The Risk Protection Value of "Moral Hazard"

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November 2026

Definition

- Classic empirical result in health economics :

  Higher coverage health insurance causes greater consumption of healthcare

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$\Rightarrow$ The risk protection value of "moral hazard"
=
The risk protection value of insurance-induced utilization
=
The risk protection value of the ability to change behavior in response to insurance

Motivation

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  value of risk protection must be weighed against cost of distorted incentives

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symmetric information

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(Arrow-Debreu securities)

– can move resources (income) without distorting incentives (MRS=MRT)

→ and moving resources might change behavior ↔ income effects

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first best symmetric information	**second best** asymmetric information
– state-contingent contracts (Arrow-Debreu securities)	– indemnity contracts ("makes you whole" for covered perils)
– can move resources (income) without distorting incentives (MRS=MRT)	– can only distort prices (incentives) (MRS≠MRT)
→ and moving resources might change behavior ↔ income effects	→ which might also change behavior ↔ income + subs effects

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Remark: "Ex ante" versus "ex post" moral hazard

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(i) Can insurance-induced utilization be socially valuable in health insurance?

↳ consumer would not commit to forgo it, if she could

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- Standard logic : ex post revealed preference (Pauly 1968)

> *"By the standard logic of moral hazard, if consumers optimally choose [a given level of medical spending absent insurance], they would **value** the increase in ... [insurance]-induced medical spending at less than its cost, since they chose not to purchase that medical spending at an unsubsidized price."*
>
> *JPE*, 2019

- uninsured consumer doesn't buy a unit of care at full cost
  - ↳ values it at less
  - ↳ units of utilization induced by insurance must be valued below cost

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- Focal example : spinal muscular atrophy (SMA)
  - rare genetic disease of infants (about 1 in 10,000 births)
  - untreated : death or permanent ventilation by about age 1
  - one-time gene therapy (Zolgensma, 2019) : $2.1 million
    ↳ uninsured family doesn't buy it (facing full cost)
    ↳ values it at less than its cost?

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- Necessary : risk
- Important : non-zero income elasticity of demand for healthcare
- Hinges on : size of desired resource transfer towards sick states +
  relative size of subst vs income effect from healthcare price decrease

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- Standard estimates imply large risk protection value of insurance-induced utiliz.

  → prohibiting insurance-induced utilization en masse *lowers* social welfare

Related literature

- ⋆ Closely related work on value of income effect (Marshall 1976; de Meza 1982; Nyman 1999/2001/2018)
  - here : formalizing this intuition → link with risk protection
    ⇒ provide a novel theoretical and graphical framework for this class of models

- Foundational work on optimal insurance (Arrow 1965; Pauly 1968; Zeckhauser 1970)
  - classic trade-off : risk protection vs. cost of distorted incentives
  - we emphasize : larger behavioral response ≠ larger cost of distorted incentives

- Work highlighting other reasons insurance-induced utilization may be valuable (Baicker et al 2015 [internalities/info frictions]; Chernew Frick 2009 [market power]; Newhouse 2006 [externalities]; Ericson Sydnor Jaspersen 2025 [liquidity constraints])
  - here : only channel is risk protection; risk is necessary

- Work quantifying welfare consequences of insurance-induced utiliz. in health insurance (e.g., Pauly 1969; Manning et al 1987; Feldman Dowd 1991; Finkelstein Hendren Luttmer 2019)
  - here : show (and quantify) how insurance-induced utiliz. can enter *both* positively and negatively

1. Introduction

2. Model

3. Empirical magnitudes

4. Discussion and conclusion

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Model outline

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Model pt. 1 : Consumers

- Consumer has state-dependent preferences represented by vNM utility $u(y, m; l)$

  $y \in \mathbb{R}_+$: non-health consumption

  $m \in \mathbb{R}_+$: healthcare consumption (aka utilization, or spending)

  $l \in L$: health state

  where $\forall\ l:\ u_y > 0$, u concave in (y, m), bliss point in m , $\frac{u_m}{u_y}|_l > 0$ $\rightarrow$ so higher l = sicker

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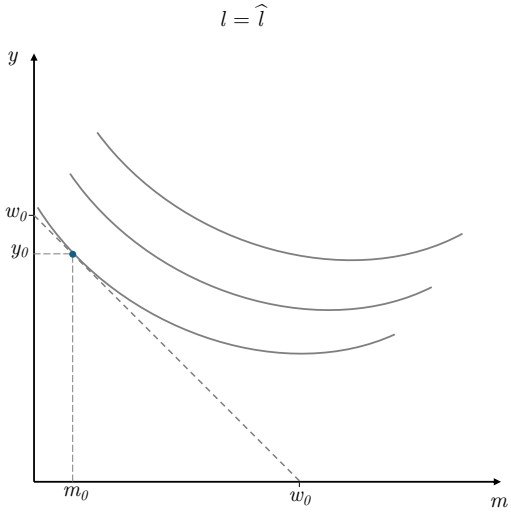
- Units of y and m set such that relative market price (MRT) is 1
- Consumer faces **risk** over her health state $l \sim F$ → and thus, her tastes for (y, m)
- Consumer endowed with initial resources w_0 → same in all states
- Information : F commonly known, realization l private to consumer

  ↳ non-verifiable health status is singular market failure → no selection, just moral hazard

Pic. 1.a : Consumer's ordinal preferences over (y, m) given l



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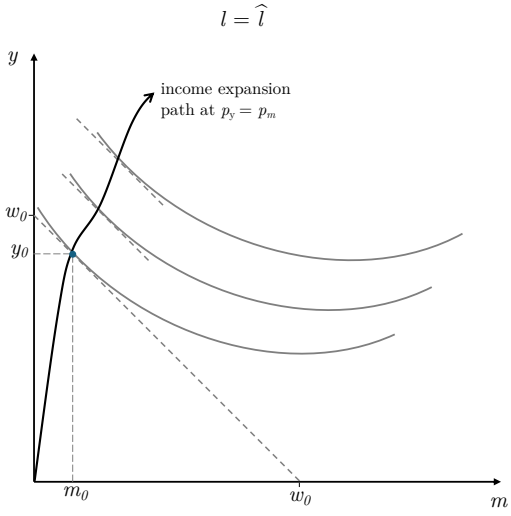

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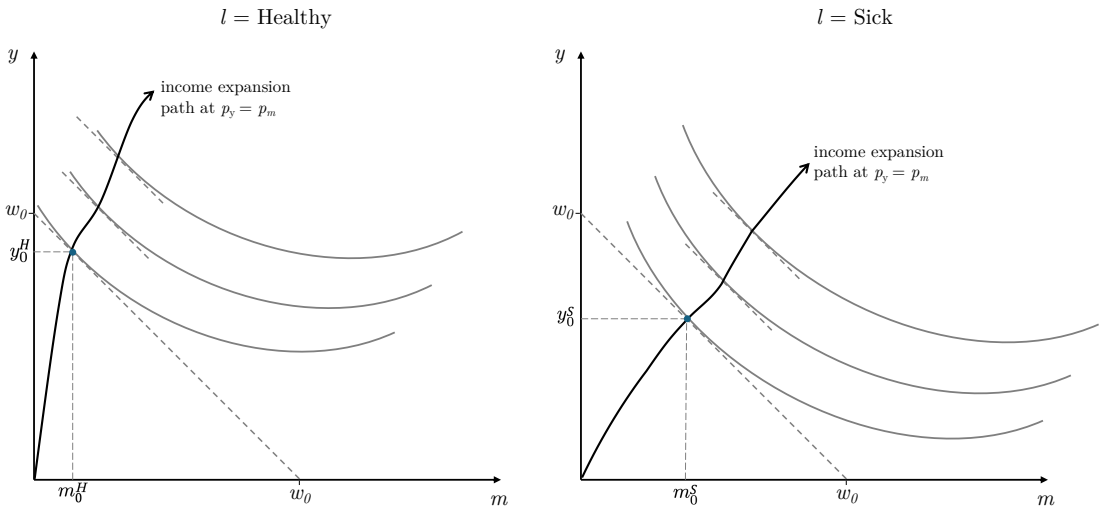

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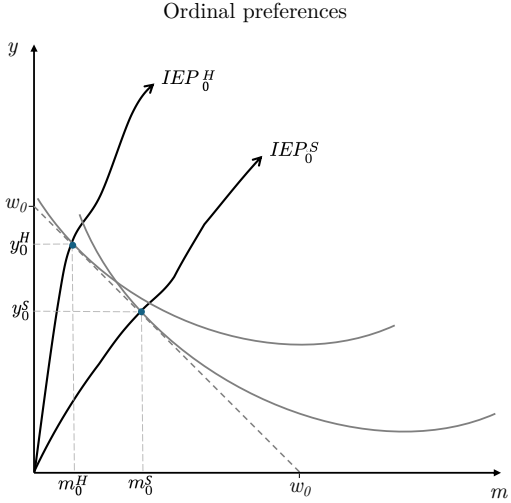
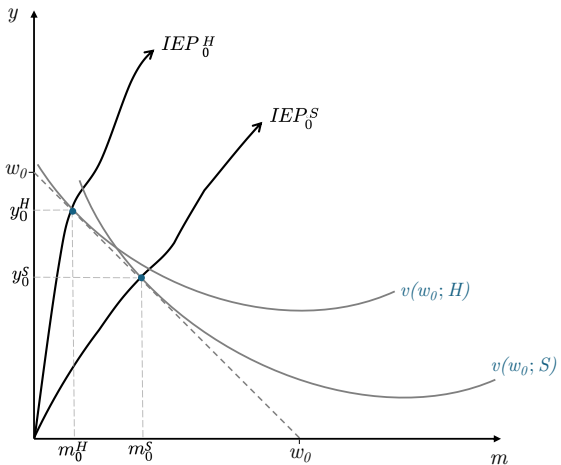


$$\max_{y,m} \; u(y, m; l) \quad s.t. \quad y + m \leqslant w_0$$

Pic. 1.b : Consumer's risk preferences

Ordinal preferences



$$\max_{y,m} \; u(y, m; l) \quad s.t. \quad y + m \leqslant w_0$$
$$= v(w_0\,; l)$$

$$U_0 = \mathbb{E}_l\left[v(w_0\,; l)\right]$$

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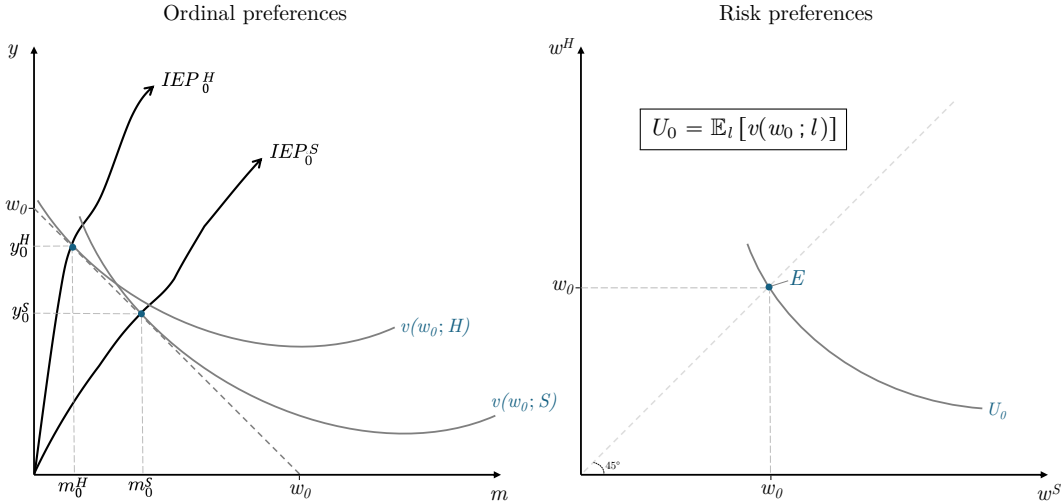

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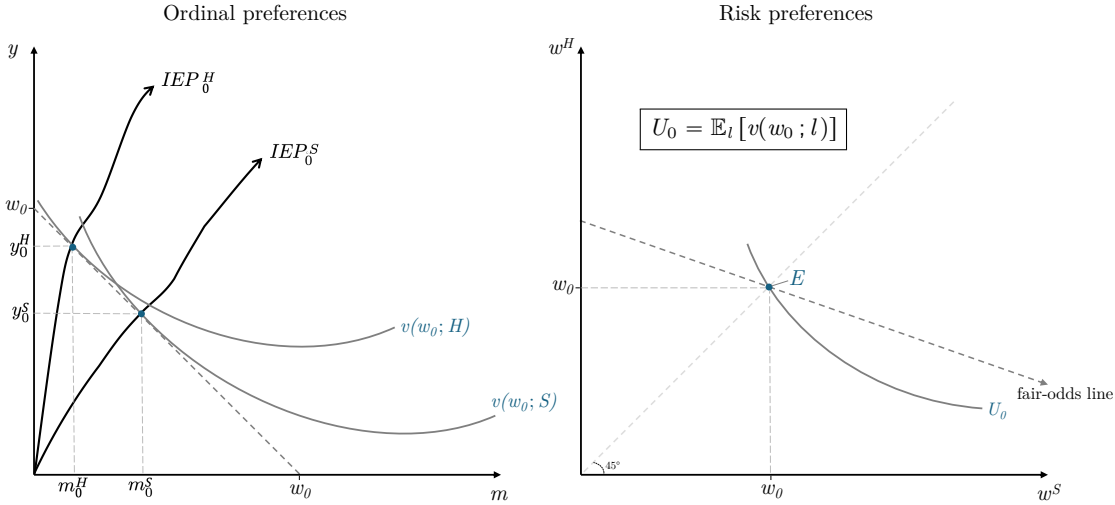

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Model pt. 2 : First-best benchmark

- Suppose health state were contractible
- Best state-contingent contract (first-best) solves

$$\max_{w(l)} \ \mathbb{E}_l[v(w(l); l)] \quad \text{s.t.} \quad \mathbb{E}_l\, w(l) \leqslant w_0$$

↳ where $v(w; l)$ is indirect utility function given $p_y = p_m$

$$\Longleftrightarrow$$

$$\max_{y(l), m(l)} \ \mathbb{E}_l[u(y(l), m(l); l)] \quad \text{s.t.} \quad \mathbb{E}_l[y(l) + m(l)] \leqslant w_0$$

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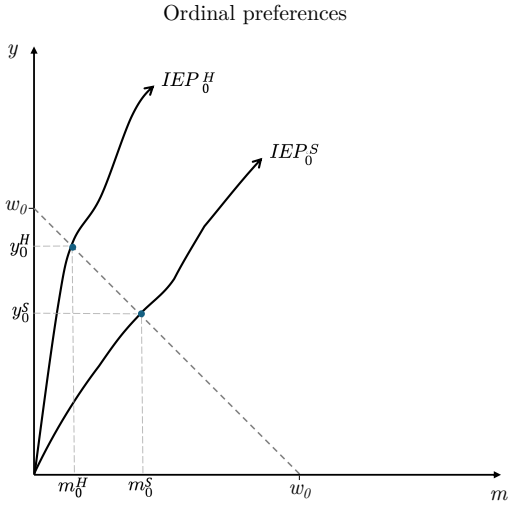
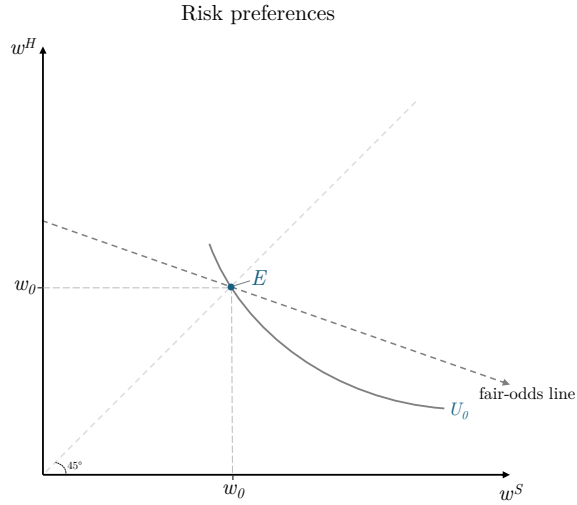
- Solution yields first-best allocations in each state : $w^{FB}(l) = y^{FB}(l) + m^{FB}(l)$

$\Rightarrow$ Define $m^{FB}(l)$ to be the socially efficient level of healthcare utilization

Pic. 2.a : First-best allocations





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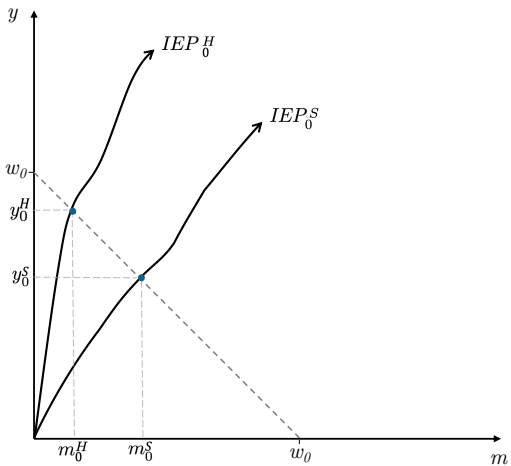

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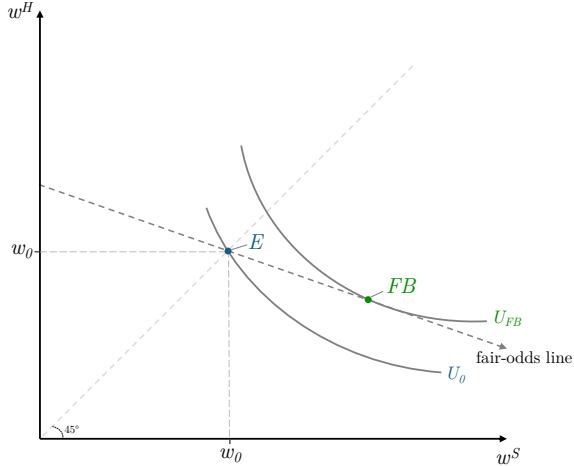

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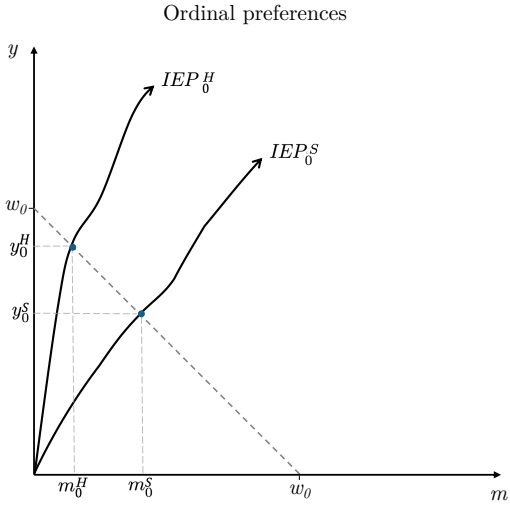

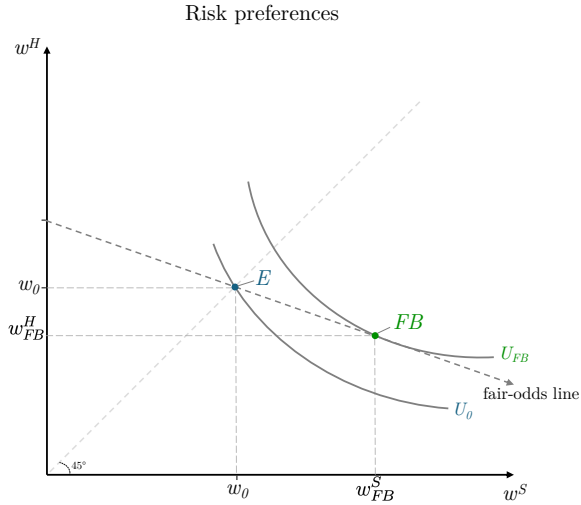

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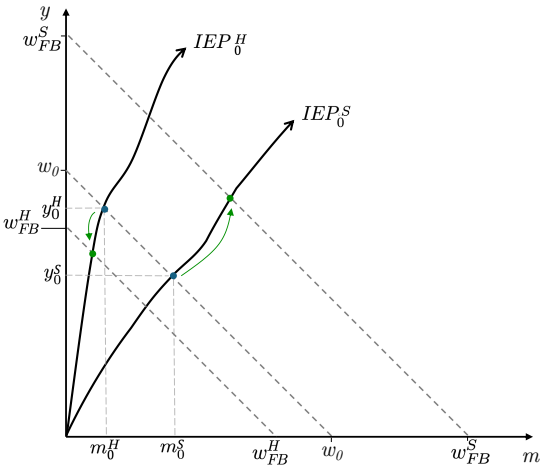

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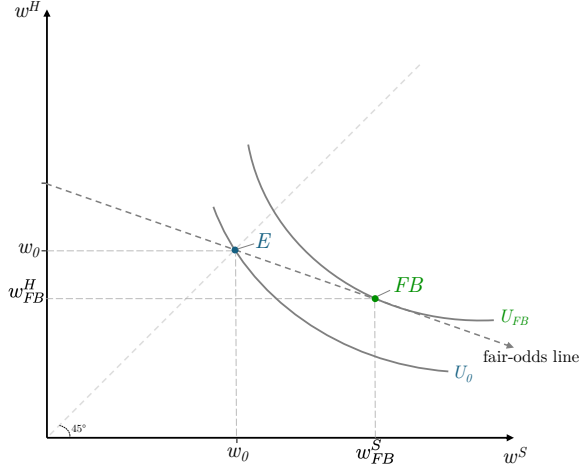

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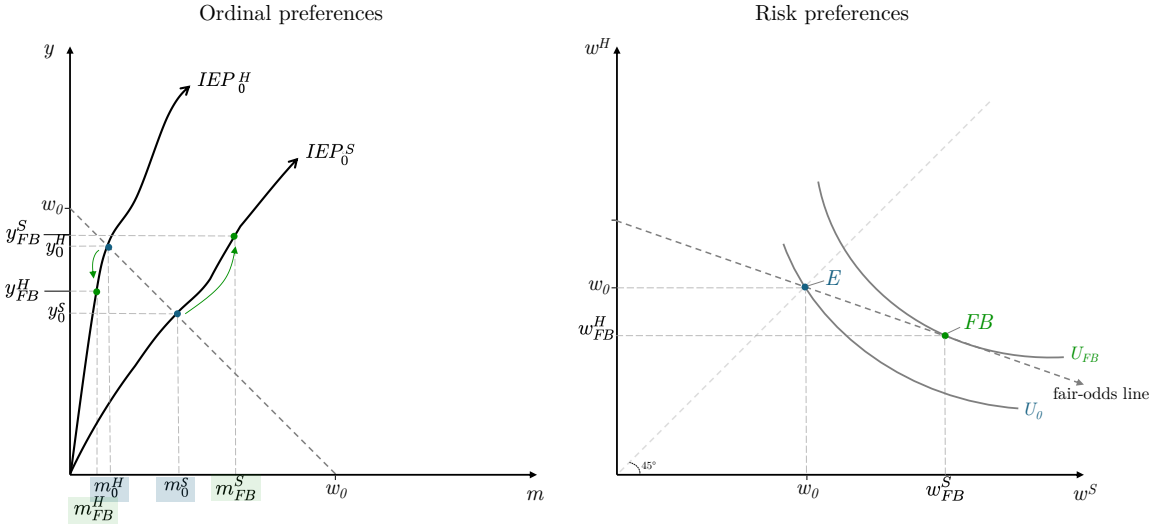

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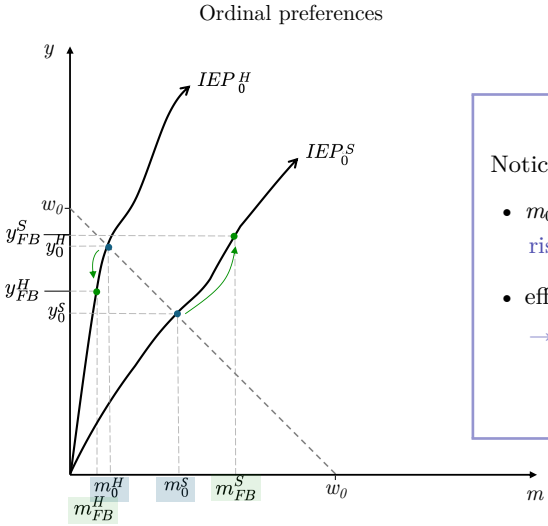

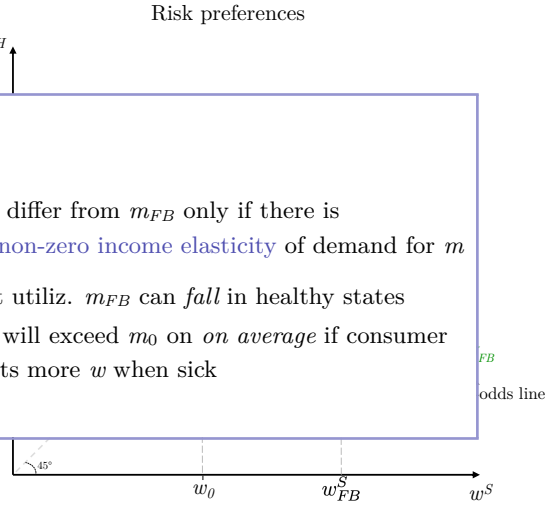

Notice:

- m_0 will differ from m_{FB} only if there is risk & non-zero income elasticity of demand for m
- efficient utiliz. m_{FB} can *fall* in healthy states
  → but will exceed m_0 on *on average* if consumer wants more w when sick

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Model pt. 3 : Feasible insurance contracts

Back in second-best world...

- Insurance contract x lowers consumer price of healthcare to $c(x) \in [0, 1]$
  - ↳ no insurance = null contract x_0 where $c(x_0) = 1$

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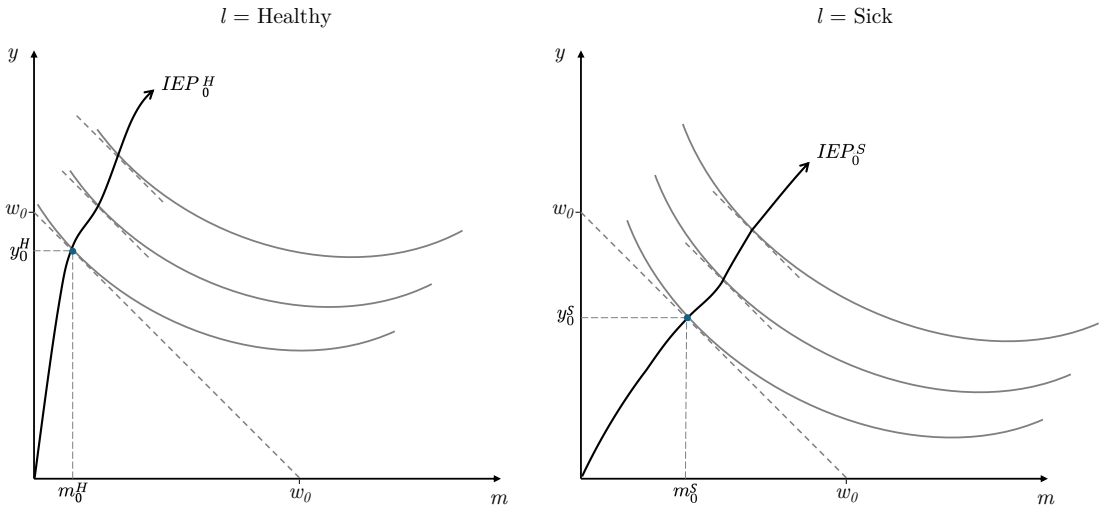
- Consumer solves : $\max_{y,m} \; u(y, m; l) \quad s.t. \quad y + m \cdot c(x) \leqslant w_0 - p$

  $$\Rightarrow m^*(l, x, w_0, p) \quad \text{and} \quad y^*(l, x, w_0, p)$$

- Actuarially fair premium : $\bar{p}(x) = \mathbb{E}_l[(1 - c(x)) \cdot m^*(l, x, w_0, \bar{p}(x))]$

Pic. 3.a : Feasible insurance contracts [full insurance]



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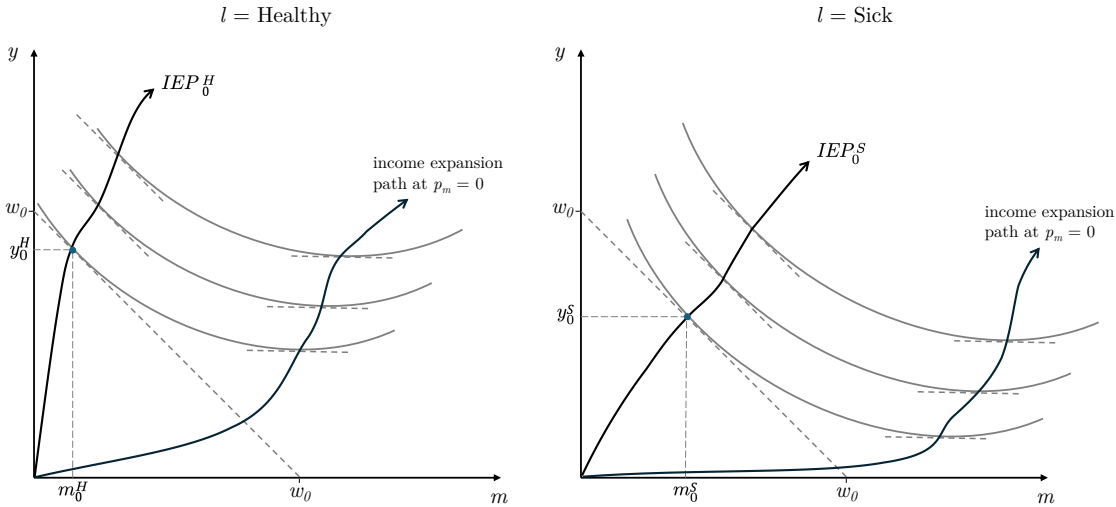

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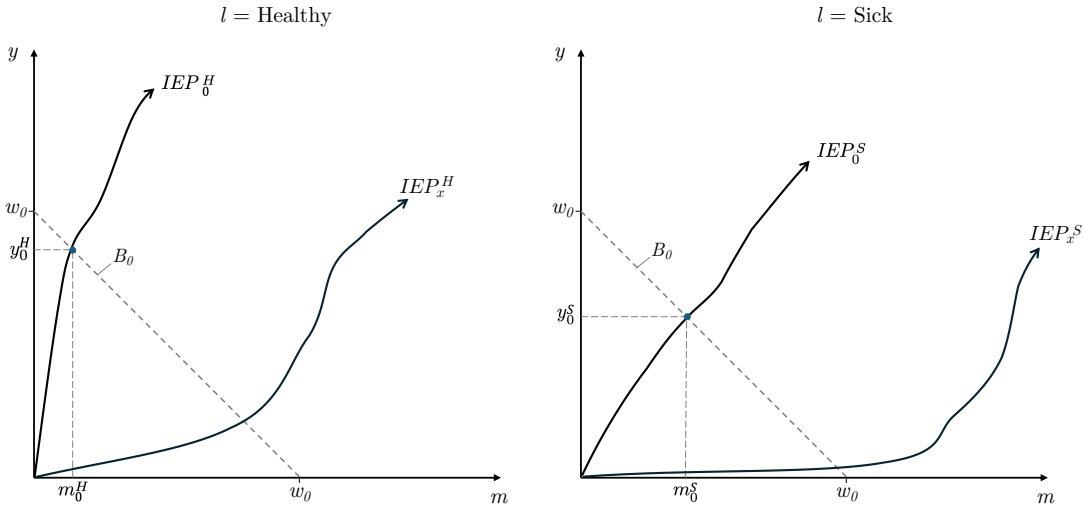

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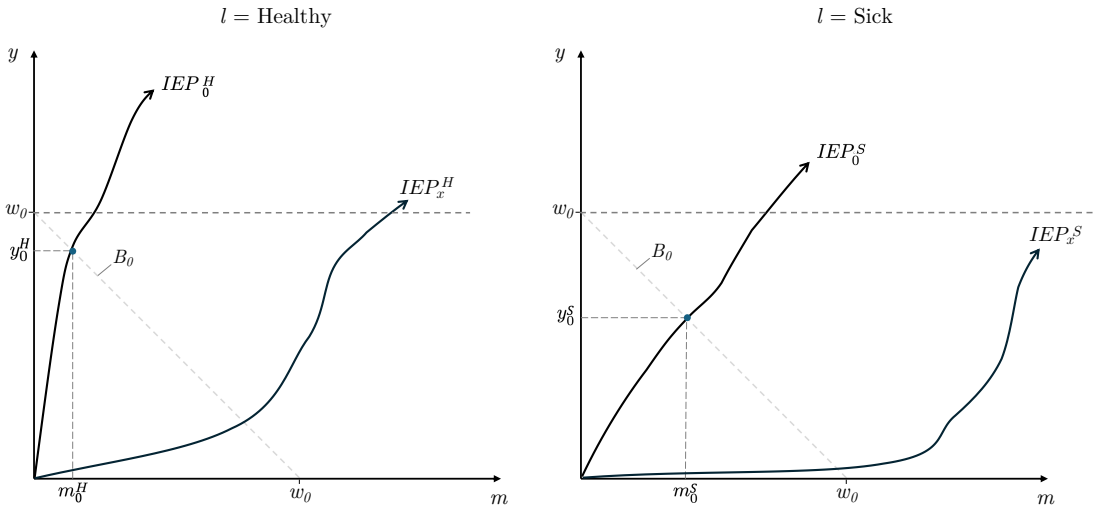

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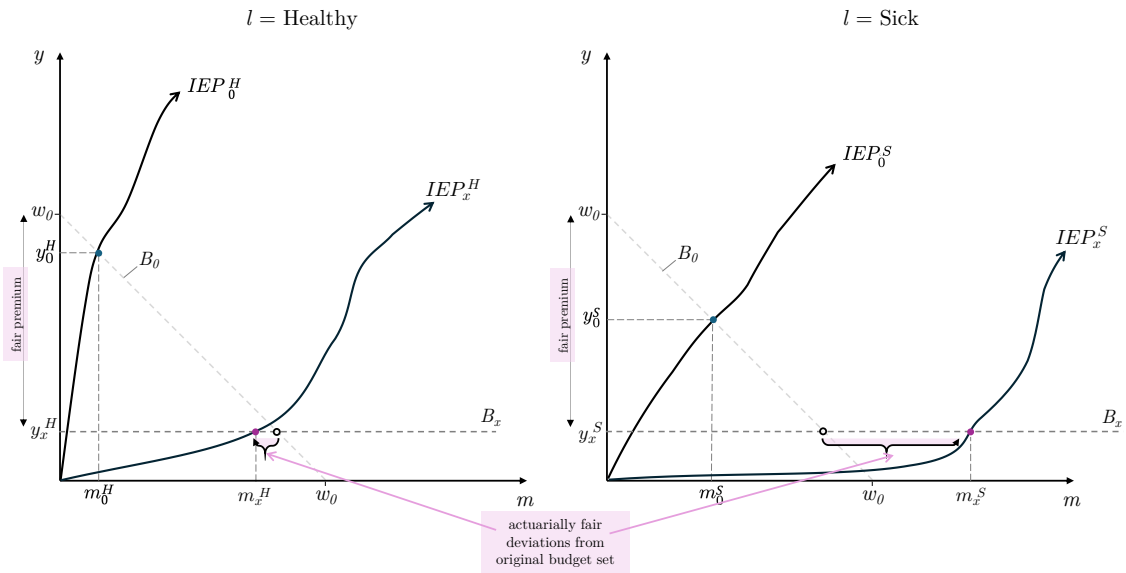
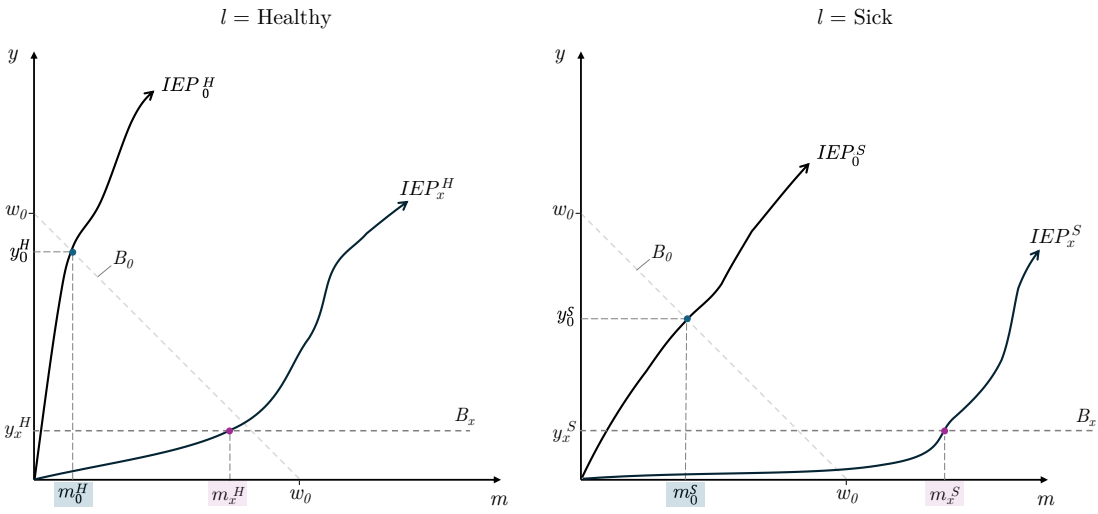


Pic. 3.b : Decomposition of insurance-induced utilization Slutsky



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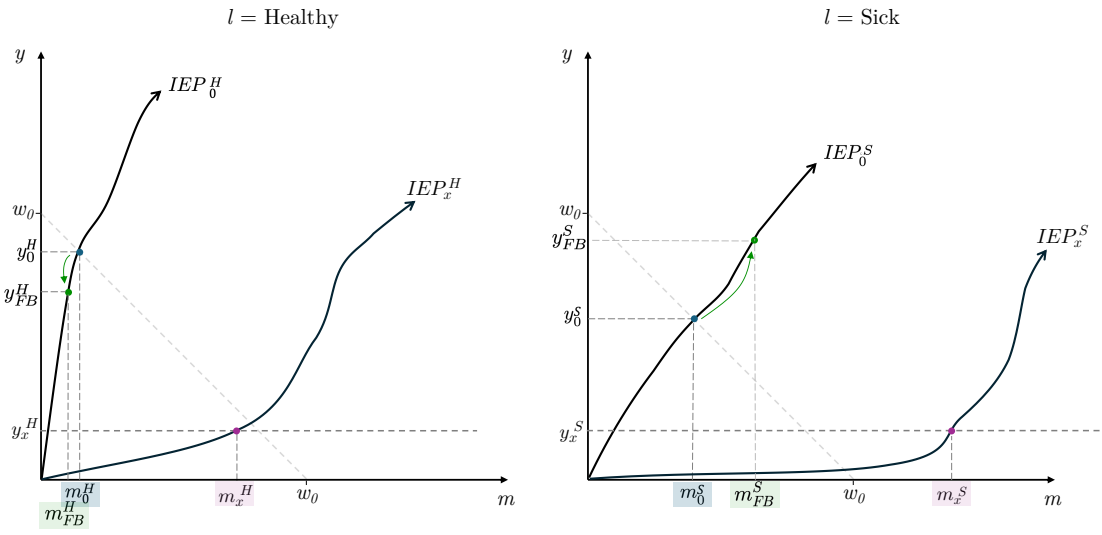

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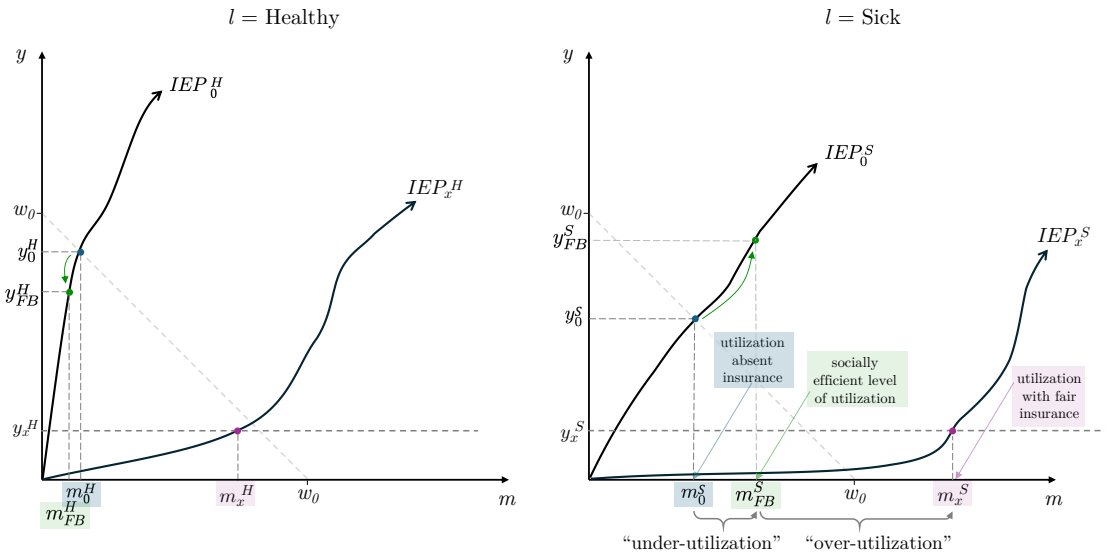

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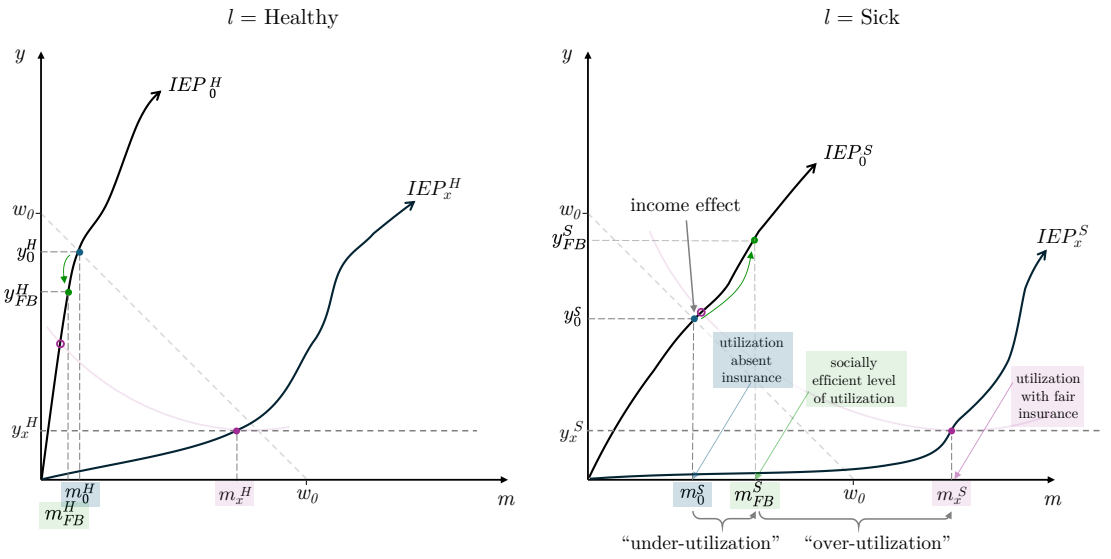

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Model pt. 4 : Welfare

Consumer derives

- expected utility from first-best contract equal to : $U_{FB} = \mathbb{E}_l[v(w^{FB}(l); l)]$
- expected utility from null contract equal to : $U_0 = \mathbb{E}_l[v(\ w_0\ ; l)]$
- expected utility from contract x equal to : $U_x = \mathbb{E}_l[\underbrace{u(y^*(l), m^*(l); l)}_{u^*(l)}]$

Model pt. 4 : Welfare

Consumer derives

- expected utility from first-best contract equal to : $U_{FB} = \mathbb{E}_l[v(w^{FB}(l); l)]$
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  - define $\tilde{w}_x(l) \equiv e(u^*(l); l) =$ "equivalent income"
    $=$ minimum amount of money needed to reach utility level u^* in state l when $p_y = p_m$

Model pt. 4 : Welfare

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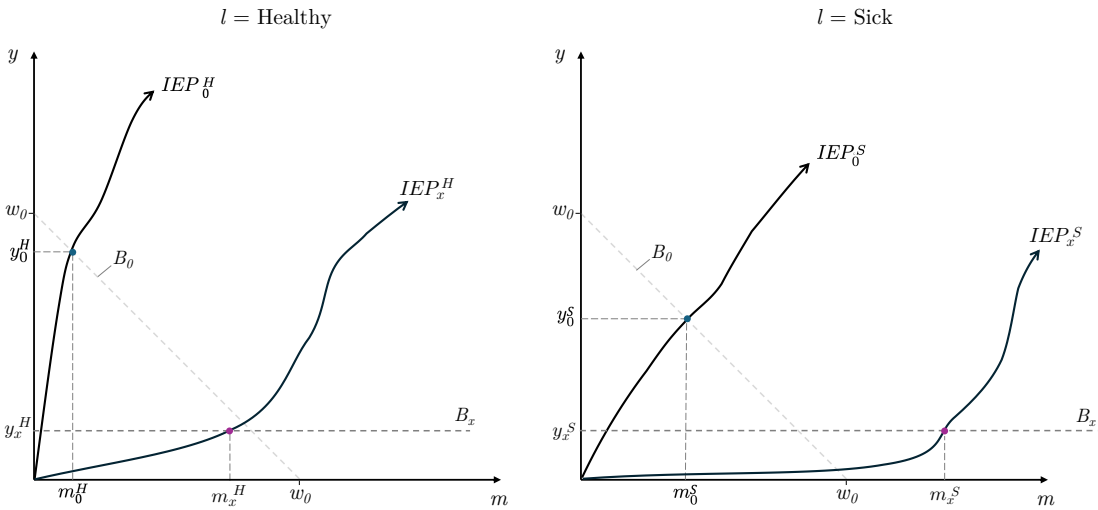
Pic. 4.a : Welfare



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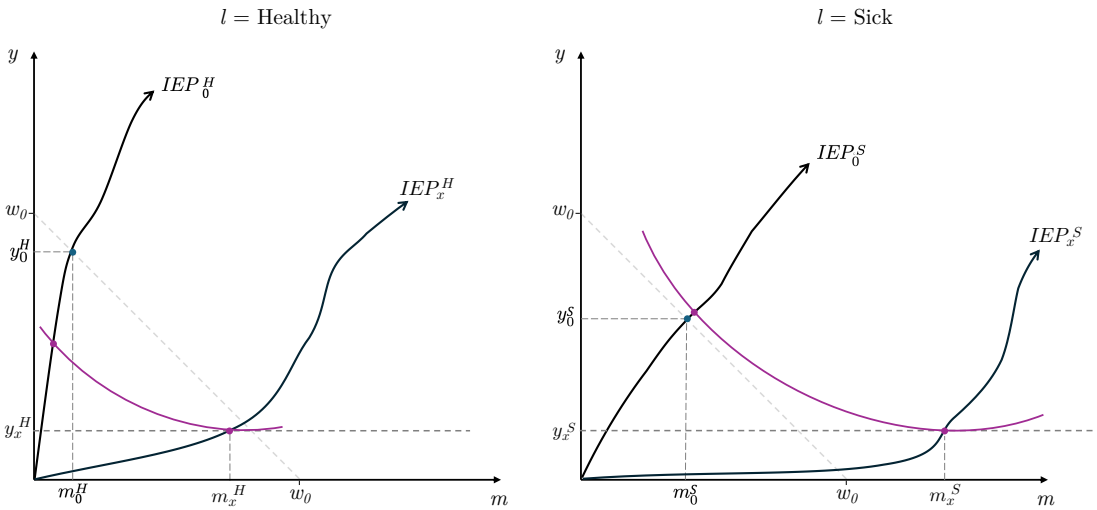

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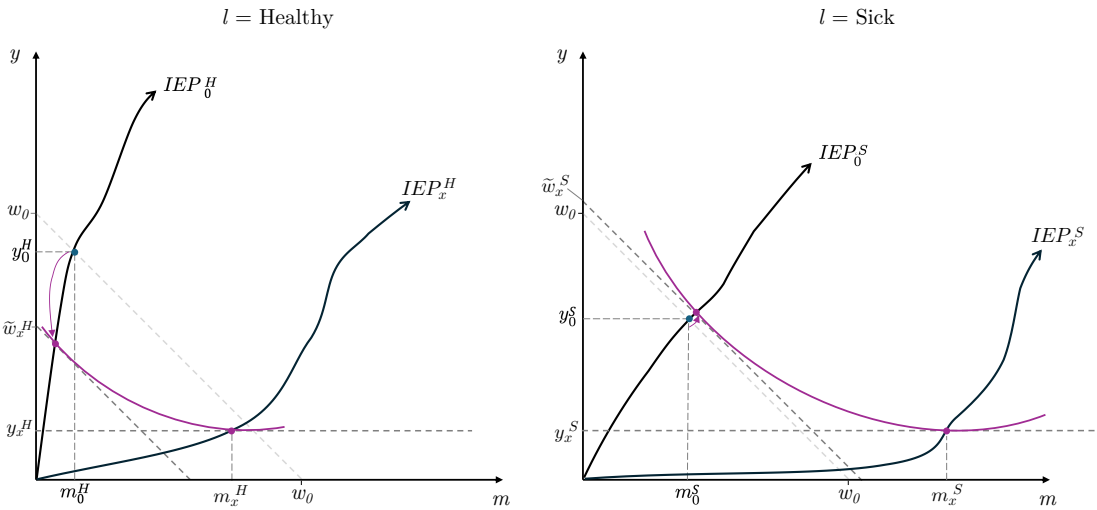

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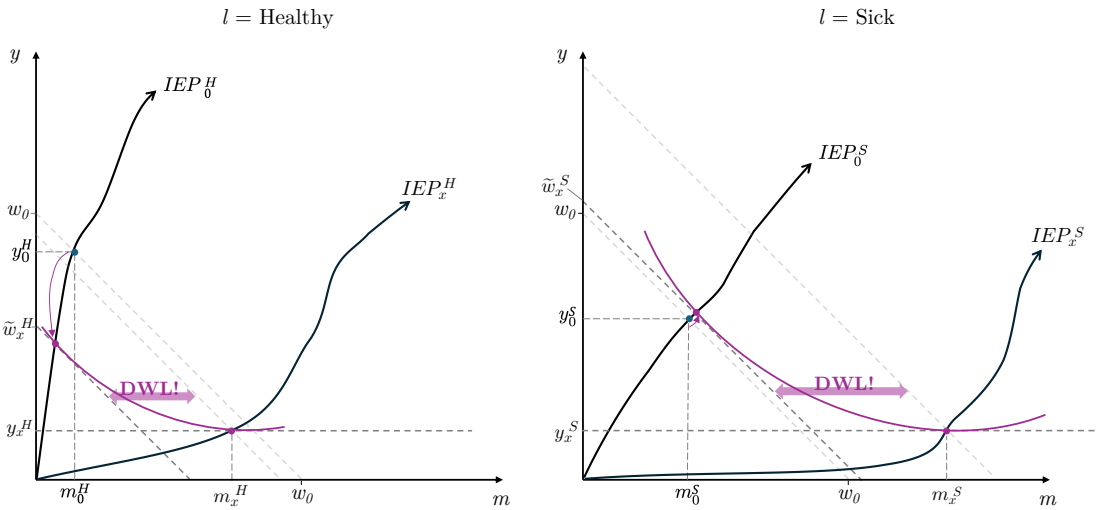

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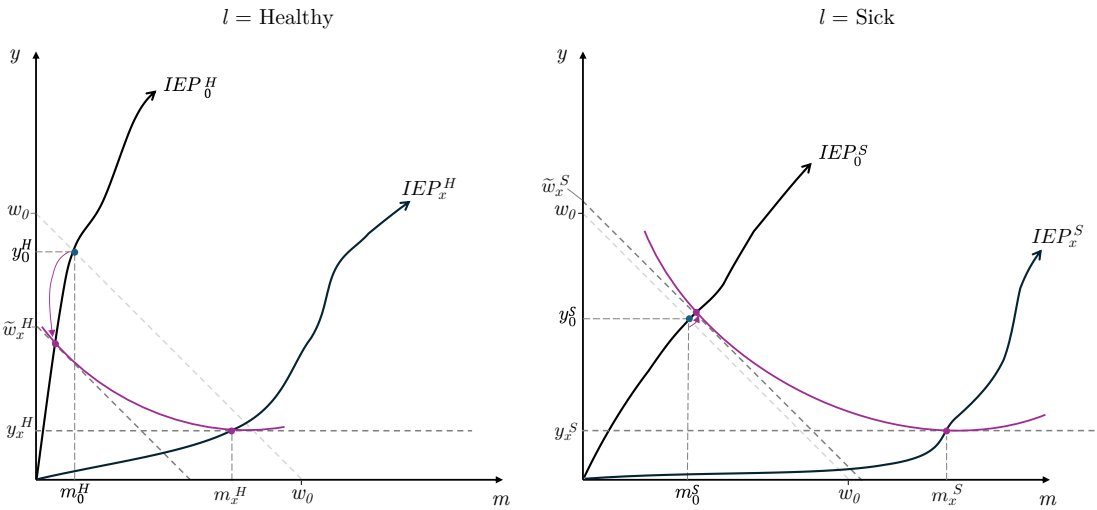

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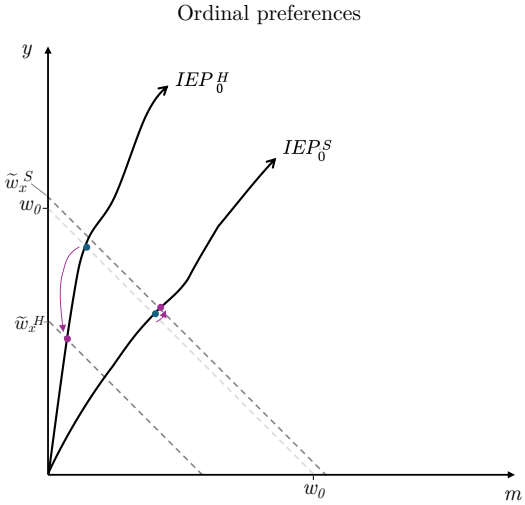

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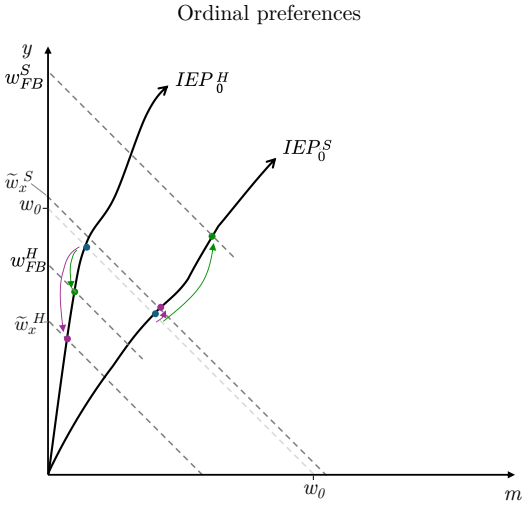

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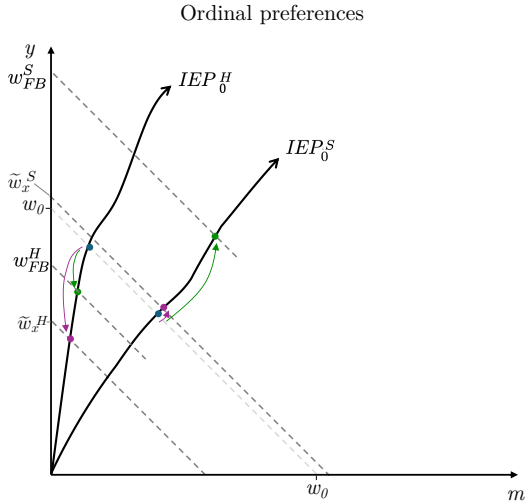

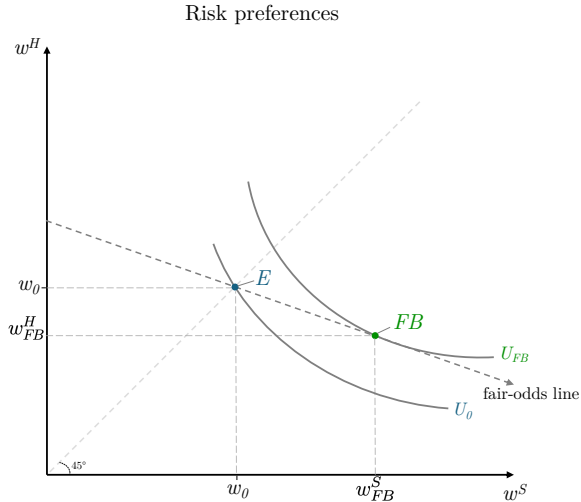

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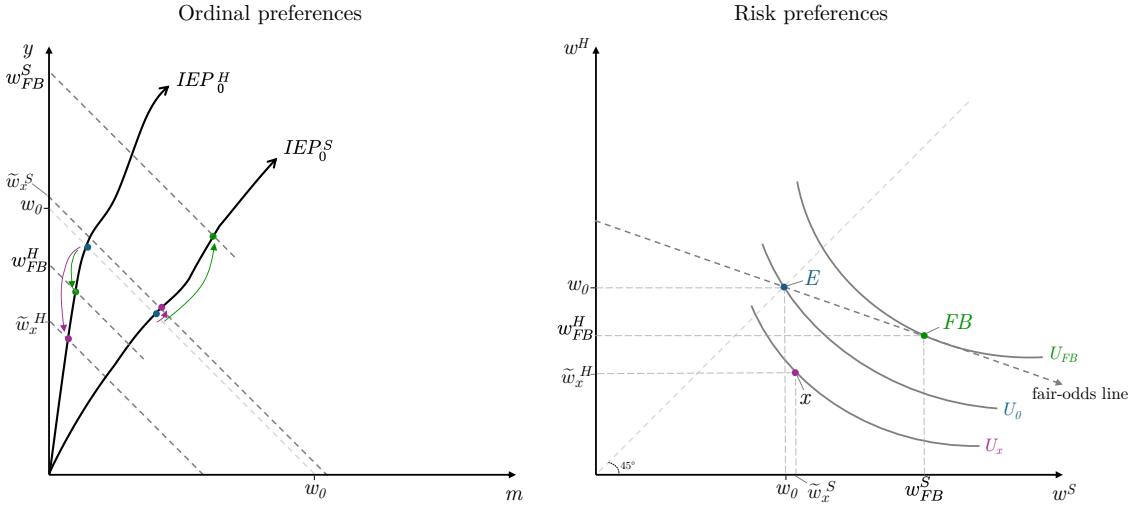
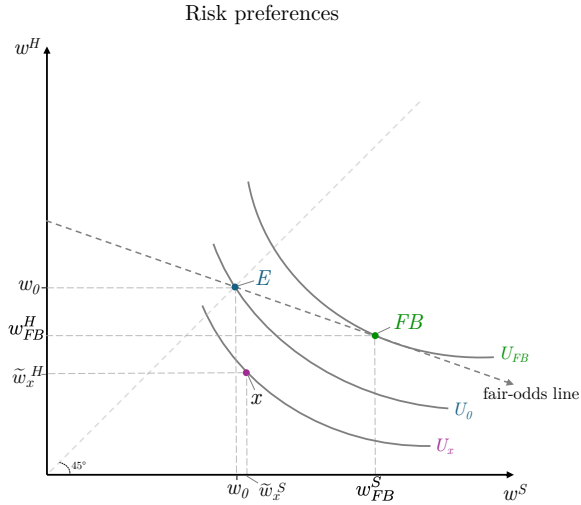
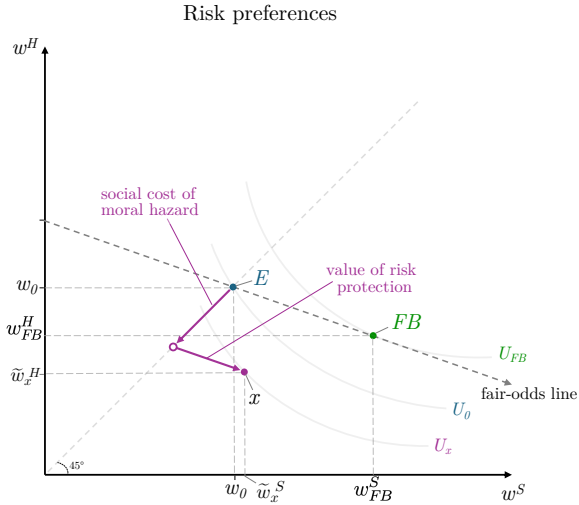


Pic. 4.b : Welfare decomposition



Pic. 4.b : Welfare decomposition

$$V_x = \underbrace{\Psi_x}_{\substack{\text{value of} \\ \text{risk protection}}} - \underbrace{SCMH_x}_{\substack{\text{social cost} \\ \text{of moral hazard}}}$$



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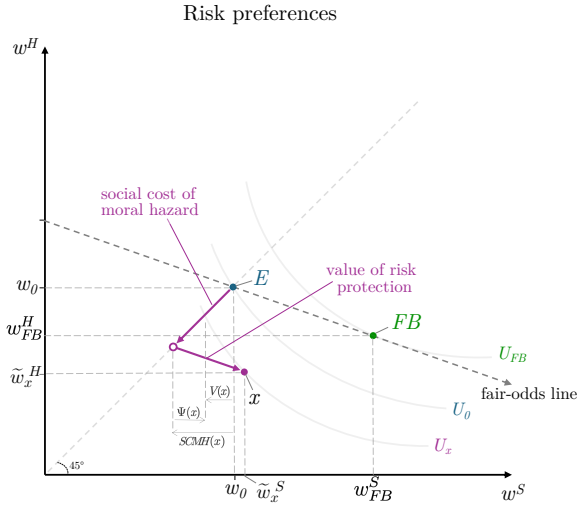

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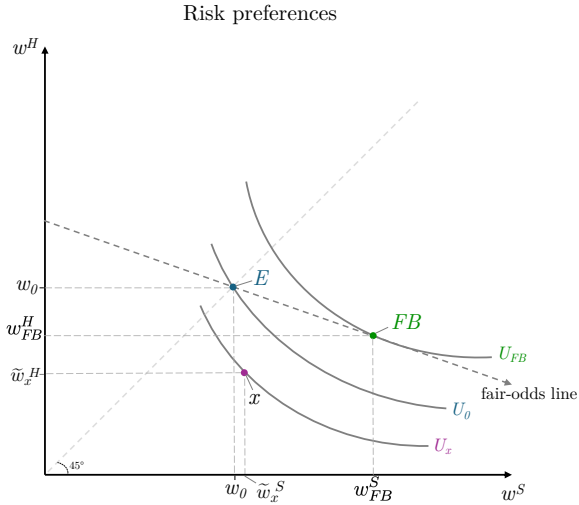
- Counterfactual to consider : x^N
  → prevent utilization response to insurance (hold m fixed at m_0)
  ↳ movement in both directions!
  ↳ still have DWL

- Research question : is it more or less preferred to x?



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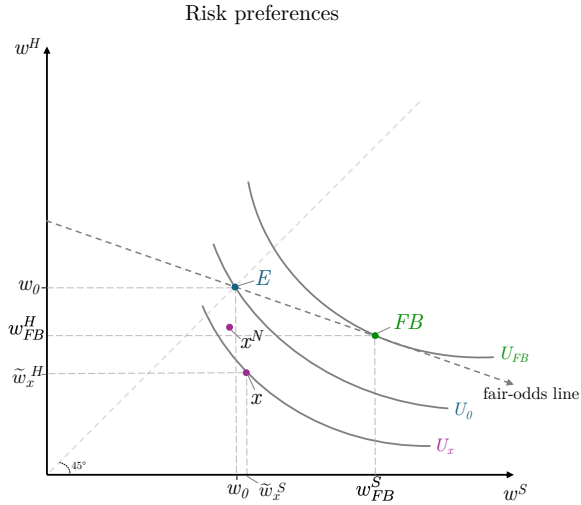

1. Introduction

2. Model

3. Empirical magnitudes

4. Discussion and conclusion

Empirical approach

- Construct population of consumers w/ demographics to match US non-elderly popl
- Apply parameterizations of utility and estimates from three papers:
  - all take form : $u(y, m; l) = -\exp\big(-\psi\,[\,y + b(m; l)\,]\big)$ (b quadratic → linear demand)

Spec.	Source of estimates	Parametrization of $b(m; l)$	Implied demand for healthcare
(1)	Marone and Sabety (2022)	$(m-l) - \frac{1}{2\omega}(m-l)^2$	$l + \omega(1-\bar{c})$
(2)	Einav et al. (2013) – Additive	$(m-l) - \frac{1}{2\omega}(m-l)^2$	$l + \omega(1-\bar{c})$
(3)	Einav et al. (2013) – Multiplicative	$(m-l) - \frac{1}{2\tilde{\omega}l}(m-l)^2 - \frac{\tilde{\omega}l}{2}$	$l + \tilde{\omega}l(1-\bar{c})$
(4)	Ho and Lee (2023)	$(m-l) - \frac{1}{2\tilde{\omega}l}(m-l)^2 - \frac{\tilde{\omega}l}{2}$	$l + \tilde{\omega}l(1-\bar{c})$

⇒ See what is implied about risk protection value of insurance-induced utilization

Results : Decomposition of welfare generated by full insurance

Utility specification	Decomposition of welfare *(avg. fraction of total)* Ψ^N	Ψ^{MH}	$-SCMH$	Relative change in welfare *(avg. across consumers)* Prevent over-utiliz.	Prevent all induced utiliz.
(1) Marone & Sabety 2022					
(2) Einav et al. 2013 *(Addv.)*					
(3) Einav et al. 2013 *(Mult.)*					
(4) Ho & Lee 2023					

Ψ^N = value of risk protection if utilization fixed at uninsured level
Ψ^{MH} = risk protection value of insurance-induced utilization
$SCMH$ = social cost of moral hazard

Utilization

Results : Decomposition of welfare generated by full insurance

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(1) Marone & Sabety 2022	0.94	0.10	-0.04		
(2) Einav et al. 2013 *(Addv.)*	0.93	0.09	-0.02		
(3) Einav et al. 2013 *(Mult.)*	1.03	0.08	-0.11		
(4) Ho & Lee 2023	1.19	0.03	-0.22		

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(2) Einav et al. 2013 *(Addv.)*	0.93	0.09	-0.02	0.02	-0.07
(3) Einav et al. 2013 *(Mult.)*	1.03	0.08	-0.11	0.06	0.02
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Preventing over-utilization only increases average welfare

Utilization

Results : Decomposition of welfare generated by full insurance

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Preventing consumers from changing behavior entirely lowers average welfare

Utilization

1. Introduction

2. Model

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4. Discussion and conclusion

Four implications

1) Parameterization of utility critical for normative implications of insurance-induced utiliz.
   - ↳ income effects in demand for healthcare (more empirical work to do?)
   - ↳ state-dependent marginal indirect utility of income (how much w would people really want when sick in a first best world?)

Four implications

1) Parameterization of utility critical for normative implications of insurance-induced utiliz.
   - ↳ income effects in demand for healthcare (more empirical work to do?)
   - ↳ state-dependent marginal indirect utility of income (how much w would people really want when sick in a first best world?)

2) Size of the utilization response is not a measure of waste
   - ↳ same response can be mostly under- or mostly over-utilization
   - ↳ most under-utilizing consumers : $\Psi^{MH} = 62\%$ of welfare, $SCMH = 1\%$ [spec. (1)]

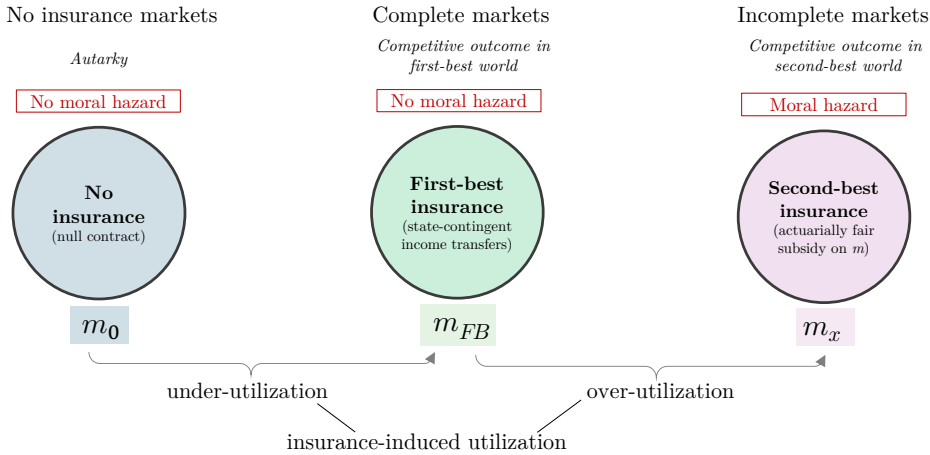
Four implications

3) In centrally planned health insurance, target the **right** level of utilization: m_{FB} not m_0
   - ↳ key thought experiment :
     - ✗ would consumer have been willing to pay for this absent insurance?
     - ✓ would consumer have been willing to pay for this under first-best income?
   - ↳ in states with low probability and/or high marginal indirect utility of income, under-utilization likely absent insurance → low (or zero) optimal cost-sharing

4) Unlike with **selection**, no reason to think govt has an advantage over private firms in realm of **moral hazard** and optimal insurance design
   - ↳ key market failure is ex-post asymmetric info ; govt has no magic power here
   - ↳ planner should learn from competitive private markets if and where they exist
     → some relevant clues: critical illness insurance, hospitalization insurance

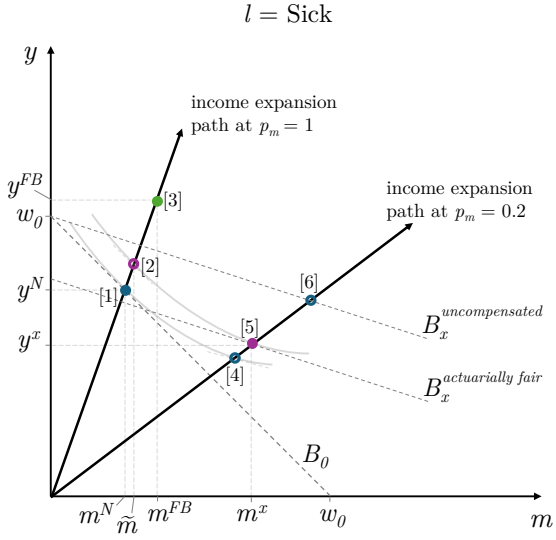
Conclusion

Insurance-induced healthcare utilization may be—and is likely to be—an important part of the mechanism through which second-best insurance provides risk protection



Slutsky income vs substitution effects

Back



[1] → [4] → [6] → [5]

Hicksian substitution effect | Hicksian income effect | Premium income effect

[1] → [3] → [5]

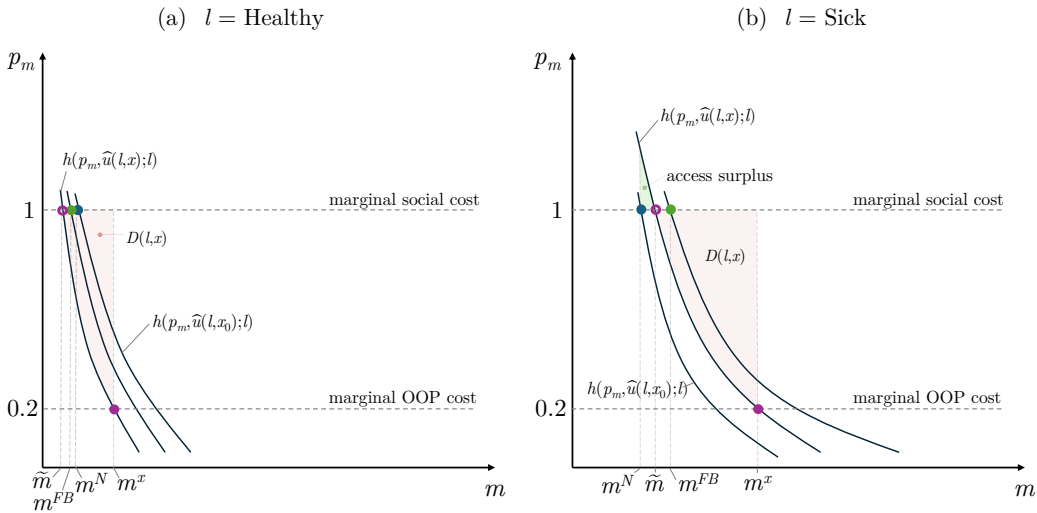
Under-utilization | Over-utilization

[1] → [2] → [5]

Equivalent income effect | Equivalent substitution effect

Compensated demand curves for healthcare

Back



Decomposition of healthcare utilization (full insurance)

Back

Utility specification	Share of total utilization *(avg. across consumers)*			Annual utilization *(avg. across consumers)*		
	Non-induced utiliz.	Under-utiliz.	Over-utiliz.	Non-induced utiliz.	Under-utiliz.	Over-utiliz.
(1) Marone & Sabety 2022	0.81	<0.01	0.18	$8,276	$86	$1,348
(2) Einav et al. 2013 *(Addv.)*	0.81	<0.01	0.18	$4,512	$11	$1,142
(3) Einav et al. 2013 *(Mult.)*	0.80	<0.01	0.19	$3,433	$24	$862
(4) Ho & Lee 2023	0.85	<0.01	0.14	$6,576	$32	$1,147