Economics 2450A: Public Economics and Fiscal Policy I

Section 9: Generalized Social Welfare Weights

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Outline

1. Generalized Marginal Social Welfare Weights (Saez and Stantcheva 2016)
    - Motivation / Review
    - Individual Characteristics
    - Optimal Tax Formulae
    - Optimal Nonlinear Tax with Fixed Incomes

Review: Marginal Social Welfare Weights

- From the first few weeks of class: optimal tax formulas depended on functions of marginal social welfare weights g_i, which were defined in terms of an underlying (welfarist) social welfare function.

- For instance, consider the social welfare function:

$$SWF = \int_i G(u^i)di$$

with u^i the realized (indirect) utility of household i and $G(\cdot)$ an increasing, weakly concave, differentiable function, we can define the marginal social welfare weight as:

$$g_i = G'(u^i) \cdot u^i_c$$

Generalizing the Marginal Social Welfare Weights

- This week's lecture and section follow Saez and Stantcheva (AER, 2016). This paper is super readable, and should be a good reference for you if any of this material needs further clarification. I also promise it's a fun paper to read. Read this paper!

- The objective of Saez and Stantcheva is to think about a broader class of g_i's in our optimal tax formulae that are potentially not defined in terms of the social welfare function. These 'generalized' weights will behave exactly like the g_i's we have seen before, and appear in our tax formulae in the same way.

- Generalized social welfare weights also exhibit some nice theoretical properties, like local Pareto optimality (review: what do you think this means?) when non-negative for all i.

Saez and Stantcheva (2016): Setup

- Unit mass of households indexed by i maximize utility functions of the form:

$$u_i = u\big(c_i - v(z_i; x_i^u, x_i^b)\big)$$

  where c_i is household i's consumption, z_i is household i's earnings, and x_i^u, x_i^b are sets of individual-specific characteristics (more below).

- Functions u and v are common to all individuals; u assumed increasing and concave, v assumed increasing and convex, both differentiable everywhere.

- Characteristics x^u enter only in utility function, not in social welfare weights; characteristics x^b enter in both utility and social welfare weights.

Saez and Stantcheva (2016): Setup

- Define the generalized social marginal welfare weight as:

$$g_i = g(c_i, z_i; x_i^s, x_i^b)$$

where c and z are consumption and earnings, x_i^s represents individual-specific characteristics that only impact the social welfare weight (does not appear in previous slide!) and x_i^b are individual-specific characteristics that impact both the social welfare weight and utility.

Individual Characteristics

- We have three sets of individual-specific characteristics: x_i^s, x_i^u, x_i^b. It's worth reminding ourselves what each of these must satisfy:

- x_i^u: characteristics that impact utility, but not social welfare weights.

- x_i^b: characteristics that impact both utility and social welfare weights

- x_i^s: characteristics that impact social welfare weights, but not utility

- Naturally, we do not need to worry about characteristics that neither impact utility nor social welfare weights. Otherwise, these definitions form a partition over individual characteristics.

Individual Characteristics: Interpretation

- The individual-specific characteristics x_i^s and x_i^b enter in the definition of the generalized social marginal welfare weight g_i. Any characteristic in either of these is implicitly something that the government values for the purposes of redistribution through taxes.

- The individual-specific characteristics x_i^u are in the utility function, but do not enter in the social welfare function. Not fair game for redistribution through taxes.

- All of these characteristics may either be observed by the government or not. If they are unobserved and enter in g_i (s or b), then we must 'aggregate up' to things the tax system can depend on (income and potentially observable characteristics)

Individual Characteristics and Redistribution

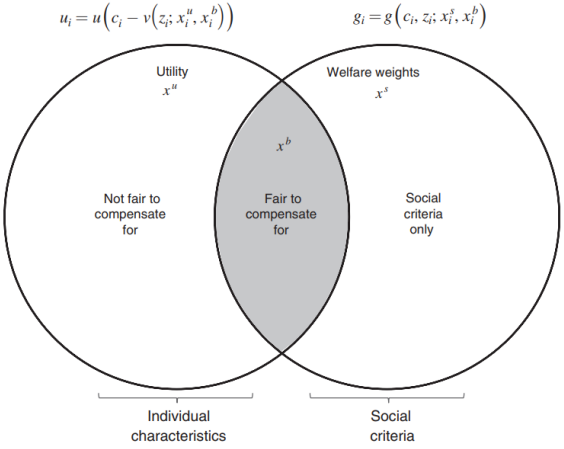

FIGURE 1. GENERALIZED SOCIAL WELFARE WEIGHTS APPROACH

Notes: This figure depicts the three sets of individual characteristics x^b, x^u, and x^s. Characteristics x^u enter solely the utility function (i.e., they affect individual utilities and choices). Characteristics x^s enter solely the generalized social welfare weights (i.e., they affect how society values marginal transfers to each individual). Characteristics x^b enter both the utility function and social weights.

Individual Characteristics: Aggregation

- Suppose that x_i^b includes, for instance, height (like the Mankiw paper about Talls vs. Shorts we discussed for tagging/commodity taxation.

- If the government can observe height: construct average social welfare weights by aggregating at each (z, x^b)

- If the government cannot observe height (just earnings), construct average social welfare weights by aggregating at each z instead.

Optimal Taxes with Generalized Welfare Weights

- All of our classic Saez-like optimal income tax formulas (linear; top linear; nonlinear) go through even when our social welfare weights g_i are generalized (and so not generally derived from an explicit SWF).

- Top linear tax satisfies:

$$\tau = \frac{1-\bar{g}}{1-\bar{g}+e} \qquad \text{with} \qquad \bar{g} = \frac{\int_i g_i z_i di}{\int_i g_i di \cdot \int_i z_i di}$$

- Top nonlinear tax satisfies:

$$T'(z) = \frac{1-\bar{G}(z)}{1-\bar{G}(z)+\alpha(z)\cdot e(z)} \qquad \text{with} \qquad \bar{G}(z) = \frac{\int_{i:z_i \geq z} g_i di}{\Pr(z_i \geq z) \cdot \int_i g_i di}$$

- Local proofs (perturbation arguments) follow exactly the same as before.

Generalized Welfare Weights with Fixed Incomes

- What does this approach buy us, apart from the ability to perhaps condition taxes on other observable characteristics? Leading example: optimal taxes with fixed incomes (no behavioral responses): $z_i = z$ for all i.

- Recall from first week: if government is choosing nonlinear tax $T(z)$ to maximize standard welfarist SWF, optimal $T(z)$ implies consumption is constant across i (why?).

- Three issues with the old standard approach:
  1. A priori, complete redistribution seems very strong
  2. Sensitive to utility specification: optimal tax changes a lot for linear utility vs. utility with very slight concavity
  3. Can't handle heterogeneity in utility very well

Generalized Welfare Weights with Fixed Incomes

- Generalized social welfare weights provide a different lens to this problem!

- Let $g_i = g(c_i, z_i) = \tilde{g}(c_i, z_i - c_i)$ with $\tilde{g}_c \leq 0$, $\tilde{g}_{z-c} \geq 0$.

- Two extreme / polar cases to consider:
  1. Utilitarian weights: $g_i = g(c_i, z_i) = \tilde{g}(c_i)$ for all z_i with $\tilde{g}(\cdot)$ decreasing.
  2. Libertarian weights: $g_i = g(c_i, z_i) = \tilde{g}(z_i - c_i)$ with $\tilde{g}(\cdot)$ increasing.

- Optimal nonlinear tax w/ fixed incomes satisfies (for any z):

$$T'(z) = \frac{1}{1 - \tilde{g}_{z-c}/\tilde{g}_c} \qquad \text{so that} \quad 0 \leq T'(z) \leq 1$$

- Utilitarian case: $T'(z) = 1$. Libertarian case: $T'(z) = 0$. (why? take limits)

Generalized Welfare Weights with Fixed Incomes

- Intuition: in this case, when the optimal tax is conditioned only on z (i.e. no observed individual characteristics x^b, x^s):

- Weights depend negatively on c: standard welfarist logic, a dollar is worth more in marginal utility terms for the poor

- Weights depend positively on $z - c$: captures idea that those who pay more taxes ($z - c$) more deserving of benefits/transfers

- At an optimum, g_i constant across z. Generalizes to case with more conditioning variables.

Eliciting Social Preferences

- So, we can throw in arbitrary kinds of social preferences inside our marginal social welfare weights g_i, and all of the math will go through pretty much the same as before.

- This begs the question: how can we discipline our generalized marginal social welfare weights?

- One possibility is to use surveys to ask people how deserving of a given tax break a person with a given level of income and tax burden ought to be. Can use this information to calibrate $\bar{g}$.

- Question always emerges with surveys: are we eliciting true beliefs? Talk is cheap! Good experimental and survey work take these concerns very seriously.