Behavioral Economics

Lecture A1: Public Policy to Combat Errors

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Overview

- A major theme in behavioral economics: In <u>some</u> 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, <u>in addition to</u> 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:

$\Longrightarrow$ "Paternalism" $\Longleftarrow$

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.”
  - BUT this is just semantics!

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”.

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)?

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.

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.

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.)

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.

“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!

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.
- Should we tax potato chips to induce people to consume less (and return the tax proceeds via a lump-sum transfer)?

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 β, δ preferences with $\delta = 1$.

Optimal Sin Taxes: Model

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:

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

Optimal Sin Taxes: Model

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 ℓ (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

$$z = I + \ell - (1 + t)x.$$

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

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

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

As a function of t and ℓ, actual behavior x^* maximizes

$$u^{*}(x, z) = [(\rho - \beta\gamma)\ln x] + I + \ell - (1 + t)x$$

$$\implies x^{*} = \frac{\rho - \beta\gamma}{1 + t} \qquad [\text{and, if } \ell = tx^*,\ z^* = I - x^*]$$

Optimal Sin Taxes: Behavior

Recall: The *first-best outcome* is

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

As a function of t and ℓ, actual behavior is

$$x^{*} = \frac{\rho - \beta\gamma}{1 + t} \qquad [\text{and, if } \ell = tx^{*},\ z^{*} = I - x^{*}]$$

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 leads society to a larger u^{**}.

Optimal Sin Taxes: Benchmark Results

<u>Benchmark results</u>:

- 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.
  - Note: $\beta = 1$ implies $t^{**} = 0\%$, while $\beta < 1$ implies $t^{**} > 0\%$.

Optimal Sin Taxes: Introducing Heterogeneity

More realistically, people differ in:

- their tastes for potato chips (ρ)
- their susceptibility to health problems from potato chips (γ)
- their degree of self-control problems (β)

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

What is the "optimal" <u>uniform</u> 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).

Optimal Sin Taxes: Introducing Heterogeneity

A simple version of heterogeneity:

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

If we weight everyone equally, what is the optimal uniform tax and lump-sum transfer?

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, δ-types consume

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

As a function of t, β-types consume

$$x_\beta^*(t) = \frac{\rho - \beta\gamma}{1+t} = \frac{15}{1+t}.$$

Optimal Sin Taxes: Solving for the Optimal Tax

[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

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

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

As a function of t, welfare for δ-types is

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

As a function of t, welfare for β-types is

$$\begin{aligned} u_\beta^{**}(t) &= (\rho-\gamma)\ln x_\beta^*(t) + I + \ell(t) - (1+t)x_\beta^*(t) \\ &= 10\ln\left(\frac{15}{1+t}\right) + I + \frac{11t}{1+t} - (1+t)\left(\frac{15}{1+t}\right) \end{aligned}$$

Solving for the Optimal Tax

Weighting everyone equally, social welfare is

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

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.

Optimal Sin Taxes: Who is Hurt?

Helping the β-types to the detriment of the δ-types:

For the β-types:

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

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

For the δ-types:

$$u_\delta^{**}(t = 0\%) = 10 \ln(10) + I - (1)(10) = I + 13.026$$

$$u_\delta^{**}(t = 10\%) = 10 \ln\left(\frac{10}{1.1}\right) + I + \frac{11(.1)}{1.1} - (1.1)\left(\frac{10}{1.1}\right) = I + 13.073$$

Optimal Sin Taxes: Who is Hurt?

It turns out that everyone is better off!

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

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

Optimal Sin Taxes: Who is Hurt?

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

- People have different tastes for potato chips (ρ), where the average ρ in the population is 60.
- People have different susceptibilities to health problems from potato chips (γ), where the average γ in the population is 50.

It turns out that, weighting everyone equally, the optimal tax is still 10%.

However, a 10% tax might not make everyone better off — in particular, a δ-type with a large ρ and a small γ (for whom optimal potato-chip consumption is large) is likely to be hurt.

Optimal Sin Taxes: Who is Hurt?

Claim:

- Even so, the β-types and δ-types are still both on average better off.

Intuition: β-types are on average helped because sin taxes counteract over-consumption. At the same time, because β-types on average consume more potato chips than δ-types, on average income is redistributed from β-types to δ-types.

Optimal Sin Taxes: Concluding Thoughts

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?
- Implementation problems (smuggling, bureaucracy)?

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?

- If energy prices are below social marginal cost (and cannot be raised due to political constraints).
- Subsidizing new or emerging products might help correct for uninternalized spillovers from R&D or consumer learning.
- Asymmetric information / incentives in real estate markets.
- "Behavioral" reasons.

Analysis above applies to present-bias analysis of CFLs.

Analysis of Policy: CFL vs Incandescent Light-bulbs

What about *inattentive* consumers?

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

- Experiment provided specific information to consumers.

  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.
  $16 for a CFL: $4 for the bulbs plus $12 for electricity.

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

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