A Construction of Instruments

For our first instrument (IV_1), we proceed as follows. For NP i in the 1-digit NTEE classification j located in state k, define LONP to be the total of government grants for all NPs within NTEE j and state k excluding NP i such that

$$LONP_{i,j,k} = \sum_{\ell} G_{\ell,j,k} \quad \text{where} \quad \ell \neq i. \tag{A1}$$

For our second instrument (IV_2), we use government grants for all NPs, not just social service organisations, outside NTEE j located in state k ($LOINDUS$).[1] That is,

$$LOINDUS_{i,j,k} = \sum_{\ell} \sum_{s} G_{\ell,s,k} \quad \text{where} \quad s \neq j. \tag{A2}$$

The SOI contains a random sample of smaller NPs so we employ weights included in the dataset in order to represent the entire NP population and accurately measure the total level of government grants within a state. We use total, rather than average government grants, to account for the size of the NP market within a state which is related to the demand for NPs.

[1] We use the levels of these instruments rather than the change in the levels since our first-stage regression also includes fixed effects. Moreover, a levels specification should perform as well as a change specification since the latter is just a linear combination of the former (Wooldridge (2002)).

B Main Robustness Results

In Table B1, we examine the robustness of our results (for SP2 and linear parametric specifications). We consider several alternatives for our excluded instruments. First, we acknowledge that finding exogenous instruments for the DPF is difficult. Whilee have provided what we believe are economically plausible reasons for why our preferred instrument set is exogenous and documented statistical evidence of our instrument validity, we consider alternative instruments. Knight (2002) shows how political bargaining between legislators implies that seniority and congressional leadership provide exogenous shifts to the level of government grants. For our purposes, it is uncorrelated with the complementarity of government and nonprofit services. If one state, provides more government grants to NPs because they outsource public services and that is related to the level of donations or fund-raising, it is difficult to imagine how the seniority of congressmen would affect the fund-raising efforts or total donations received by a specific nonprofit, except through its effect on government grants. One of the disadvantages of this instrument is that the unit of measurement is at the state level. Thus, unobserved effort at the NP level cannot be identified; this is the primary rationale for not utilizing such instruments in the main set of estimates. Given the clear theoretical basis for these instruments to be excluded and its analogous instruments in the crowd-out literature (Gruber and Hungerman (2007); Andreoni and Payne (2011)), we also use the average of the total number of years served by the Senators and Congressmen respectively in the U.S. Congress as an alternative instrument.

Next, while we argue that our first instrument (LONP) is most likely to shift fundraising independent of individual firm effort, it may be correlated with state or time-specific preferences for particular nonprofit sectors which could negate the exclusion requirements. We therefore also present results using only LOINDUS.[2] Bun and Harrison (2019) suggest that additional interactions with plausible exogenous controls can mitigate any endogeneity bias. We include total assets (A) interacted with fundraising as additional instruments (given the observed variation by size in Table 5). We show results with and without LONP in Table B1. As a final check, we present SP2 and the linear parametric specifications using lagged fundraising expenditures as an instrument for f as endogeneity bias may stem from simultaneous budgeting decisions for acquiring government grants and donations (Andreoni and Payne (2011)).

The average gradients are similar across these variations (this should quell some concerns regarding the LATE estimates) and SP2 continues to provide much more economically plausible estimates for the fundraising productivity as compared to the parametric specifications.

The last row of Table B1 naively assumes that grants are exogenous. The cross-partial and the marginal productivity of fundraising provide similar qualitative conclusions to our prior results. The cross-partial is much smaller than our instrumented results and is essentially economically zero.[3] Consistent with prior results (Andreoni and Payne (2011)), we find the largest changes to the crowd-out estimates and in particular, find evidence of an upward bias in the estimates when the endogeneity of grants is not considered. For the linear estimates, the (average) point estimate is still negative but insignificant while SP2 at the average of the gradients would suggest a positive, crowd-in effect.[4]

[2] The parametric coefficients are shown in Table C1 – here we concentrate on the gradient.

[3] We present the quartiles for the estimates in Table C7 and also present quartiles by asset size in Table C8. The signs change, but the cross-partial continues to be extremely small and economically zero when not instrumented.

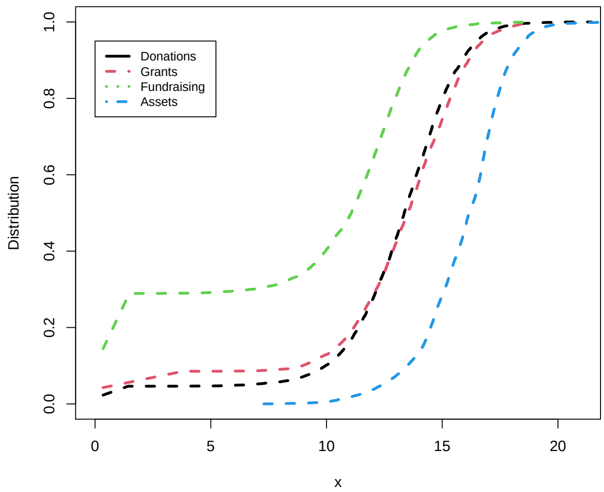
[4] Tables C8 and C7 show crowd-in for the quartiles, but the magnitude of the upward bias in the non-instrumented results is similar between the Linear and SP2 models (likely explaining the switch in sign for SP2).

TABLE B1
Robustness Estimates with Various Instrument Assumptions

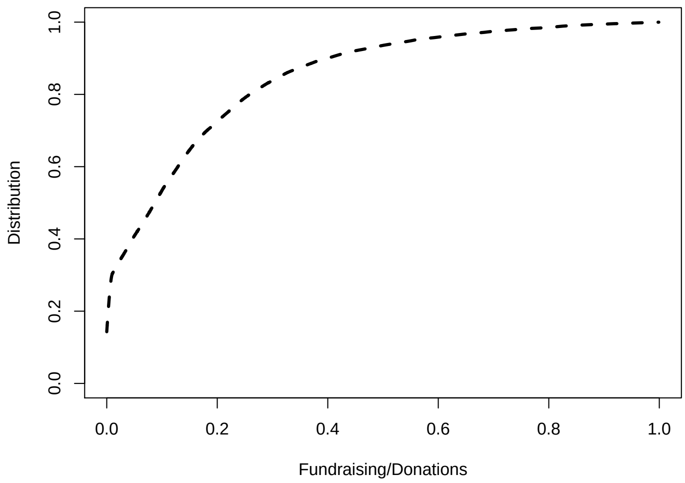
	$\frac{\partial \widehat{F}}{\partial G}$	$\frac{\partial \widehat{F}}{\partial f}$	$\frac{\partial^2 \widehat{F}}{\partial G \partial f}$
Baseline estimates (Tables 2 & 3)			
Linear	-0.2358	3.8474	0.0399
	(0.0574)	(0.3138)	(0.0117)
SP2	-0.0374	0.3942	-0.4439
	(0.0222)	(0.0753)	(0.1276)
Congress Tenure used as instruments			
Linear	-0.0639	2.6516	0.0461
	(0.0245)	(0.2002)	(0.0106)
SP2	-0.1512	0.6793	-0.0430
	(0.0478)	(0.2526)	(0.0146)
Assets and f interactions included in 1^{st} stage			
Linear	-0.2375	3.8596	0.0380
	(0.0592)	(0.3122)	(0.0117)
SP2	-0.4631	0.6133	-0.1556
	(0.0101)	(0.0795)	(0.0213)
Only LOINDUS used as instrument with Assets and f interactions included in 1^{st} stage			
Linear	-0.2032	3.7875	0.0375
	(0.0600)	(0.3180)	(0.0117)
SP2	-0.1669	0.3251	-0.9371
	(0.0393)	(0.1203)	(0.2153)
f instrumented with lagged f			
Linear	-0.1061	3.9589	0.0389
	(0.0424)	(0.6064)	(0.0090)
SP2	-0.0455	0.4269	-0.3423
	(0.0359)	(0.0872)	(0.2308)
G treated as exogenous			
Linear	-0.0776	5.9899	0.0300
	(0.0411)	(1.9412)	(0.0045)
SP2	0.0468	0.1465	-0.0000
	(0.0040)	(0.0200)	(0.0000)

All reported values are averages of our key gradients where F is total donations G is government grants and f is fundraising expenses. For the semiparametric models, SP1 ($F = g(f,G,A) + X\beta + U$) and SP2 ($F = g(f,G) + X\beta + A\theta_0 + (A*G)\theta_1 + (A*f)\theta_2 + U_3$), the top values are the average of the estimated gradient and wild bootstrapped standard errors are reported in parentheses. The standard errors of the parametric nonlinear model ($F = exp(\alpha_1 f + \alpha_2 G + \alpha_3 A) + \alpha_4 X + U_{nl}$) are also obtained via wild bootstrap. All equations include year and firm fixed effects, and in all of them G is treated as an endogenous variable, unless otherwise stated. Parametric nonlinear model is estimated via two-step GMM estimator.

C Additional robustness estimates



(a) Generalized log transformation (kernel estimated) cumulative distribution plots



(b) (Kernel estimated) cumulative distribution of fundraising as a percent of donations

Figure C1: Alternative (kernel estimated) cumulative distribution functions for Figures 1 and 2

TABLE C1
Coefficient estimates for linear parametric models

Coefficients	(1)	(2)	(3)	(4)	(5)	(6)
G	-0.0868	-0.2480	-0.2492	-0.2147	-0.1189	-0.0780
	(0.0712)	(0.0592)	(0.0609)	(0.0616)	(0.0428)	(0.0256)
f	5.9204	3.7552	3.7717	3.7007	3.8659	2.5449
	(2.7764)	(0.3240)	(0.3225)	(0.3275)	(0.6140)	(0.2111)
Gf	0.0300	0.0399	0.0380	0.0375	0.0389	0.0461
	(0.0346)	(0.0117)	(0.0117)	(0.0117)	(0.0090)	(0.0106)
Endogeneity cont. for G	No	Yes	Yes	Yes	Yes	No
Endogeneity cont. for f	No	No	No	No	Yes	No
1^{st} stage A interactions	No	No	Yes	Yes	No	No
Dropped 1 instrument	-	No	No	Yes	No	No
New instruments	-	No	No	No	No	Yes
R^2	0.5325	0.4787	0.4775	0.4778	0.4975	0.3262
Cragg-Donald F statistic of Models	-	13.951	14.087	13.4080	48.459	10.9800
Anderson LR test of under-identification (p-value)	-	0.0000	0.0000	0.0000	0.0000	0.0000
Overid test of Exogeneity (p-value)	-	0.3731	0.3745	-	0.4248	0.0239

The top value in all of the estimated models are the coefficient estimates, and the robust standard errors are reported in parenthesis where F is total donations G is government grants and f is fundraising expenses. All of the models include the listed controls in Section IV., in addition to the firm and year effects. All of the first step regressions include interaction terms with the instruments and f, except the column 1.

TABLE C2

Robustness check: Coefficient estimates and partial effects for linear parametric models with additional interaction and nonlinear terms

Coefficients	Lin.	Quad.	Cub.	Cub.+ $(Gf)^2$	Cub. + $(Gf)^2 + (Gf)^3$	Quart.	Quin.
G	-0.2480	-0.2537	-0.2006	-0.5021	-1.4066	-0.6843	0.7846
	(0.0592)	(0.1944)	(0.3370)	(0.3639)	(0.6026)	(0.2702)	(0.6630)
f	3.7552	1.6200	6.8202	6.6280	0.5227	1.4523	2.1509
	(0.3240)	(0.4054)	(0.5639)	(0.5834)	(0.8518)	(0.4220)	(0.5633)
$f*G$	0.0399	0.0206	0.0688	0.1310	2.7300	0.0977	0.0497
	(0.0117)	(0.0159)	(0.0179)	(0.0280)	(1.5700)	(0.0243)	(0.0273)
G^2		0.0035	-0.0226	-0.0189	0.0447	0.0403	-0.1610
		(0.0049)	(0.0162)	(0.0173)	(0.0339)	(0.0229)	(0.1540)
f^2		0.0206	-0.2780	-0.2990	0.1510	0.1920	0.3030
		(0.0159)	(0.0384)	(0.0377)	(0.0764)	(0.0484)	(0.2620)
G^3			0.0003	0.0003	-0.0004	-0.0011	0.0112
			(0.0001)	(0.0002)	(0.0004)	(0.0006)	(0.0134)
f^3			0.0029	0.0033	-0.0001	-0.0076	-0.0456
			(0.0004)	(0.0004)	(0.0023)	(0.00132)	(0.0349)
G^4						0.0000	-0.0000
						(0.0000)	(0.0000)
f^4						0.0000	-0.0000
						(0.0000)	(0.0000)
G^5							0.0000
							(0.0000)
f^5							-0.0000
							(0.0000)
$(f*G)^2$				-0.0000	-0.3980	-0.0000	-0.0000
				(0.0000)	(0.7430)	(0.0000)	(0.0000)
$(f*G)^3$					0.0027		
					(0.0973)		
Partial effects							
$\frac{\partial \widehat{F}}{\partial G}$	-0.2358	-0.2310	-0.2280	-0.5011	6568.891	-0.5606	1.3183
	(0.0574)	(0.1766)	(0.2919)	(0.3180)	(3133.4464)	(0.2183)	(1.4842)
$\frac{\partial \widehat{F}}{\partial f}$	3.8474	1.6887	6.8581	6.7985	6225.379	1.7550	-1.4321
	(0.3138)	(0.4029)	(0.5579)	(0.5811)	(2337.4215)	(0.4041)	(1.8560)
$\frac{\partial^2 \widehat{F}}{\partial f \partial G}$	0.0399	0.0206	0.0688	0.1310	108.3	0.0977	0.0497
	(0.0117)	(0.0159)	(0.0179)	(0.0280)	(15.6900)	(0.0243)	(0.0273)
Cragg-Donald F stat	13.951	5.013	4.341	4.211	0.336	3.490	1.891

The top value in all of the estimated models is the coefficient estimate where F is total donations G is government grants and f is fundraising expenses. Robust standard errors reported in parenthesis. All units are in dollars.

TABLE C3

Estimated gradients ordered by asset size quartiles for SP1 model

		Below Q1	Q1-Q2	Q2-Q3	Above Q3
$\frac{\partial \widehat{F}}{\partial G}$	Mean	-0.0024	-0.0091	-0.0309	0.0502
		(0.0061)	(0.0115)	(0.0237)	(0.0269)
	Median	-0.0018	-0.0023	-0.0031	0.0059
		(0.0055)	(0.0061)	(0.0071)	(0.0090)
$\frac{\partial \widehat{F}}{\partial f}$	Mean	0.0203	0.0345	0.2455	1.0810
		(0.0113)	(0.0156)	(0.0355)	(0.0963)
	Median	0.0183	0.0244	0.1196	0.5220
		(0.0109)	(0.0125)	(0.0255)	(0.0559)
$\frac{\partial^2 \widehat{F}}{\partial G \partial f}$	Mean	-0.0313	0.0027	-0.1887	-0.1458
		(0.0043)	(0.0004)	(0.0248)	(0.0192)
	Median	-0.0945	-0.0284	-0.0392	-0.0134
		(0.0125)	(0.0039)	(0.0053)	(0.0019)

The top value in each case is the mean or median of the object of interest from estimating model SP1 ($F = g(f, G, A) + X\beta + U_2$) where F is total donations G is government grants and f is fundraising expenses and we group by the quartile of asset size. Wild bootstrapped standard errors are reported in parentheses. All models include year and firm fixed effects.

TABLE C4
Estimated gradients ordered by grant or fundraising quartiles for SP1 model

		Below Q1	Q1-Q2	Q2-Q3	Above Q3
Panel A–Grants					
$\frac{\partial \widehat{F}}{\partial G}$	Mean	-0.0028	-0.0028	-0.0044	-0.0856
		(0.0079)	(0.0078)	(0.0077)	(0.0409)
	Median	-0.0020	-0.0021	-0.0031	-0.0133
		(0.0084)	(0.0059)	(0.0070)	(0.0158)
$\frac{\partial^2 \widehat{F}}{\partial G \partial f}$	Mean	0.0183	0.0596	0.0679	-0.5433
		(0.0021)	(0.0075)	(0.0078)	(0.0704)
	Median	-0.1461	-0.1141	-0.0011	0.1375
		(0.0193)	(0.0152)	(0.0005)	(0.0176)
Panel B–Fundraising					
$\frac{\partial \widehat{F}}{\partial f}$	Mean	0.0097	0.0601	0.1462	1.0882
		(0.0242)	(0.0200)	(0.0275)	(0.0979)
	Median	0.0229	0.0210	0.0634	0.4978
		(0.0140)	(0.0125)	(0.0205)	(0.0550)
$\frac{\partial^2 \widehat{F}}{\partial G \partial f}$	Mean	0.1823	0.0610	0.0158	-0.6159
		(0.0236)	(0.0079)	(0.0269)	(0.0800)
	Median	-0.1315	-0.1051	-0.0006	0.0695
		(0.0174)	(0.0139)	(0.0004)	(0.0082)

The top value in each case is the mean or median of the object of interest from estimating model SP1 ($F = g(f,G,A) + X\beta + U_2$) where F is total donations G is government grants and f is fundraising expenses and we group by the quartile of government grants and fundraising intensity, respectively . Wild bootstrapped standard errors are reported in parentheses. All models include year and firm fixed effects.

TABLE C5

Two-way table for the cross-partial effect ($\partial^2\widehat{F}/\partial G\partial f$) grouped by high and low grants and fundraising for SP1 model

		Low f	High f
Low G	Mean	-0.2260	0.4327
		(0.0298)	(0.0473)
	Median	-0.1514	0.1277
		(0.0200)	(0.0147)
High G	Mean	0.5808	-0.8320
		(0.0748)	(0.1053)
	Median	0.1546	-0.0443
		(0.0200)	(0.0152)

The top value in each case is the mean or median of the object of interest from estimating model SP1 ($F = g(f,G,A) + X\beta + U_2$) where F is total donations G is government grants and f is fundraising expenses and we group by being high (above the median value) or low (below the median value) in terms of government grants and/or fundraising. Wild bootstrapped standard errors are reported in parentheses. All models include year and firm fixed effects.

TABLE C6

Robustness Estimates with Various Instrument Assumptions for SP1

	$\frac{\partial \widehat{F}}{\partial G}$	$\frac{\partial \widehat{F}}{\partial f}$	$\frac{\partial^2 \widehat{F}}{\partial G \partial f}$
Baseline (Table 3)			
SP1	-0.0239	0.3470	-0.0933
	(0.0132)	(0.0254)	(0.0123)
SP2	-0.0374	0.3942	-0.4439
	(0.0222)	(0.0753)	(0.1276)
SP1, with A and f interactions at 1^{st} stage	-0.1010	0.4158	-0.0195
	(0.0446)	(0.0255)	(0.0029)
SP1, with new instruments	-0.1493	0.9418	-0.1290
	(0.0429)	(0.1584)	(0.0557)

All reported values are averages of the gradients where F is total donations G is government grants and f is fundraising expenses. For the semiparametric models, SP1 ($F = g(f, G, A) + X\beta + U$) and SP2 ($F = g(f, G) + X\beta + A\theta_0 + (A * G)\theta_1 + (A * f)\theta_2 + U_3$), the top values are the average of the estimated gradient and wild bootstrapped standard errors reported in parentheses.

TABLE C7
Quartiles of Gradient estimates for SP2 without endogeneity control

		SP2
$\frac{\partial\widehat{F}}{\partial G}$	Mean	0.0468
		(0.0040)
	Q1	0.0036
		(0.0003)
	Q2	0.0143
		(0.0012)
	Q3	0.0387
		(0.0033)
$\frac{\partial\widehat{F}}{\partial f}$	Mean	0.1465
		(0.0200)
	Q1	0.0723
		(0.0241)
	Q2	0.1351
		(0.0198)
	Q3	0.1565
		(0.1915)
$\frac{\partial^2\widehat{F}}{\partial G\partial f}$	Mean	-2.460e-18
		(4.0786e-17)
	Q1	-1.750e-18
		(7.0357e-17)
	Q2	2.230e-18
		(6.7580e-17)
	Q3	2.111e-17
		(1.9192e-17)

The top value in each case is the gradient estimates from model SP2 where F is total donations G is government grants and f is fundraising expenses. Wild bootstrapped standard errors are reported in parentheses. Reported model includes year and firm fixed effects.

TABLE C8

Estimated gradients ordered by asset size quartiles for SP2 model without Endogeneity Control

		Below Q1	Q1-Q2	Q2-Q3	Above Q3
$\frac{\partial \widehat{F}}{\partial G}$	Mean	0.0015	0.0063	0.0256	0.1495
		(0.0001)	(0.0005)	(0.0022)	(0.0128)
	Median	0.0014	0.0054	0.0250	0.00711
		(0.0001)	(0.0005)	(0.0021)	(0.0061)
$\frac{\partial \widehat{F}}{\partial f}$	Mean	0.1590	0.1509	0.1698	0.1177
		(0.0191)	(0.0196)	(0.0355)	(0.0203)
	Median	0.1585	0.1496	0.0974	-0.0095
		(0.0191)	(0.0193)	(0.0225)	(0.0283)
$\frac{\partial^2 \widehat{F}}{\partial G \partial f}$	Mean	2.8260e-18	4.8440e-18	-7.9000e-18	-9.6400e-18
		(6.6098e-17)	(1.3182e-17)	(1.0652e-17)	(1.5162e-17)
	Median	-3.160e-19	1.9890e-18	7.5400e-18	1.4480e-17
		(3.975391e-17)	(1.5587e-17)	(4.1764e-17)	(2.8426e-16)

The top value in each case is the mean or median of the object of interest from estimating model SP2 where F is total donations G is government grants and f is fundraising expenses and we group by the quartile of asset size. Wild bootstrapped standard errors are reported in parentheses. All models include year and firm fixed effects.