Measuring Price Responsiveness in Charitable Giving Using Matching

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Motivational Example

- Imagine a donor gives \$100 to a charitable organization.
- Now, a tax rebate of 50% for donations is introduced. It means that the donor needs to donate \$50 for the charity to have \$100.
  - The price of \$1 of charity is \$0.5.
- Alternatively, a $1:1$ match is introduced. Again, for the charity to have \$100, the donor needs to give only \$50.
  - The price of \$1 of charity is again \$0.5.
- The question is, how giving by the donor will react if price of giving changes?

Economic Theory

- Standard microeconomic theory says that in both cases, the *demand for donations received*, R_i, will react the same way.
- Let's denote the rebate price as p_t and match price as p_m.
- Price elasticity of donations received measures the responsiveness of the R_i to a price change.
- We have the following elasticities of R_i in response to p_t and p_m:

$$e_t = \frac{\partial R_i}{\partial p_t} \frac{p_t}{R_i} \tag{1}$$

$$e_m = \frac{\partial R_i}{\partial p_m} \frac{p_m}{R_i} \tag{2}$$

- According to the theory, e_t and e_m should be the same.

Empirical Evidence and Refinement in the Theory

- Eckel and Grossman (2003) find that donations received are significantly higher with match subsidies than with rebate subsidies.
- The differential responses to a match and a rebate can be reconciled with the impure altruism theory first proposed by Andreoni (1990), which investigates the motives behind why people give.
  - People may give because they care about the benefits of the recipients. In this case, they only care about R_i.
  - But, people may also derive a private benefit (a warm glow feeling) from the act of giving. In this case, they care only about how much they give, g_i.
  - More realistically, people give due to a mix of both of these motives.
  - Elasticities differ because a change in p_t affects both R_i and g_i, but a change in p_m only affects R_i (Hungerman and Ottoni-Wilhelm, 2021).
  - Hungerman and Ottoni-Wilhelm (2021) derives e_m and e_t for implicit utility functions.
- My task is to find out whether there is a specific relationship between these elasticities for explicit general utility functions.

Results for a Quasi-linear Constant Elasticity of Substitution (CES) Utility Function

- First, I consider the following utility function:

$$U(c_i,\ g_i,\ R_i) \quad = \quad c_i \quad + \quad \frac{\theta}{1 \ + \ 1/e} \left(\frac{[\gamma g_i^{\rho} \ + \ (1-\gamma) R_i^{\rho}]^{\frac{1}{\rho}}}{\theta} \right)^{1+ \ 1/e} \tag{3}$$

- Here,
  - c_i : Consumer good,
  - θ : Taste-shifting parameter,
  - γ : Relative weight to warm glow feeling,
  - e: Price elasticity of donations received.
  - ρ controls the elasticity of substitution between g_i and R_i.

Results for a Quasi-linear Constant Elasticity of Substitution (CES) Utility Function (contd.)

- I get the following relationship between the two elasticities for this utility function:

$$e_m = \frac{e_t - e_t\gamma - \gamma p_m^{\rho}}{\gamma p_m^{\rho} + 1 - \gamma} \tag{4}$$

- Irrespective of the nature of substitutability between g_i and R_i (Cobb-Douglas, perfect substitutes, or perfect complements), e_m is always trapped between e_t and 1 (in absolute terms).
- It implies that the responsiveness in received donations to a match price is the same as or higher than the responsiveness to a rebate price.
- In practice, e_t has seldom been found to be more than 1. Hence, we expect e_m to be as high as 1 but possibly higher than e_t.

Next Steps

- Do the same exercise for more general utility functions like the following:

$$U(c_i, g_i, R_i) = \left[\beta c_i^{\rho_1} + (1-\beta)\left\{[\gamma g_i^{\rho_0} + (1-\gamma)R_i^{\rho_0}]^{1/\rho_0}\right\}^{\rho_1}\right]^{1/\rho_1} \tag{5}$$

- Investigate the mechanism through which matching works.
  - A match signals quality, akin to a leadership effect (Huck and Rasul, 2011).
  - A match creates negative psychological costs; people give to avoid incurring such costs (DellaVigna et al., 2012).

References

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