The marginal internality is defined as

Money-metric marginal internality: Definition

Utility

The model

Period 1: Individual uses income $Y_t$ to purchase sin good $X_t$, numeraire good $Z_t$, and pay public health insurance premium $P_t$. Government provides health insurance: taxes sin in real rate $r_t$ and returns tax revenues as a lump-sum transfer $\ell_t$ to $X_t$.

Utility

Long-Term (True) Expected Utility:

Proposition

The money-metric marginal internality $\varphi$ can be determined using (1) without information on present-bias $\beta$ and beliefs $\{b(X)\}$.

Health

Elasticities: Income and price elasticities from Allcott et al. (2019a)

Results

Extensions

Private health insurance: The sin good demand’s health insurance elasticity, $\xi^h$, is replaced by the elasticity after cenceding out of private insurance takes place (taken into account in previous calibration, results remain unchanged).

Multiple sin goods: When there are multiple sin goods: the marginal internality of each good can be identified. Calibration adding diet soda affects the estimated $\varphi$ only slightly.

Life expectancy effects: Life expectancy likely declines in sick state. In the case of sugary drinks, this has small effects on the numerical results.

Intuition behind Estimation of Marginal Internality

If the consumer is rational, then a change in health insurance coverage affects sin good demand only through its effects on insurance premium and out-of-pocket costs. In this case, the terms in brackets in Equation (1) should sum up to zero. If the individual makes mistakes in sin demand, then the insurance also affects the marginal internality. This effect is given by the terms in brackets in (1). Multiplying it with the money-metric utility loss in the sick state gives the marginal internality.

Proposition

The money-metric marginal internality $\varphi$ can be estimated using (1) without information on present-bias $\beta$ and beliefs $\{b(X)\}$.

If first-period utility is of the form $U^1(Z_t, H^0_t, X_t) = U^0(Z_t, H^0_t) + V(X_t)$, then (1) can be estimated without additional assumptions about $V(X_t)$.

If health insurance is optimal, then $\varphi$ can be estimated without any assumptions regarding first-period utility $U^1(Z_t, H^0_t, X_t)$.

If health insurance is optimal and second-period utility is state-independent, then $\varphi$ can be approximated without further assumptions about $U^2(Z_t, H^0_t, X_t)$ and $U^2(Z_t, H^0_t)$.

Calibration

Utility:

where $b_{Z,X} = \{0, 1\}$, $\gamma = $ relative risk aversion ($\gamma > 0$) and $p = $ the state dependence of utility, $\phi = $ marginal utility from health.

Results

Additional notation: $\xi^s$: marginal externality via health insurance, $b = 1/M = $ share of costs covered by insurance.

Table: Results from the benchmark calibration ($\gamma = 10, \beta = 0.01$)

<table>
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<tr>
<th>Propositions</th>
<th>$\varphi$</th>
<th>$\xi^s$</th>
<th>$\xi^h$</th>
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<tbody>
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<td>Proposition 1</td>
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References


