Recent Advances and Challenges in Benefit Cost Analysis
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How to deal with social comparisons in BCA and public policy

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The presentation draws on several empirical papers:

- Measuring Future Grandparents - Preferences for Equality and Relative standing, with Fredrik Carlsson and Dinky Daruvala, *Economic Journal*, 2002, vol. 112, pp. 362-83.
- How Much do We Care About Absolute Versus Relative Income and Consumption? with Francisco Alpizar and Fredrik Carlsson, *Journal of Economic Behavior and Organization*, 2005, 56(3), 405-21.

- Honestly, why are you driving a BMW? with Peter Martinsson, *Journal of Economic Behavior and Organization*, 2006, 60, 129-46.
- Do You Enjoy Having More than Others? Survey Evidence of Positional Goods with F. Carlsson and P. Martinsson, *Economica*, 2007, 74, 586-98.
- Keeping up with the Vaishias: Caste and relative standing with Fredrik Carlsson and Gautam Gupta. *Oxford Economic Papers*, 2009, 61, 52-73.

What is best for your grandchild, to live in Society A or B?

A: Your grandchild makes 11,000 Euro/Month

Average income 13,000 Euro/Month

B: Your grandchild makes 10,000 Euro/Month

Average income 8,000 Euro/Month

Other methods:

- Happiness studies (e.g. Luttmer 2004, QJE)
- Evolutionary models (e.g. Samuelson, 2004 Econometrica; Rayo and Becker, 2005 JPE)
- Brain science (e.g. Fliessbach et al., 2007 Science)
- Physiological and health related measures of both animals and human beings (e.g. Daly and Wilson 2009, JEEA)

Theoretically based implications for policy from now on

Earlier literature dealing with public policy and relative consumption or income addresses a variety of issues such as:

- Income tax policy (Boskin and Sheshinski, 1978 QJE; Ireland, 2001 JPubE)
- Public good provision (Ng, 1987 OEP; Wendner and Goulder, 2008 JPubE
- Social insurance (Abel 2005)
- Growth (Corneo and Jeanne 1997, 2001)
- Environmental externalities (Wendner 2005 EcGov)
- Stabilization policy (Ljungqvist and Uhlig, 2000 AER)

Journal of Public Economics, 2008

When the Joneses' Consumption Hurts: Optimal Public Good Provision and Non-Linear Income Taxation

Thomas Aronsson and Olof Johansson-Stenman

- Extends earlier studies of public policy under relative consumption to nonlinear taxation
- Is based to an explicit measure of the extent that relative consumption matter, and links to corresponding empirical evidence

Nonlinear income taxes constitute a reasonably realistic description of the tax instruments that many countries have (or potentially have) at their disposal

The decision to use distortionary income taxation follows from optimization subject to the available information, not by a priori restrictions on the set of available policy instruments

Work-Horse Adopted:

A two-type, self-selection model with nonlinear income taxation, following Stiglitz (1982) and Stern (1982)

This model provides the same qualitative insights as the continuous type model of Mirrlees (1971), but is much easier to work with analytically

Individuals and Preferences

2 types of people: Type 1–Low ability, Type 2–High ability

Each individual of type *i* cares about:

- own consumption, x^i
- own leisure z^i, given by a time endowment, H, less the hours of work, l^i
- the provided amount of the public good G.
- *relative* consumption, $x^i - \overline{x}$

The utility function of ability-type *i* can then be written as

$$U^i = v^i(x^i, z^i, x^i - \bar{x}, G) = u^i(x^i, z^i, \bar{x}, G)$$

where v^i is increasing in each argument, implying that u^i is decreasing in $\bar{x}$

The degree of positionality is given as follows:

$$\alpha^i = \frac{v_\Delta^i}{v_\Delta^i + v_x^i} \qquad \text{where } \Delta^i = x^i - \bar{x}$$

α^i is the fraction of the overall utility increase from the last Dollar spent that is due to the increased relative consumption

- When $\alpha^i = 0$ relative consumption doesn't matter on the margin
- When $\alpha^i = 1$ absolute consumption doesn't matter at all, and all that matters is the relative consumption

The individual budget constraint is given by

$$w^i l^i - T(w^i l^i) = x^i$$

We also assume a linear production function so that gross wages are fixed and profits zero

The Government's Problem

Objective: Obtain a Pareto efficient allocation

Max utility of type 1 individuals, while holding utility fixed for type 2 individuals, subject to a self-selection constraint and a resource constraint.

The informational assumptions are conventional (possible to observe income and consumption, but not ability or leisure)

The government wants to redistribute from the high income to the low income earners while preventing high-ability types from mimicking low-ability types, i.e. work less and have the same income as the low-ability types

The self-selection constraint that may bind then becomes

$$U^2 = u^2(x^2, z^2, \bar{x}, G) \geq u^2(x^1, H - \frac{w^1}{w^2} l^1, \bar{x}, G) = \hat{U}^2$$

First-best optimal taxation results

(self-selection constraint does not bind)

$$T'(w^i l^i) = \bar{\alpha}$$

where $\bar{\alpha}$ is the mean degree of positionality

Intuitively: $\bar{\alpha}$ Reflects a Pigouvian externality-correcting tax, where the externalities here are *positional* externalities

Second-best optimal taxation results

$$T'(w^i l^i) = \tau^i + [1-\tau^i]\bar{\alpha} - [1-\tau^i][1-\bar{\alpha}]\frac{\Gamma}{1-\Gamma}$$

.

τ^i reflects the conventional optimal tax for type *i* in the absence of positional concerns

$$\Gamma = \frac{\lambda \hat{u}_x^2}{\gamma N}\left[\hat{\alpha}^2 - \alpha^1\right]$$

Order of Magnitudes

- According to Alpizar et al. (2005) and Carlsson et al. (2007) $\bar{\alpha}$ is typically in the order of magnitude of 0.5; Luttmer (2005) obtained larger estimates close to 1
- There is little evidence regarding the size of Γ
- Overall, the optimal marginal labor income tax rates may be substantially higher when considering relative consumption effects

Public Good Provision

The optimal public good provision is given by:

$$\sum_i n^i \; MRS^i_{G,x} = (p^G + \Omega)\frac{1-\bar{\alpha}}{1-\Gamma}$$

where $\Omega = \frac{\lambda}{\gamma}\hat{u}_x^2\left[\hat{MRS}^2_{G,x} - MRS^1_{G,x}\right]$ reflects the self-selection terms that would result without any positional concerns

Consider the following special case:

If

i) the degree of positionality is the same among types and

ii) leisure is weakly separable from private and public consumption such that $U^i = q^i(f(x^i, G, x^i - \bar{x}), z^i)$,

then the optimal provision of G is given by

$$\sum_i n^i \, MRS^i_{G,x} = p^G(1-\bar{\alpha})$$

Intuition: Private consumption causes waste through relative consumption effects, public consumption does not.

$\bar{\alpha}$ is the waste share of people willingness to pay due to zero-sum effects of private consumption.

It is thus optimal to provide considerably more of the public good than the level corresponding to the Samuelson rule.

A Reinterpretation of the Benefit Side

How to measure the benefit of a public good is a classic problem in economics at least since Samuelson (1954)

Note that $MRS^{i}_{G,x}$ reflects *i*'s marginal willingness to pay while holding consumption for everybody else fixed

However, an increase in G typically comes together with other changes, notably that others' taxes or charges are increased

- Consider a referendum format where people are asked for their maximum (marginal) WTP for a public good financed by a uniform tax increase $CVMRS_{G,x}$.
- Let us make the same assumptions regarding constant degree of positionality among types and utility separability.

Then we have the following result:

The optimal provision of the public good is given by:

$$\sum_i n^i \, CVMRS^i_{G,x} = p^G$$

We are back to the conventional Samuelson rule!

Extensions

The above model is a static one, making it impossible to analyze the potential role of capital taxation

It has often been argued that capital taxation distorts the economy and is not part of an optimal tax system

Maybe this conclusion would be called into question when considering relative income effects?

International Economic Review 2010

Positional Concerns in an OLG Model: Optimal Labor and Capital Income Taxation

Thomas Aronsson and Olof Johansson-Stenman

- Dynamic OLG model where people work during the first period and do not work during the second
- The consumer decides how much to work and save
- The government can use non-linear labor and capital income taxation

Important findings:

The labor income taxation results largely carry over to the dynamic case

The case for capital taxation is still rather weak, and conditions for when there should be no (positive or negative) capital taxation are derived.

Different reference points are also analyzed:

Perhaps people compare their own consumption primarily with that of the high-ability type? Then only the high-ability type causes positional externalities

Or perhaps they compare their own consumption primarily with that of others in their own generation? This has implications for capital taxation

But maybe people do not only compare their consumption with others presently living?

Maybe they also compare with their own and others' previous consumption?

They remember what they and others consumed in the past, and they dislike consuming less now

Journal of Economic Behavior and Organization 2014

Positional Preferences in Time and Space: Implication for Optimal Income Taxation

Thomas Aronsson and Olof Johansson-Stenman

The model is largely similar to the IER-paper, but with a much richer set of possible social comparisons

Important findings:

Comparisons with own previous consumption has no tax implications; people internalize their own relative concerns

Comparisons with others' previous consumptions have important tax implications.

The general model becomes rather messy.

Yet, under some restrictive assumptions a simple additive structure follows where comparisons with earlier time periods imply an additional term of the optimal tax expression

What about *public good* provision in a dynamic economy when relative consumption matter both within and between time periods?

And what about state-variable public goods such as the greenhouse effect, where people derive utility from the level of a stock rather than from what is currently provided?

Journal of Environmental Economics and Management 2014

State-variable public goods and social comparisons

Thomas Aronsson and Olof Johansson-Stenman

Much of the insights regarding optimal public provision rules carry over from the static setting, including the implications of the way people's marginal willingness to pay for the public good is quantified

So far we have consistently assumed that people care about relative *consumption*, but not about relative *leisure*

But maybe people, at least to some extent, also care about relative leisure? Indeed, according to Veblen (1899):

High-bred manners and ways of living are items of conformity to the norm of conspicuous leisure and conspicuous consumption.

Scandinavian Journal of Economics 2013

Conspicuous Leisure: Optimal Income Taxation when Both Relative Consumption and Relative Leisure Matter

Thomas Aronsson and Olof Johansson-Stenman

Main findings: Relative leisure concerns have an off-setting role, but this role is not symmetric

Relative leisure concerns imply a progressive tax effect on the marginal income tax rates

A one unit consumption reduction for the low-ability type implies a smaller leisure increase than for the high-ability type

The modification of the optimal public provision rule for public goods is not affected by relative leisure concerns

But maybe leisure instead has a displaying role in making relative consumption more visible?

It takes leisure time to consume in a seemly manner and the positional consumption externality ay therefore increase with the time he/she spends on leisure.

People will have a hard time noticing your new BMW if you work all the time!

Social Choice and Welfare,2013

Veblen's Theory of the Leisure Class Revisited: Implication for Optimal Income Taxation

Thomas Aronsson and Olof Johansson-Stenman

- Increased importance of relative consumption implies higher marginal tax rates, in line with previous research
- The effect of leisure-induced consumption visibility is to make the income tax more regressive in terms of ability

So far, we have assumed a single-country model

However, the world is becoming increasingly interrelated

There is evidence that people increasingly compare their consumption with those of people in other countries

This has implications both for optimal taxation and for public good provision

Working paper 2014

Keeping up with the Joneses, the Smiths and the Tanakas: Optimal Taxation with Social Comparisons in a Multi-Country Economy

Thomas Aronsson and Olof Johansson-Stenman

- Many countries
- The government in each country decides about optimal non-linear income taxes

In Nash equilibrium the resulting tax policy will only internalizes the externalities from within-country comparisons

A Stackelberg leader government will to some extent also reflect between-country comparisons

There are potentially large welfare gains from international tax policy coordination

Economica, 2014

When Samuelson met Veblen abroad: National and global public good provision when social comparisons matter

Thomas Aronsson and Olof Johansson-Stenman

Both global and national public goods are systematically under-provided in Nash equilibrium when people care about relative consumption both within and between countries

A crucial question in BCA is to compare costs and benefits now with those occurring in the future

How will the optimal social discount rule change when people care about relative consumption?

Non-trivial question since they will care about relative consumption also in the future

Working paper (R&R JEEM), 2014

Discounting and Relative Consumption

Olof Johansson-Stenman and Thomas Sterner

- We incorporate relative consumption effects into the theory of social discounting
- We compare the social, private and (the conventional) Ramsey discount rates

The social discount rate tends to exceed the private one

The social discount rate tends to be lower than the Ramsey rate

Potentially large effect implying that relative consumption effects are important for the economics of Climate Change

Finally, so far we have assumed a welfarist government which respects individual preferences for social comparisons

What if it does not?

What if the government disregard utility coming from relative concerns in its optimization problem?

Working paper, 2014

Paternalism against Veblen: Optimal Taxation and Non-Respected Preferences for Social Comparisons

Thomas Aronsson and Olof Johansson-Stenman

Remarkably, the optimal tax rules are very similar in the paternalist and welfarist cases

Conditions are derived for when they are indeed identical

Overall, there is room for much more research in the field of normative implications of social comparison processes

Thank you for listening!