

# Internalities and Paternalism: Applying Surplus Maximization to Multiple Selves across Time

3 May 2010 Eric Rasmusen Dan R. and Catherine M. Dalton Professor, Department of Business Economics and Public Policy, Kelley School of Business, Indiana University. Erasmuse@indiana.edu. <http://www.rasmusen.org>. This paper: <http://www.rasmusen.org/papers/interiority-rasmusen.pdf>. It will probably appear in *Social Choice and Welfare*.

A person lives for three periods labelled 0, 1, and 2. 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. We will denote wealth in each period as  $W_0$ ,  $W_1$ ,  $W_2$ , where  $W_0 = W$  and the later wealths depend on earlier saving.

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.

We will view this person as consisting of three people, Self 0, Self 1, and Self 2, with utility functions:

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

$$U_1 = X + U(C_1) + \beta\delta(-\alpha X + U(C_2)), \quad (2)$$

and

$$U_2 = -\alpha X + U(C_2), \quad (3)$$

with  $\alpha > 1$ ,  $0 \leq \delta < \frac{1}{1+r}$ , and  $0 \leq \beta < 1$ . If the person chooses to smoke he receives  $X$  in period 1 and loses  $\alpha X$  in period 2, where we assume the loss is bigger than the gain, so  $\alpha > 1$ . We will assume  $U(C) = C$  for most of the paper.

**The Consume-Early Assumption:** The person's rate of time preference is greater than the market rate of interest:  $0 \leq \delta < \frac{1}{1+r}$

**The Precommitment Criterion:** A change in the value of the choice variables is an improvement if it increases utility according to the utility function of Self 0.

**The Intraself Pareto Optimality Criterion.** A change in the value of the choice variables is an improvement if it increases utility according to the utility function of at least one Self and reduces utility according to the utility functions of none, recognizing that money transfers across periods pay or receive interest rate  $r$ .

**The Intraself Kaldor-Hicks Criterion.** A change in the value of the choice variables is an improvement if it could be combined with money transfers such that the combined changes would increase utility according to the utility function of at least one Self and reduce utility according to the utility functions of none, recognizing that money transfers across periods pay or receive interest rate  $r$ .

*Results:* The intraself Kaldor-Hicks criterion can justify paternalistic banning of a vice even if discounting is exponential, but not if he borrows too much, his borrowing is unconstrained, or he is saving. If discounting is quasi-hyperbolic, the Kaldor-Hicks criterion can support paternalism even if the person is borrowing an unconstrained amount, but not if he is saving.

In fact, even Pareto optimality can justify banning the vice, taxing the old, and subsidizing the young, so long as borrowing is constrained and the person is not saving when young.