Economic Inquiry

EDUCATION'S GAMBLING PROBLEM: EARMARKED LOTTERY REVENUES AND CHARITABLE DONATIONS TO EDUCATION

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I examine the impact that lotteries introduced to support education have on voluntary contributions to education. State lotteries, and the causes they are introduced to support, are highly publicized. This provides the opportunity to assess whether donors are crowded-out by government spending of which they are almost certainly aware. Using donor-level survey data and nonprofits' tax returns, I find that donations to education-related organizations fall with the introduction of a lottery. This result is driven by donors' response to the new (highly publicized) government revenue source (rather than a decrease in nonprofit fundraising efforts). (*JEL* D64, H3, H75)

I. INTRODUCTION

Over the past several decades, state governments in the United States have come to embrace lotteries as an alternative source of revenue. Lotteries have proven to be successful in raising revenue; on average, lotteries add nearly 500 million dollars to each state's budgets yearly.[1] While a handful of states add lottery revenue to their general funds, states typically earmark the revenue to support particular public goods. States adopt lotteries with the intention of funding causes as diverse as environmental protection, the arts, and support for their elderly, but most commonly lottery funds are earmarked for education. Twenty of the 43 states that currently sponsor lotteries direct all of their revenues toward education, while several more dedicate at least some fraction to education. However, existing research suggests that, at best, education earmarking fails to increase education funding by the promised amount (Evans and Zhang 2007; Novarro 2005); at worst, total education funding either remains constant (Garrett 2001; Spindler 1995) or falls with the introduction of a lottery (Borg, Mason, and Shapiro 1991; Erekson et al. 2002).

Even if earmarked lottery revenues do not increase government's contribution to the intended public good, government of course is not the only source of funding for many public goods. In most cases, the causes supported by state lotteries also benefit from and rely on charitable contributions. This is especially true of education. In aggregate, education-related organizations consistently receive more donations than any other secular cause in the United States. Americans donated a total of 38.87 billion dollars toward education in 2011, which is roughly twice the amount of money that was raised through state lotteries in the same year.[2] An examination of government expenditures alone therefore does not capture the full impact that a lottery has on public good provision, as the lottery may also affect charitable contributions.

With this in mind, I examine the impact of the introduction of education lotteries on private donations. Standard models of public good provision suggest that if an individual's utility depends at least in part on the overall level of the public good, then government spending serves as a substitute for charitable contributions (Andreoni 1989; Bergstrom, Blume, and Varian 1986). Thus, we should expect charitable contributions to decrease with an increase in government spending. If, on the other hand, donors are motivated entirely by "warm glow" or the

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1. On the basis of the 2008 *Survey of Government Finances.*

2. *Giving USA*, 2012.

ABBREVIATIONS

CES: Consumer Expenditure Survey
COPPS: Center on Philanthropy Panel Study
DID: Difference-in-Differences
GVS: Giving and Volunteering Survey

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joy of giving, then government spending is not a good substitute for one's own donation and should therefore have no impact on donations. Numerous empirical tests have generally found some drop in giving, though the magnitude of the crowd-out is typically small.[3] If donors respond to the announced increase in government funding associated with the introduction of a lottery, then this—combined with the fungibility of lottery revenue—may imply that lotteries lead to a *decrease* in total provision.

I assess the degree to which lottery revenue impacts donors' contributions using several individual-level surveys: Center on Philanthropy Panel Study (COPPS), Giving and Volunteering Survey (GVS).[4] Collectively, these surveys span from 1989 to 2008, so all of the analysis in the paper focuses on this time period. All of these surveys ask respondents to indicate how much money they have donated recently to a variety of causes, including education. In a difference-in-differences (DID) framework I compare the level of education-related donations before and after a state has introduced an education-funding lottery. I find a significant decrease in education giving when an education lottery is introduced.

I then address why contributions fall in this context. In doing so, I speak to more general questions in the literature on donors' motivations and response to government activity. Andreoni and Payne (2003, 2011) show that the negative relationship between charitable contributions and government grants to nonprofits can in some cases almost entirely be explained by a decrease in fundraising. Their results might suggest that donation decisions are in fact relatively unresponsive to the overall level of the public good. In this paper, I empirically examine a different explanation for their result and for the small degree of crowd-out that is often observed in the literature: donors may be largely unaware of government activity in most settings. While this theoretical possibility has been discussed in the literature,[5] (to my knowledge) this is the first paper to empirically assess the importance of the salience of government spending.

Unlike government spending in the form of grants to nonprofits, the intended increase in government spending associated with the introduction of a lottery is highly publicized and the beneficiary is well known. States are eager to advertise that revenues go toward a "good cause," perhaps to overcome moral opposition to the lottery and draw in customers who might not otherwise gamble (Clotfelter and Cook 1990); advertisements therefore typically include some reminder of the cause supported by lottery revenues (Clotfelter and Cook 1991). Thus, state lotteries provide the opportunity to test whether donors (and not just fundraisers) respond to government activity in a setting where government spending is highly salient.

To determine whether donors or nonprofits drive crowd-out, I analyze the tax returns of a random sample of nonprofits in the same DID framework. I find that an education lottery decreases donations received by education-related organizations by roughly 8%. This is not driven by a change in fundraising behavior. Moreover, there is a negative relationship between donations received and a proxy for a state's lottery advertising expenditures. This suggests that donors' response to (the perception of) increased government spending on education is dependent on the salience of government activity.

While researchers have examined a variety of issues related to state lotteries, the general impact of state lotteries as a means to finance public goods is not well understood. This paper fills this gap by examining the side of education funding that has been neglected in this literature: charitable donations. In doing so, the results also contribute to the more general literature on the interaction of government activity and charitable giving. Recent work in this area has generally found that crowd-out is largely explained by fundraiser behavior. The results presented here point to the importance of salience of government activity; when donors are more aware of government activity, their behavior is more in line with the crowd-out predicted by classic models of voluntary contributions to public goods.

II. ADDITIONAL BACKGROUND: LOTTERY AND CHARITABLE SUPPORT FOR EDUCATION

Before proceeding to the analysis, some additional detail on state lottery and charitable support for education will help fix ideas. In particular, the degree to which we might expect donors to reduce their contributions depends in

3. See Vesterlund (2006) for a review of the empirical crowd-out literature.

4. Some additional analysis in an online appendix makes use of a third survey: the Consumer Expenditure Survey.

5. In particular, both Garrett and Rhine (2010) and Monti (2010) point to higher awareness of government activity as a potentially important difference between direct government spending and spending through government grants. Monti presents a model demonstrating the impact that increased awareness may have on donations.

part on their perception of the overlap between the causes they support and the specific causes supported by the lottery. Thus, despite the fact that most of the analysis will center on the impact of lotteries on education spending and giving in general, here I discuss which particular causes within education tend to benefit from each source of funding.

As noted, education is typically the most popular secular category of giving in the United States, second only to religious giving. According to a recent *Giving USA* report, 38.87 billion dollars and 13% of all charitable donations went to education-related causes in 2011. This figure—and the "education giving" discussed throughout—includes donations to a wide array of education-related organizations: "*giving to the education subsector includes giving to support nonprofit, public, and charter pre-K through grade 12 schools; nonprofit and public colleges and universities; vocational and technical schools; nonprofit and public libraries; education research and policy; adult education programs; tutoring programs; and student services organizations.*"[6] However, a majority of donations to education (roughly 78% in 2011) support public and private higher education (including scholarship and financial aid programs). There is a fairly even split between support for public and private institutions: in 2011, private institutions received 55% of donations to higher education, while public institutions received 45% of donations.[7]

So while a broad array of causes fall under the umbrella of "support for education," the main beneficiaries are public and private institutions of higher education. We will see that this is generally true of education lotteries introduced during the sample period as well. The main donor-level data I use spans from 1989 to 2008 so I focus on this time period throughout. The states that introduced education lotteries during these years and the specific causes that they currently support are listed in Table 1.[8] Like private charitable support for education, a majority of these lotteries are currently designed—at least in part—to fund higher education. Many of these lotteries were accompanied by the introduction of large-scale, state-run, lottery-funded scholarship programs.[9] Many of the lottery programs also support programs outside of higher education that often fall within the private nonprofit sector, such as literacy programs and pre-kindergarten programs for low-income children.

III. GENERAL EMPIRICAL APPROACH

Throughout the paper, I employ a DID approach to identify the impact of an education lottery on donors' contributions (Section IV), and donations received by nonprofits (Section V). The generic empirical specification employed throughout is:

$$y_{\text{ist}} = \alpha + \beta_{\text{DID}}\text{Edulot}_{\text{ist}} + \beta_x X_{\text{ist}} + \left[\text{state } FE's\right]_s + \left[\text{year } FE's\right]_t$$

where y_{ist} is the outcome variable of interest and X_{ist} is a vector of individual-level covariates. "$\text{Edulot}_{\text{ist}}$" is an indicator variable equal to one if observation i is in a state (s) that, at that point in time (t), sponsors an education-funding lottery.[10] Throughout, standard errors are adjusted to allow for clustering at the state level.

One potential concern with the DID approach is that states may introduce education lotteries in response to a decrease in the availability of education funding from either public or private sources. This would violate the assumption of parallel pre-treatment trends across treatment and control states. However, factors that are unrelated to education financing (e.g., within-state religiosity, the adoption of a lottery in a neighboring state) have been shown to be more important predictors of lottery adoption than fiscal crises (Coughlin, Garrett, and Hernández-Murillo 2006), particularly in lotteries introduced after the 1970s (Alm, McKee, and Skidmore 1993). In online appendix Table A1, I report results suggesting that donations are not different in treatment states just prior to the

6. Source: *Giving USA 2012* report.

7. Source: Council for Aid to Education Annual Survey (2012).

8. A comprehensive historical listing of specific beneficiaries is not available. All lotteries listed have supported *some* education-related cause(s) since the date indicated. Some states (like South Carolina) adjust the specific composition of their beneficiaries on a year-to-year basis.

9. Georgia's HOPE Scholarship is a prominent example and seems to have served as a model for several states that followed.

10. An "education-funding lottery" is defined here as a lottery that is introduced solely for the purpose of funding education. Some states defined here as education lotteries use a small fraction of their revenues for other causes, but only after achieving a certain threshold of funding for education. Thus, more precisely, an education lottery is defined here as a lottery for which the entire first dollar of revenue is earmarked for education.

TABLE 1
Education Lotteries Introduced during Sample Period

State	Education Lottery Established	Specific Beneficiary[b]
Georgia	1993	Higher ed. scholarships (public & private schools), funding for pre-K programs
Missouri	1993[a]	Programs at all levels of public education
New Mexico	1996	Higher ed. scholarships (public universities/community colleges)
Texas	1997[a]	Public K-12
Vermont	1998[a]	"Education fund"
Virginia	2000[a]	Public K-12
Washington	2001[a]	Higher ed. scholarships/fin. aid (public and private schools), low-income pre-K programs
South Carolina	2002	All levels of education, scholarships/fin. aid for public and private universities
Tennessee	2004	Higher ed. scholarships (public and private), pre-K and after-school programs
Kentucky	2005[a]	Higher ed. scholarships (public and private), early childhood literacy programs
Oklahoma	2005	Public K-12, Higher ed. grants/loans/scholarships, Other higher ed. programs
North Carolina	2006	Public K-12, Higher ed. scholarships/financial aid, and pre-K programs

[a]These states already had a lottery (with revenues going toward a different cause or a general fund) but switched to earmarking funds only for education in the year indicated.
[b]Information on specific beneficiaries is obtained from state lottery websites and was current as of early 2013.

application of treatment.[11] In Section V, I use an event-study methodology and find no difference between treatment and control states with regards to donations received by education organizations prior to treatment.

IV. DONOR RESPONSE TO EDUCATION LOTTERY REVENUE

A. Data and Empirical Approach

How do donors respond to the introduction of an education lottery? To begin to answer this question, I primarily draw from two individual-level surveys: the Giving and Volunteering in the United States Survey (GVS) and the Center on Philanthropy Panel Study (COPPS).[12] These surveys ask respondents to indicate how much they have donated to a variety of causes, including education.

GVS and COPPS were designed to gather information about individuals' charitable activities and are two of the most widely used sources of data on the topic. Both surveys ask detailed questions about the amount donated to various charitable causes such as education, health, public services, etc., in addition to more basic demographic information. COPPS follows a panel of individuals between 2001 and 2009 (with surveys every 2 years). GVS is not a panel, but I have constructed a repeated cross-section of surveys between 1990 and 1999 (again, with waves every 2 years—until 1996, when the next wave was not administered until 1999). In both surveys, participants are asked about their charitable giving in the preceding calendar year, so collectively GVS and COPPS provide results for the years 1989 through 2008.

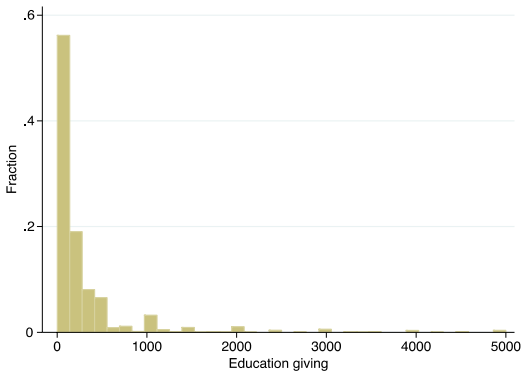
The COPPS data are preferable as it is a panel and allows for individual fixed effects, thereby controlling for unobserved differences in altruism. However, given that identification in the DID framework stems from a state establishing an education lottery within 2001–2009, one might be concerned that the results are driven by something specific about this handful of states. Thus, the GVS data is included to further support the robustness of the results by providing additional observations during a different decade with different states introducing education lotteries.

The primary outcome variable of interest in all three datasets is total giving to education. In both COPPS and GVS, respondents report education giving for the preceding calendar year. To provide some sense of the magnitude of giving in these samples, the mean of education giving is roughly $40 in both datasets. In GVS, only 16% of respondents report making any donation to an education-related cause. In COPPS, 13% of respondents report positive donations to education. To provide some sense of the

11. Additionally, in analyses not reported here, I find that lottery states' governments do not experience drops in revenue or increases in education expenditures in the years preceding to the adoption of a lottery.

12. Additional results drawing from the Consumer Expenditure Survey (CES) are in an online appendix.

FIGURE 1
Distribution of Education-Related Donations in the Survey of Giving and Volunteering (Conditional on Making any Education Donation)



distribution of giving, Figure 1 is a histogram of donations in the COPPS data *conditional on making any donation*. The distribution is similar in GVS. As documented in the figure, even when restricting attention to positive donations, the distribution of donations is still rather skewed toward low donations.

Included covariates vary by the survey and empirical approach being used. In the COPPS data, all specifications control for family income. When the COPPS data is estimated without individual fixed-effects, I also include a variety of additional controls: number of children, employment (respondent and spouse), marital status, urban-rural residence status, age, sex, and race. GVS specifications include controls for race, gender, employment (respondent and spouse), church attendance, age, education level, income, marital status, children in household, and confidence in education (as indicated in the survey). Regardless of the survey being used, all specifications include year fixed effects and state fixed effects (unless the specification includes individual-level fixed effects.)

B. Results

Results from the baseline specifications in both datasets are presented in Table 2. Column 1 reports the results of a fixed-effects regression in the COPPS data; Column 2 reports the results of the repeated cross-section analysis in the GVS data. In either case, we find that education giving significantly decreases when an education lottery is introduced.

I also estimate logit models to assess how an education lottery impacts giving on the extensive margin. Results are presented in columns 3 and 4 for COPPS and GVS, respectively. In both models, the dependent variable is equal to one if the respondent reports any education giving. There is little response to the introduction of an education lottery. Thus, the baseline results are driven by changes on the intensive margin. This provides an initial indication that these results may not be entirely driven "fundraiser crowd-out." If the only reason that contributions decrease is a decline in the number of donors being solicited, then we might expect to find that the drop in giving is driven by the extensive margin.

There is reason to be concerned that the simple baseline results might be biased due to the large number of individuals who contribute nothing to education. This concern is addressed in two ways, with results reported in Table 3. In analyzing the COPPS data, I can restrict the sample to "education-givers"—individuals who donate to education at *any point* in the panel. This substantially reduces the number of zero-contribution observations. This specification is also interesting in its own right as it estimates the impact of the treatment on the individuals who *would* be giving. As the GVS is not a panel, the GVS parallel to this is to restrict the sample to observations with positive education contributions.[13] Results from these estimations are reported in Columns 1 and 3, respectively. Again, we see a significant decrease in giving in both datasets/decades but, as we would expect, the magnitude is much larger than the baseline result.

In Models 2 and 4, I estimate Tobit models to address "censoring" of contributions at $0. There is not a straightforward and unbiased implementation of fixed effects in Tobit models for panel data, so in the COPPS data I instead estimate a standard Tobit model, adjusting standard errors for clustering at the individual-level (Column 3).[14] Similarly, in Column 4 I report the results of estimating a Tobit model in the GVS data. For each of these specifications, I report the marginal effect of "Edulot" on the unconditional expected value of *observed* giving. In both cases, we continue to observe a significant decrease in giving

13. Restricting our attention to education givers would be problematic if the treatment changed *the set of donors* and not just the size of their contribution.

14. Estimating a random-effects Tobit model yields similar results.

TABLE 2
Baseline Results—Impact of Education Lottery on Education Giving

Variables	(1) Educ. giving	(2) Educ. giving	(3) Any educ. giving	(4) Any educ. giving
Edulot	−9.372*	−33.49***	−.033	−.003
	(5.153)	(11.94)	(.032)	(.019)
Observations	29,715	11,017	7,985	11,012
Dataset	COPPS (2000–2008)	GVS (1989–1998)	COPPS (2000–2008)	GVS (1989–1998)
Model	FE Reg.	OLS	FE Logit	Logit

Robust standard errors (clustered at state level) in parentheses.
Columns 3 and 4 report marginal effects.
***$p < .01$, **$p < .05$, *$p < .1$.

TABLE 3
Alternative Specifications—Impact of Education Lottery on Education Giving

Variables	(1) Educ. giving (Educ. givers only)	(2) Educ. giving	(3) Educ. giving (Educ. givers only)	(4) Educ. giving
Edulot	−27.77*	−8.44*	−191.9***	−11.96*
	(16.27)	(5.12)	(53.09)	(7.01)
Observations	9,279	28,426	1,801	11,017
Dataset	COPPS	COPPS	GVS	GVS
Model	FE	Tobit	OLS	Tobit

Robust standard errors in parentheses (clustered at state level in Models 1 and 3, individual level in Models 2 and 4). Columns 2 and 4 report marginal effect on the unconditional expected value of observed giving.
***$p < .01$, **$p < .05$, *$p < .1$.

after accounting for the large number of censored observations. These estimates suggest that the introduction of an education lottery decreases average giving by between $8 and $12; from an average of $40, this represents a drop in giving of between 20% and 30%.

What is driving this drop in giving? The decrease is consistent with classic models of crowd-out; the expected introduction of a new source of funding for a public good serves as a substitute for individual contributions and as such donors reduce their level of giving. There are of course alternative explanations. Kearney (2005) finds that, for the average lottery player, lottery spending is entirely financed by a reduction in non-gambling expenditures; thus, it is reasonable to expect that lottery spending may come at the expense of a particular category of non-gambling expenditures: charitable giving. If this were the case, we would expect charitable giving to decrease generally instead of finding a drop only in education-related giving.

It is not the case that giving to other causes substantially decreases with the introduction of an education lottery. To show this, I again estimate the baseline specifications (Columns 1 and 2 of Table 2) and the Tobit models (as in Table 3) but take "non-education giving" as the dependent variable.[15] Results are reported in Table 4. With the exception of Column 3 (where there is a small and insignificant drop in non-education giving), we see that giving to other causes actually slightly increases, but this increase is not significant. (The magnitudes of these coefficients are larger than those of the education-only estimations as the mean of giving to the sum of other causes is naturally much higher than giving to just education. For instance, average non-education giving in GVS is roughly $224.)

Another alternative to the crowd-out explanation is that donors view the lottery as a new way to contribute to education. The idea that donors view donations and lottery expenditures as equally good ways to contributions drives

15. In GVS, "non-education giving" is defined as total reported giving minus education giving. In COPPS, respondents do not report "total giving" and the way that they are asked to report giving to several causes changed between the 2002 wave and the remaining waves. However, questions regarding education giving, religious giving, "combined purpose" giving (e.g., United Way), health giving, and "help for the needy" are consistent across waves. Thus, in COPPS "non-education giving" is the sum of these consistently measured categories (religious, health, combined purpose, and needy).

TABLE 4
Giving to Other Non-Education Related Causes

Variables	(1) Non-educ. giving	(2) Non-educ. giving	(3) Non-educ. giving	(4) Non-educ. giving
Edulot	68.98	35.61	−25.38	22.69
	(73.38)	(47.70)	(47.16)	(32.15)
Observations	29,715	28,426	11017	11,017
Dataset	COPPS	COPPS	GVS	GVS
Model	FE-Reg	Tobit	OLS	Tobit

Robust standard errors in parentheses (clustered at state level in Models 1 and 3, individual level in Models 2 and 4). Columns 2 and 4 report marginal effect on the unconditional expected value of observed giving.
***$p < .01$, **$p < .05$, *$p < .1$.

Morgan's (2000) theoretical result (and following experimental work) that lotteries are better at providing public goods than voluntary contributions. If donors are (in their mind) simply shifting to another way of contributing, this would not truly be considered crowd-out. However, using the Consumer Expenditure Survey, which allows me to observe both lottery and charitable expenditures, I find that it is the individuals who do *not* play the lottery who are reducing their donations. These results are reported and discussed in greater detail in an online appendix.

To summarize, the introduction of an education lottery reduces donors' contributions to education by 20–30%. This reduction appears to be driven by changes on the intensive margin; the lottery does not impact the probability that an individual will make a contribution. Moreover, there is evidence that the drop in giving might be explained by (expected) government spending crowding out private contributions, as opposed to individuals sacrificing charitable contributions to play the lottery. However, while the decrease in giving seems to be a response to new government funds, empirical results from recent literature on crowd-out suggests that the crowd-out may be a response by *nonprofit organizations* and not donors. This issue is explored in the next section.

V. NONPROFIT ORGANIZATION RESPONSE TO EDUCATION LOTTERY REVENUE

How does the introduction of an education-funding lottery impact donations received by education-related nonprofits? We have already seen that an education lottery crowds out donations to education organizations, but it is possible that the result is driven by a reduction in the effort of fundraisers—either because they expect the marginal benefit of fundraising to be lower or because they have benefitted directly from lottery revenues and their level of need has reduced. Andreoni and Payne (2003) document that, in a more general setting, the crowd-out that results from government grants to nonprofits can be almost entirely explained by this "fundraising crowd-out." In some of their results that account for fundraising, donors' contributions are either unaffected by or slightly increase with grants.

One explanation for the observed lack of "traditional crowd-out" in Andreoni and Payne's work (and, more generally, for the relatively small degree of crowd-out typically observed in response to government grants) is that individuals are largely unaware of government grants to nonprofits. In the United States, the introduction of a lottery to fund education tends to be highly publicized and as such individuals are more likely to be aware of this change in government funding. Thus, it may be reasonable to expect that the crowd-out observed in the previous section is in fact driven by donor preferences, consistent with classic models of charitable giving and crowd-out.

A. Data and Empirical Approach

To examine whether this is the case, I next turn to data on nonprofit organizations' revenue and expenses from federal tax returns spanning from 1989 to 2007. The data are collected and constructed by the IRS Statistics of Income division, and then compiled and provided for research purposes by the National Center for Charitable Statistics (NCCS). Each year a subset of tax returns from nonprofit organizations that hold 501(c)(3) status are randomly sampled for inclusion in the dataset, which reports a variety of financial variables from their tax return (from the year sampled) such as operation expenses, charitable contributions received, fundraising expenses, etc. The dataset also includes

groupings of nonprofit organizations by function, categorizing organizations as *Arts*, *Education*, *Health*, *Human Services*, or *Other*.

A broad array of education-related organizations are represented in the data, including colleges, universities, preschools, libraries, remedial reading organizations, etc. However, as noted in the introduction, a vast majority of charitable activity in the education subsector is directed toward higher education. These data of course include private nonprofit colleges and universities, but many public universities and colleges are also represented: either because (1) they officially hold 501(c)(3) status or (2) their fundraising activities are accomplished through an affiliated but independent nonprofit foundation, both of which are common.

While the dataset is not constructed as a true panel of nonprofit organizations, nonprofit organizations reappear in the data often enough that it can be treated as panel (as Andreoni and Payne do, for instance).[16] Thus, I construct an unbalanced panel where each observation is a particular nonprofit organization in a particular year; there are typically (but not always) gaps between a nonprofit organization's appearances in the panel but these appearances are randomly determined.

The goal of this section is to examine the donations received and the fundraising behavior of nonprofit organizations in response to the introduction of a lottery. Thus, I restrict my sample to organizations that receive donations at any point in the panel. The resulting dataset consists of a total of 192,478 observations and 19,505 unique nonprofit organizations; 39,410 of these observations are education-related organizations.

Throughout this section, I use a fixed-effects approach (with fixed-effects at the organization level) within the same DID framework employed in previous sections. Two questions are of primary interest: First, how does the introduction of an education lottery impact the amount of donations received by education-related organizations? This essentially tests the robustness of the results from the previous section, but with much richer data. Here, for instance, we do not suffer from the censoring at $0 that plagued the assessment of the donor-level data. Second, are changes in donations received by nonprofits driven by changes in fundraising efforts?

16. The median organization in the dataset I use appears seven times.

With these questions in mind, the primary outcome variables of interest is log of *contributions received*.[17] I regress contributions on the "Edulot" indicator variable and, in all specifications, I include controls for the log of total revenue (excluding public support), the log of total expenditures (excluding fundraising), and year fixed effects. I additionally control for state-level covariates which may impact donations: log of income per capita, log of state population, log of education expenditure per capita, and log of other expenditures per capita. To address the impact of fundraising, I then control for fundraising expenditures. In doing so, I use an instrumental variables approach to account for the endogeneity between fundraising and donations received, using *liabilities at the beginning of the fiscal year* as an instrument for fundraising.[18]

B. Results

Table 5 provides an initial assessment of the impact that a lottery has on contributions received by nonprofits. Columns 1 and 2 report the results of fixed-effects estimations, with fixed-effects at the organization level, for education organizations and non-education organizations, respectively. Consistent with the findings from the previous section, the introduction of an education lottery reduces the contributions received by education organizations—in this case, by an estimated 8%—but has no significant impact on contributions to other causes.[19]

17. Taking the log of contributions was not feasible in the previous section given the large number of $0 donations. In this section, where the organizations in the sample mostly all receive some positive amount of donations, it is both feasible and preferable; the log specification better handles outliers.

18. Andreoni and Payne (2011) use this instrument for fundraising as well arguing that higher debt impacts the need for fundraising in a way that is unrelated to the amount of donations one expects to receive.

19. To link this result more closely to the existing literature on crowding-out of charitable giving, we would ideally like to know the extent to which charitable giving decreases as a function of the *amount* that government spends. Answering this question is difficult because there is very little actual increase in spending, but we do know how much government *claims* it will spend. That is, in the state government finance data I observe "lottery proceeds," which is the amount of money remaining for the beneficiaries after accounting for prizes awarded and administrative costs. Thus, we can estimate the continuous impact of treatment by adopting the same specifications as before but replacing the "Edulot" dummy with log of lottery proceeds in education-lottery states. Online Appendix Table A2 reports the results of these estimations for both education and non-education organizations. Based on the instrumental variable specification which controls for fundraising (Table A2, Panel B), a 10% increase in lottery proceeds is associated with a 5.25% decrease in contributions received by education-related organizations.

TABLE 5
The Impact of an Education Lottery on Contributions Received

Variables	(1) Contributions received: *Educ. orgs.*	(2) Contributions received: *Non-educ. orgs.*	(3) Contributions received: *Educ. orgs.*	(4) Contributions received: *Educ. orgs.*
	FE-Reg.	FE-Reg.	FE-Reg.	FE-Reg.
Edulot	−.0817***	.0119		−.0734*
	(.0275)	(.0282)		(.0369)
Failed Edulot			−.0247	
			(.0817)	
Non-educ. lottery				.0138
				(.0363)
Other expenditures	.339***	.282***	.340***	.339***
	(.0374)	(.0142)	(.0373)	(.0374)
Other revenues	−.0747***	−.0659***	−.0745***	−.0747***
	(.0216)	(.00876)	(.0217)	(.0217)
State: income	.850***	1.053***	.783***	.851***
	(.258)	(.294)	(.258)	(.258)
State: population	.433	.666***	.264	.425
	(.270)	(.198)	(.241)	(.280)
State: educ. exp.	.0443	.0149	.0565	.0435
	(.105)	(.0889)	(.108)	(.104)
State: non-educ. exp.	−.131	−.217*	−.149	−.135
	(.140)	(.115)	(.145)	(.139)
Observations	38,585	129,267	38,585	38,585
R^2	.263	.066	.227	.331

Robust standard errors (clustered at state level) in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$.

Columns 3 and 4 offer two robustness tests. Between 1989 and 2008, three states[20] attempted to introduce a lottery through referenda or ballot initiatives, but failed to achieve enough votes. In Column 3, I replace the "Edulot" dummy with a "Failed Edulot" dummy. If the treatment effects here are merely picking up trends in giving that *cause* a state to introduce a lottery, the coefficient on "Failed Edulot" should be negative and significant. While negative, the coefficient is substantially smaller in magnitude than the result from Column 1 and is not significantly different than zero. Column 4 adds a dummy to indicate a non-education lottery to the main specification. No drop in giving to education organizations is observed when the lottery is not intended to benefit education.

Is the decrease in contributions to education organizations driven by a change in fundraising efforts? To answer this, I add a control for fundraising to the preceding specification. However, to account for potential endogeneity between fundraising and donations, I do so in an instrumental variables framework, taking liabilities as an instrument for fundraising. Results for education (Columns 1 and 2) and non-education organizations (Columns 3 and 4) are presented in Table 6. Columns 1 and 3 report the first stage of the instrumental variables regression. Notably, the introduction of an education lottery has very little impact on education organizations' fundraising expenditures (Column 1). Thus, in turning to the impact of the lottery after accounting for fundraising (Column 2), it is unsurprising to find that the estimated decrease in giving is very close to the estimate from Table 5.

Next, I report the results of an event study approach to analyzing the data. This is done for two reasons. First, the DID approach I rely on throughout the paper requires that there is not a difference in trends across treated and control states prior to treatment. The event study approach explicitly tests this. Second, the dynamics of the crowd-out detected thus far is interesting in its own right. Does the lottery cause just a brief drop in giving, or is there a more persistent treatment effect?

To assess this, I adapt the two-stage least squares approach reported in Table 6 and employ an event study approach similar to that of Jacobson, LaLonde, and Sullivan (1993)

20. Oklahoma in 1995, Alabama in 2000, Arkansas in 2001.

TABLE 6
The Impact of an Education Lottery—Accounting for Fundraising

	(1) Educ. orgs: Fundraising FE-Reg. (first-stage)	(2) Educ. orgs: Contributions received IV-FE-Reg.	(3) Educ. orgs: Contributions received FE-Reg.	(4) Non-educ. orgs: Fundraising FE-Reg. (first-stage)	(5) Non-educ. orgs: Contributions received IV-FE-Reg.	(6) Non-educ. orgs: Contributions received FE-Reg.
Edulot	−.00296	−.0689**	−.0650**	.0685	.00314	.0247
	(.0324)	(.0279)	(.0296)	(.0422)	(.0412)	(.0372)
Liabilities	.0346**			.0432***		
	(.0130)			(.00644)		
Fundraising		.0614	.130***		.4851***	.176***
		(.2656)	(.0116)		(.1273)	(.00924)
Obs.	27,905	27,905	28,828	58,374	58,374	61,996
R^2	.452	.155	.512	.245	.469	.363

Robust standard errors (clustered at state level) in parentheses.
Additional controls included as noted in text.
***$p < .01$, **$p < .05$, *$p < .1$.

and Kline (2012). Specifically, I now estimate the following:

$$y_{ist} = \alpha + \sum_t \delta_t D_{st} + \beta_f \widehat{\text{fundraising}}_{ist} + \boldsymbol{\beta} X_{ist} + \left[\text{state } FE's\right]_s + \left[\text{year } FE's\right]_t$$

where, instead of the simple "treatment" dummy, I now include a vector of dummies D_{st} that are equal to one only when treatment is exactly t periods away in state s. Given the small amount of noise in defining when a state is "treated," one "period" in this specification is 2 years. So that the results can be interpreted as the treatment effect of the lottery, one period prior to the introduction of the lottery—that is, 0–2 years before the lottery—is the omitted category. (More precisely, $\delta_{-1} = 0$.) If the parallel trends assumption is satisfied $\delta_t = 0$ as long as $t < 0$. The remainder of the specification is no different than the one used to generate results in Table 6; "$\text{fundraising}_{\text{ist}}$" is predicted in a first-stage using the assets instrument.

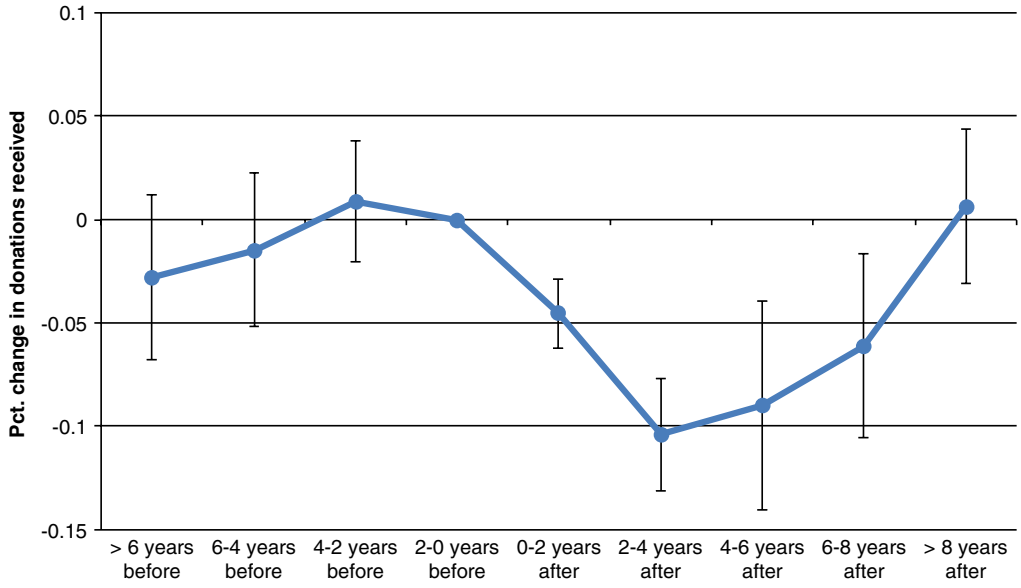
The results are documented graphically in Figure 2, which plots the estimated event study coefficients, δ_t. The horizontal axis indicates the period in question, while the vertical axis reports the estimated percentage change in giving. First, note that the parallel trends assumption is satisfied; for all periods prior to the introduction of a lottery, there is no statistical difference between treated and untreated nonprofit organizations. After the lottery has been introduced (starting with "0–2 years after lottery"), donations fall. Donations decline by 4.5% in the first 2 years ($p < .01$), 10.4% in the third and fourth years ($p < .01$), and 9% in the fifth and sixth years ($p < .10$). In the long run, the effect is dampened. Six-to-eight years after treatment there is an estimated drop in giving of 6%; there is an even smaller (and insignificant) difference between treated and untreated organizations more than 8 years after treatment.

C. Variation in Crowd-Out by Type of Lottery and Type of Organization

As noted in Section II, different states designate funds for different levels of education. Some states that introduce an education lottery during the sample period aim to support both K-12 and higher education. Some aim to support only higher education, usually creating a scholarship fund. Two states (namely, Texas and Virginia) support only K-12 education. In this subsection, I allow each of these categories of treatment to have their own effect. Similarly, some states generate funds for both public and private institutions (usually in the form of scholarship funds) while others are designated only for public institutions. I also allow these two groups of states to have different impacts. (I do not decompose the treatment effects in the main analysis of the paper as, in some cases, there are very few states that fit into these categories.)

Table 7, Column 1 reports the results of extending the basic specification to allow for three different types of treatments: lotteries that are intended to support both K-12 and higher education, lotteries that are intended to support K-12 education only, and lotteries that are

FIGURE 2
The Impact of an Education Lottery—Event Study Approach



intended to support higher education only. These results suggest that crowd-out is most prominent in states that designate the lottery *either* for K-12 only *or* higher education only.

Of course, we may expect the impact of these three separate treatments to vary for different types of nonprofit organizations represented in the data. For instance, a higher education organization should be impacted in states where lottery funds are used for higher education, but not in states where lottery funds are used for K-12 education only. This notion is explored in the remaining columns of Table 7.

Specifically, in each remaining column, I restrict the sample to a particular type of organization: K-12 organizations in Column 2, Higher education organizations in Column 3, and "Fundraising/support organizations" in Columns 4–6. This final category requires some additional explanation: in many cases, the organization that raises funds for a university (public or private) registers as its own separate nonprofit organization. These organizations appear in the data as "Fundraising/support organizations."[21] Also captured in this category are any other organizations "that raise and distribute funds for multiple organizations within the Education major group area" or "Organizations existing as a support and fund-raising entity for a single institution." This therefore also includes organizations such as: Library Friends Groups, School Athletic Booster Clubs, School Booster, United Negro College Fund, and Funding for School Districts. Column 4 includes all such organizations. A separate variable in the data further categorizes these organizations as being related to K-12 or higher education, but this coding is only available for a fraction of the data and therefore cannot be used on its own to make sample restrictions. Thus, in attempting to split the sample further, I simply drop organizations that are clearly designated as being related to K-12 in Column 5 (therefore leaving behind mostly higher education related organizations) and drop higher education-related organizations in Column 6 (leaving behind mostly K-12 organizations).

Columns 3 and 5 document declining contributions to higher education organizations and higher education fundraisers (respectively) in states where higher education is the only beneficiary. This lends credence to the argument that declining giving is indeed crowd-out rather than a more general drop in giving to education.

21. For example, the University of South Carolina's (a public university) "Development Foundation" and "Educational Foundation" both appear in the data and are categorized as "fundraising/support organizations."

TABLE 7
The Treatment Effects of Different Types of Lotteries on Different Types of Nonprofit Organizations—K-12 Lotteries Versus Higher Education Lotteries

Variables	(1) ln(Donations received)	(2) ln(Donations received)	(3) ln(Donations received)
Sample	Full	K-12 education organizations	Higher education organizations
Treated—K-12 and higher ed.	−.0313	.742	−.0112
	(.0405)	(10.26)	(.0340)
Treated—K-12 only	−.0907***	−.602	−.0740
	(.0330)	(6.457)	(.0488)
Treated—Higher ed. only	−.0939*	−2.177	−.109**
	(.0545)	(27.12)	(.0440)
Observations	27,905	7,696	14,335

Variables	(4) ln(Donations received)	(5) ln(Donations received)	(6) ln(Donations received)
Sample	Fundraising/support organizations	Fundraising/support organizations (excluding K-12 support)	Fundraising/support organizations (excluding higher ed. support)
Treated—K-12 and higher ed.	.0152	.0801	.203
	(.0924)	(.0665)	(.175)
Treated—K-12 only	−.122	−.0782	−.0785
	(.121)	(.120)	(.106)
Treated—Higher ed. only	−.291	−.425**	.0755
	(.221)	(.193)	(.230)
Observations	4,129	3,972	2,393

Robust standard errors in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$.

It may also be unsurprising to find that higher education organizations suffer more when a lottery is introduced as higher education organizations do receive a larger share of donations to start with.

Interestingly, there is little or no evidence that higher education organizations are impacted in states where all levels of education benefit from the lottery. This could arguably be consistent with the salience argument: it is only in states where advertisements can focus on the fact that the money goes toward higher education that higher education organizations suffer. In states where advertising only makes broad claims about "benefitting education," there is less crowd-out.

We might also expect differences across states that do and do not generate funds for private institutions. In particular, as noted in Section II, roughly 55% of higher education donations are directed at private institutions. Thus, we might expect more crowd-out in states that generate funding for both public and private institutions. Table 8 shows that this is the case. Crowd-out of donations, especially to higher education organizations, is most prominent in states that generate funds for both public *and* private institutions.

D. Salience of Government Activity as an Explanation for Crowd-Out?

Consistent with the findings from the previous section, contributions to education-related organizations fall after the introduction of an education lottery, which is not true of contributions to other organizations. However, we can now say that this result appears to be driven by donors' decisions to reduce their contributions as opposed to reduced fundraising efforts. This result differs from a recent literature that demonstrates that crowd-out is often largely explained by a change in nonprofits' fundraising behavior (Andreoni and Payne 2003, 2011; Heutel 2009; Hughes, Luksetich, and Rooney 2014; Monti 2010). I have suggested that an important difference between state lotteries and other forms of government spending is the high level of publicity that lotteries receive. Relative to government grants to nonprofits, donors are likely to be more aware of government spending resulting from lotteries—and therefore more likely to respond—in large part because states themselves heavily advertise the recipient of lottery revenues.

Is there more direct evidence to support this suggestion? I take two approaches to answer this question. First, if the crowd-out

TABLE 8

The Treatment Effects of Different Types of Lotteries on Different Types of Nonprofit Organizations—Public Education Lotteries Versus Public and Private Education Lotteries

Variables	(1) ln(Donations received)	(2) ln(Donations received)	(3) ln(Donations received)
Sample	Full	K-12 education organizations	Higher education organizations
Treated—Public and private	−.101***	−1.888	−.0869***
	(.0319)	(24.18)	(.0291)
Treated—Public only	−.0477	.162	−.0358
	(.0377)	(3.971)	(.0376)
Observations	27,905	7,696	14,335

Variables	(4) ln(Donations received)	(5) ln(Donations received)	(6) ln(Donations received)
Sample	Fundraising/support organizations	Fundraising/support organizations (excluding K-12 support)	Fundraising/support organizations (excluding higher ed. support)
Treated—Public and private	−.160	−.177	.0927
	(.164)	(.168)	(.140)
Treated—Public only	−.0503	−.0206	.0604
	(.124)	(.124)	(.135)
Observations	3,914	3,834	2,210

Robust standard errors in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$.

observed in this paper is indeed driven by donors' awareness of government activity and if this awareness is (at least in part) the result of government advertising, then we would expect the magnitude of the crowd-out to increase with governments' advertising activities. The Census Bureau's *Survey of Government Finances* reports states' yearly lottery administrative costs, which includes advertising expenditures.[22] Advertising expenditures are not reported, so I use the ratio of *administrative costs to ticket sales* as a proxy for advertising. In addition to advertising, administrative costs include the cost of printing and distributing tickets which obviously varies with the number of tickets sold, so most of the variation in administrative costs after accounting for tickets sales presumably comes from advertising.[23]

I extend the previous empirical specifications (FE and FE-IV-Regressions controlling for fundraising) to include controls for *the ratio of administrative costs to ticket sales* ("Advertising") and the interaction of "Advertising" with "Edulot." In doing so, I re-center "Advertising" around its mean so that the main effect of "Edulot" can be interpreted as the impact of an education lottery evaluated at the mean level of advertising. If crowd-out is increasing in advertising we would expect the coefficient on "Edulot X Advertising" to be negative.

This is indeed the case, as can be seen in Columns 1 and 3 of Table 9 which report the results of these estimations for education organizations. On the basis of Column 3, an education lottery is associated with a 6% decrease in contributions received by education organizations. For each additional cent of ticket sales that a state devotes to administrative costs, contributions decrease by an additional 1%. The same significant relationship does not hold for non-education organizations (Columns 2 and 4).

A second approach allows for the possibility that the political method of introducing the lottery impacts crowd-out. In particular, seven of the 12 states that introduced an education lottery between 1989 and 2008 did so through referenda or ballot initiatives.[24] The remaining states introduced their lottery through legislative action. One might expect that citizens are more aware of the

22. According to the Census Bureau, administrative costs "includes salaries of officials as well as advertising, supplies, and the like."

23. In an online appendix, I assess the strength of this ratio as a proxy for advertising cost. I obtain data on actual advertising budgets from one year from *LaFleur's World Lottery Almanac*; I find a strong positive relationship between my constructed proxy and actual advertising budgets from that year.

24. These states are Georgia, Missouri, Virginia, Washington, South Carolina, Tennessee, and Oklahoma.

TABLE 9
Crowd-Out and Awareness of Government Spending—Proxy for Advertising Expenditures

Variables	(1) Contributions received: *Educ. orgs.* (FE-Reg.)	(2) Contributions received: *Non-educ. orgs.* (FE-Reg.)	(3) Contributions received: *Educ. orgs.* (FE-IV-Reg.)	(4) Contributions received: *Non-educ. orgs.* (FE-IV-Reg.)
Edulot	−.0686**	.0263	−.0594**	.0154
	(.0286)	(.0280)	(.0256)	(.0393)
Edulot X Advertising	−1.274***	−.589	−.988**	−.247
	(.387)	(.485)	(.466)	(.488)
Advertising	.655***	.00285	.556***	−.243
	(.200)	(.270)	(.197)	(.221)
Observations	38,585	129,267	27,905	58,374
R^2	.294	.068	.156	.000

Robust standard errors (clustered at state level) in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$.

TABLE 10
Crowd-Out and Awareness of Government Spending—Political Method of Lottery Introduction

Variables	(1) Contributions received: *Educ. orgs.* (FE-Reg.)	(2) Contributions received: *Non-educ. orgs.* (FE-Reg.)	(3) Contributions received: *Educ. orgs.* (FE-IV-Reg.)	(4) Contributions received: *Non-educ. orgs.* (FE-IV-Reg.)
Edulot (Legislative)	−.0627*	−.00842	−.0413	−.00215
	(.0329)	(.0296)	(.0473)	(.0468)
Edulot (Direct vote)	−.0921**	.0261	−.0842***	.00658
	(.0355)	(.0374)	(.0275)	(.0562)
Observations	38,585	129,267	27,905	58,374
R^2	.266	.066	.155	.000

Robust standard errors (clustered at state level) in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$.

lottery and its beneficiary when they vote directly on the issue. Thus, if salience is important to crowd-out, there should be more crowd-out in states that introduced their lotteries through direct voting (referenda/ballot initiatives).

I test whether this is the case in Table 10, which includes a separate treatment dummy for *legislative action* and *direct vote* states. Columns 1 and 3 report the results of these estimations for education organizations. Crowd-out is indeed higher in *Direct vote* states. The same relationship is not observed for non-education organizations (Columns 2 and 4).

Of course, these results should be taken as merely suggestive: we cannot directly observe advertising expenditures, nor do we *know* that donors are more aware of the lottery beneficiary in "Direct voting" states. However, the results are consistent with the suggestion that a higher level of awareness of government activity leads to more crowd-out. This may help explain why crowd-out is driven by donors when the source of funding is a state lottery, while crowd-out is driven mostly by nonprofits when the source of funding is much-less-publicized government grants.

The reaction to government activity only when it is salient is not without precedent in the literature. These results relate and contribute to the recent literature on salience and taxation. In both experimental and observational data, Chetty, Looney, and Kroft (2009) find that consumers adjust their buying decisions in the face of higher taxes only when taxes are clearly highlighted; for instance, posting "after-tax" price next to items in a grocery store dramatically decreased demand despite evidence that consumers knew and could calculate after-tax prices. Similar effects have been documented in other settings (Cabral and Hoxby 2012; Finkelstein 2009; Goldin and Homonoff 2013). The results

reported in this paper highlight a different context where decision-makers react to government activity in the way that theory might predict, but only when the activity is highly salient.

VI. CONCLUSION

In this paper, I assess the impact that education-funding state lotteries have on donations to education. I find that charitable contributions to education significantly decrease after the introduction of an education lottery; contributions received by education-related nonprofit organizations drop by 8% with a lottery. There is evidence to suggest that this drop is driven by a crowding-out of donations, consistent with classic models of voluntary public good provision. In particular, I am able to rule out alternative explanations that might suggest that individuals are merely shifting charitable expenditures to lottery expenditures.

Additionally, unlike recent work that finds that crowd-out stemming from grants to nonprofits is often mostly explained by nonprofit fundraising behavior, here the effect is almost entirely driven by donors. I argue that this is because of the high level of publicity that lotteries and their intended beneficiaries receive. Consistent with this suggestion, I show that crowd-out is increasing in a measure of state advertising activity. Also, crowd-out is higher for states that introduce a lottery through referenda instead of legislative action, which is presumably less salient to citizens. Though the *potential* importance of salience as a determinant of charitable crowd-out has been discussed in recent work by Monti (2010), to my knowledge this is the first paper to provide empirical evidence that crowd-out is indeed increasing in awareness of government activity.

There are of course a variety of policy-oriented reasons why some oppose state-sponsored lotteries; for instance, it has been repeatedly shown that, as a tax, lotteries are highly regressive. This paper highlights an additional trade-off that states face in implementing a lottery as a way to fund public goods. While some existing work shows that earmarking for a "good cause" increases a lottery's revenue (Landry and Price 2007), I find that this comes at a price: private, voluntary support for the cause falls.

However, the fact that state governments are vocal about the *particular* cause being supported (education) seems to be critical to this result. This suggests that a government that is vocal about supporting "good causes," but does not support or highlight any one cause in particular, may enjoy the benefits of higher revenue without disrupting charitable activity. The UK National Lottery operates in this manner, advertising that the Lottery supports "380,000 … good causes … across the UK."[25] Indeed, in an analysis of UK charities that have received lottery grants, Andreoni, Payne, and Smith (2014) find no evidence of charitable crowd-out.[26]

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25. http://www.national-lottery.co.uk/player/p/goodcausesandwinners.ftl

26. In fact, for small organizations, they find evidence of *crowd-in*.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

APPENDIX S1. Online Appendices: Data Notes and Additional Results.