

# **Internalities and Paternalism: Applying Kaldor-Hicks to Multiple Selves across Time**

This will probably appear in *Social Choice and Welfare*.

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# The idea to be explored

Smoking should be banned if it would hurt a person in later life more than it pleases him in the present.

Approach 1: Smoking is a problem of self-control, and even when he is smoking the person would value being constrained not to.

Approach 2: Smoking is a problem of not caring enough about one's future self.

I will take approach 2.

Economists have suggested hyperbolic discounting as a reason for regulation. I will include that as a possibility here, but it will turn out not to be necessary.

# The intraself Kaldor-Hicks criterion

Strotz (1955): Think of the single person as a series of different persons: Self 0, Self 1, Self 2, and so forth, depending on the time period.

What do we maximize? If the multiple selves are treated as different people, the Kaldor-Hicks criterion is natural.

See if there is a change in choice variables which when combined with wealth transfers would increase someone's utility and reduce nobody else's. That change is an improvement even if the wealth transfers are not made.

A Coasean bargain: would Self X agree to transfer wealth to Self Y in exchange for Self Y agreeing to change his behavior?

If so, there is an unpriced "internality" in analogy to "externalities".

# The Model

A person lives for three periods labelled 0, 1, and 2. This is Presmoking, Smoking, and Postsmoking.

He receives income of  $W$  in each period. He consumes  $C_0$ ,  $C_1$ , and  $C_2$ .

He can save at interest rate  $r$ , but he cannot borrow.

In period 1, the person chooses between smoking ( $X = 1$ ) or not smoking ( $X = 0$ ). Smoking is free; it does not reduce consumption.

If the person chooses to smoke he receives 1 unit of utility in period 1 and loses  $\alpha > 1$  in period 2.

# The Utility Function

$$U_0 = U(C_0) + \beta\delta(X + U(C_1)) + \beta\delta^2(-\alpha X + U(C_2)), \quad (1)$$

with  $0 \leq \beta < 1$  and

$$0 \leq \delta < \frac{1}{1+r}. \quad (2)$$

Let  $U(C) = C$  for now.

The “consume-early” assumption (2) ensures that the person’s rate of time preference is greater than the interest rate.

If  $\beta = 0$  he does not care at all about the welfare of his future self.  
If  $\beta = 1$  he has a standard exponential-discounting utility function.

# The Equilibrium

Self 0 will consume his entire income. He would like Self 1 to smoke if and only if

$$\alpha < \frac{1}{\delta} \quad (3)$$

Self 1 will consume his entire income too. He would like to smoke if and only if

$$\alpha < \frac{1}{\beta\delta} \quad (4)$$

Self 2 will consume his entire income. He would never like Self 1 to smoke.

# Why Hyperbolic Discounting Favors Paternalism

Self 1 puts a higher value on period 1 sensations relative to period 2 than Self 0 does.

Shifting an extra unit of consumption from period 1 to period 2 adds  $\delta$  to Self 0's utility, but adds only  $\beta\delta$  to Self 1's.

From the point of view of Self 1, smoking is in the present, and hyperbolic discounting puts special value on present sensations.

If discounting is exponential, it may be that smoking hurts Self 2, much more than it helps Self 1, but if discounting is heavy enough that Self 1 would choose smoking then it is heavy enough that Self 0 cares much more about Self 1's utility than about Self 2's disutility.

# The Kaldor-Hicks Criterion

Smoking adds  $(1 - \beta\delta\alpha)$  to Self 1's utility and  $-\alpha$  to Self 2's.  
Would Self 2 pay enough to change Self 1's decision?

Selves 1 and 2 never meet, so the transaction is not possible, but Kaldor-Hicks only requires a potential Pareto improvement, not an actual one.

Self 1 cares about Self 2's consumption level, so a dollar payment from Self 2 to Self 1 raises Self 1's utility by less than one dollar.

Self 0 might also pay to ban smoking.

# How Much Must Self 2 Pay Self 1 to Ban Smoking?

Self 2 must pay:

$$P_2 = \frac{(1+r)(1-\alpha\beta\delta)}{1-\beta\delta(1+r)}. \quad (5)$$

1. Direct effect on Self 1:  $(1 - \alpha\beta\delta)$ .
2. Interest rate, converting Self 2 to Self 1 dollars:  $(1 + r)$ .
3. Adjust for loss of future consumption:  $1 - \beta\delta(1 + r)$ .

Self 2 is willing to pay this much if  $\alpha > 1 + r$ , so KH says:

$$\text{Ban smoking if : } \alpha > 1 + r,$$

i.e. if smoking damage is large relative to the interest rate.

# When Should Smoking Be Banned?

*Result 1: In a multiple selves model, the intraself Kaldor-Hicks criterion can justify paternalistic banning of a vice even if discounting is exponential.*

This is true even if discounting is exponential, not hyperbolic.

There is market failure within the self, a missing market for trade of future money for present abstention.

In fact, we can get a **Pareto improvement**. Ban smoking, but tax old people and give the money to young people.

But for Kaldor-Hicks, we don't need to make the compensating money transfer.

# What Should a Libertarian Think about This?

People who are libertarians for reasons of liberty rather than efficiency favor personal freedom, usually including freedom from constraint by other individuals as well as by government.

**Paradigm I (single self):** Steve forces Joe to stop smoking. Sam poisons Lou with arsenic. Both of those are bad things.

**Paradigm II (multiple selves):** Young Joe blows smoke into Old Joe's body over Old Joe's objections, killing him with lung cancer. That's bad.

Which is the better libertarian paradigm?

**Paradigm III (family or DNA as self):** Steve doesn't allow Joe to borrow against Joe Jr.'s future income. That is an unjust constraint on the Joe family's freedom.

I'm not a libertarian myself, but I'd like to hear what libertarians think about this.

# The Effect of Borrowing on Smoking's Optimality

Suppose borrowing is allowed. Self 0 would borrow and consume all three endowments. Selves 1 and 2 would consume zero, and Self 1 would smoke.

Now Self 2 can't offer any payment to Self 1 to stop smoking, so Kaldor-Hicks does not argue for a smoking ban.

*Result 2: If the person borrows enough against his future income, the Kaldor-Hicks criterion can support a smoking ban only if discounting is quasi-hyperbolic.*

(Why can it with hyperbolic? – Then Self 0 will want to pay self 1 not to smoke, too, helping out Self 2's compensating payment.)

## Concave Utility and Consumption Smoothing

Extreme amounts of borrowing destroy the Kaldor-Hicks argument for regulation. How about moderate amounts?

Let us now give Self 0 an endowment of  $(W + K)$  instead of  $W$  and make the utility of consumption concave, a function  $U(C)$  with  $U' > 0$ ,  $U'' < 0$ . Let us assume that borrowing is limited to an amount  $B$  in borrowing period dollars.

## Result 3: No Ban

*Result 3: If discounting is exponential and a person is saving a positive amount or his borrowing is unconstrained, then the intraself Kaldor-Hicks criterion does not support a paternalistic smoking ban.*

If Self 1 is saving, he doesn't value his own marginal consumption any more than Self 2's. He has decided to save and increase Self 2's consumption.

If Self 1 is borrowing less than the limit, the same is true. He has decided NOT to borrow the maximum and push down Self 2's consumption further.

If discounting is hyperbolic, then Self 0's willingness to pay Self 1 *could* lead to a smoking ban being optimal using the Kaldor-Hicks criterion.

# The Results

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Result 2: If the person borrows enough against his future income, the Kaldor-Hicks criterion can support a smoking ban only if discounting is quasi-hyperbolic.

Result 3: If discounting is exponential and a person is saving a positive amount or his borrowing is unconstrained, then the intraself Kaldor-Hicks criterion does not support a paternalistic smoking ban.

**Implication:** Ban vice for people who are borrowing up to their borrowing constraints. Don't ban vice for people who are saving or borrowing less than their constraint.