

When Governments Increase Their Funding of Public Goods, How Do Individuals Respond?

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We discuss how standard public goods theory can explain a wider range of individual responses to changes in government funding of public goods than the literature suggests. For example, increases in volunteerism in national parks in response to increases in public parks funding are consistent with volunteers obtaining private benefits, such as park enjoyment, and contributing to environmental conservation within the model of “impure altruism.”



Volunteering in the National Park Service provides mutual benefits to both the parks and the volunteers.

Photo Credit: Katherine R.H. Wagner.

Understanding how changes in government provision of public goods affect private contributions is a central question in public economics. Individuals are unable to capture all of the benefits from contributing to public goods such as clean air, seawalls, public radio, or environmental conservation, and so they are typically reluctant to pay for them privately. As a result, such goods are typically publicly provided. The extent to which public funding of public goods decreases or increases (i.e., crowds out

or crowds in) private contributions determines the optimal supply of these goods by governments. In addition, testing for crowding out is the standard approach in the economics literature for distinguishing between competing theories for why individuals contribute to public goods.

This article highlights how government provision of public goods affects private provision. We first discuss how a broader range of individual responses is possible in the standard model of “impure altruism” describing underlying motives for engaging in charitable activity, which implies that the commonly used test between competing theories is based on an implicit special case of the model. Second, we propose a new test to distinguish between these models describing individual motivations that is valid under more general conditions.

Finally, we conduct an empirical analysis that focuses on the significance of these results for interpreting the response of volunteerism to increases in funding of the U.S. National Park Service (NPS). The NPS’s mission is to preserve natural and cultural landmarks for current and future generations’ recreation and education. The NPS annually hosts over 330 million visitors per year across its more than 400 parks. Yet, despite the popularity of its parks, the NPS has accumulated a deferred maintenance backlog that exceeds \$12 billion. Its chronic underfunding is a topic of active policy debate. The agency is almost entirely funded by federal appropriations; during the government shutdown at the end of 2018 and beginning of 2019, the parks experienced widespread damage from unauthorized access of sensitive areas and operational disruptions due to a lack of public funding.

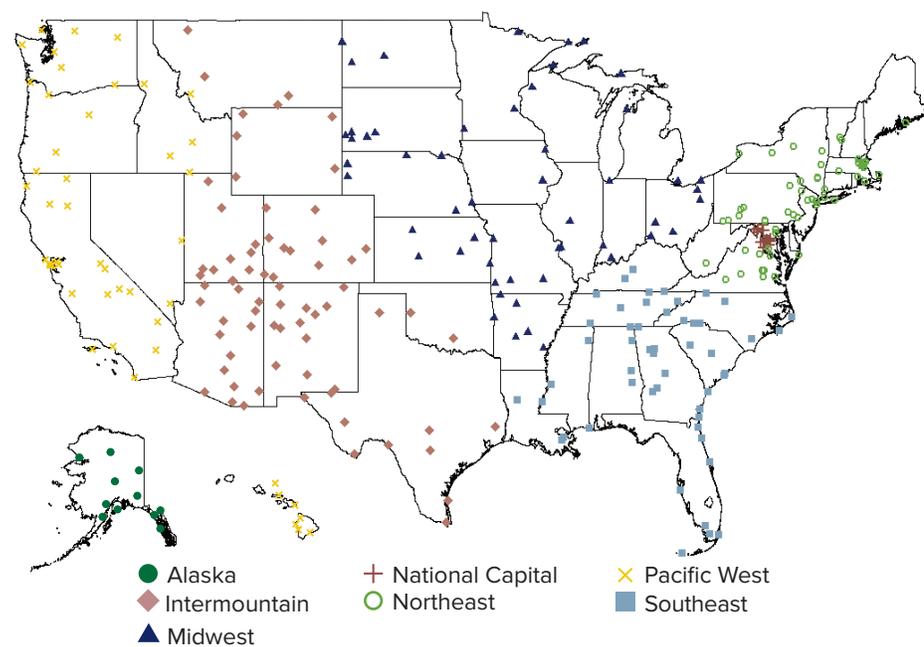
Theory of Private Provision of Public Goods

We revisit classic public goods theory and come to different conclusions, which has implications for the provision of public goods such as environmental conservation or public defenses against natural disasters. The economics literature begins by defining the model of “pure altruism,” which proposes that individuals contribute to public goods only because they care about the total amount of the public good provided. For example, funding a seawall that reduces the risk of inundation for all members of a community makes protected individuals happier, but the pure altruism model proposes that they don’t care whether any improvements are due to public funding or their private donations; they only care about the total protection provided. Since public and private contributions are perfectly substitutable in this model, any increase in public provision is completely offset by a decrease in private provision.

Such complete crowding out is seldom observed in the real world, however, and the standard model of “impure altruism” seeks to reconcile the disconnect between the theoretical predictions and empirical observations. In this more general impure public good model, individuals obtain a jointly produced private benefit as part of their giving. Individuals feel good about themselves when contributing to a public good such as community flood protection or conservation, and they don’t obtain this same “warm glow” if the government provides funding instead.

The existence of a private benefit from giving means that government and individual contributions are no longer

Figure 1. Geographic Distribution of Parks Managed by the National Park Service



Note: Map shows distribution by administrative region, excluding five parks in American Samoa, the Mariana Islands, and Puerto Rico.

Source: National Park Service. Available at: <https://bit.ly/3Ny9AGo>.

perfect substitutes, and so, according to the standard theory, a one dollar increase in public funding results in less than one-for-one crowding out. A substantial body of empirical literature tests between the models of pure and impure altruism by assessing whether crowding out is incomplete.

Our first main theoretical result is that the impure altruism model admits a much broader range of possible outcomes—including crowding in and more than one-for-one crowding out—under the model’s standard setup. Individuals’ responses depend on the degree of complementarity or substitutability between the public and private benefits from contributing to the public good. For example, if private enjoyment of volunteering in parks is higher when the park is of higher quality, then this complementarity creates the possibility for crowding in, rather than crowding out. The same effect could arise if the scale of a seawall or scope of a public program influences how good you feel about funding it (i.e., the private “warm glow”).

Such crowding in is actually observed in about one-third of the studies in the literature. Figure 2 shows the distribution of crowding effects from a survey of hundreds of estimates. We can see that researchers do, in fact, commonly find both crowding in (i.e., a positive estimate) and more than one-for-one crowding out (i.e., an estimate below minus one).

Our second main theoretical result is that crowding in is consistent only with impure altruism. Hence, if we take as a starting point a setting where public and private benefits from contributing to a public good are complementary, such as volunteerism in the NPS, we may in fact observe crowding in and conclusively reject pure altruism as a motivation for private provision.

Public and Private Provision of Conservation

Indeed, we find evidence of crowding in of volunteerism in the NPS in response to higher levels of public funding. We estimate the effect of changes in parks’ federal appropri-

ations on within-park volunteerism using data on all NPS units (e.g., parks or historic sites) over 16 years. The changes in park funding that we exploit are based on differences in congressional support for other pro-environmental legislation in a given year. The resulting fluctuations in park funding are plausibly uncorrelated with other changes in each park that affect volunteerism, such as expansion of park programs. This approach allows us to identify the effect of the funding changes on volunteerism, rather than these other factors.

Overall, we estimate that a \$1,000 increase in a park’s annual funding increases volunteerism by 12 hours, on average. Using the NPS’s standard wage rate, this volunteerism is valued at approximately \$270. This means that an additional dollar of federal funding crowds in roughly 27 cents’ worth of volunteerism, over and above the direct benefit of the increase in public funding to the park.

In this setting, we conjecture that the impure altruism model applies because volunteerism in the NPS is characterized by the joint production of both public conservation benefits and volunteers’ private park enjoyment. The NPS explicitly highlights this joint production in their promotional materials, emphasizing that “the primary purpose of the Volunteers-In-Parks program is to provide a vehicle through which the NPS can accept and utilize voluntary help and services from the public in such a way that is mutually beneficial to the NPS and the volunteer.”

We also find different effects of funding across park and program types that are consistent with the theory. Volunteers’ experiences differ depending on the type of park and program with which they are involved: volunteers in parks focused on outdoor recreation, for example, can take advantage of park improvements in the same

way as visitors. We find crowding in of volunteerism in environmentally oriented parks and outdoor volunteer programs, where complementarity between park quality and volunteer enjoyment seem most likely to arise. By contrast, we find no meaningful effects in cultural parks or indoor activities.

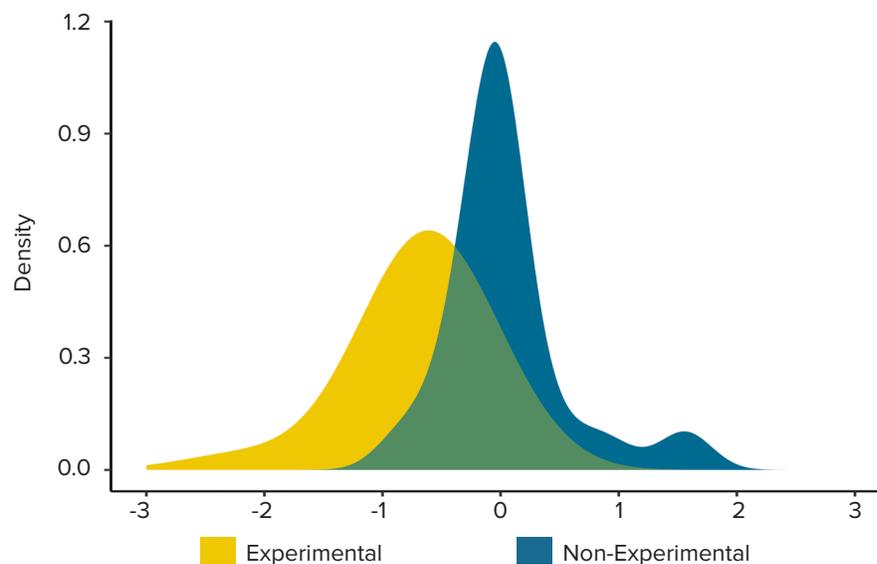
Policy Implications

The implications of these results for interpreting individual responses to government policy are consequential. First, the theoretical analysis shows that a broader range of outcomes are possible under the standard assumptions of the impure altruism model. A finding of crowding in need not be explained away by appealing to alternative explanations such as changes in fundraising, but rather is consistent with individuals obtaining private benefits from the act of giving.

Second, crowding out cannot be used to test between the models of pure and impure altruism—as is typical in the literature—without additional assumptions. By contrast, the presence of crowding in is consistent only with impure altruism.

Finally, the possibility of crowding in and our empirical evidence of it suggests that increasing public funding of public goods could leverage greater private contributions, and accounting for this behavioral response could meaningfully increase the marginal benefit of providing public goods. Given that individuals may plausibly give more when public funding increases, our results emphasize the importance of accounting for individuals' responses in government budgeting. This is an important consideration for publicly funded social and environmental programs such as the NPS, which suffers from perennial budgetary shortfalls and a growing deferred maintenance backlog. Newly authorized funding to the NPS through the landmark Great American

Figure 2. Distribution of Estimated Responses of Private Provision to Changes in Public Provision



Note: Negative is crowding out, positive is crowding in.

Source: de Wit and Bekkers. 2017. Based on 325 estimates from 54 studies from the public economics literature, shown separately for experimental and nonexperimental studies.

Outdoors Act, for example, may in fact generate larger returns than previously anticipated, hopefully allowing us to enjoy these parks for many years in the future.

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For additional information, the authors recommend:

Andreoni, James. 1990. "Impure Altruism and Donations to Public

Goods: A Theory of Warm-Glow Giving." *Economic Journal* 100(401): 464–477. Available at: <https://bit.ly/3IPXOvr>.

Cornes, Richard and Todd Sandler. 1994. "The Comparative Static Properties of the Impure Public Good Model." *Journal of Public Economics* 54(3): 403–421. Available at: <https://bit.ly/3MQdB9i>.

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National Park Service (NPS). "Volunteer Engagement." Available at: <https://bit.ly/3tF6F7E>.

de Wit, Arjen and Rene Bekkers. 2017. "Government Support and Charitable Donations: A Meta-Analysis of the Crowding-Out Hypothesis." *Journal of Public Administration Research and Theory* 27(2): 301–319. Available at: <https://bit.ly/3aiUkPn>.