

# Supplemental Lecture: Public Policy to Combat Errors

EC 404: Behavioral Economics  
Professor: Ben Bushong

April 4, 2023

- ▶ A major theme in behavioral economics: In some contexts, people make errors that lead them not to behave in their own best interests.
- ▶ If so, should policy analysis take such errors into account?
  - ▶ That is, in addition to the usual considerations, if a policy combats errors, that's good, and if a policy exacerbates errors, that's bad.
  - ▶ This question can be quite contentious, because it gets people thinking about the nasty "P" word:

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# What is “paternalism”?

To some, “paternalism” means restricting choice sets (telling people there are certain things they cannot do).

- ▶ Examples: Bans on smoking, drinking, gambling, etc.

Two puzzling reactions to behavioral economics and public policy based on this perspective:

- ▶ “Public policy to combat errors means paternalism, and paternalism means restricting choice sets, and restricting choice sets is bad — because we shouldn’t tell people what to do.”
  - ▶ BUT “public policy to combat errors” need NOT involve “restricting choice sets”!
- ▶ “Many of the supposed paternalistic policies discussed by behavioral economists are in fact not paternalistic policies because they do not restrict choice sets.”
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# What is “paternalism”?

To behavioral economists, “paternalism” means designing policy with an eye towards how that policy might help people make better choices (or cause them to make worse choices).

- ▶ Includes restricting choice sets (e.g., bans), but also includes changing choice sets (e.g., budget-neutral taxes that alter relative prices), and sometimes even expanding choice sets (e.g., introducing and enforcing voluntary commitment devices).
- ▶ Perhaps better label: “public policy to combat errors”.

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# Is “paternalism” justified?

My answer: I don't know — I suspect it probably is, but more investigation is required.

Three major issues:

- ▶ Avoid Ideology — Embrace Analysis.
- ▶ Is it ok to help those who make errors to the detriment of those who do not?
- ▶ But what if firms are hurt (i.e., earn reduced profits)?

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# A “Cautious” Approach

## Initial approach:

“Libertarian Paternalism” (Thaler & Sunstein, ChiLaw 2003)

“Asymmetric Paternalism” (Camerer *et al*, PennLaw 2003)

“Soft Paternalism” (*Economist*, April 8, 2006)

*Nudge* (Thaler & Sunstein, 2008)

- ▶ We need to proceed cautiously, because it's hard to be certain that people are making errors — to know the prevalence of errors in the population and the severity of errors in the population.
- ▶ Hence, let's identify policies that would be helpful for people making errors but mostly irrelevant for rational people.
- ▶ The ideal is a policy that helps people making errors, has no effect on rational people, and has zero implementation costs.

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# Some Examples of this “Cautious” Paternalism

## (1) Rules for default outcomes.

- ▶ Many public policies “require” a response from citizens, and hence must specify a “default” outcome for citizens that do not respond.
  - ▶ Example: Electricity deregulation and choosing a provider.
- ▶ Firms sometimes set up “default” actions that are implemented unless a customer actively says to do otherwise.
  - ▶ Example: Automatic renewals of subscription services.
- ▶ Whereas the standard model would say such default outcomes are mostly irrelevant, evidence suggests otherwise.
- ▶ Hence, perhaps there is scope for policy to help shape (or restrict) the setting of default outcomes.

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# Some Examples of this “Cautious” Paternalism

## (2) Rules for the framing of information.

- ▶ Whereas the standard model would say that how we describe or frame a choice situation is mostly irrelevant, evidence suggests otherwise.
- ▶ Hence, perhaps there is scope for policy to restrict framing a choice in a way that leads people to make worse decisions.
  - ▶ Example: rent-to-own contracts:
    - ▶ Contract 1: Here's a \$300 TV. You can rent it for \$40 per month, and if you rent it for one year, it's yours. (You can return the TV and stop paying rent at any time.)
    - ▶ Contract 2: Here's a \$300 TV. You can buy it on credit, specifically by paying us back in 12 monthly installments at an interest rate of 120%, or \$40 per month. (You can return the TV and stop making payments at any time, although you will not get back any prior payments.)

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# Some Examples of this “Cautious” Paternalism

(3) Cooling-off laws — give people a short duration to back out of their decisions.

- ▶ Sometimes people make decisions “in the heat of the moment” that they later regret (e.g., due to projection bias).
- ▶ Hence, perhaps there is scope for policy that gives people a chance to “cool off” and assess whether they are happy with their decisions.
- ▶ In fact, such laws are implemented in many states for purchases from door-to-door salesmen, marriage, and divorce.

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# “Optimal Paternalism”

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

- ▶ 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.
  - ▶ Embrace analysis!

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

- ▶ 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.
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# An Example of “Optimal Paternalism”: Optimal Sin Taxes

## Optimal Sin Taxes

[based on O'Donoghue & Rabin (*AER* 2003)]

- ▶ Suppose you consume potato chips ( $x$ ) and money ( $z$ ).
- ▶ Potato chips are a “sin” good in the sense that they create negative health consequences in the future.
- ▶ If you have self-control problems, you will be prone to over-consume potato chips — to consume more than you would like from a long-run perspective.
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# Optimal Sin Taxes: Model

## A simple model:

(Total Utility) = (Chip Utility) + (Money Utility).

(Money Utility) =  $z$ .

(Chip Utility):

- ▶ Let  $v(x) \equiv$  immediate eating pleasures from potato chips.
- ▶ Let  $c(x) \equiv$  future health costs from potato chips.

Assume  $\beta, \delta$  preferences with  $\delta = 1$ .

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Behavior: The person will choose  $(x, z)$  to maximize

$$u^*(x, z) = [v(x) - \beta c(x)] + z.$$

Welfare: The person's long-run utility is

$$u^{**}(x, z) = [v(x) - c(x)] + z.$$

For simplicity, assume  $v(x) = \rho \ln x$  and  $c(x) = \gamma \ln x$ , in which case:

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A few more assumptions:

- ▶ Potato chips are produced with constant returns to scale, with a marginal cost of 1.
- ▶ The potato-chip market is competitive:
  - ▶ In the absence of taxes, market price of potato chips is 1.
  - ▶ If the government imposes a per-unit tax  $t$  on potato chips, market price of potato chips is  $1 + t$ .
- ▶ The government might give you a lump-sum transfer  $\ell$  (recall: tax proceeds will be returned to consumers via lump-sum transfers).
- ▶ Given an income  $I$  (that is “large” relative to potato-chip consumption), your consumption of money will be

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# Optimal Sin Taxes: Behavior

The *first-best outcome* is the  $(x^{**}, z^{**})$  that maximizes welfare  $u^{**}$  given  $t = \ell = 0$ . Substituting  $z = I - x$ ,  $x^{**}$  maximizes

$$u^{**}(x, z) = [(\rho - \gamma) \ln x] + I - x$$

$$\implies x^{**} = \rho - \gamma \quad [\text{and } z^{**} = I - (\rho - \gamma)]$$

As a function of  $t$  and  $\ell$ , actual behavior  $x^*$  maximizes

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# Optimal Sin Taxes: Behavior

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Example: Suppose  $\rho = 60$ ,  $\gamma = 50$ ,  $\beta = 0.9$ , and  $I = 200$ .

First-best outcome:  $x^{**} = 10$  and  $z^{**} = 190$ .

Actual behavior (given  $t = 0$ ):  $x^* = 15$  and  $z^* = 185$ .

Note:  $(x = 15, z = 185)$  “better” than  $(x = 10, z = 185)$  because it yields a larger  $u^{**}$ .

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# Optimal Sin Taxes: Benchmark Results

## Benchmark results:

- ▶ If  $t = 0$ , then  $\beta = 1$  implies  $x^* = x^{**}$ .
  - ▶ Standard agents consume optimally in the absence of taxes.
- ▶ If  $t = 0$ , then  $\beta < 1$  implies  $x^* > x^{**}$ .
  - ▶ People with self-control problems are prone to over-consume sin goods such as potato chips.
- ▶ If  $t = t^{**} \equiv \gamma(1 - \beta)/(\rho - \gamma)$ , then  $x^* = x^{**}$ .
  - ▶ A sin tax on potato chips (and a lump-sum transfer) can implement the first-best outcome.
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# Optimal Sin Taxes: Introducing Heterogeneity

More realistically, people differ in:

- ▶ their tastes for potato chips ( $\rho$ )
- ▶ their susceptibility to health problems from potato chips ( $\gamma$ )
- ▶ their degree of self-control problems ( $\beta$ )

If so, implementing the first-best outcome requires individual-specific taxes and lump-sum transfers, which are unrealistic.

What is the “optimal” uniform tax and lump-sum transfer?

- ▶ Note: If everyone has  $\beta = 1$ , the optimal tax is  $t = 0\%$  (which implements the first-best outcome for everyone).

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A simple version of heterogeneity:

- ▶ Suppose everyone has  $\rho = 60$  and  $\gamma = 50$ .
- ▶ Suppose that 80% of the population has  $\beta = 1$  ( $\delta$ -types), while 20% of the population has  $\beta = .9$  ( $\beta$ -types).

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# Optimal Sin Taxes: Solving for the Optimal Tax

Step 1: As a function of the tax  $t$ , what is the uniform lump-sum transfer?

As a function of  $t$ ,  $\delta$ -types consume

$$x_{\delta}^*(t) = \frac{\rho - \beta\gamma}{1 + t} = \frac{10}{1 + t}$$

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[Using the results from the previous slide]

As a function of  $t$ , average consumption is

$$X^*(t) = 0.8 * x_\delta^*(t) + 0.2 * x_\beta^*(t) = \frac{11}{1+t}.$$

Hence, the lump-sum transfer is

$$\ell(t) = t * X^*(t) = \frac{11t}{1+t}.$$

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# Optimal Sin Taxes: Solving for the Optimal Tax

Step 2: As a function of  $t$ , what is social welfare?

As a function of  $t$ , welfare for  $\delta$ -types is

$$\begin{aligned}u_{\delta}^{**}(t) &= (\rho - \gamma) \ln x_{\delta}^{*}(t) + I + \ell(t) - (1 + t)x_{\delta}^{*}(t) \\&= 10 \ln \left( \frac{10}{1 + t} \right) + I + \frac{11t}{1 + t} - (1 + t) \left( \frac{10}{1 + t} \right)\end{aligned}$$

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Weighting everyone equally, social welfare is

$$\Omega(t) = 0.8 * u_{\delta}^{**}(t) + 0.2 * u_{\beta}^{**}(t).$$

# Optimal Sin Taxes: Solving for the Optimal Tax

Step 3: Solve for the optimal tax.

Claim:  $t^* = 10\%$ .

Hence, if we weight everyone equally, the optimal tax is  $t^* = 10\%$ .

Even if the prevalence of self-control problems is relatively small, it can be optimal to impose significant taxes on sin goods.

- Intuition: Starting from  $t = 0\%$ , sin taxes create large benefits in terms of reducing over-consumption by people with self-control problems, while causing relatively little distortion in the potato-chip consumption of fully rational people.



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Helping the  $\beta$ -types to the detriment of the  $\delta$ -types:

For the  $\beta$ -types:

$$u_{\beta}^{**}(t = 0\%) = 10 \ln(15) + I - (1)(15) = I + 12.081$$

$$u_{\beta}^{**}(t = 10\%) = 10 \ln\left(\frac{15}{1.1}\right) + I + \frac{11(.1)}{1.1} - (1.1)\left(\frac{15}{1.1}\right) = I + 12.127$$

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It turns out that everyone is better off!

- In other words,  $t = 10\%$  is Pareto-superior to  $t = 0\%$ .

Intuition:  $\beta$ -types helped because sin taxes counteract over-consumption. At the same time, because  $\beta$ -types consume more potato chips than  $\delta$ -types, while everyone gets the same lump-sum transfer, income is naturally redistributed from  $\beta$ -types to  $\delta$ -types.

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More generally, it may not be the case that everyone is helped. For instance, suppose:

- ▶ People have different tastes for potato chips ( $\rho$ ), where the average  $\rho$  in the population is 60.
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However, a 10% tax might not make everyone better off — in particular, a  $\delta$ -type with a large  $\rho$  and a small  $\gamma$  (for whom optimal potato-chip consumption is large) is likely to be hurt.

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## Bottom line:

- ▶ If some people are prone to over-consume sin goods, it might be useful to tax sin goods to counteract this over-consumption, and use the proceeds to reduce other taxes.
- ▶ In fact, such a policy need not involve helping people making errors to the detriment of fully rational people.

Of course, there are other issues that must be addressed before implementing such taxes:

- ▶ Are such taxes regressive?
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# Analysis of Policy: CFL vs Incandescent Light-bulbs

[Based on Allcott and Taubinsky, *AER* 2015]

Electric utilities in the U.S. spent \$252 million promoting compact fluorescent light-bulbs (CFLs) in 2010.

Why subsidize CFLs over standard incandescents?

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Analysis above applies to present-bias analysis of CFLs.

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Put another way, what if consumers do not understand the total cost of ownership of CFLs? Can that explain existing subsidies?

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*For eight years of light, the total costs to purchase bulbs and electricity would be:*

*\$56 for incandescents: \$8 for the bulbs plus \$48 for electricity.*

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**Results:** Information increases WTP for the CFL by an average of \$2.30

In the real world, electricity firms offer  $\approx$ \$3 subsidies.



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