actively opting in favor of an alternative.

Status-quo bias exists in many fields and in a variety of forms (see Kahneman et al. (1993) for a review of the evidence). Madrian and Shea (2001) showed that, when one must opt out of a 401(k) rather than opt in, rates of both participation and savings dramatically increase. Johnson and Goldstein (2003) showed that the fraction of the population that agrees to donate organs is significantly higher in countries where citizens have to opt out in order *not* to be donors (85.9–99.98%) than in countries where opt in to be donors (4.3–27.5%). Johnson, Bellman, and Lohse (2002) investigated this topic in an online experiment regarding preferences about contact from a website simply by changing the box that was pre-selected. In the context of agriculture, Messer et al. (2008) argued that the high levels of voluntary contributions to collective marketing campaigns can be associated with the opt out nature of most commodity check off programs. Other examples of default bias works include Ariely, Loewenstein, and Prelec (2003), Chetty et al. (2014), Messer et al., (2007), (Kahneman et al., 1991), and Tversky and Kahneman (1974)

Social Priming

The literature on the power of social priming is extensive. More than 60 years ago, Festigner (1954) noted that individuals validate the appropriateness of an action by comparing themselves to others. People make decisions based on beliefs about social norms (Cialdini, 2006). The influence of social norms has been demonstrated in a variety of contexts, including charitable giving, environmental conservation behavior, compliance with rules, and healthy behaviors. The provision of information about others "preferences" in an auction environment can affect behavior through at least two mechanisms: (1) norms that affect valuation about both private and public attributes of good (contract); and (2) information to boundedly rational agent about key parameters required to formulate a bid in a discriminative-price auction.

In our research that involves a competitive reverse auction, we could anticipate two impacts from providing social priming information. First, it could affect the value that producers put on the nutrient management practices. In other words, if other farmer's report that the practice is highly desirable, then they may raise their scores and become more likely to enter the competitive reverse market. On the other hand, providing producers information that other producers found the practice to be highly desirable could lead the producer to consider the information strategically as a way of anticipating the level of competition they are likely to face in the reverse auction.

III. Experimental Design

In this field experiment, landowners in Delaware and Texas who were identified by Freedom of Information Requests and examination of the county tax roles were invited to visit a website where they could register to participate in the survey and auction using an online interface designed in Qualtrics. The survey and auction together took approximately 30 minutes and each participant was paid $50 for completing the study.

First, participants answered about questions related to their demographic characteristics and the production of their operations, including acres owned and leased, acres of row crops and pasture, and participation in USDA conservation programs. These characteristics were used to increase the statistical power of the design. Since our treatments are assigned at random, the addition of covariates to the model has little effect on the estimated treatment effect but greatly increases the precision of the estimated effects.

Next, participants where shown instructions (see screenshots in Appendix A) informing them that they could bid on nine nutrient management practices to implement: six types of riparian buffers involving different widths and kinds of vegetation, two types of in-stream phosphorous filters, and demolition and remediation of abandoned poultry houses. These practices were selected because studies have shown that they benefit water quality. To avoid competition with existing programs, we selected practices (such as riparian buffer widths) that were not eligible for federal, state, or local cost-share programs at the time. The practices offered are best viewed as generating impure public goods that provide both private and external benefits. Thus, producers are expected to contribute to the cost of implementing the practices. In the United States, cost-sharing in agri-environmental programs is common.

Bids in the auction were expressed as the "percentage cost-share" of the total cost to implement the practice. For example, if a phosphorus filter costs $20,000 and the producer submits a cost-share bid of 25%, the producer pays $5,000 and the research project pays $15,000. The cost to implement each practice in each state was determined through negotiations we conducted with local firms that agreed to complete the nutrient management practices at a pre-negotiated price. The name, address, and phone number of the contractor for each practice was provided in the description of the practice. Participants were shown the total cost of implementation of each practice. As shown in Figure 1, the average cost to implement the practices that received bids was $14,700 (ranging from $1,100 to $53,458); the average cost of implementing any practice was $6,851.

Participants were told that there was a pool of money that could pay one or more producers up to $40,000[2] to implement nutrient management practices and that bids would be accepted between January 1 and March 31, 2014. The instructions advised participants that they could treat each practice contract independently. If they won more than one contract, they could choose to implement some and not others (in other words, they did not need to view the decision environment as a combinatorial auction). Note that any strategic bidding induced by this design was not a confounder to drawing inferences about treatment effects because our treatments were randomly assigned among the entire participant pool.

The instructions informed participants that all of the bids submitted for the various practices would be pooled together and the "winner(s)" of the auction would be the participant(s) who offered the greatest cost-share percentage for a practice. Thus, they would be competing in a sealed-bid, discriminative-price auction in which the buyer (the researchers) first ranked all of the bids from highest (100% cost-share) to lowest (0% cost-share) and then sequentially selected each highest producer offer from the ranked list until the budget was exhausted. A key advantage of this design is that it allowed bids for different practices to compete against each other, regardless of the total cost of the project, because only the cost-share bid was relevant in the context of the auction (except in the situation where the total cost exceeded the remaining budget, at which point the next highest cost-share bid that was affordable with the given budget would be selected). Such auctions are used in many agricultural contexts, including agri-environmental programs. The Delaware Agricultural Lands Preservation Foundation's auction program for agricultural easements, for example, has been operating for more than 20 years (Messer and Allen, 2010).

[2] The total pool of funds was for the entire group of farmers, not each farmer.

In the experiment, the participants selected the practice(s) on which they wished to bid and the "quantity" of each practice to implement (number of feet of buffer, number of phosphorus filters, number of poultry houses to be remediated). Using a cursor-controlled slider, they chose the percent of the cost they were willing to pay between 0% (the research project would pay the entire cost) and 100% (the landowner would pay the entire cost) (see Figure 2). As the producers adjusted the slider, they were instantly shown, for each cost-share percentage, the costs incurred by the producer and the costs incurred by the research project.

The participants were randomized into four approximately equally sized treatment arms in a 2x2 design that varied by (1) the default starting point of the cursor-controlled slider and (2) the presence or absence of social priming, which consisted of information about the desirability of each practice to the producers. The desirability rating made on a 1 to 9 scale by all participants, regardless of whether they wanted to submit a bid for this practice. After submitting their desirability rating, participants were then asked whether they would be interested in submitting a bid for this practice and what the scale of this practice would be. While the order by which participants saw the information about the different nutrient management practices was varied to control for potential order effects, subjects were allowed to go back and forth amongst the different computer screens in the Qualtrix program and make revisions to there desirability scores, their willingness to submit a bid, and the amount of the cost-share bid. Thus, the producer decisions on the nutrient management practices can be thought of as being done simultaneously instead of sequentially.

Default

Approximately half of the participants were shown a slider on which the default cost-share was 100% and the other half were shown a slider on which the default cost-share was 0% (Figure 2). Traditional economic theory assumes that sellers want to maximize their profits and thus predicts that the default bid setting should not affect the amount of bids submitted. However, theories from behavioral economics based on boundedly rational agents and empirical results from randomized controlled trials in noncompetitive contexts have demonstrated that default settings can affect behavior. In this case, they predict that a default bid of 100% will induce participants to make larger bids, on average.

Social Priming

In the social priming treatment arms, approximately half of the participants received information on the desirability of each of the nine practices via a rating on a 1–9 Likert scale that was the average of scores reported by the first 20 producers who logged onto the auction. To help ensure variability in these scores, the desirability of each of the practices was updated daily. To minimize endogeneity, the desirability scores only came from those farmers who were in the treatment that did not display the priming numbers. As mentioned previously, the effect of priming on bidding behavior can be ambiguous because priming influences behavior through at least two mechanisms: (1) as a signal of the quality of the contract offered (imperfect information about contract attributes) – the more popular the practice, the more likely a producer is to bid on it and the larger the bid the producer is likely to make; and (2) as a signal of the number of bidders and the bid distribution – the more popular the practice, the less likely the producer is to bid on it (bidders prefer less competitive contracts) but if the producer bids, the bid amount will be relatively high because of greater competition and the producer’s level of risk-aversion.

Results

Over the three-month enrollment period, 371 producers participated in the online auction (13.4% of the producers invited). While the majority of these bids came from Delaware and Texas, in total there were participants from over 20 states and the District of Colombia, including Alaska, California, Colorado, Florida, Georgia, Illinois, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Pennsylvania, South Carolina, Tennessee, Virginia, Washington, and West Virginia. The level of participation is similar to rates of participation in other agri-environmental programs: 3.7% of U.S. producers applied to USDA's Environmental Quality Incentives Program in 2007, 0.05% enrolled in USDA's Conservation Stewardship Program in 2010, and 16.6% were enrolled in USDA's Conservation Reserve Program on January 1, 2015.

The average participant was 56 years old and had been a producer for 36 years. Most participants were men (83%) and owned some of the land they used for production (91%). The average participant owned 208 acres and leased 182 additional acres. These producers had substantial experience operating in competitive agricultural markets and engaging in governmental and nongovernmental agri-environmental programs.

As shown in Figure 3, the average cost-share bids ranged from 17.5% (15' Forest Buffers) and 28.8% (5' Grass Buffers). However, when looking at the individual practices one can see differences between cost-share based on whether the default for the cost-share was set at 0% or 100%. For instance in Figure 4, the average cost-share bid for the 5' grass buffers from producers with the default set at 0% was 22.4% while the cost-share from producers with the default set at 100% was 35.0%. Likewise, for the 5' forest buffers the average cost-share bid was just 8.7% from the producers who had the 0% default, but 26.5% from the producers with the 100% default. Overall, the average bid from producers in the 0% setting was 22.4% (0% bids at 100% and 28% at 0%). In contrast in the 100% setting the average bid was 35.0% (9% of bids at 100% and 18% at 0%). Table 2 shows the difference in cost-share bids depending on the default treatment for each of the nine practices. Finally, note that even when all of the 0% and 100% bids: 100% default, the average bid was still higher by 4.5%.

We use a fractional logit model Papke and Wooldridge (1996))., which is a generalized linear model with a binomial distribution and a logit link function. To model the bid, **y**, as a function of the covariates, **x**, we express the expected value of **y** as $\text{logit}\{E(y)\} = x\ \beta$, $y \sim$ Bernoulli with standard errors clustered at the bidder level. We have observables that correlate with bids, and thus can increase statistical power.

As shown in Tables 1 and 2, a starting default bid of 100% of the cost-share increases producers' bids by about 9 percentage points ($p < 0.01$) on average, while priming has no statistically significant effect on the average bid amount. For example, producers bid an average cost-share of 22.4% for contracts to establish five-foot riparian grass buffers when the default bid was set at 0% and an average cost-share of 35% when the default bid was set at 100%. The average cost of implementing a practice desired by bidders is $14,700. Thus, the approximate 9% increase in bids for a default setting of 100% amounts, on average, to about $1,300 more paid by the producer per contract.

For the social priming treatments, we also analyze the effect of priming on the probability of submitting a bid. We estimate unconditional effects and effects that are conditional on the priming score observed for a producer for a particular practice. We then conduct tests of the null hypothesis of zero treatment effect for each treatment. We estimate the models both with and without covariates (solely to increase statistical precision, not to control for confounding since there is no correlation between our error term and our treatment variables). For tests of the effects of priming on the probability of bidding, we used a probit model with and without covariates.

Although social priming has no effect on bids, our preliminary analysis suggests that priming increases the probability that a producer will submit a bid. Participants who observe that a practice is relatively popular (via ratings by other producers) are more likely to bid on that practice. These results are consistent with the hypothesized mechanism of priming as a signal of the quality of the contract and with previous studies of social norms that found that people are more likely to engage in a behavior when they believe others in their peer group engage in it (Cialdini, 2006; Ferraro and Price, 2013). In this research, the desirability for the various nutrient management practices was generally low with six of the nine practices scoring around 3, out of a possible score of 9 (see Figure 3). The small 5' grass buffer strip and the removal and mediation of abandoned poultry houses were the most popular scoring 5.2 and 6.3, respectively. These scores make intuitive sense in that both of these practices offer more private benefits, as farming within five feet of a stream may not be feasible and actually could put equipment in jeopardy and the removal of an abandoned poultry house enables the farmer to put that land back into productive use.

Priming is also a signal of the likely number of bidders in a reverse auction with a budget constraint. In a popular auction, producers must make bid more aggressively to improve their chances of winning. However, whether bids in such an auction are affiliates is uncertain. As can be seen in Table 4, the influence of providing the desirability ratings from other producers had a relatively small, if non-existent, influence on the valuation of these practices.

The analysis shown in Table 5, shows that the priming score is related to the likelihood of submitting a bid, where a higher priming leads to the higher likelihood of submitting a bid into the competitive auction (Models 1 and 2). However, more careful inspection (Models 3 and 4), suggests that this effects is mostly due to low desirability scores which lowered the probability of submitting a bid, while the high scores did not significantly change the likelihood of bids. This suggests that in this research the social priming scores were generally affected the values that people placed on these practices and did not lead to significant strategic behavior, such as entering into the auction and submitting low cost-share bids in the hopes of winning the auction at a low price.

V. Conclusion

Our results demonstrate that behavioral nudges can be effective when attempting to influence profit-maximizing agents in a competitive environment. For agri-environmental programs in particular, we find that program administrators can make inexpensive changes to the decision environment related to the default bid presented and provision of priming information that can increase the amount of land conserved for a set budget amount and encourage enrollment in the program. For instance, the 9% improvement in the share offered by producers that we observe in this experiment, when scaled to USDA's $4.2 billion in annual expenditures on agri-environmental programs, represents a savings of approximately $378 million per year. Whether the impacts of such behavioral nudges lead to long-term behavioral changes and whether they are effective when applied to corporate firms and partnerships remains to be studied.

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Table 1. USDA Agri-Environmental Program Expenditures.

Program	Funding	Acres	Farms
Conservation Reserve Program (2015)	$1,609,000,000	24,273,833	365,402
Conservation Reserve Enhancement Program (2012)		1,300,000	48,165
Conservation Technical Assistance Program (2013)	$728,800,000	n/a	n/a
Environmental Quality Incentives Program	$1,391,200,000 (2013)	13,000,000 (2011)	38,352 (2011)
Farm and Ranch Lands Protection Program	$118,100,000 (2013)	533,000+ (1996-2007)	400+ (1996-2007)
Watershed Rehabilitation (2013)	$15,400,000	n/a	n/a
Emergency Watershed Protection Program	$400,200,000 (2013)	n/a	150+ Projects (2015)
TOTAL	**$4,262,700,000**	**39,106,833**	**452,319**

Table 1. Effect on Cost-Share

Effect on Cost-Share (percentage pts)			
		Model	
	Mann-Whitney	GLM^	OLS
Default	*6.20***	8.89***	9.14**
		(3.29)	-3.52
N	264	264	264
*** p<0.01, **p<0.05, *p<0.10			
^ Controls in regression models: contract type, time, total acres farmed, participation in CRP, row crop acres.			
Standard errors in parentheses are clustered at bidder level.			

Notes: For GLM: 95% CI ranges from 2.5 pp to 15.3 pp

Table 2.

Effect on Cost-Share (percentage pts)									
	5ft	15ft	30 ft	5ft F	15ft F	30 ft F	Trench	Filter	Poultry
Default	*12.94***	9.92*	9.33	*11.41**	0.01	0.02	*5.62*	6.61	8.1*
N	64	40	21	27	12	18	29	30	20

*** p<0.01, **p<0.05, *p<0.10

^ Controls in regression models: contract type, time, total acres farmed, participation in CRP, row crop acres.

Standard errors in parentheses are clustered at bidder level.

Table 3. Regression analysis of cost share percentage.

	Cost share percentage
Constant	24.334*** (4.120)
Default	9.017** (4.229)
Priming	-0.179 (4.177)
Texas	-6.144 (8.137)
Grass(15')	-4.110 (3.176)
Grass(30')	-8.835** (4.203)
Forest(5')	-8.578** (3.938)
Forest(15')	-10.923** (4.774)
Forest(30')	-12.904*** (4.393)
Ph(Tank)	-12.331*** (3.624)
Ph(Filter)	-12.068*** (3.603)
PoultyHouse	-7.057 (5.057)
Total Observations	279

Table 4. Average desirability by management practice with and without social priming.

	5ft grass	15ft grass	30ft grass	5ft forest	15ft forest	30ft forest	Ph Tank	Ph-Filter	Poultry House	Total
Average Value	4.84	3.99	3.13	3.39	3.09	2.92	3.07	3.05	5.07	3.62
- With Priming	4.93	4.06	3.13	3.28	2.95	2.75	3.14	2.98	4.82	3.56
- Without Priming	4.74	3.90	3.13	3.51	3.24	3.11	2.99	3.12	5.34	3.68
Change with Priming	0.19	0.16	0.00	-0.23	-0.30	-0.36	0.15	-0.14	-0.53	-0.12
	3.9%	4.1%	-0.1%	-6.5%	-9.2%	-11.6%	5.0%	-4.4%	-9.9%	-3.2%

Table 5. Analysis of Decision to Submit a Bid

	(1) Probit	(2) Logit	(3) Probit	(4) Logit
Constant	-2.601***	-4.678***	-2.014***	0.059***
	(0.263)	(0.501)	(0.203)	(0.022)
Default	-0.038	-0.067	-0.021	0.005
	(0.217)	(0.414)	(0.135)	(0.015)
In-person	0.324	0.648	0.334**	0.045***
	(0.253)	(0.479)	(0.157)	(0.018)
Priming Score	0.124***	0.206***		
	(0.045)	(0.084)		
Priming Treatment			0.142	0.023
			(0.173)	(0.019)
Low Desirability			-0.341**	-0.032**
			(0.141)	(0.014)
High Desirability			-0.019	-0.005
			(0.144)	(0.016)
Wald chi^2	10.24	8.84	12.51	14.93
Prob > chi^2	0.017	0.032	0.028	0.011
Log-likelihood	-404.74	-405.58	-779.88	-140.49

Notes:
*** Statistically significant at the 0.01 level. ** Statistically significant at the 0.05 level.
* Statistically significant at the 0.01 level

Figure 1. Cost of Nutrient Management Practices, average.

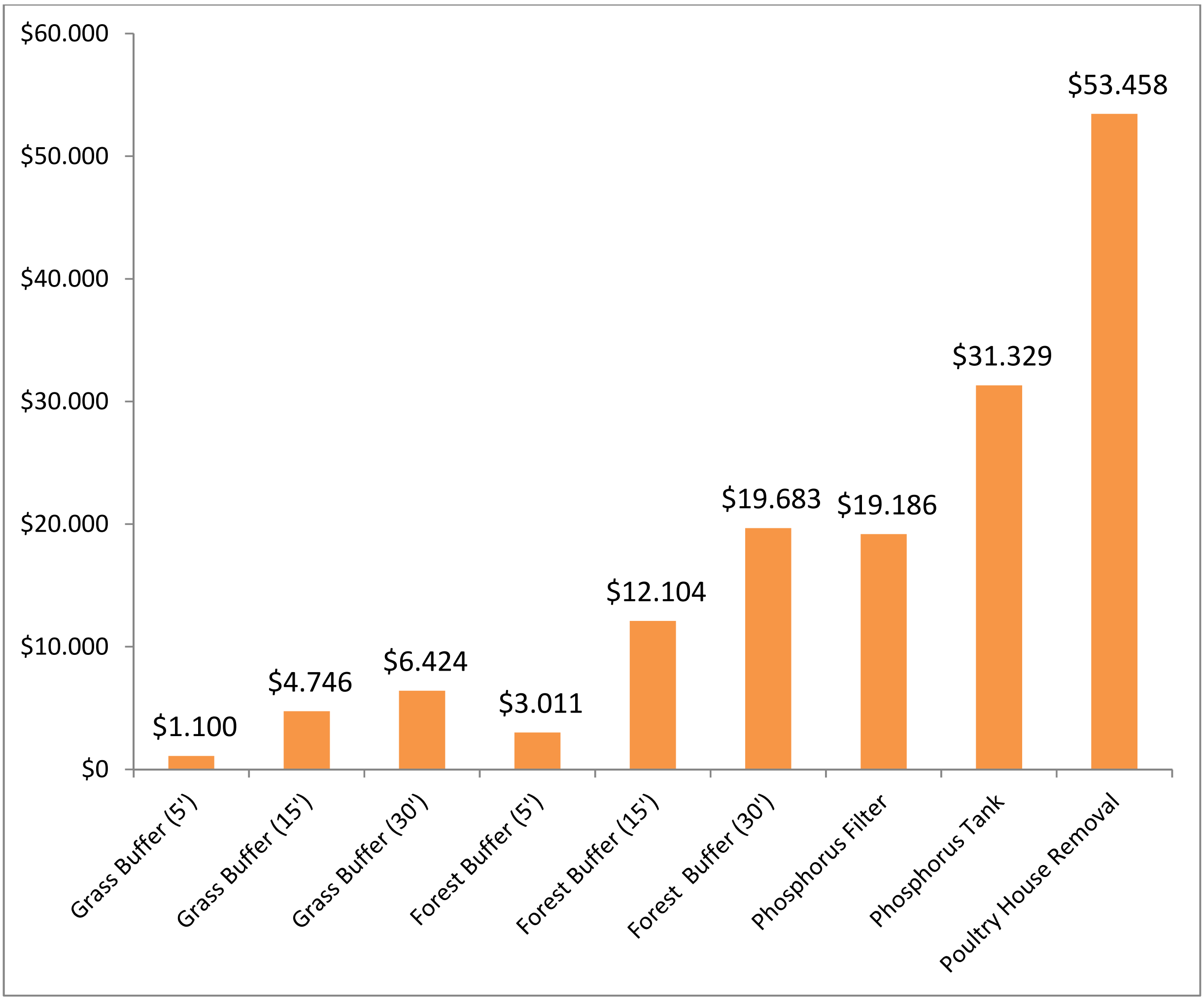


Figure 2. Sliders and default settings

Figure 3. Cost-share Bids (Percentage)

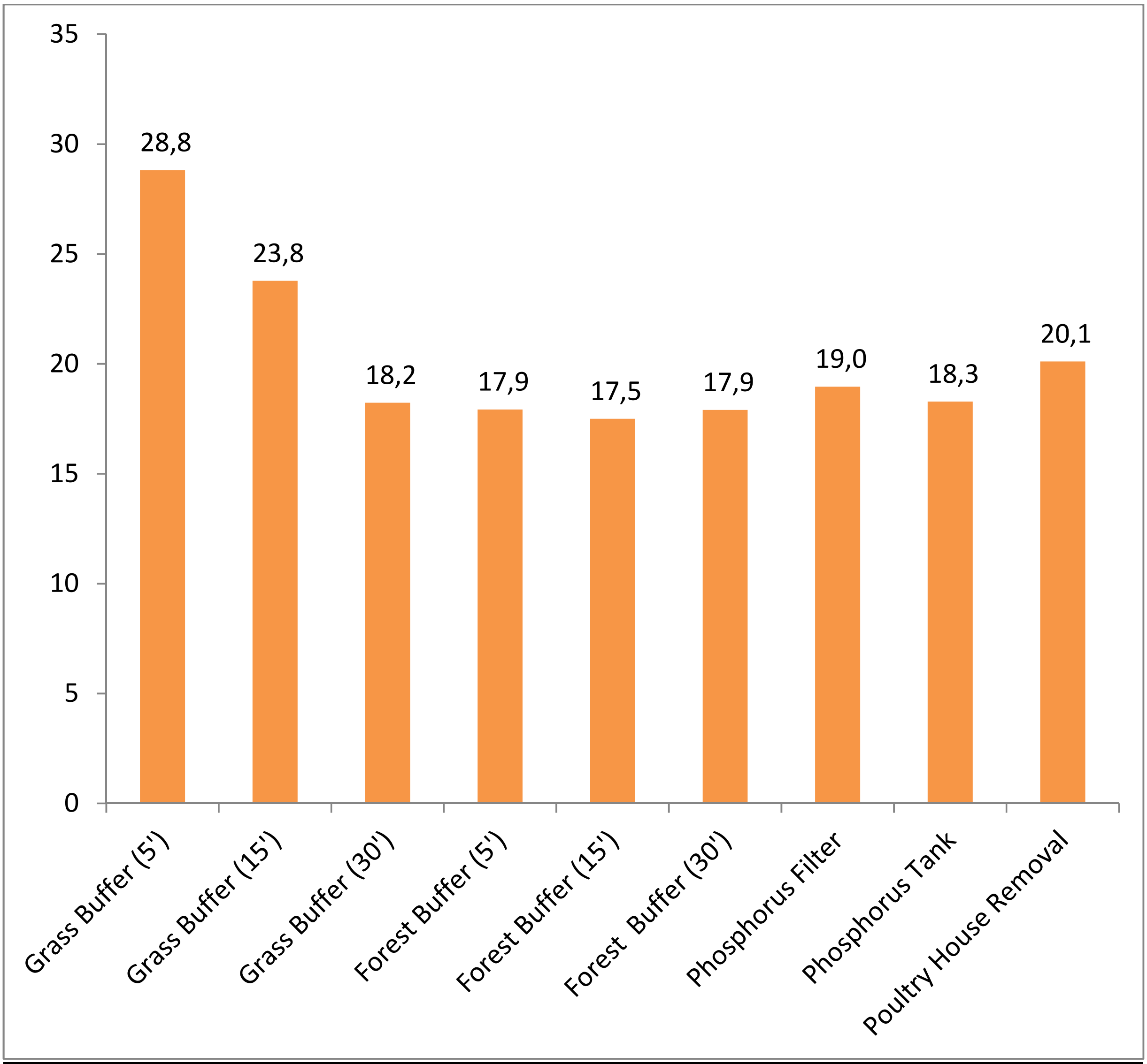


Figure 4. Impact of Defaults on Cost-share Bids (example)

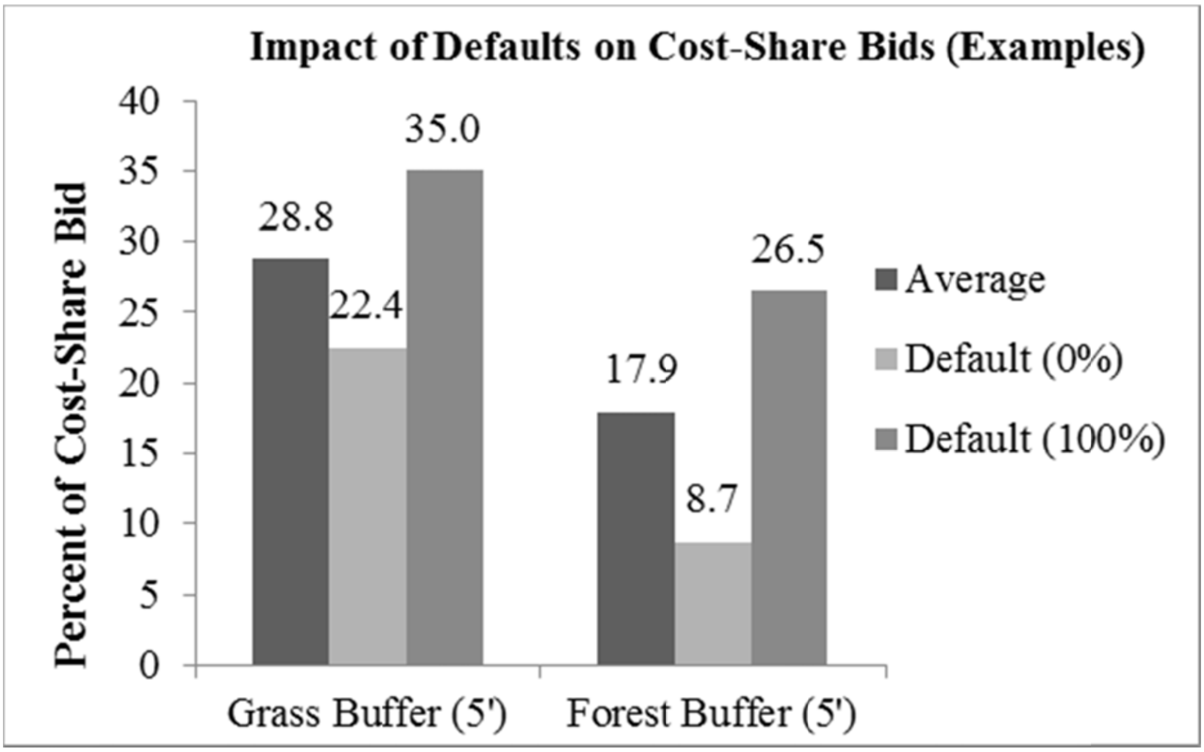
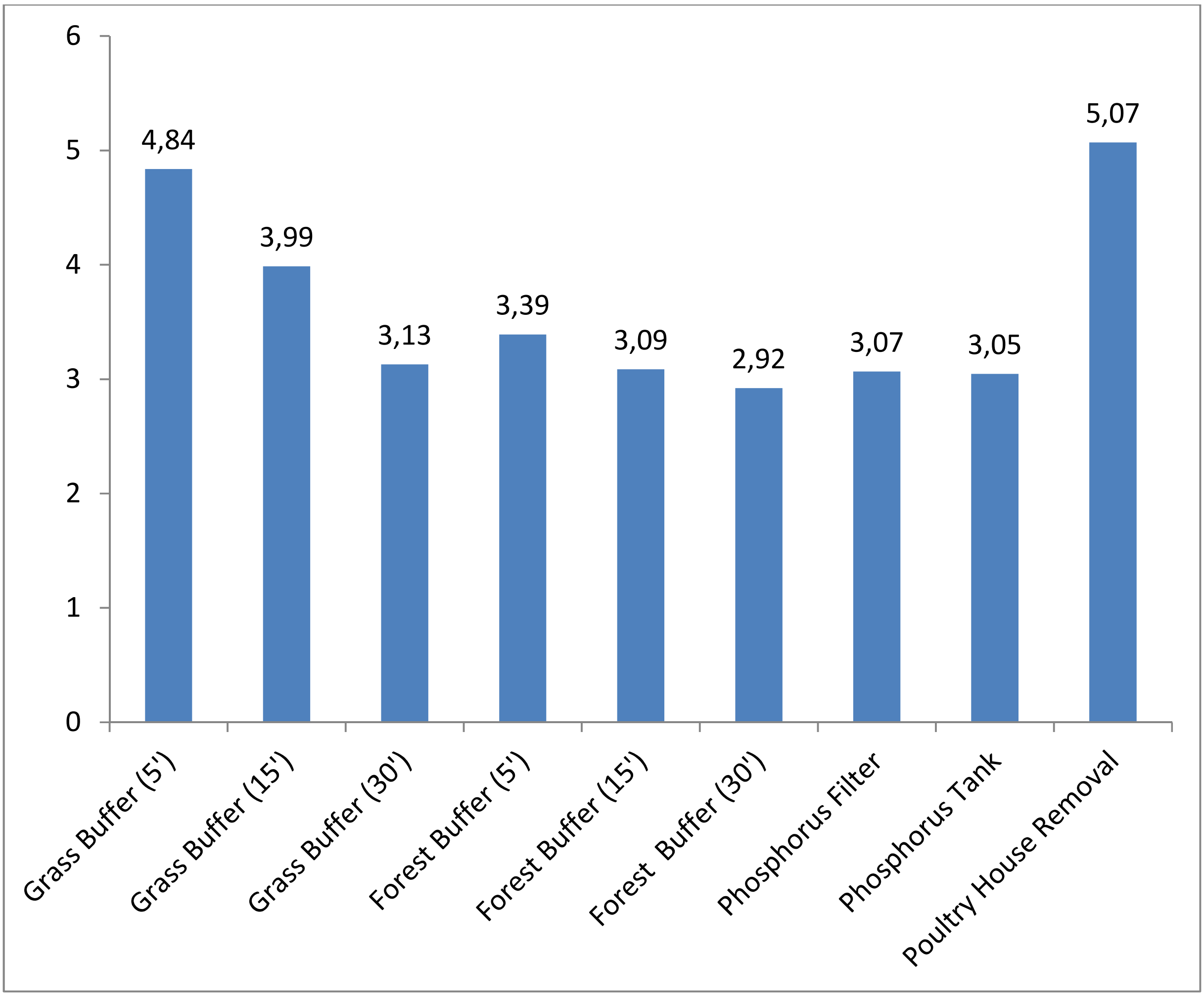
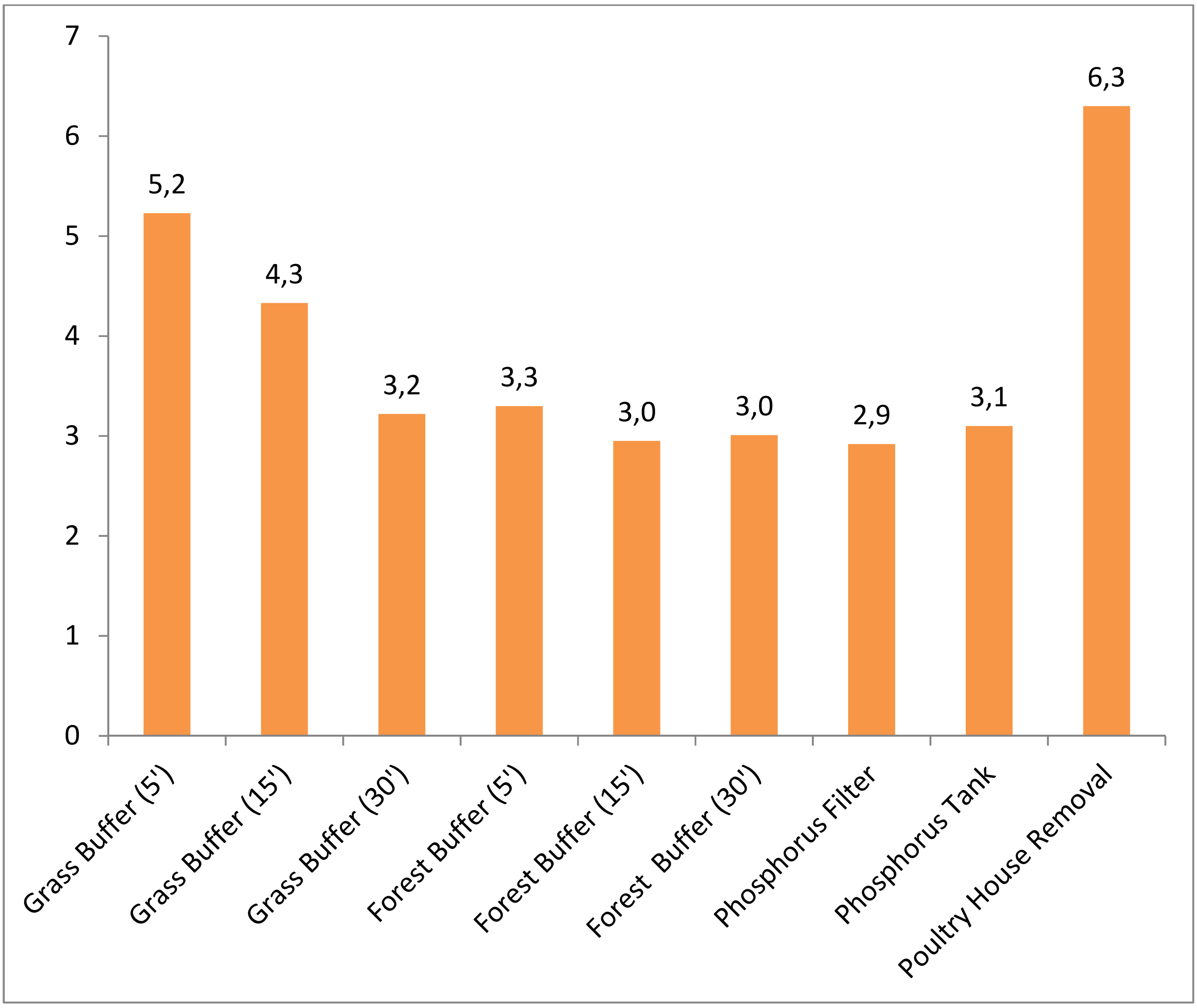


Figure 5. Average Desirability of Nutrient Management Practices (1-9 scale).




7
6
5
4
3
2
1
0
5,2
4,3
3,2
3,3
3,0
3,0
2,9
3,1
6,3
Grass Buffer (5')
Grass Buffer (15')
Grass Buffer (30')
Forest Buffer (5')
Forest Buffer (15')
Forest Buffer (30')
Phosphorus Filter
Phosphorus Tank
Poultry House Removal