

An Experimental Application to Voluntary Funding of Generic Advertising

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Generic advertising programs have been a popular tool used by many agricultural commodity organizations in the United States to enhance market demand, raise prices, and increase producer net revenue. These programs operate by assessing producers in an industry and using the collected funds for generic (non-branded) advertising and promotion of the commodity. Currently, there are thirteen federal programs and over fifty state programs in existence. The majority of economic studies evaluating generic advertising programs have found large benefits for producers relative to costs.

Funding for some commodity programs originally came from voluntary donations from participants via a voluntary contributions mechanism (VCM). While initial contributions for the advertising programs using a VCM were typically high, free-riding and decreased donations eventually became a significant problem, raising questions of equity and fairness. As a result of these concerns, essentially all VCMs were abandoned and producers held referenda on whether to adopt mandatory assessments to fund the advertising programs. Virtually all programs in operation today are mandatory.

Some individual producers have recently challenged the constitutionality of mandatory generic advertising programs arguing that being required to contribute money to generic advertising programs is an infringement of their rights to free speech. Currently, there are over 70 First Amendment challenges to generic advertising

programs being litigated. To date, there have been decisions delivered by district and circuit courts on both sides of the issue, upholding the constitutionality of some of the programs and ruling others unconstitutional. Because of these challenges, there is a need to assess whether a new institutional arrangement that maintains the voluntary spirit of the court findings will achieve the same goals and benefits of generic advertising.

An alternative funding mechanism that could potentially yield long-term benefits to producers is the provision point mechanism (PPM) for public goods. The PPM, which has never been used to fund generic advertising for agricultural commodities, has two desirable characteristics given the current legal environment: (1) it is voluntary and thus would not likely be vulnerable to legal challenges based on freedom of speech, and (2) it has been shown in both the lab and the field to reduce the incentives for free-riding and to generate greater total contributions than the VCM does. The PPM operates by announcing a threshold (or goal) for the fundraising campaign and soliciting contributions to achieve this threshold. If the threshold is met or exceeded, the contributions collected are used to fund the public good; otherwise all of the contributions are returned and no funding is provided.

Several key questions related to the institutional design of a PPM need to be explored to find the combination of features and procedures that could lead to maximum producer welfare. The first question that

arises is what impact producer referenda have on contributions to the advertising program and, ultimately, on producer surplus. The second question is what the optimal threshold is for the PPM. The third question is what combination of institutional features leads to stability of contributions to the advertising program over time. The fourth question is the impact that effectiveness of the advertising program has on producer contributions. These questions are the subject of the research summarized in this paper.

Experimental Design

All experiments were conducted at Cornell University and the subjects (N=240) were recruited from undergraduate economics courses. The experiments were carefully designed to simulate the key economic and psychological elements that influence producer contributions to generic advertising. The elements included inelastic supply and demand, an incentive compatible market mechanism, stochastic variation in demand, producer discussion, and confidential refund-by-requests that enable subjects to receive a refund of their assessments they paid on their sales.

Each experimental session involved three separate parts, where twenty subjects assumed the role of producer and seated in front of a private computer spreadsheet informing them of their costs for producing up to three units of a fictitious commodity. The first part of the experiment enabled subjects to become familiar with the experimental platform and did not involve an advertising program. The second part

demonstrated the benefits of the advertising program and had a mandatory program. Simulating the potential change that could result if mandatory programs are ruled unconstitutional, the third part replaced the mandatory program with a voluntary PPM where the PPM thresholds were varied.

Control of the rate of return was the most critical economic element to simulate in the experiment. Increases in demand due to advertising in the next period were based on several benefit-cost ratios – 2:1, 4:1, and 6:1. These rates of return are similar to the rates of return commonly observed with generic commodity advertising promotion. A particular benefit-cost ratio was constant throughout an experimental session.

In the third part of the experiment, the advertising program was implemented and contributions expended only if the PPM threshold was met or exceeded. The subject participation thresholds used in the experiment were 50%, 70%, and 90%. If the threshold was not met, then all subjects received a refund of their assessments and there was no advertising program. In the subsequent round, subjects were given the opportunity to reach the threshold again.

To test the influence of producer referenda on contribution behavior, in some of the experimental sessions, subjects were asked to submit confidential votes on whether they would prefer the PPM with a certain threshold level or whether they would prefer no advertising program. Referenda were held prior to the start of a series of rounds for each PPM threshold. In the other sessions, subjects were not given a choice and were simply informed that for the next series of rounds the advertising program would be funded by the PPM with a certain threshold level.

Results

Of primary importance, were subjects' behavior when PPM thresholds were varied. An econometric model was developed to determine the relationships between gross producer surplus on PPM threshold level (*PPM*), accounting for advertising contributions (*ADV_CONT_t*), market demand (*DEMAND*), group referendum type (*GRPREF*), and treatment round (*ROUND*). The model was specified to account for the three-level hierarchical nature of the experimental data, where subject-level information is nested within experimental groups (or blocks) and observed over rounds (i.e., repeated measures). For more specifics, see Messer, Schmit, and Kaiser.

Regression estimates for the models and utilizing the experimental data calibrated on a benefit-cost ratio of 4:1 are included in table 1. All estimated parameters were statistically significant for the producer surplus model at the 0.05 significance level or less. The statistical significance of the covariance parameter estimates lends support to the hypothesized three-level hierarchical error structure. As expected, both demand and final advertising contribution levels were significantly high given the price impacts from changes in demand.

PPM thresholds significantly affected producer profits, as did their effects across referendum groups and program duration (round). A striking result is that subjects offered significantly higher average contributions in the referendum sessions than in the non-referendum sessions for all PPM thresholds. Simulation of the econometric model indicates that with the exception of the lowest threshold levels, predicted

gross producer surplus in the referendum program were dramatically higher than those in the non-referendum program. For the referendum program, these relationships are illustrated in figure 1, which computes predicted gross producer surplus across thresholds and rounds. This simulation with its hump-shaped curve illustrates the practical trade-off between high levels of producer contributions and actually achieving the PPM threshold necessary to implement the program (and retain these contributions).

Also apparent from the simulation is the answer to the third question regarding the stability of producer surplus across rounds. While the sign on *ROUND* is negative suggesting deterioration in return levels over time, when interacted with the other variables included in the model, the net effect is one of improved stabilization for the referendum program, particularly near the optimal PPM threshold level of 82% (figure 1). In fact, model simulations show that the round-by-round changes in gross producer surplus were over six times larger in the non-referendum programs than in the referendum programs. Certainly, the higher and more stable gross producer surplus levels validate the inclusion of voting in PPM-funded programs. That producers can maximize higher profit levels at relatively higher PPM thresholds also means that additional funding goes to the generic promotion program, resulting in larger demand-enhancing impacts.

As mentioned above, control of the rate of return was the most critical economic element to simulate the experiments. We conducted additional experiments involving referendum calibrated at return levels both above (6:1) and below (2:1) the initial experimental settings. While these experiments do not capture the entire range or

reported payoff ratios, we felt that they provide additional insight into the role of program efficacy on contributions in a PPM setting. As expected, as benefits from advertising increased, so did subject contributions. Specifically, the average percentage of contributions increased from 59% in the case of a 2:1 BCR, to 63% for the 4:1 BCR, and to 68% for the 6:1 BCR across all threshold levels. The improved demand enhancing impacts as advertising's rate of return increased were also reflected in the average producer surplus levels across BCRs (3.3, 4.5, and 6.3, respectively).

Supplemental regressions of similar form and specification to the 4:1 BCR data were conducted on the additional sets of advertising payoff experiments. Given the changes in contribution behavior, it is not surprising that as advertising effectiveness decreases, so does the PPM threshold level that maximizes

gross producer surplus. The optimal PPM threshold dropped from 82% to 68% as the BCR decreased from 4:1 to 2:1 (table 2). Likewise, as effectiveness improved, the optimal threshold level reached the maximum threshold level evaluated within the experimental data; i.e., 90%. Expected threshold achievement at the 6:1 advertising effectiveness level was similar to that observed in the 4:1 case (77% and 76%, respectively). However, as effectiveness dropped to 2:1, expected threshold achievement dropped sharply to less than 50% of the time (table 2).

Conclusions

In light of uncertainties about the constitutionality of mandatory generic advertising programs for agricultural commodities, it is useful to investigate alternative voluntary funding mechanisms in case they become needed. Empirical results from an

experimental setting indicate that including producer referenda as part of the program design positively affects both producer profits and contribution probabilities. Given how participation in these referenda strongly affected subjects' contribution behavior, advertising programs should encourage these types of institutions that help secure higher funding levels. In addition, substantially higher program stability was evident when the program included the referendum and the threshold was set at or near the level where producer profits are maximized.

These results provide valuable information to commodity organizations that wish to design promotion programs that may pass constitutional muster and achieve the largest benefits possible to the producers who fund them. The range in optimal thresholds highlights the crucial nature of the underlying advertising performance measure in the experimental set up. An additional realization is that if commodity programs go to a voluntary PPM type of program, knowledge on the long-term relative performance of their promotions programs will be crucial to setting PPM operational parameters. Furthermore, extending this type of experimental application to producer groups and commodity organizations is a next logical step in making these types of institutional designs practical in a real-world setting.

For further details and related research see: Messer, K.D., T.M. Schmit, and H.M. Kaiser, "Optimal Institutional Mechanisms for Funding Generic Advertising: An Experimental Analysis" *American Journal of Agricultural Economics* (forthcoming).

Table 1. Regression Results for Subject Producer Surplus Per Round, Benefit-Cost Ratio 4:1.^a

Variable	Parameter Estimate	Standard Error
Fixed Effects:		
<i>INTERCEPT</i>	-10.8288**	0.7073
<i>ADV_CONT₋₁</i>	0.6167**	0.0894
<i>DEMAND</i>	0.2789**	0.0072
<i>PPM</i>	0.0510**	0.0160
<i>PPM*PPM</i>	-0.0004**	0.0001
<i>PPM*GRPREF</i>	0.0078**	0.0024
<i>ROUND</i>	-0.1292**	0.0800
<i>ROUND*PPM</i>	0.0039**	0.0011
<i>ROUND*GRPREF</i>	-0.2215**	0.0353
Covariance Parameter Estimates:		
σ_B^2 (Group)	1.1822*	0.6566
σ_S^2 (Subject)	0.7141**	0.0248
σ_R^2 (Round)	0.5081**	0.0669
PPM Level where Dependent Variable Maximized (mean ROUND)		
GRPREF = 1 (Yes)	82	
GRPREF = 0 (No)	74	

Note: Significance is indicated by * (10% significance level) and ** (5% significance level or less).

^a Producer Surplus is equal to subject gross profit, excluding advertising contributions.

Table 2. Optimal PPM Threshold by Advertising Return Level.

	Benefit-Cost Ratio		
	2:1	4:1	6:1
Optimal PPM Threshold	68%	82%	90%
Expected Threshold Achievement	47%	76%	77%

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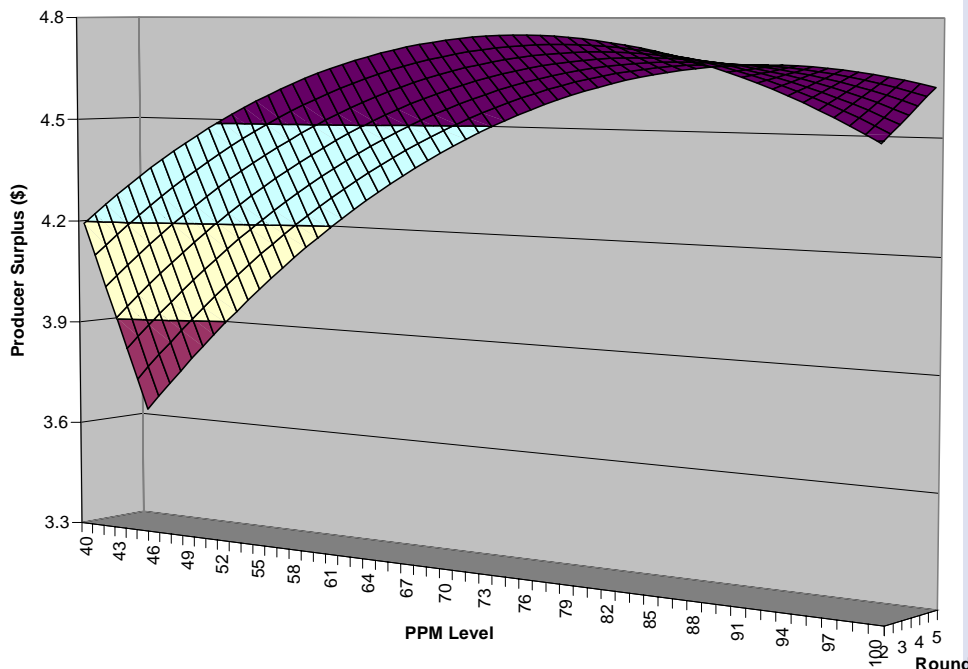
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**Figure 1. Predicted Subject Gross Surplus with Referendum
(Benefit-Cost Ratio 4:1)**



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