


Public policy to combat error:

Optimal Paternalism

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Optimal Paternalism

Optimal Paternalism formally analyzes optimal policy as a function of our beliefs about the degree of and prevalence of errors in the population.

Optimal Paternalism

- **Procedure**:
  - Write down assumptions about:
    - types of errors that people make.
    - distribution of errors in the population (prevalence and magnitude).
    - available policy instruments.
    - government’s information about agents.
  - Then investigate which policies achieve the “best” outcomes.

- **Goal:** By doing so, we can more fully understand **the benefits and costs of paternalism.**

- **Example:** Optimal sin tax

Sin tax: An excise tax specifically levied on certain goods deemed harmful

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Optimal sin taxes

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Abstract

We investigate "sin taxes" on unhealthy items, such as fatty foods, that people may (by their own reckoning) consume too much of. We employ a standard optimal-taxation framework, but replace the standard assumption that all consumers have 100% self control with an assumption that some consumers may have some degree of self-control problems. We show that imposing taxes on unhealthy items and returning the proceeds to consumers can generally improve total social surplus. Because such taxes counteract over-consumption by consumers with self-control problems while at the same time they naturally redistribute income to consumers with no self-control problems (who consume less), such taxes can even create Pareto improvements. Finally, we demonstrate with some simple numerical examples that even if the population exhibits relatively few self-control problems, optimal taxes can still be large.

Keywords: Hyperbolic discounting; Immediate gratification; Paternalism; Pigouvian taxation; Time inconsistency

Objective of the paper

- This paper investigated the use of sin taxes to combat over-consumption of unhealthy items, such as fatty foods that people may (by their own reckoning) consume too much of.

Intuition

- The simple intuition is straightforward: impose a tax to counteract over-consumption.

The standard economic approach to taxation

- The standard economic approach to taxation a priori assumes that there is no such “over-consumption”.

- The only reasons to tax commodities are to raise revenue, to correct externalities, or to redistribute wealth.

Question

In a heterogeneous world, **where:**

- **some people have self-control problems and some don't,** and
- **some people like potato chips and some don't**, and
- **people differ in the health consequences of eating potato chips**,

do the benefits of imposing sin tax outweigh the costs?

Model setting

- Consider a quasi-linear economy with two goods, potato chips (x) and a composite good (z).
- Both goods are produced with identical marginal costs.
- Markets are competitive, and we normalize price of the composite good $p_Z = 1$.
  - We assume competitive market to get rid off all other distortions.
  - Assume $p_Z = 1$. This means $\mathrm{p}_z = mc_z = mc_x = 1$.

Sin Tax

- Government might impose per-unit tax t on potato chips and return the proceeds to consumers via a lump-sum l.

- A per-unit tax t on potato chips implies $p_x = 1 + t$.

- Government sees heterogenous agents, but treats them homogenously.

Instantaneous utility

- Instantaneous utility in period t is
$$u_t \equiv v(x_t; \rho) - c(x_{t-1}; \gamma) + z_t$$
- ρ and γ are heterogenous.
- $v(x_t; \rho)$ represents the immediate benefits from current potato-ship consumption
  - Assume $v_x > 0$, $v_{xx} < 0$
  - Assume $v_{x\rho} > 0$. This means as ρ increases, the marginal utility of x, v_x, increases.

Instantaneous utility

- Instantaneous utility in period t is
$$u_t \equiv v(x_t; \rho) - c(x_{t-1}; \gamma) + z_t$$
- ρ and γ are heterogenous.
- $c(x_{t-1}; \gamma)$ represents the negative health costs from past potato-chip. consumption
  - Assume $c_x > 0$.
  - Assume $c_{x\gamma} > 0$. This means as γ increases, the marginal cost of x, c_x, increases.

Instantaneous utility

- Instantaneous utility in period t is

$$u_t \equiv v(x_t; \rho) - c(x_{t-1}; \gamma) + z_t$$

- *Examples:*

$v(x; \rho) = \frac{\rho x^{1-r}}{1-r}$ and $c(x; \gamma) = \gamma x$

$v(x; \rho) = \rho lnx$ and $c(x; \gamma) = \gamma lnx$

Actual behavior vs. Ideal behavior

- Assume β, δ preferences, and for simplicity assume $\delta = 1$
- The person's *actual behavior* (x^*, z^*) maximizes

$$u^*(x,z) \equiv v(x;\rho) - \boldsymbol{\beta} c(x;\gamma) + z.$$

- The person's *ideal behavior* (x^{**}, z^{**}) maximizes

$$u^{**}(x,z) \equiv v(x;\rho) - c(x;\gamma) + z.$$

Ideal behavior

- Consider ideal vs. actual behavior for a person with per-period income l, where l is "large".
- The first-best allocation (x^{**}, z^{**}) maximizes

$$\max_{x,\, z} u^{**}(x, z) \equiv v(x; \rho) - c(x; \gamma) + z$$

$$\text{subject to } x + z \leq l$$

- NO tax
- focus at the ideal utility

➢ x^{**} satisfies $v_x(x^{**}; \rho) - c_x(x^{**}; \gamma) - 1 = 0$

Actual behavior

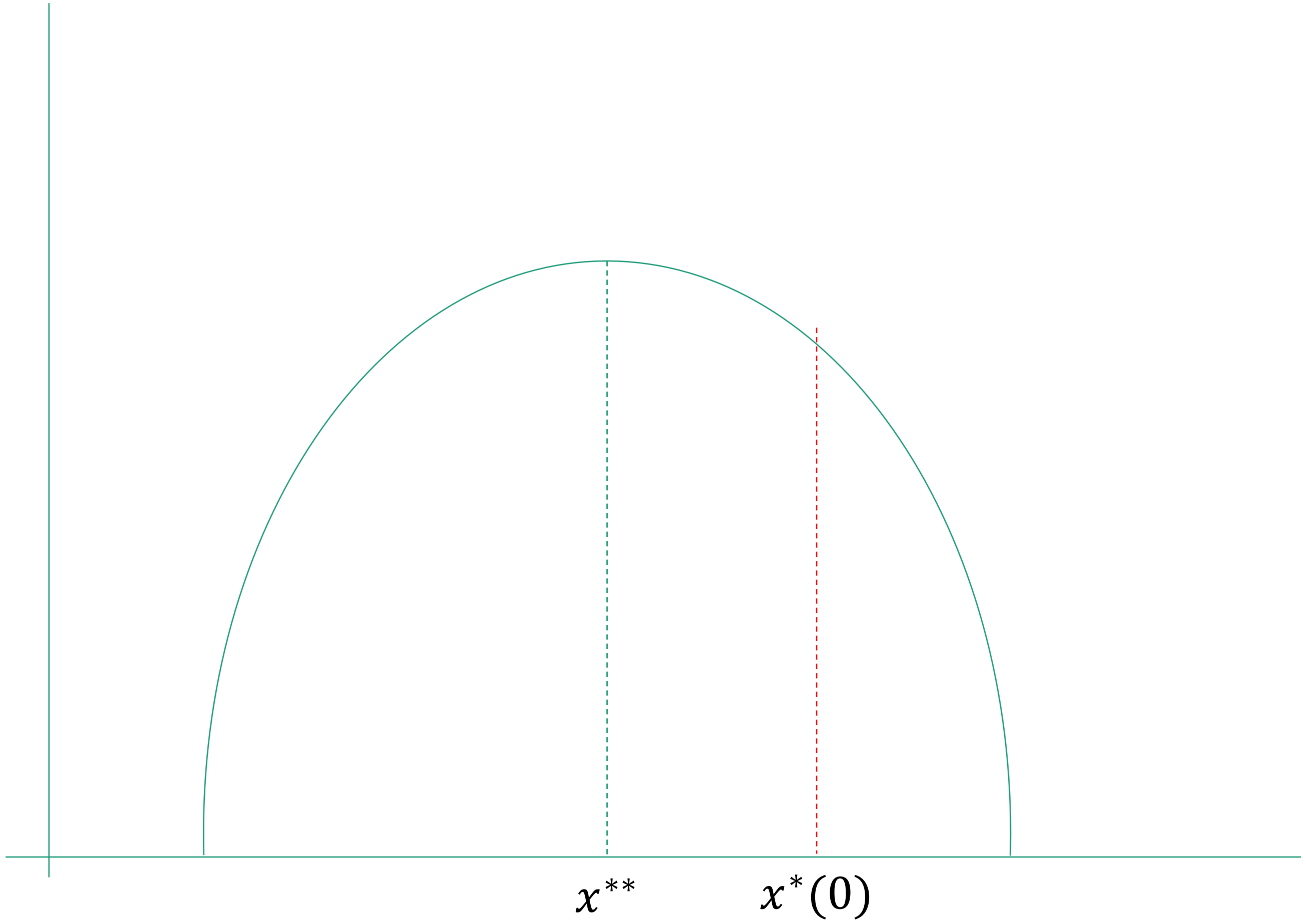
- Given policy (t, l) tax and lump-sum transfer, the person's actual allocation (x^*, z^*) maximizes

$$\max_{\mathrm{x,z}} u^*(x,z) \equiv v(x;\rho) - \boldsymbol{\beta} c(x;\gamma) + z$$

$$\text{subject to } (1+t)x + z \leq l + l$$

➢ $x^*(t)$ satisfies $v_x(x^*(t);\rho) - \beta c_x(x^*(t);\gamma) - (1+t) = 0$

- If there is no sin tax: $t = 0$,
- x^{**} satisfies $v_x(x^{**};\rho) - c_x(x^{**};\gamma) - 1 = 0$
- $x^*(0)$ satisfies $v_x(x^*(0);\rho) - \beta c_x(x^*(0);\gamma) - 1 = 0$
- For given $\rho, \gamma, z,\ u^{**}(x,z) \equiv v(x;\rho) - c(x;\gamma) + z$.



What should be the sin tax rate?

- For all ρ and γ, if $t = 0$, then $x^*(t) = x^{**}$ for people with $\beta = 1$, whereas $x^*(t) > x^{**}$ for people with $\beta < 1$.

- With homogeneous consumers, a Pigouvian tax and a uniform lump-sum transfer can implement the first-best outcome – in particular,

$$t^{**} = (1 - \beta) c_x(x^{**})$$

This t^{**} sets FOC of actual utility maximization to be FOC of ideal utility maximization. Hence, $x^*(t) = x^{**}$.

Sin tax rate

Actual $x^*(t)$ satisfies $v_x(x^*(t);\rho) - \beta c_x(x^*(t);\gamma) - (1+t) = 0$

$$v_x(x^*;\rho) - 1 - t - \beta c_x(x^*;\gamma) - c_x(x^*;\gamma\ ) + c_x(x^*;\gamma\ ) = 0$$
$$v_x(x^*;\rho) - c_x(x^*;\gamma\ ) - 1 - t - \beta c_x(x^*;\gamma) + c_x(x^*;\gamma\ ) = 0$$
$$v_x(x^*;\rho) - c_x(x^*;\gamma\ ) - 1 - t + (1-\beta)c_x(x^*;\gamma) = 0$$

Tax rate needs to be set at:

$$\therefore -t + (1-\beta)c_x(x^{**};\gamma) = 0$$
$$\therefore t^{**} = (1-\beta)c_x(x^{**};\gamma)$$

Heterogeneity

- Let's now focus on population heterogeneity in tastes and in the degree of self-control problems.
- That is, let's consider the case that individuals differ in (ρ, γ, β).
- Let $F(\rho, \gamma, \beta)$ denote population distribution
- Assume $F(\rho, \gamma, \beta) = G(\rho, \gamma) H(\beta)$

Heterogeneity

- Aggregate demand (in per capita terms) is:

$$X^*(t) = E_F[x^*(t)]$$

, summing actual consumptions of heterogenous agents

- The uniform lump-sum transfer is:

$$l(t) = tX^*(t)$$

, lump-sum transfer is equal to tax revenue

Optimal Sin Tax

- Consider a social-welfare function that puts “equal weight” on all people.
- Policymakers maximize aggregated realized ideal utility from actual consumption.

$$\Omega(t) = E_F[u^{**}(x^*(t), z^*(t))]$$

Given the budget constraint $(1+t)x + z = l + l$, we have that:

$$\Omega(t) = E_F[v(x^*(t);\rho) - c(x^*(t);\gamma) + l + l(t) - (1+t)x^*(t)]$$

,where $l(t)$ doesn’t depend on $F(\rho,\gamma,\beta)$.

Optimal Sin Tax

Given, the balanced budget constraint $l(t) = tX^*(t)$

$$\Omega(t) = E_F[v(x^*(t);\rho) - c(x^*(t);\gamma) + l - x^*(t)]$$

Optimal Sin Tax

- *Proposition 1*: Suppose policymakers maximize $\Omega(t)$.

$$\Omega(t) = E_F[v(x^*(t);\rho) - c(x^*(t);\gamma) + l - x^*(t)]$$

- For any distribution of tastes $G(\rho,\gamma)$:

(1) If everyone has $\beta = 1$, then the optimal tax is $t^* = 0\%$, and

(2) If everyone has $\beta \leq 1$ and some have $\beta < 1$, then the optimal tax is $t^* > 0\%$.

- If we are confident that all people are 100% self-controlled, then we should not tax potato chips.
- If instead we believe some people have self-control problems, we should indeed impose sin taxes on potato chips.

Optimal Sin Tax: Takeaway

- Taxes distort consumption for people with $\beta = 1$, but (may) counteract over-consumption for people with $\beta < 1$.

- That is, people with self-control problems are helped because sin taxes counteract over-consumption.

Optimal Sin Tax: Takeaway

- At the same time, because people with self-control problems on average consume more potato chips than people without self-control problems, on average income is redistributed from people with self-control problems to people without self-control problems (because we give equal lum sum transfer.)

- People with $x^*(t) > X^*(t)$ have $l(t) < tx^*(t)$.
- People with $x^*(t) < X^*(t)$ have $l(t) > tx^*(t)$.

Optimal Sin Tax: Takeaway

- If people are heterogenous and some people have $\beta < 1$, sin taxes may yield Pareto improvements.

- Rigid attachment to 100% rationality may make us fail to recognize policies that could in fact help everyone .

- Sin taxes need not involve helping people with self-control problems to the detriment of fully rational people.

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