

The Risk Protection Value of “Moral Hazard”

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Definition

- Classic empirical result in health economics :
Higher coverage health insurance causes greater consumption of healthcare

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⇒ The risk protection value of “moral hazard”

=

The risk protection value of moral hazard utilization

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The risk protection value of the ability to change behavior in response to insurance

Motivation

- ★ Classic insight from optimal insurance literature : in a **second-best** world,
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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- can move resources (income) without distorting incentives ($MRS=MRT$)
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second best

asymmetric information

- **indemnity contracts**
("makes you whole" for covered perils)
- can only distort prices (incentives)
($MRS \neq MRT$)
- which might also change behavior
↔ **income + subs effects**

Research questions and answers

- (i) Can moral hazard utilization be socially valuable in health insurance?
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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 health arising from the Medicaid-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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▶ Yes, because it facilitates risk protection

→ intuition : actuarially fair price reduction shifts real income across states

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(iii) Quantitatively, to what extent?

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▶ 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 moral hazard utilization

→ prohibiting moral hazard 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 $\neq$ larger cost of distorted incentives
- Work highlighting other reasons moral hazard utilization may be valuable (Baicker et al 2015 [internalities/info frictions]; Chernen 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 moral hazard utiliz. in health insurance (e.g., Pauly 1969; Manning et al 1987; Feldman Dowd 1991; Finkelstein Hendren Luttmer 2019)
 - ▶ here : show (and quantify) how moral hazard utiliz. can enter *both* positively and negatively

1. Introduction
2. Model
3. Empirical magnitudes
4. Discussion and conclusion

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Model outline

Math

- 1** Consumers
- 2** First-best benchmark
- 3** Feasible insurance contracts
- 4** Welfare

Pictures

- 1.a Ordinal preferences
- 1.b Risk preferences
- 2.a First-best allocations
- 2.b Change in behavior under first best
- 3.a Moral hazard utilization
- 3.b Decomposition of utilization
- 4.a Overall
- 4.b Decomposition of welfare

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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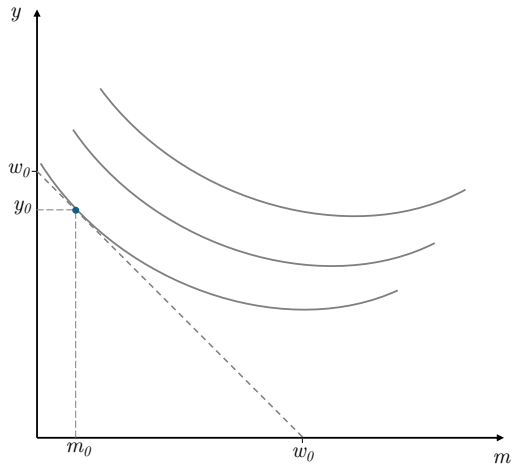
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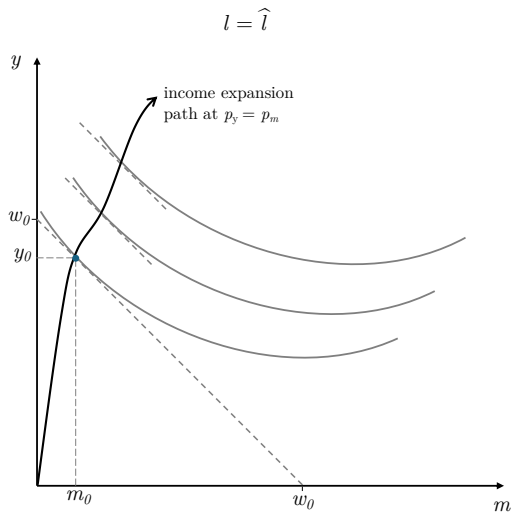
- Units of y and m set such that relative market price (MRT) is 1
- Consumer faces **risk** over her health state $l \sim F \rightarrow$ and thus, her tastes for (y, m)
- Consumer endowed with initial resources $w_0 \rightarrow$ same in all states
- **Information** : F commonly known, realization l private to consumer
 - ↳ non-verifiable health status is singular market failure $\rightarrow$ no selection, just moral hazard

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

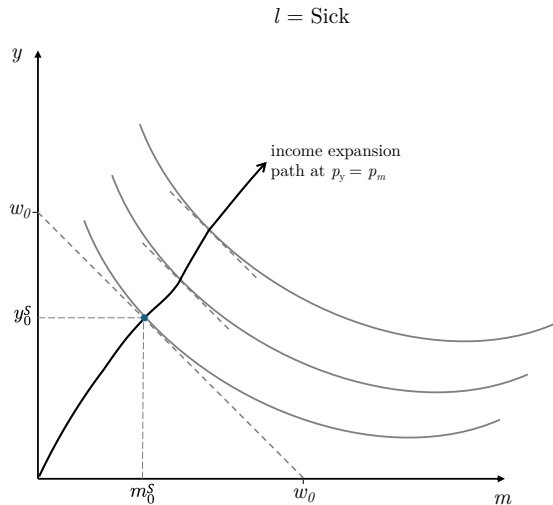
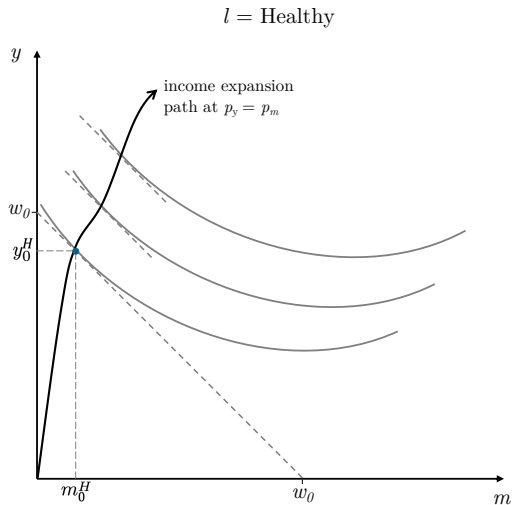
$$l = \hat{l}$$



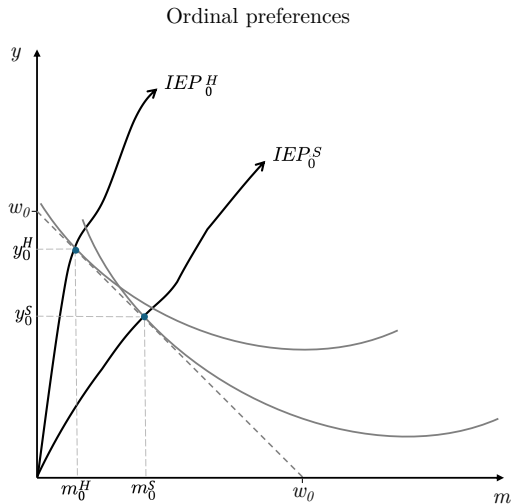
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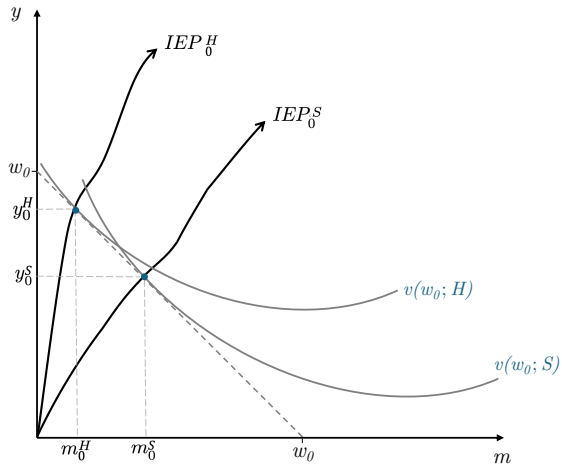
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$$\max_{y, m} u(y, m; l) \quad s.t. \quad y + m \leq w_0$$

Pic. 1.b : Consumer's risk preferences

Ordinal preferences

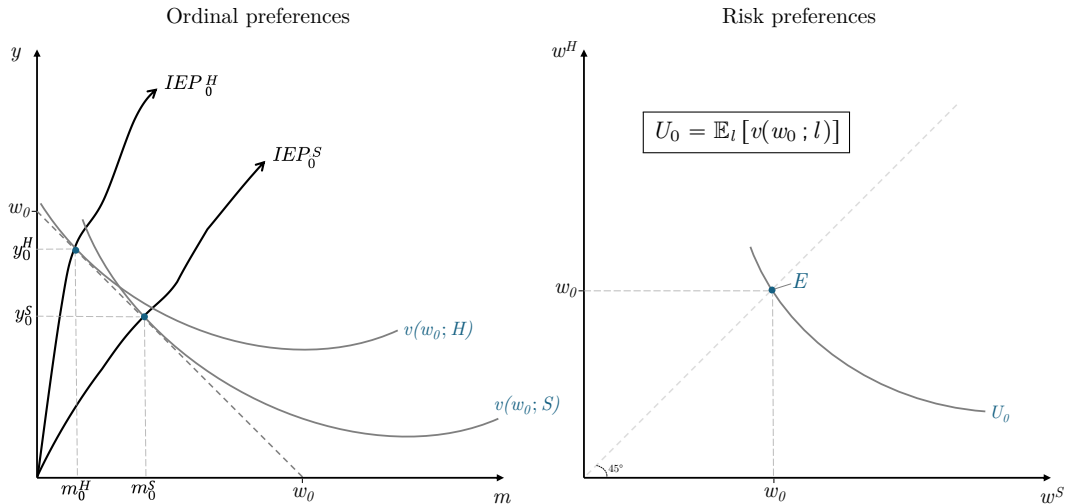


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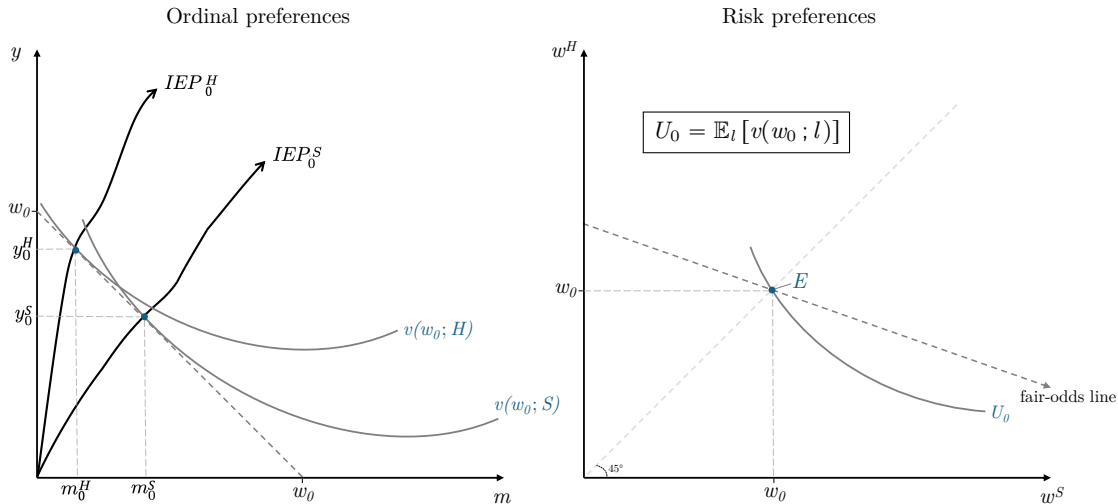
$$= v(w_0; l)$$

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

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2 First-best benchmark

3 Feasible insurance contracts

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1.b Risk preferences

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2.b Change in behavior under first best

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3.b Decomposition of utilization

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Model pt. 2 : First-best benchmark

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

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

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



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

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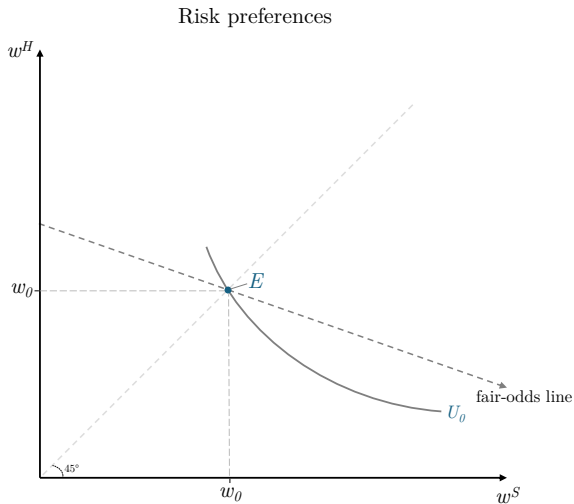
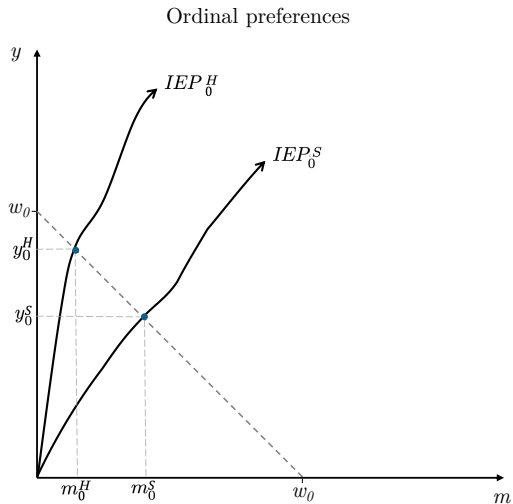
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$$\Longleftrightarrow$$

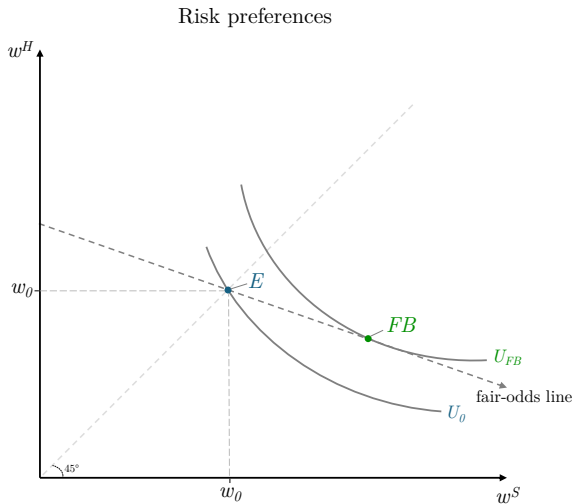
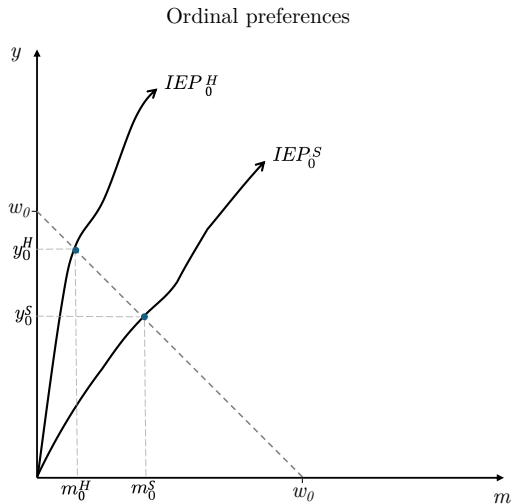
$$\max_{y(l), m(l)} \mathbb{E}_l[u(y(l), m(l); l)] \quad \text{s.t.} \quad \mathbb{E}_l[y(l) + m(l)] \leq w_0$$

- Solution yields **first-best allocations** in each state : $w^{FB}(l) = y^{FB}(l) + m^{FB}(l)$
- ⇒ Define $m^{FB}(l)$ to be the socially efficient level of healthcare utilization

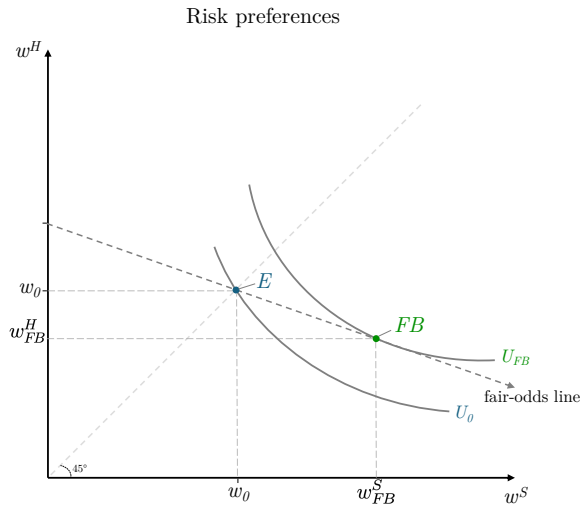
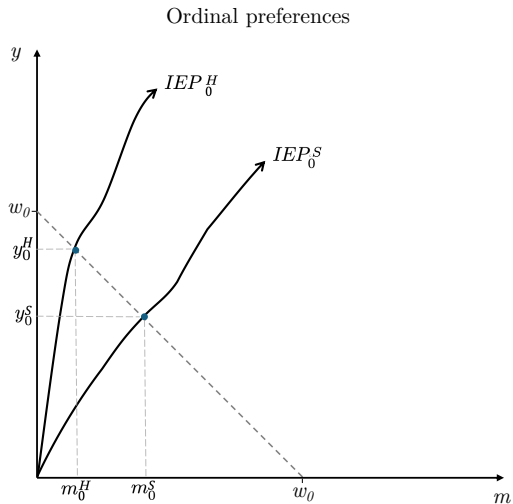
Pic. 2.a : First-best allocations



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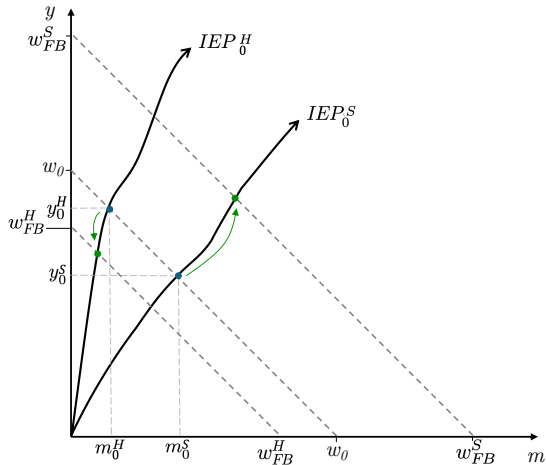


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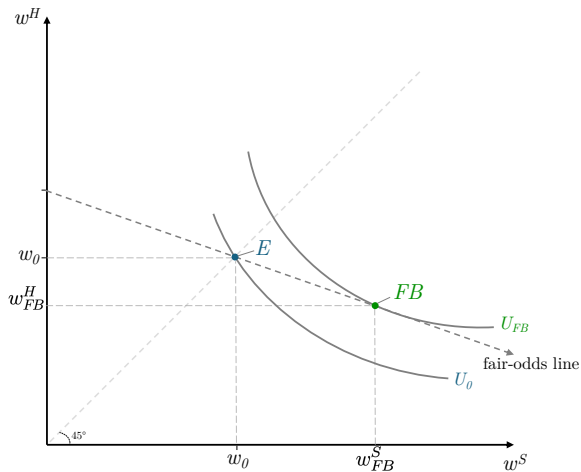


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Ordinal preferences

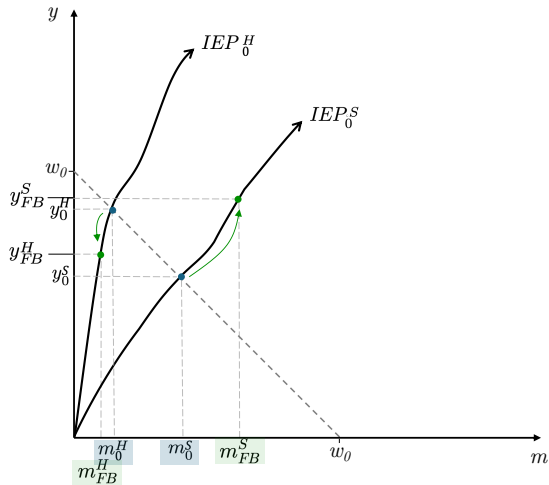


Risk preferences

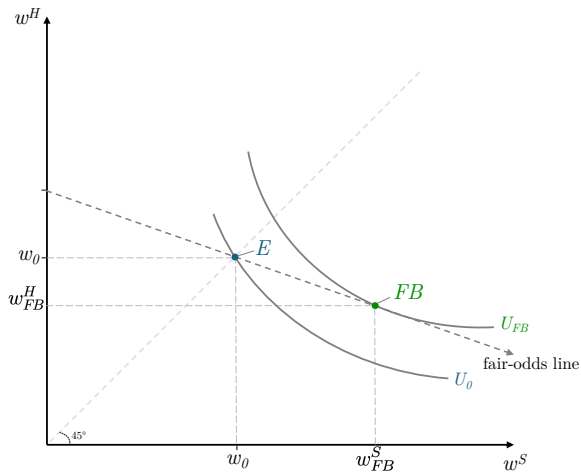


Pic. 2.b : Change in behavior under first best

Ordinal preferences

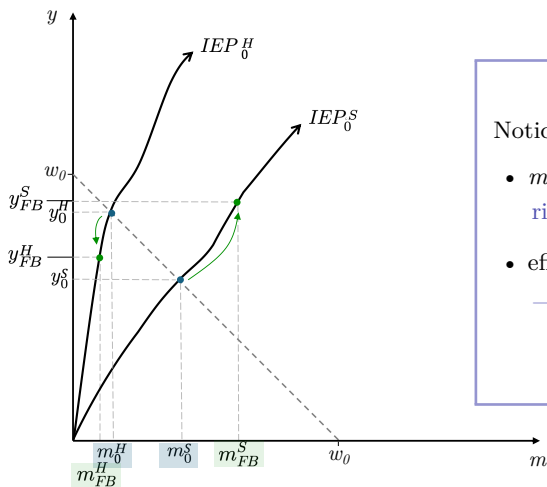


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Risk preferences

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

FB
odds line

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Model pt. 3 : Feasible insurance contracts

Back in second-best world...

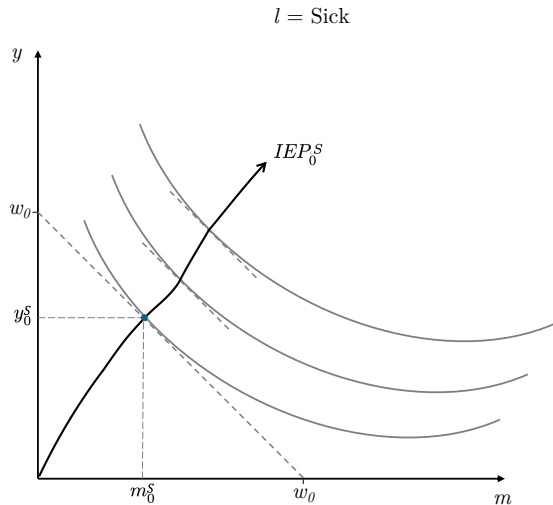
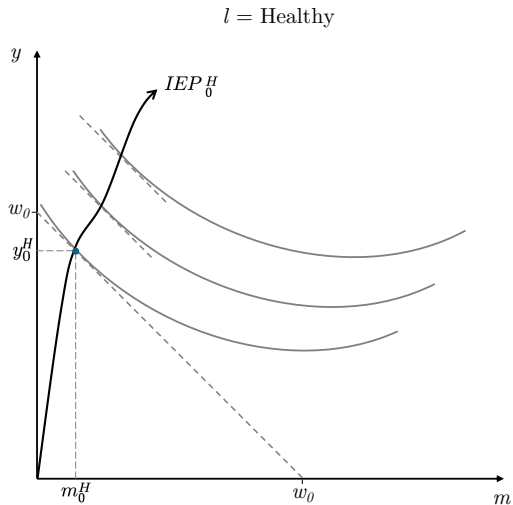
- Insurance contract x lowers consumer price of healthcare to $c(x) \in [0, 1]$
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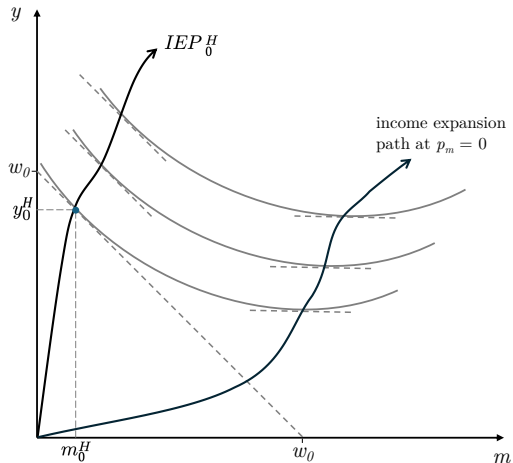
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- Consumer solves : $\max_{y, m} u(y, m; l) \quad s.t. \quad y + m \cdot c(x) \leq w_0 - p$
 $\Rightarrow m^*(l, x, w_0, p) \quad \text{and} \quad y^*(l, x, w_0, p)$
- Actuarially fair premium : $\bar{p}(x) = \mathbb{E}_l[(1 - c(x)) \cdot m^*(l, x, w_0, \bar{p}(x))]$

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

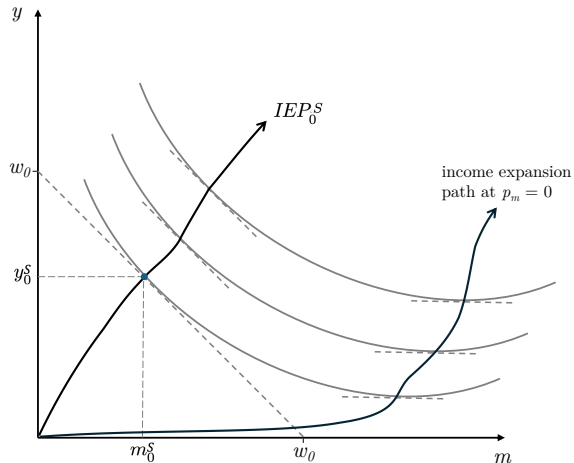


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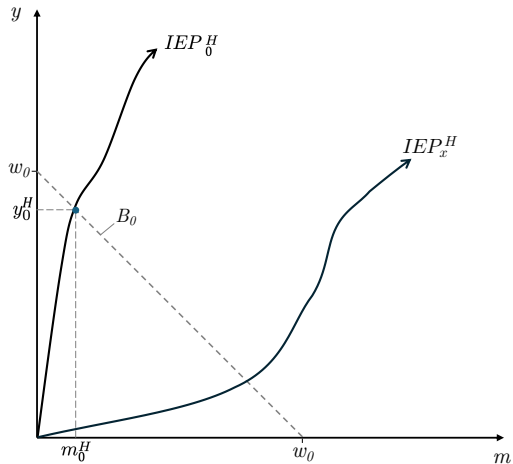


$l = \text{Sick}$

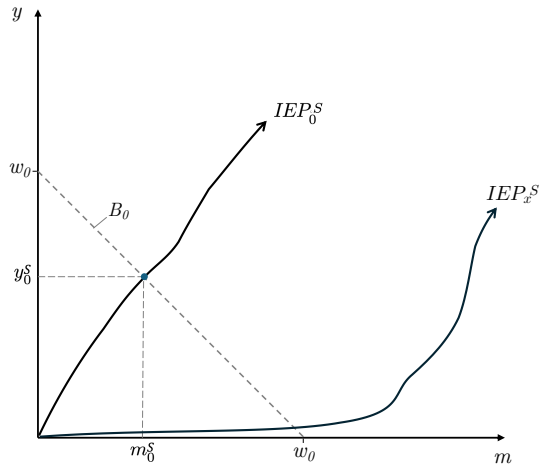


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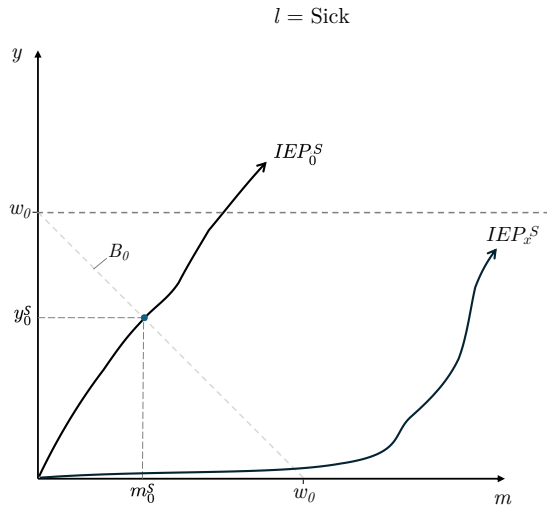
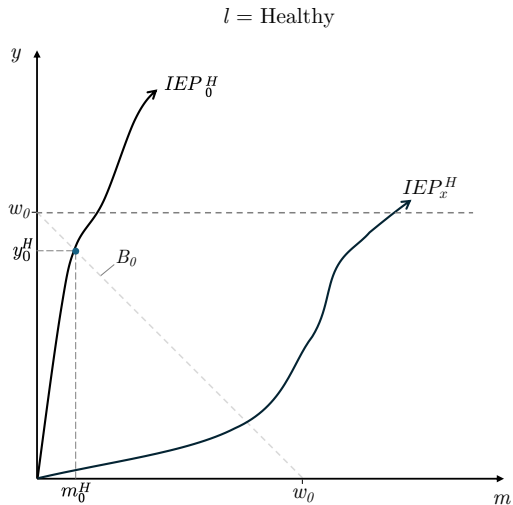
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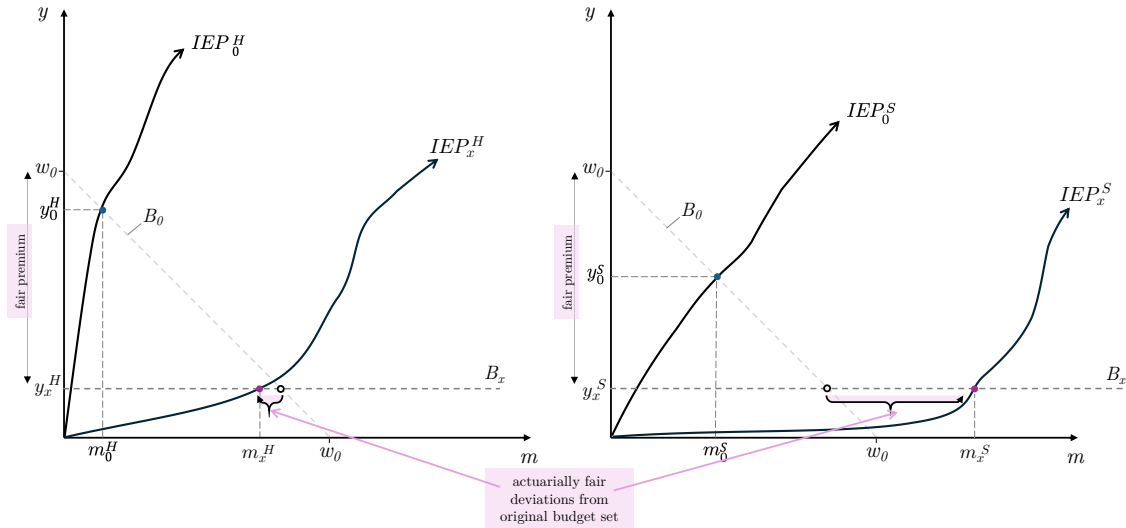
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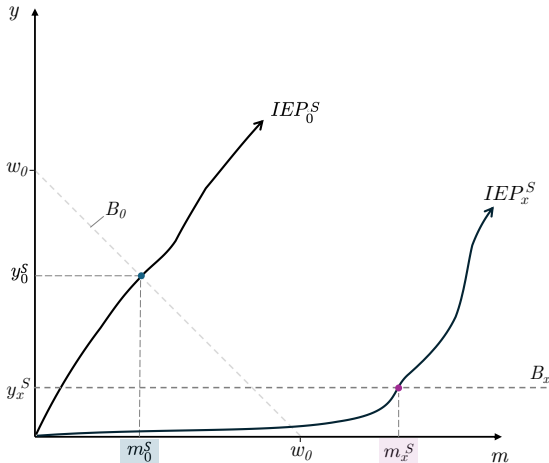


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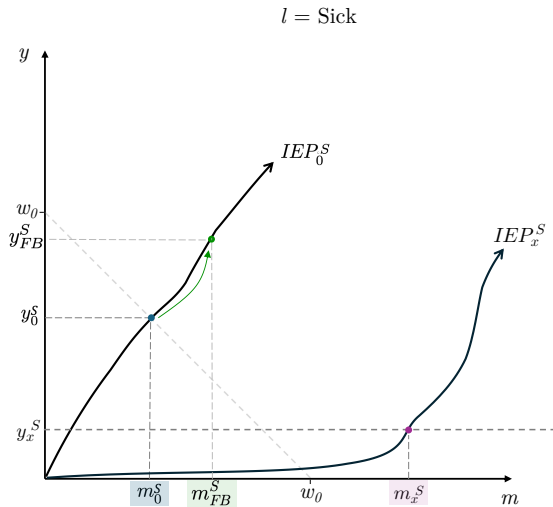
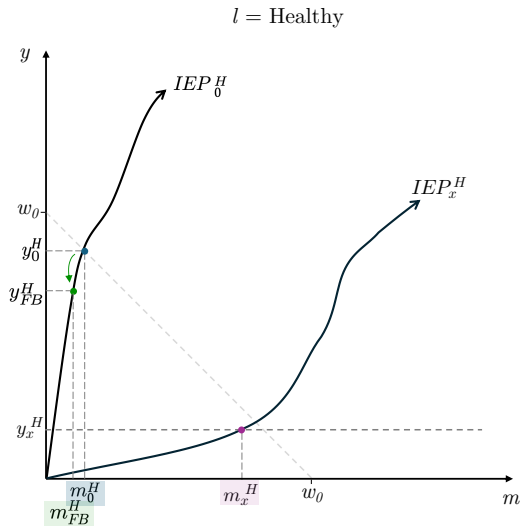
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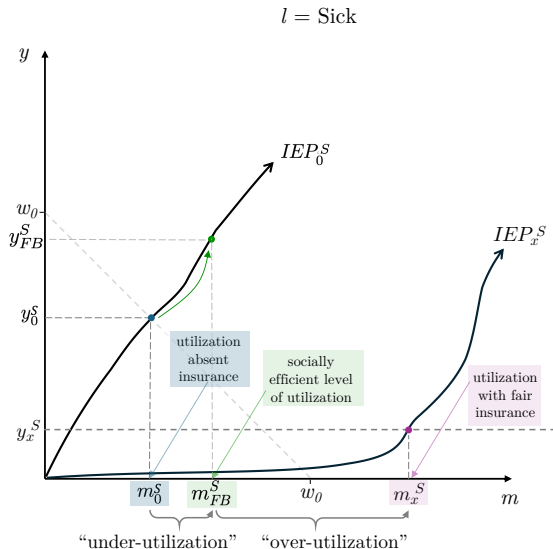
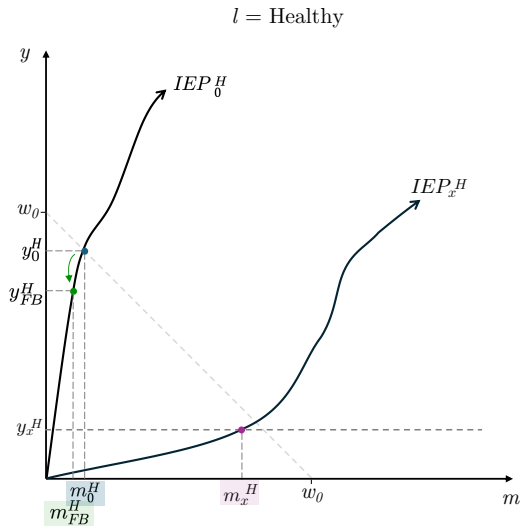


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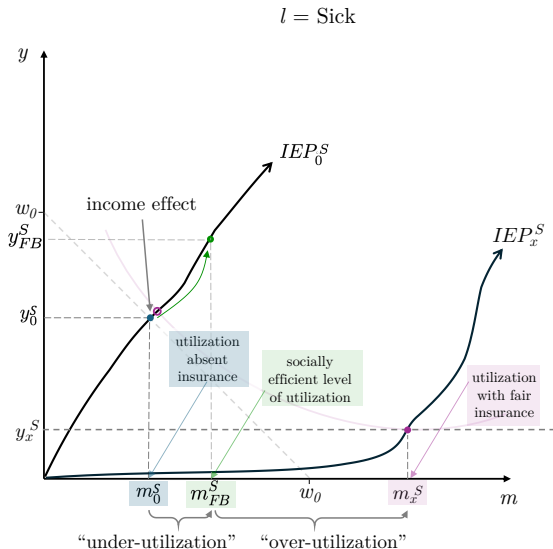
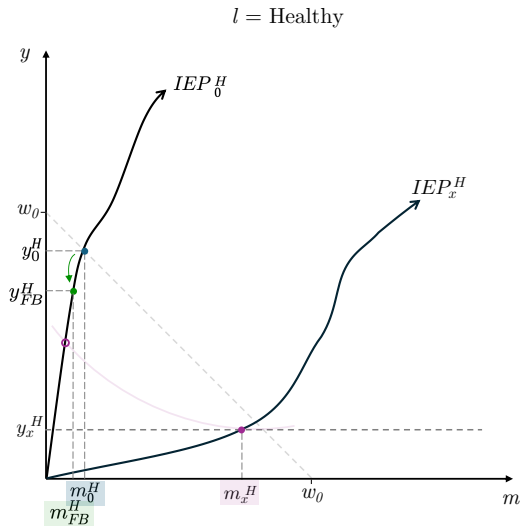
Pic. 3.b : Decomposition of moral hazard utilization Slutsky



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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 : $U_x = \mathbb{E}_l[\underbrace{u(y^*(l), m^*(l); l)}_{u^*(l)}]$

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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

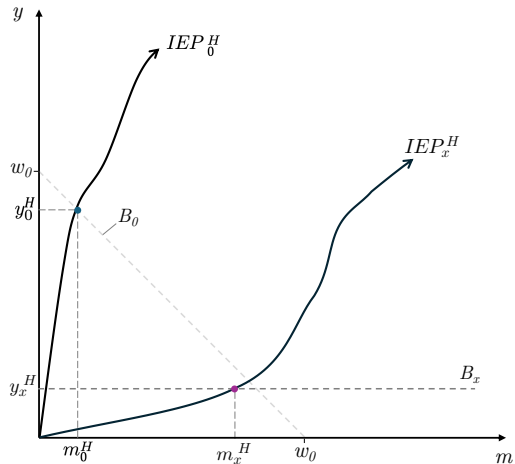
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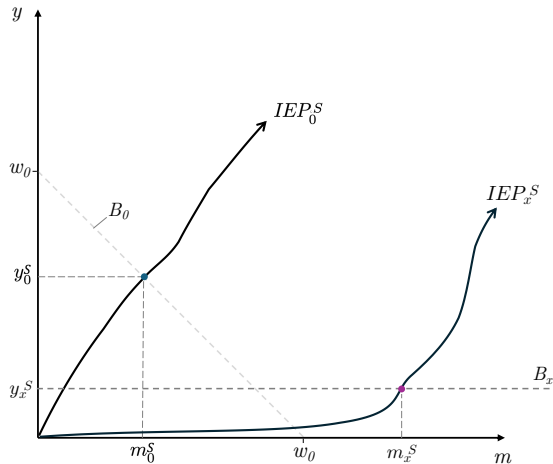
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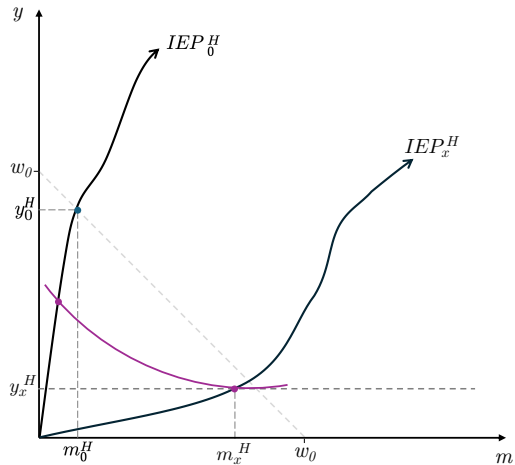


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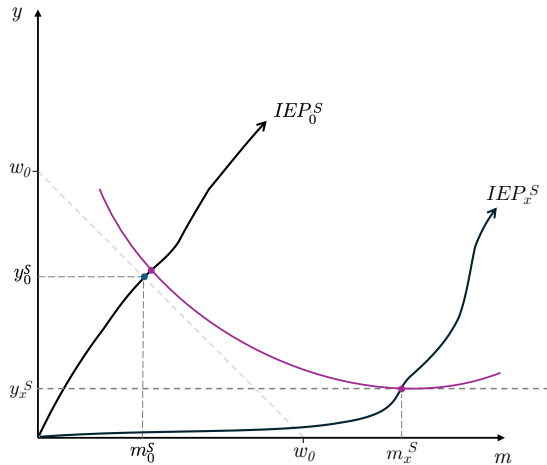


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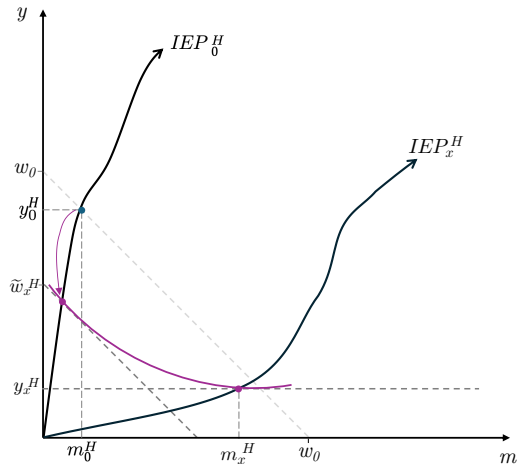


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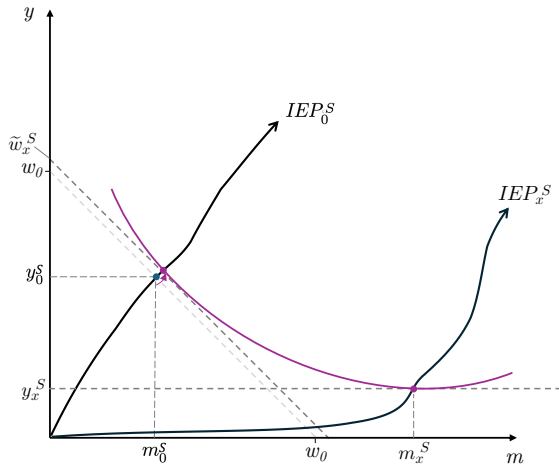


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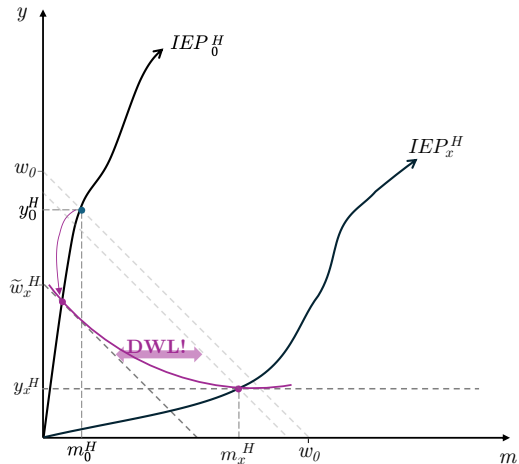


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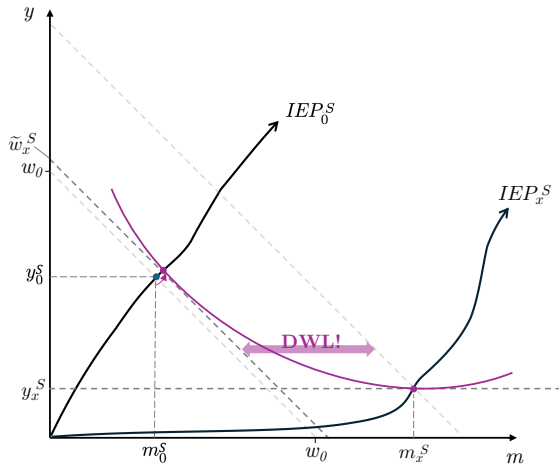


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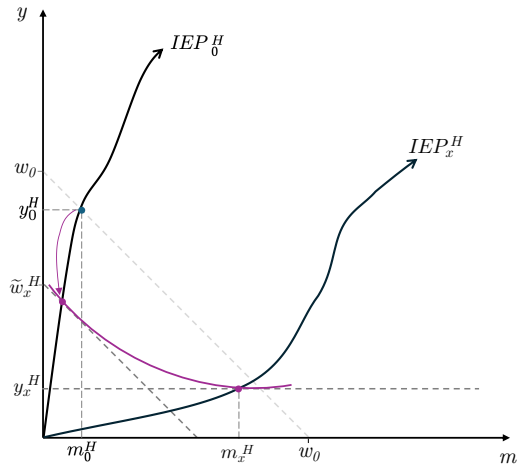


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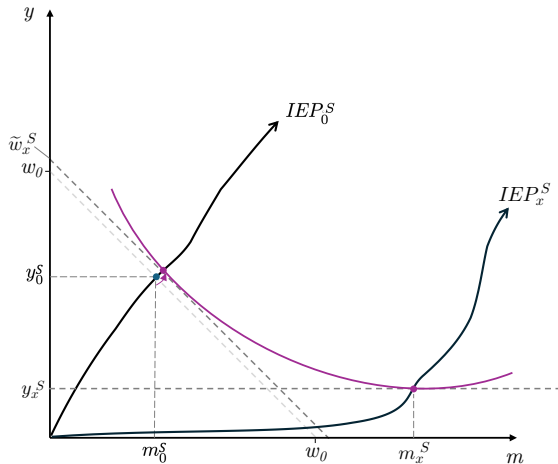


Pic. 4.a : Welfare

$l = \text{Healthy}$

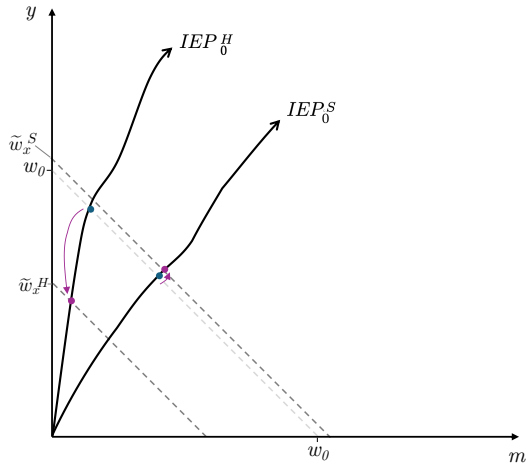


$l = \text{Sick}$



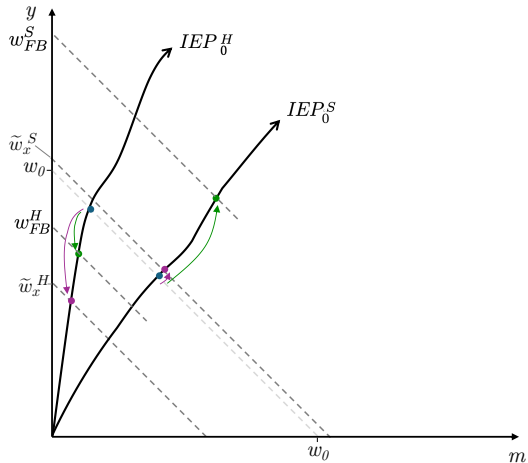
Pic. 4.a : Welfare

Ordinal preferences



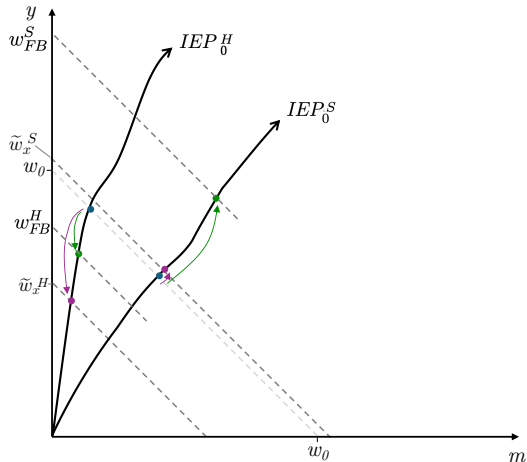
Pic. 4.a : Welfare

Ordinal preferences

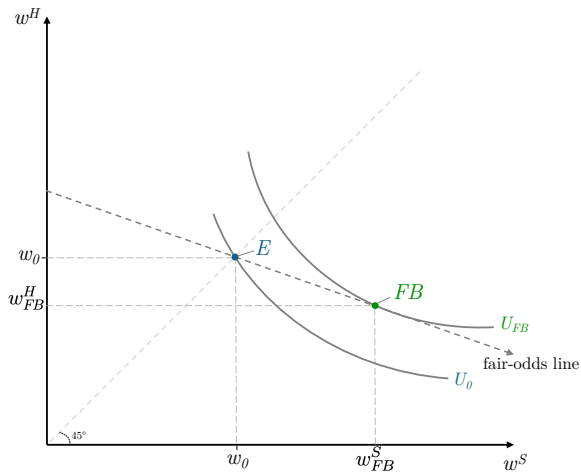


Pic. 4.a : Welfare

Ordinal preferences

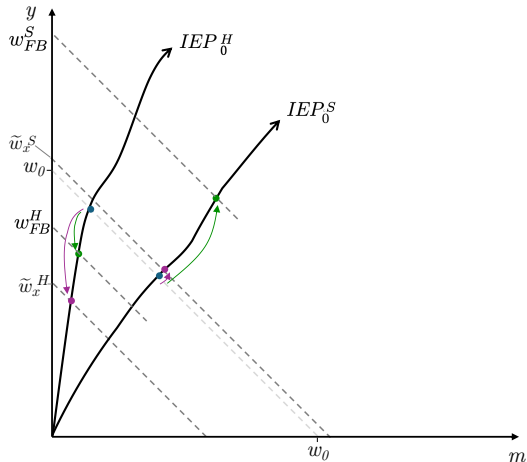


Risk preferences

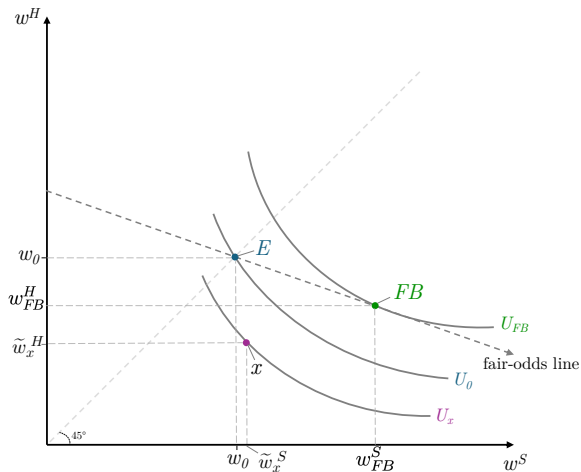


Pic. 4.a : Welfare

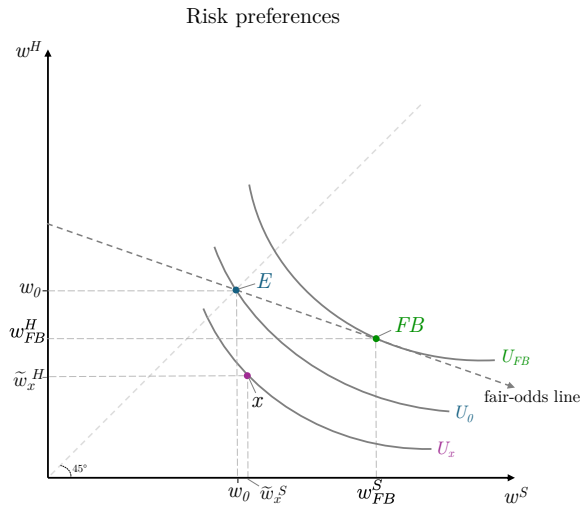
Ordinal preferences



Risk preferences

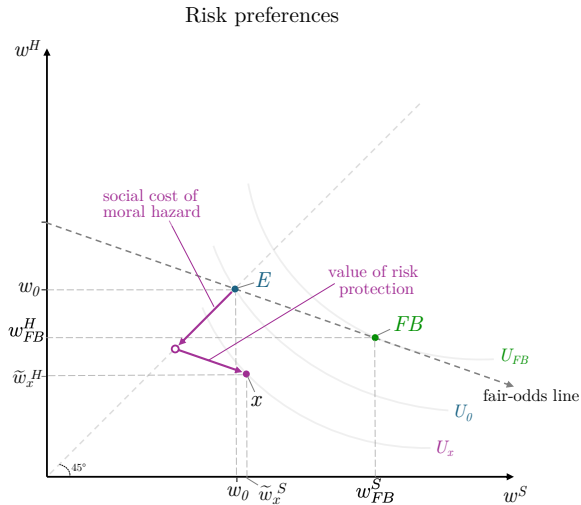


Pic. 4.b : Welfare decomposition



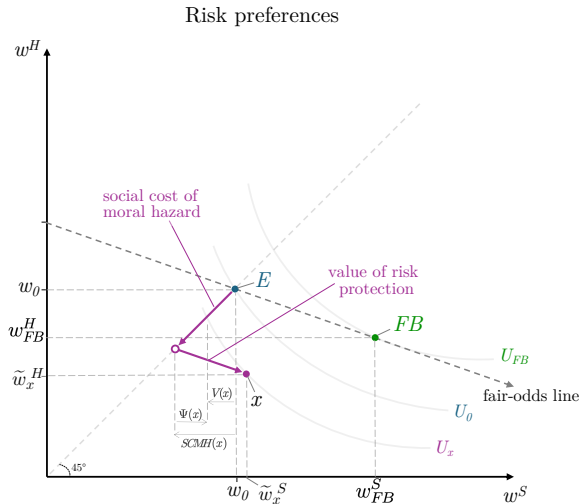
Pic. 4.b : Welfare decomposition

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



Pic. 4.b : Welfare decomposition

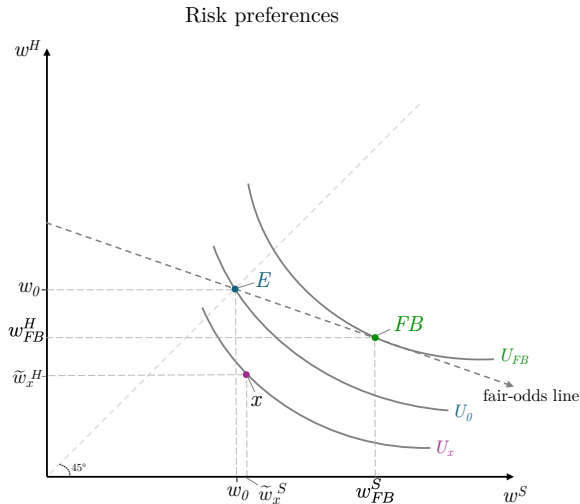
$$V_x = \underbrace{\Psi_x}_{\text{value of risk protection}} - \underbrace{SCMH_x}_{\text{social cost of moral hazard}}$$



Pic. 4.b : Welfare decomposition

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

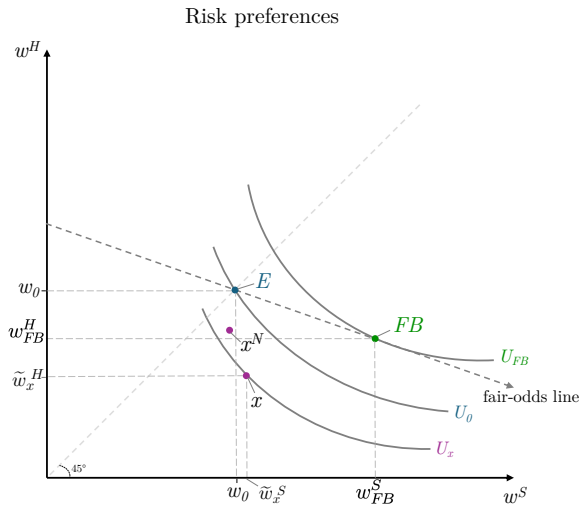
- Counterfactual to consider : x^N
 - prevent utilization response to insurance (hold m fixed at m_0)
 - ↳ movement in both directions!
 - ↳ still have DWL
- Research question : is it more or less preferred to x ?



Pic. 4.b : Welfare decomposition

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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 : $u(y, m; l) = -\exp(-\psi [y + b(m; l)])$ (b quadratic $\rightarrow$ 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)	$(m - l) - \frac{1}{2\tilde{\omega}l}(m - l)^2 - \frac{\tilde{\omega}l}{2}$	$l + \tilde{\omega}l(1 - \bar{c})$

$\Rightarrow$ See what is implied about risk protection value of moral hazard utilization

Results : Decomposition of welfare generated by full insurance

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

Ψ^N = value of risk protection if utilization fixed at uninsured level

Ψ^{MH} = risk protection value of moral hazard utilization

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

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(1) Marone & Sabety 2022	0.94	0.10	-0.04	0.04	-0.06
(2) Einav et al. 2013 (<i>Adv.</i>)	0.93	0.09	-0.02	0.02	-0.07
(3) Einav et al. 2013 (<i>Mult.</i>)	1.03	0.08	-0.11	0.06	0.02
(4) Ho & Lee 2023	1.19	0.03	-0.22	0.21	0.19

Ψ^N = value of risk protection if utilization fixed at uninsured level

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$SCMH$ = social cost of moral hazard utilization

Preventing over-utilization
only increases average welfare

Results : Decomposition of welfare generated by full insurance

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Ψ^N = value of risk protection if utilization fixed at uninsured level

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$SCMH$ = social cost of moral hazard utilization

Preventing consumers from changing behavior entirely lowers average welfare

1. Introduction
2. Model
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Four implications

- 1) Parameterization of utility critical for normative implications of moral hazard 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

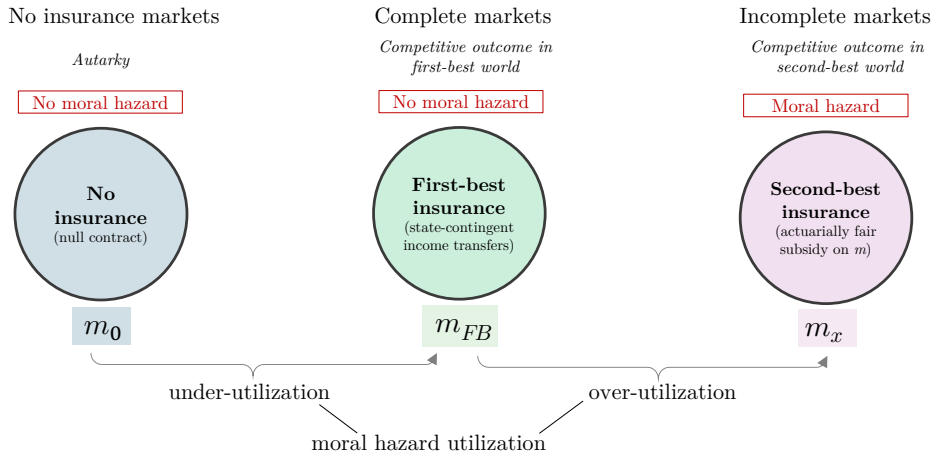
- 1) Parameterization of utility critical for normative implications of moral hazard utiliz.
 - ↳ income effects in demand for healthcare (more empirical work to do?)
 - ↳ state-dependent marginal indirect utility of income (how much w would people really want when sick in a first best world?)
- 2) Size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

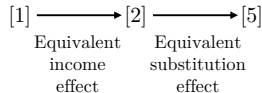
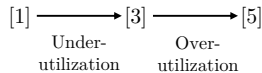
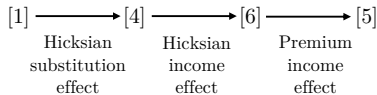
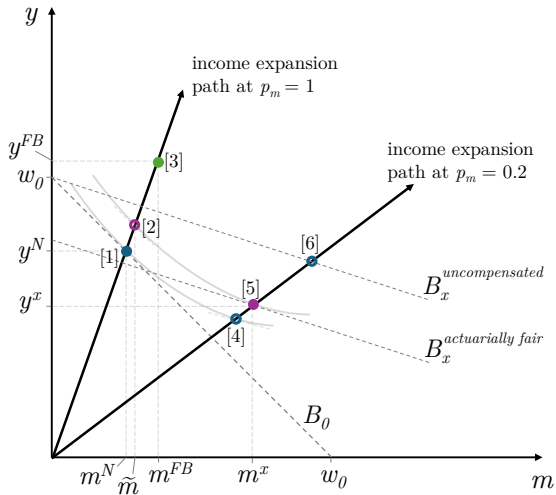
Consumer's **behavioral response to insurance** may be—and is likely to be—an important part of the mechanism through which second-best insurance provides risk protection



Slutsky income vs substitution effects

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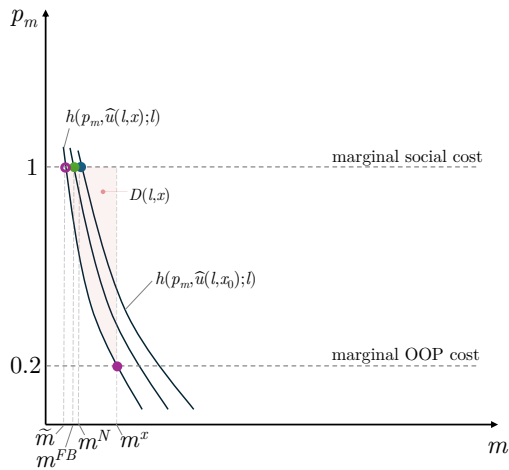
$l = \text{Sick}$



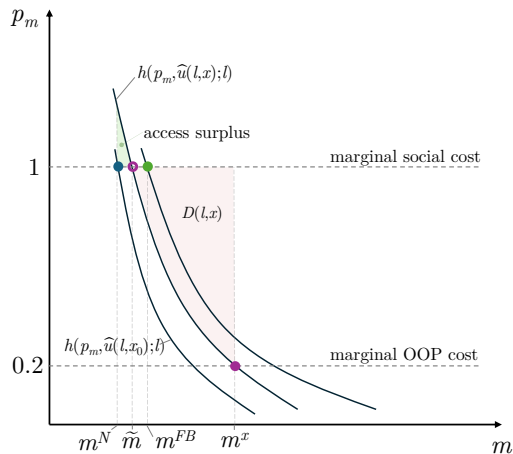
Compensated demand curves for healthcare

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(a) $l = \text{Healthy}$



(b) $l = \text{Sick}$



Decomposition of healthcare utilization (full insurance)

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Utility specification	Share of total utilization (<i>avg. across consumers</i>)			Annual utilization (<i>avg. across consumers</i>)		
	Non-MH utiliz.	Under- utiliz.	Over- utiliz.	Non-MH 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 (<i>Adv.</i>)	0.81	<0.01	0.18	\$4,512	\$11	\$1,142
(3) Einav et al. 2013 (<i>Mult.</i>)	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