The Risk Protection Value of "Moral Hazard"

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Definition and semantics

- Classic empirical result in health economics :

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> *"From a normative point of view, moral hazard [utilization] can be argued to cause a negative externality to the extent that it causes the insurer ... to increase premiums. Thus, moral hazard [utilization] should be avoided."*
>
> Zweifel and Manning, 2000 (*Handbook of Health Economics*)

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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 change in healthcare utilization induced by insurance

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

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  - ↳ state-contingent contracts (Arrow-Debreu securities)
  - ↳ can move resources (income) without distorting incentives (i.e., MRS=MRT)
- In **second best** : asymmetric info (incomplete markets) ↔ moral hazard
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↳ moral hazard utiliz. clearly can't be all bad...

Research questions and answers

(i) Can moral hazard utilization be socially valuable in health insurance?

↳ in sense that planner would not prohibit, if it could

(ii) Under what conditions?

(iii) Quantitatively, to what extent?

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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
- Foundational work on optimal insurance (Arrow 1965; Pauly 1968; Zeckhauser 1970)
  - classic trade-off : risk protection vs. cost of distorted incentives
  - we emphasize : behavioral response can be a **part of** how risk protection is produced

    → 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]; 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 moral hazard 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	**Pictures**
1 Consumers	1.a Ordinal preferences 1.b Risk preferences
2 First-best benchmark	2.a First-best allocations 2.b Change in behavior under first best
3 Feasible insurance contracts	3.a Moral hazard utilization 3.b Decomposition of utilization
4 Welfare	4.a Overall 4.b Decomposition of welfare

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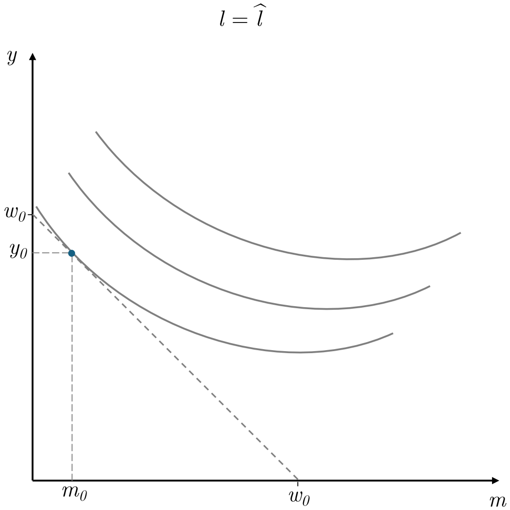
- Units of y and m set such that relative market price (MRT) is 1
- Consumer faces **risk** over her health state $l \sim F$ $\rightarrow$ and thus, her tastes for (y, m)
- Consumer endowed with initial resources w_0 $\rightarrow$ same in all states
- Information : F commonly known, realization l private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

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

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



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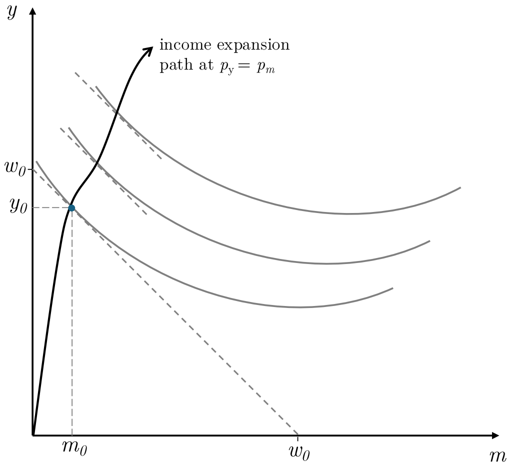

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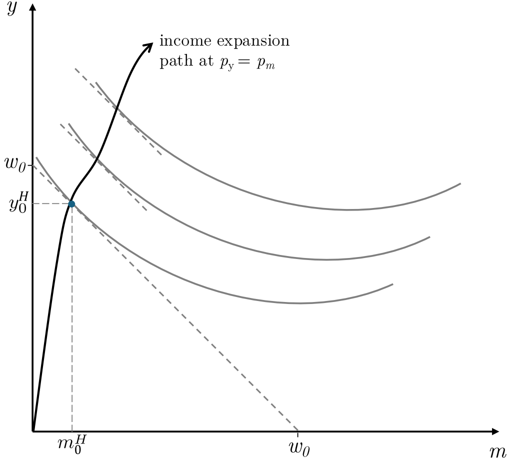

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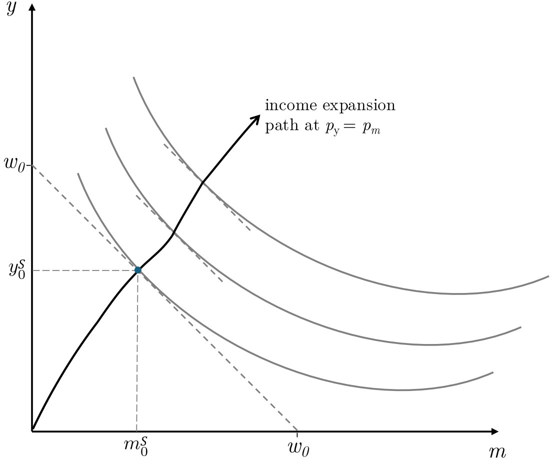

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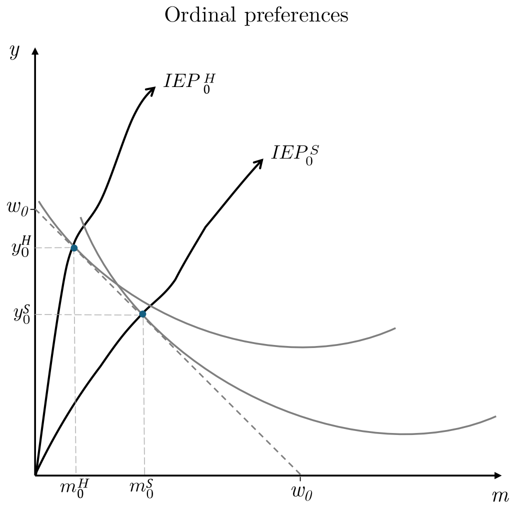
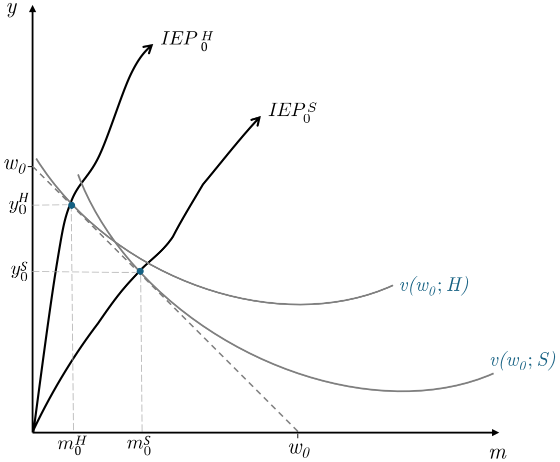


$$\max_{y,m} \; u(y, m; l) \quad s.t. \quad y + m \leqslant w_0$$

Pictures part 1b: 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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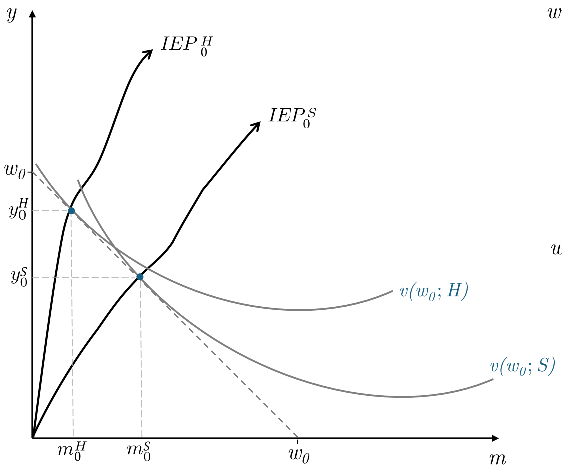

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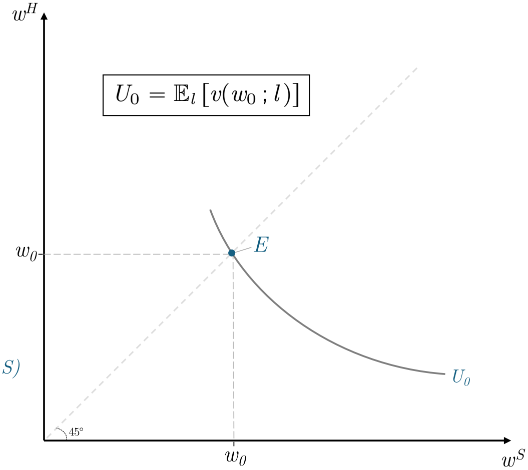

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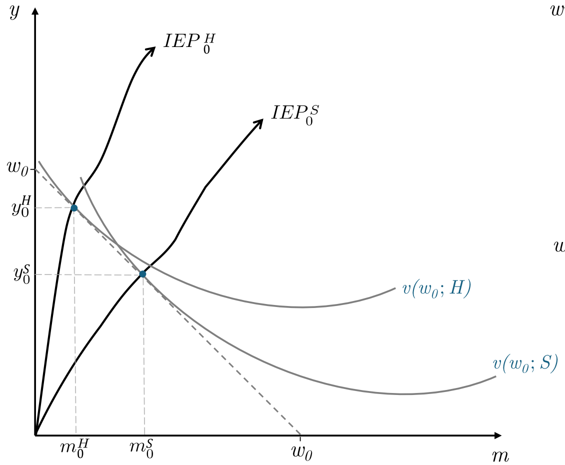

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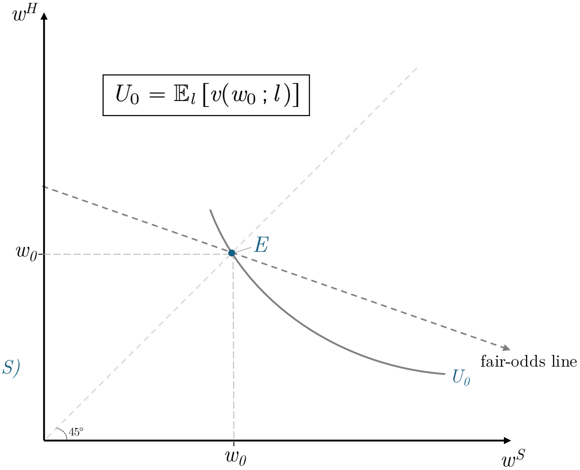

Model part 2: First-best benchmark

- Suppose health state were contractible → contract may be state-contingent
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$$\max_{w(l)} \mathbb{E}_l[v(w(l); l)] \quad \text{s.t.} \quad \mathbb{E}_l\, w(l) \leqslant w_0$$

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

$$\iff$$

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

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

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

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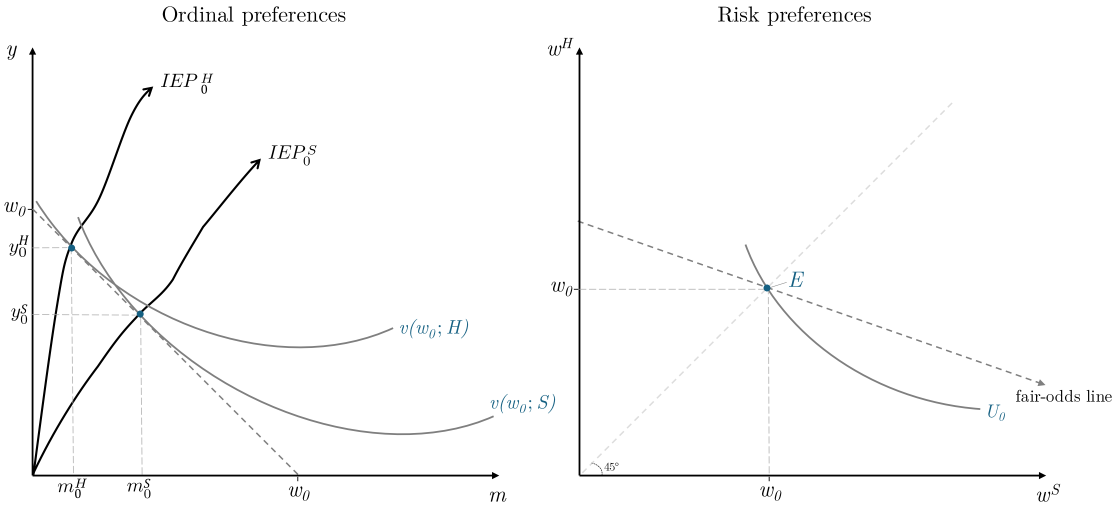

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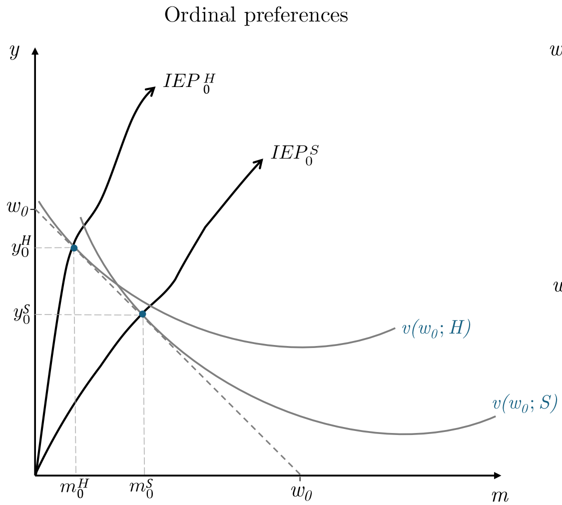

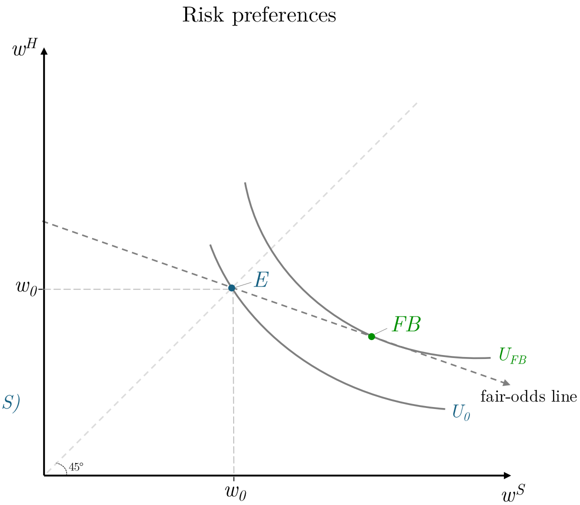

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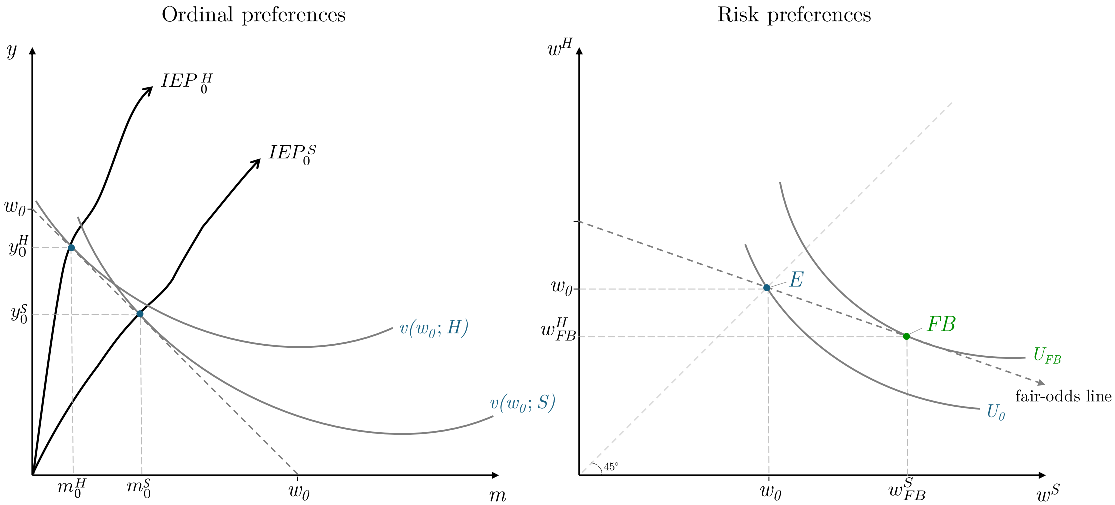

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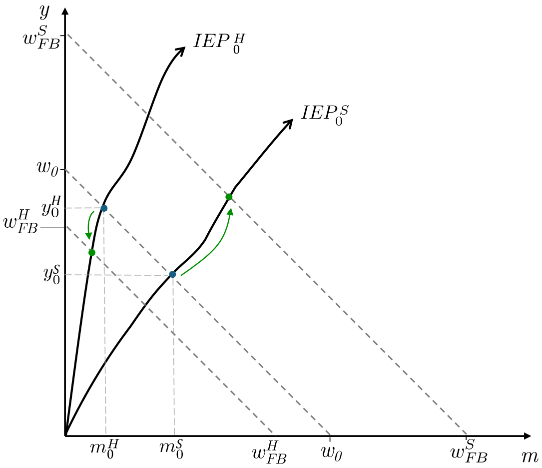

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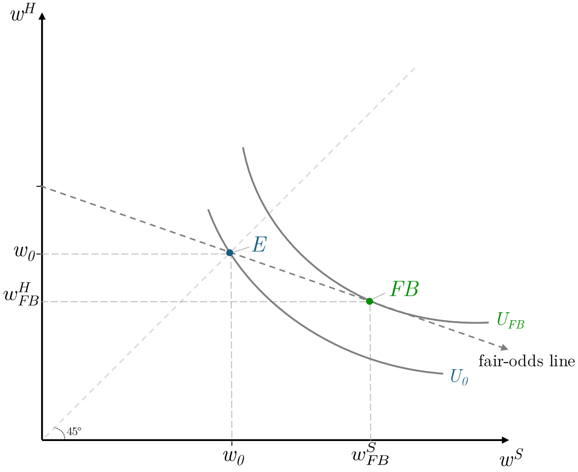

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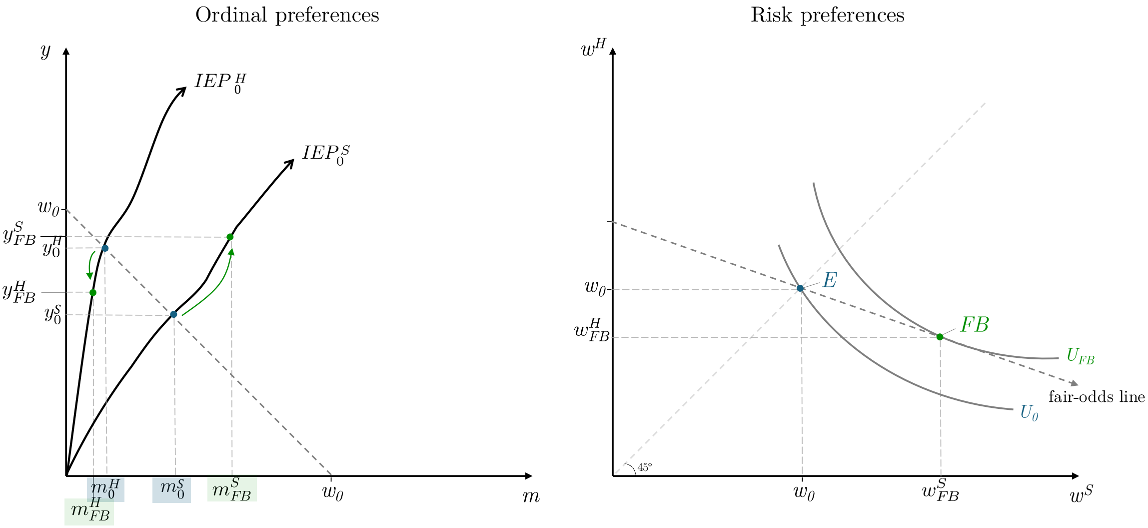

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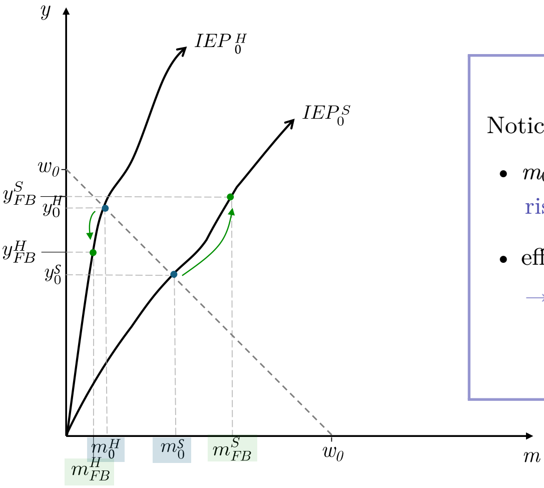

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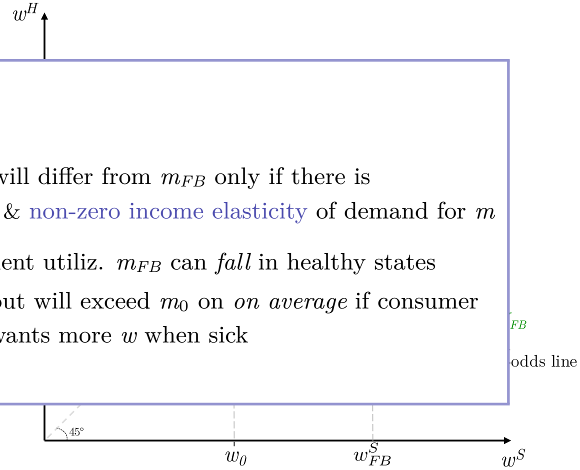

Notice:

- 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

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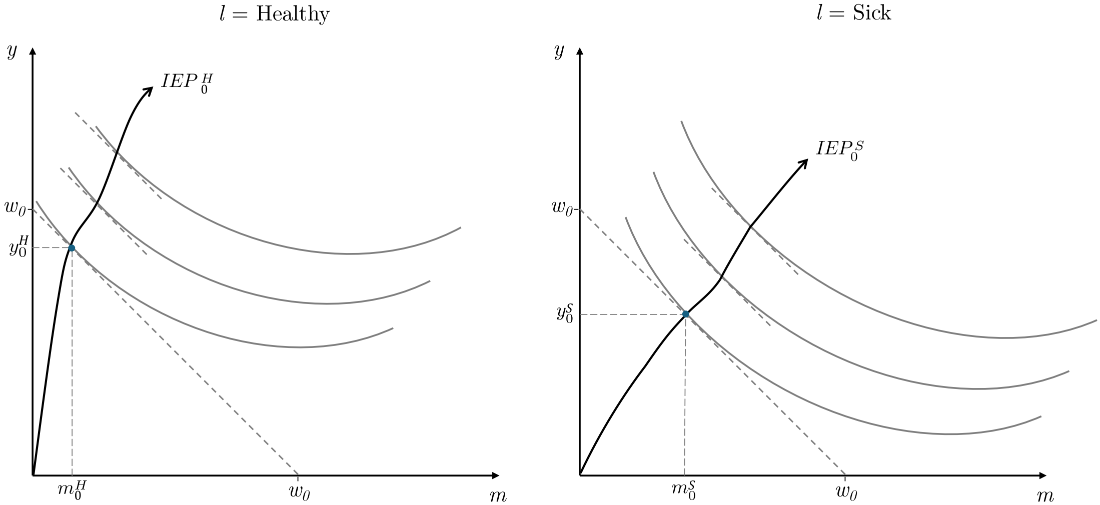
- Consumer solves : $\max_{y,m} \; u(y, m; l) \;\; s.t. \;\; y + m \cdot c(x) \leqslant w_0 - p$

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

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

Pictures part 3a: Feasible insurance contracts: Consider full insur.



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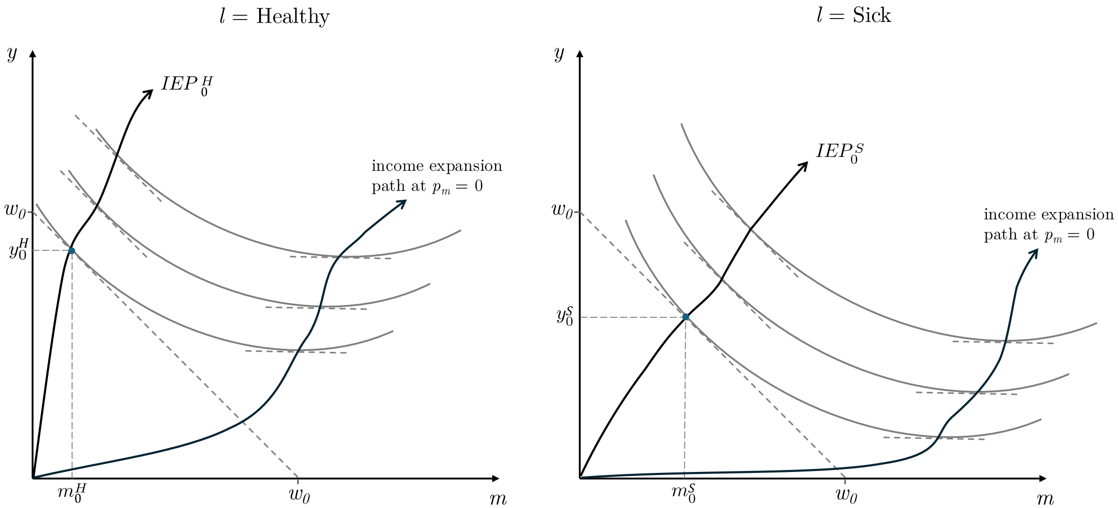

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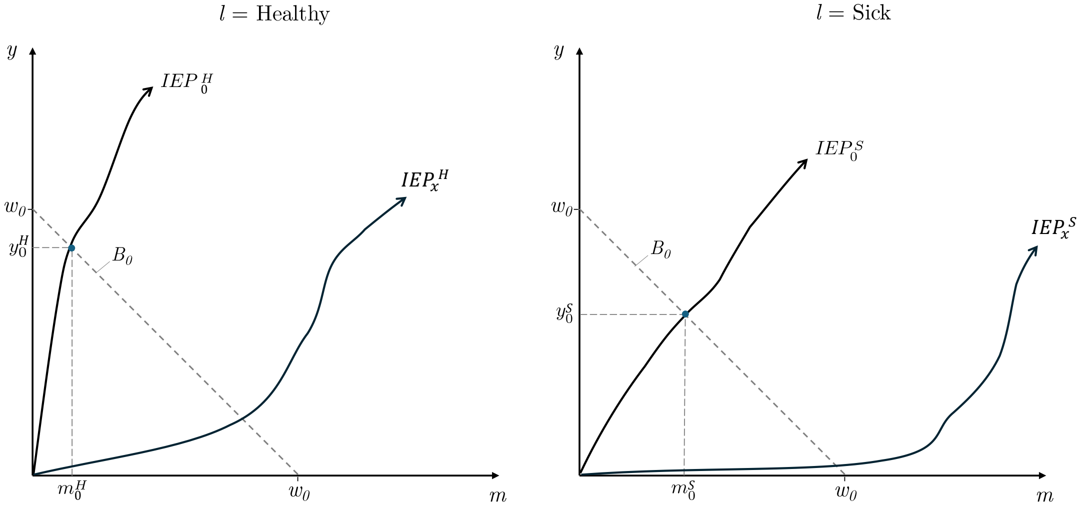

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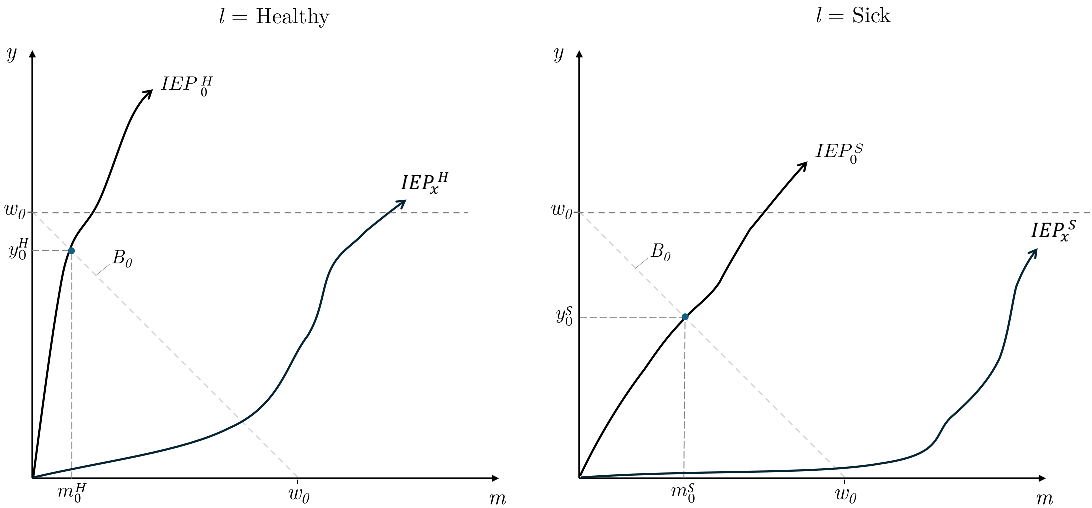

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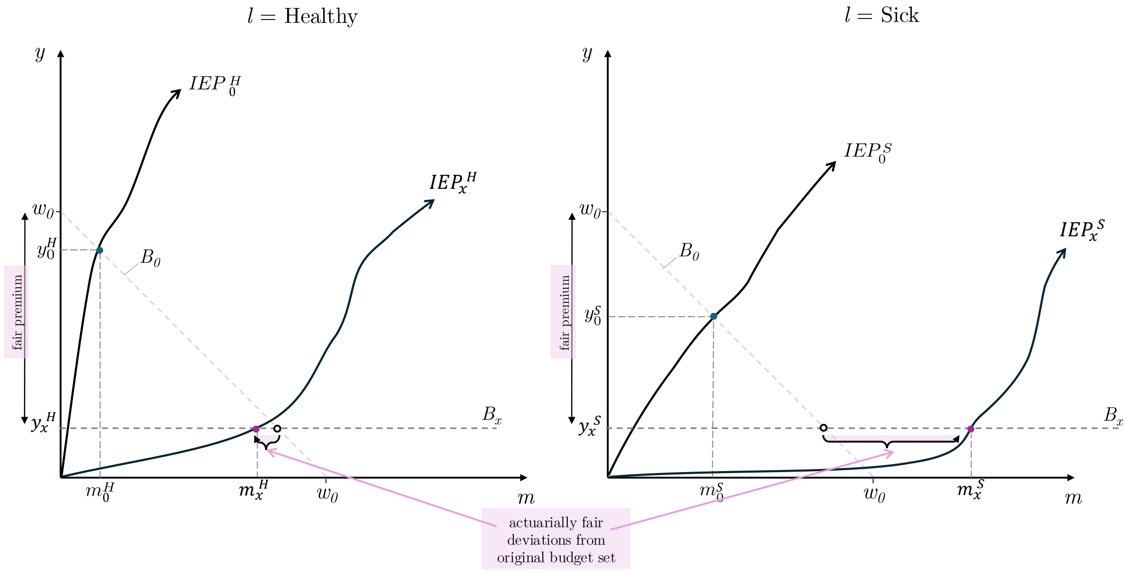
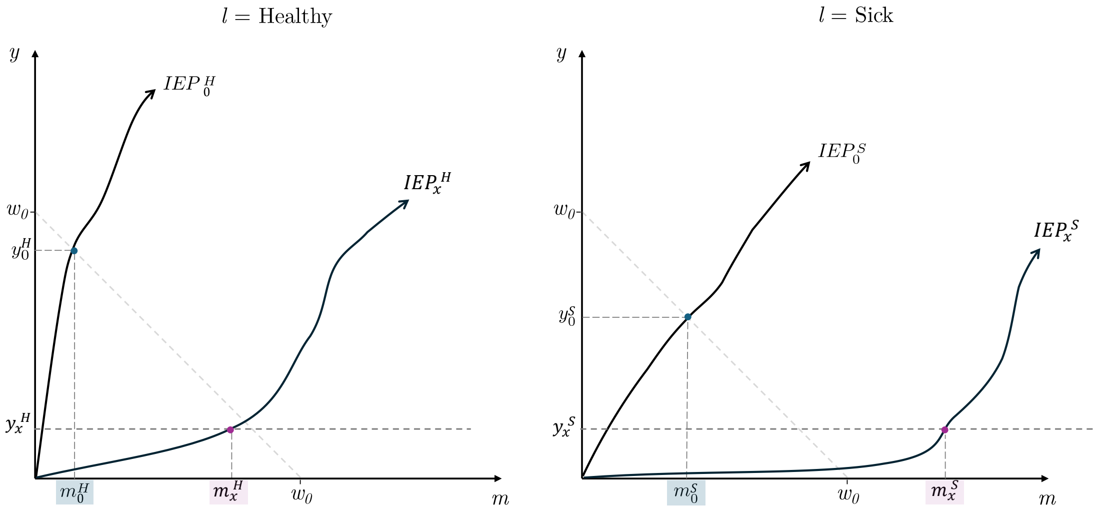


Pictures part 3b: Decomposition of moral hazard utilization Slutsky



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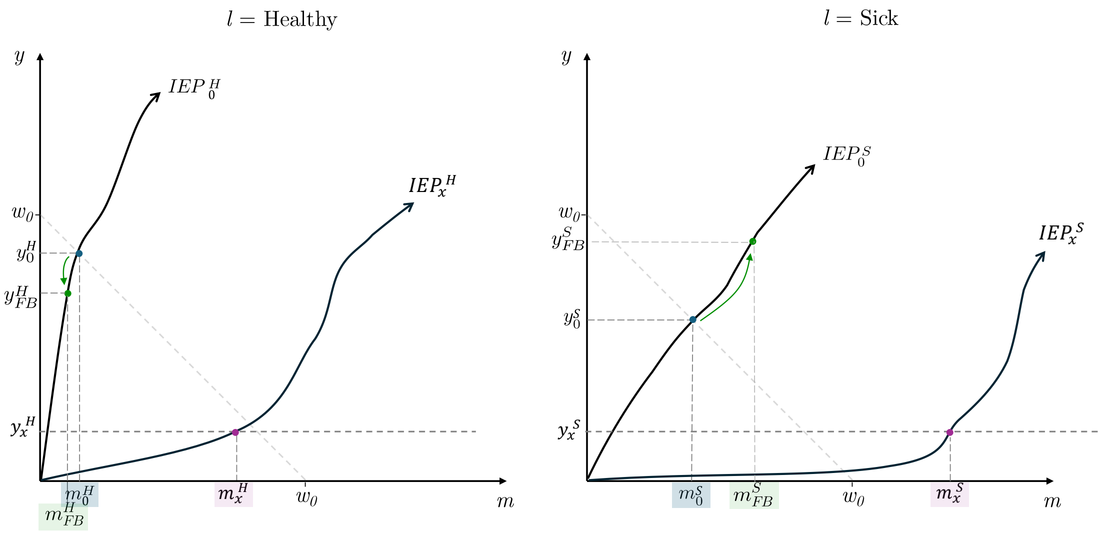

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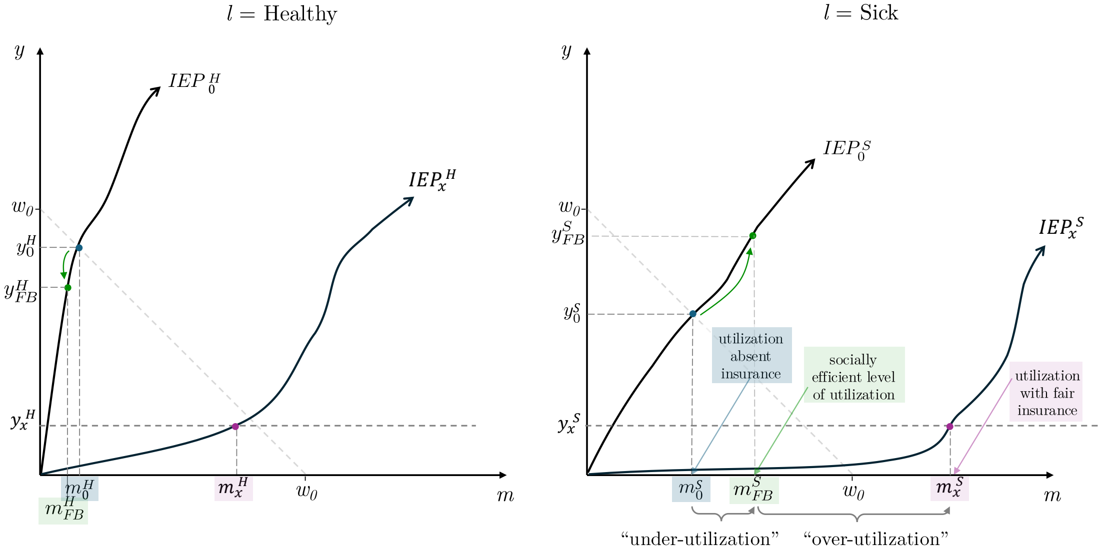

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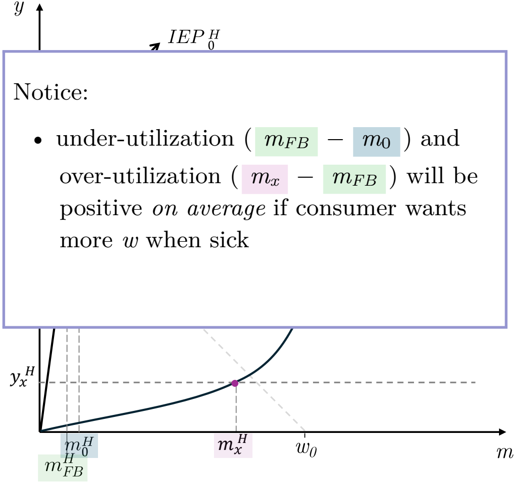
Notice:

- under-utilization (m_{FB} − m_0) and over-utilization (m_x − m_{FB}) will be positive *on average* if consumer wants more w when sick

l = Healthy



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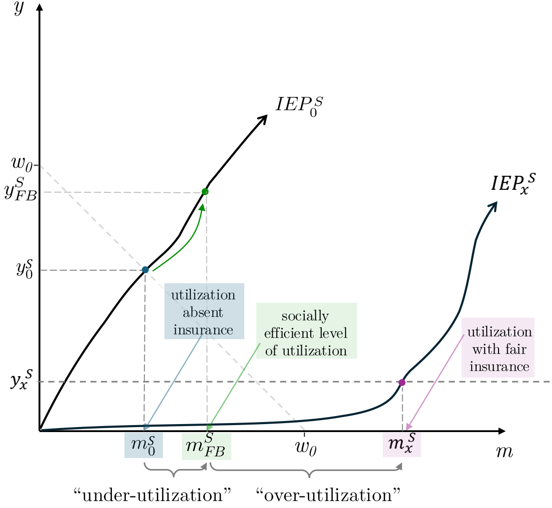

Model part 4a: Welfare

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 : $U_0 = \mathbb{E}_l[v(w_0; l)]$
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  - define $\tilde{w}_x(l) \equiv e(u^*(l); l)$ = minimum amount of money needed to reach utility level u^* in state l when $p_y = p_m$

$\Rightarrow$ $U_x = \mathbb{E}_l[\underbrace{v(\tilde{w}_x(l); l)}_{u^*(l)}]$

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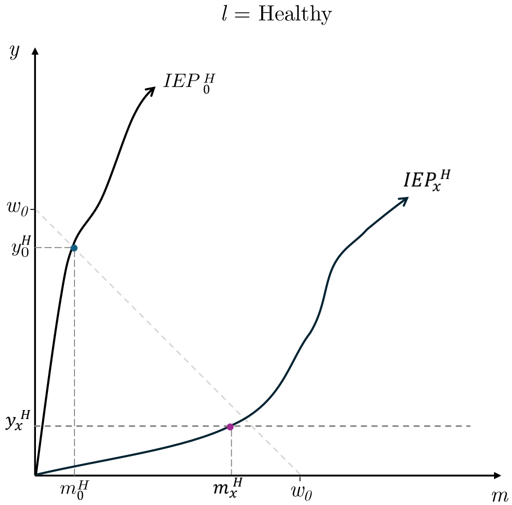

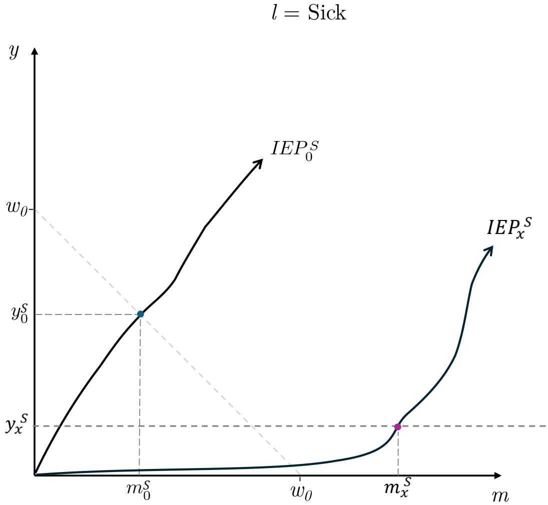

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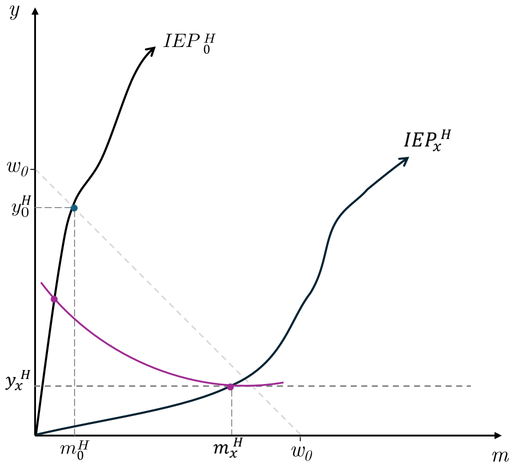
$l = $ Healthy



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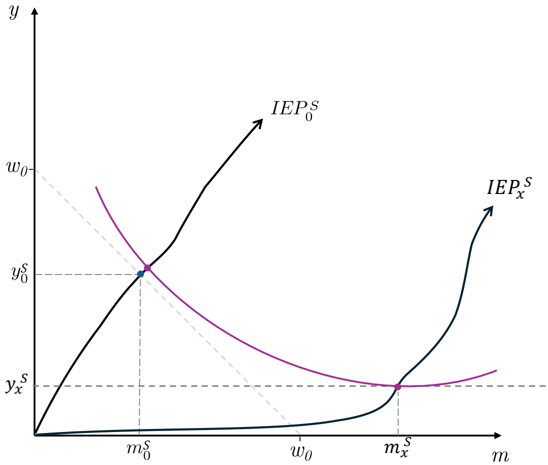

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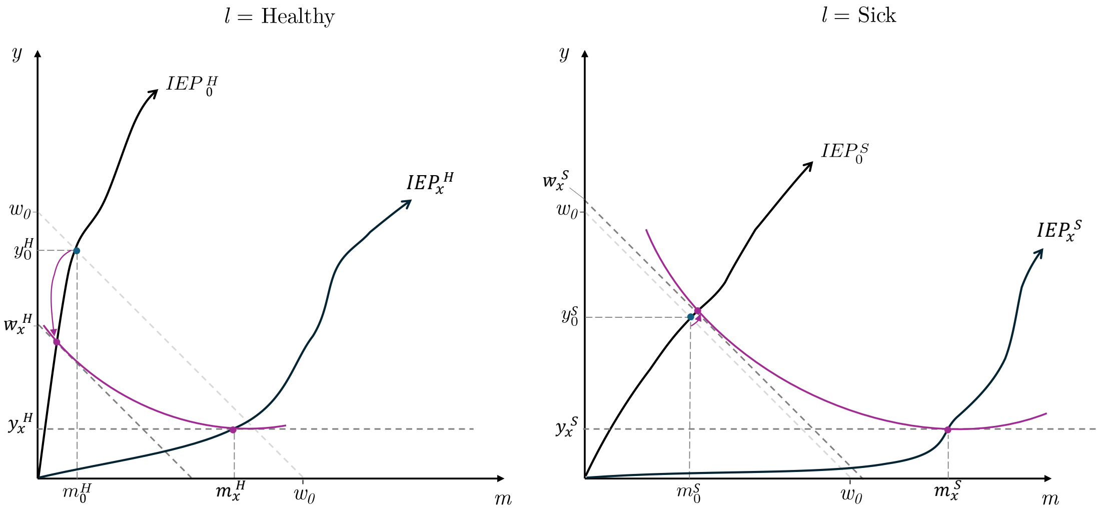

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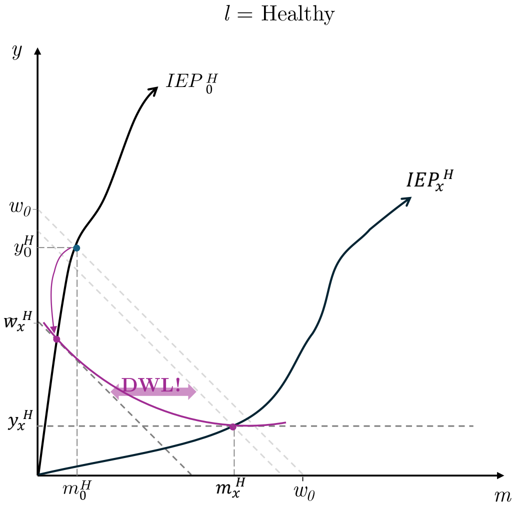

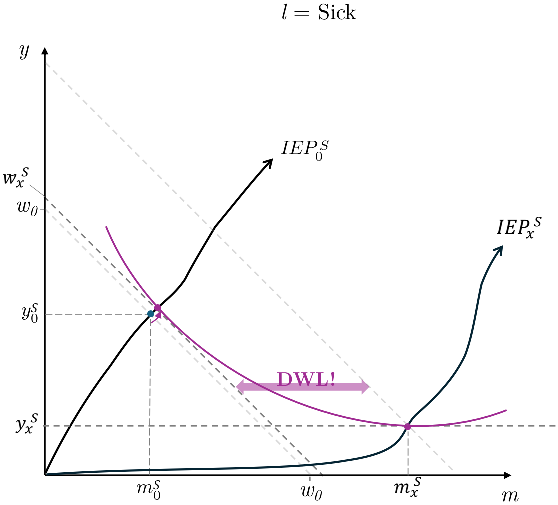

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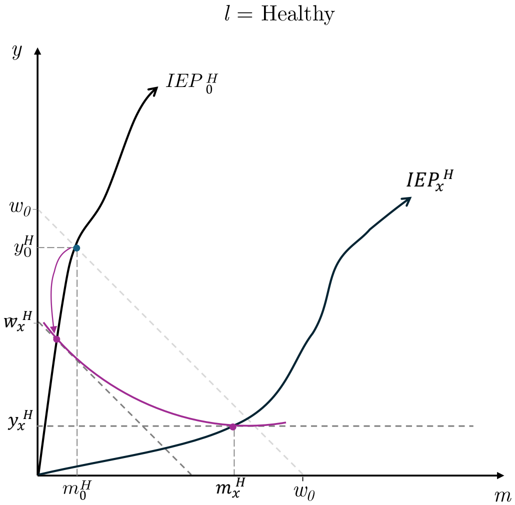

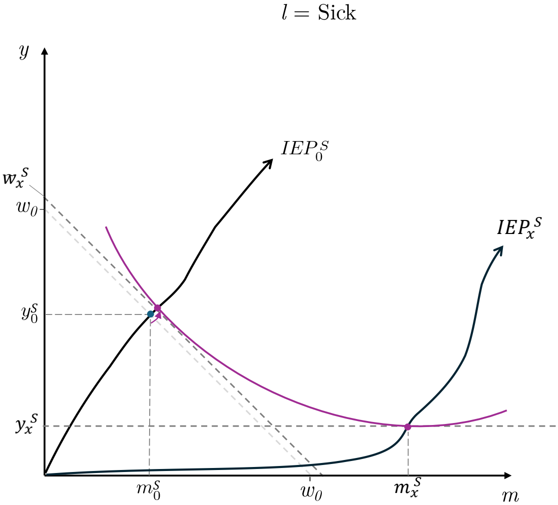

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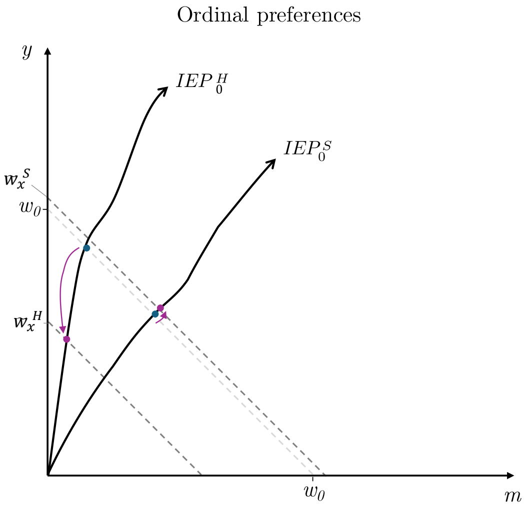
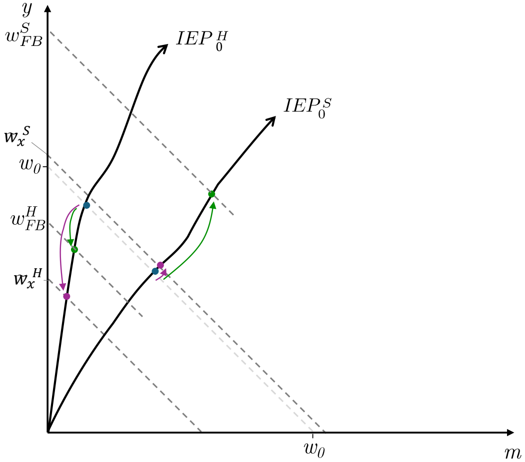
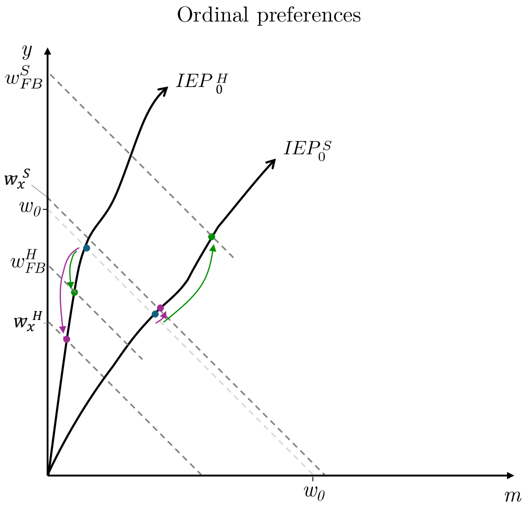


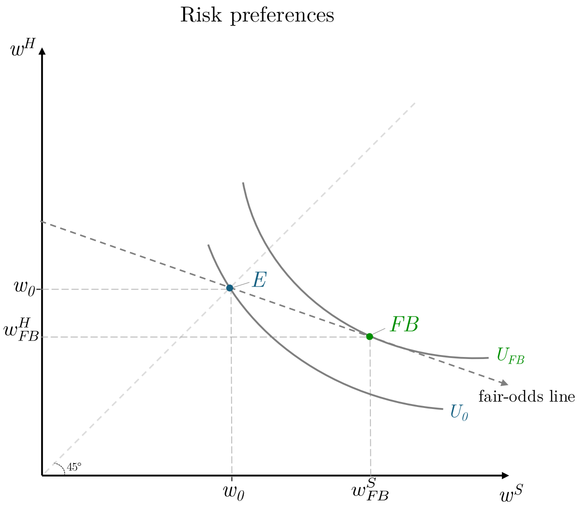
Pictures part 4a: Welfare

Ordinal preferences



Pictures part 4a: Welfare





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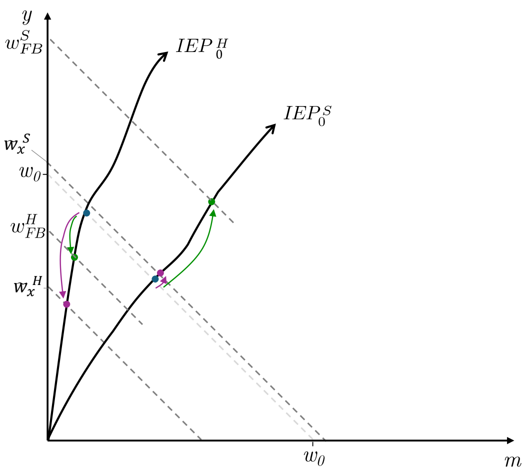
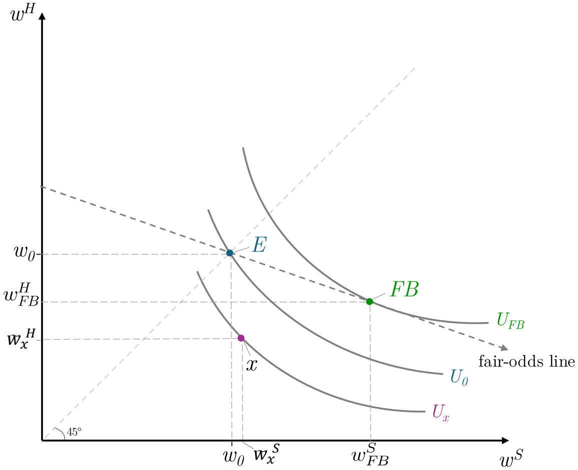


Risk preferences



Pictures part 4b: Welfare decomposition

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

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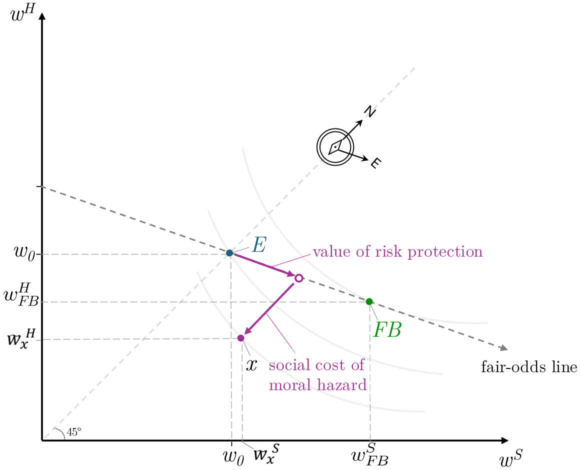

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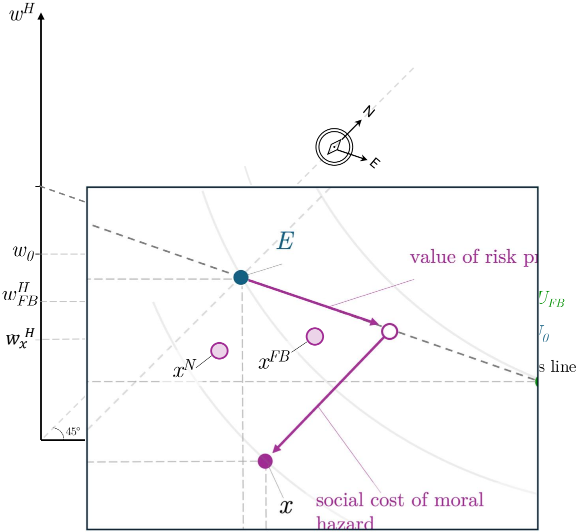
- x^N : hold m fixed at m_0 level
- x^{FB} : hold m fixed at m_{FB} level
- x : equilibrium m

Risk preferences



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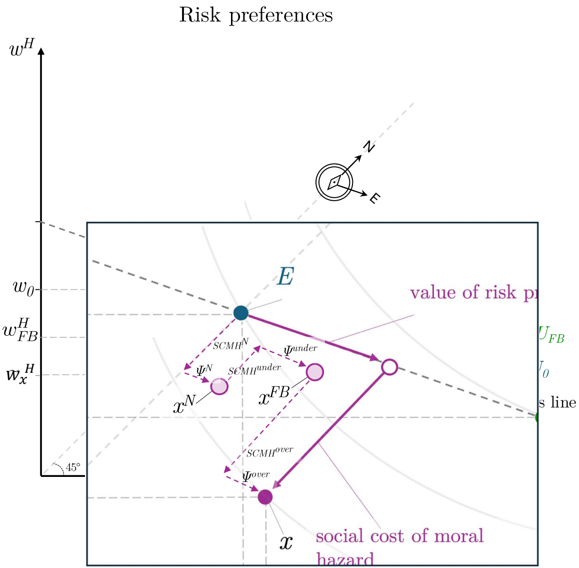
- $E \rightarrow x$
  $\equiv$
  $E \rightarrow x^N \rightarrow x^{FB} \rightarrow x$
  - and each step can be broken into Ψ and $SCMH$



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 structural estimates of Marone and Sabety 2022, Einav et al 2013
    Population characteristics
  - Follow parameterization of preferences from Einav et al 2013:

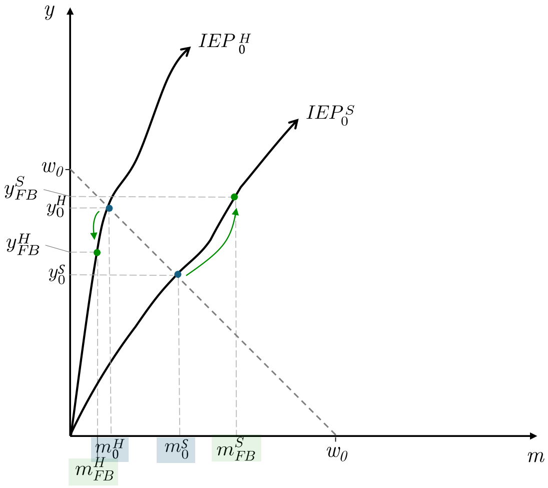
$$u(y, m; l) = -\exp\left(-\psi\left[y + b(m; l)\right]\right)$$

where b concave in m and $b_{ml} \geqslant 0$

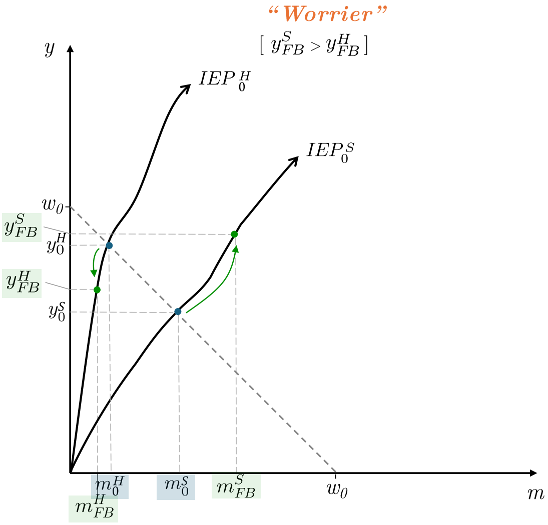
⇒ two versions...

↳ Consumer types

Consumer types



Consumer types



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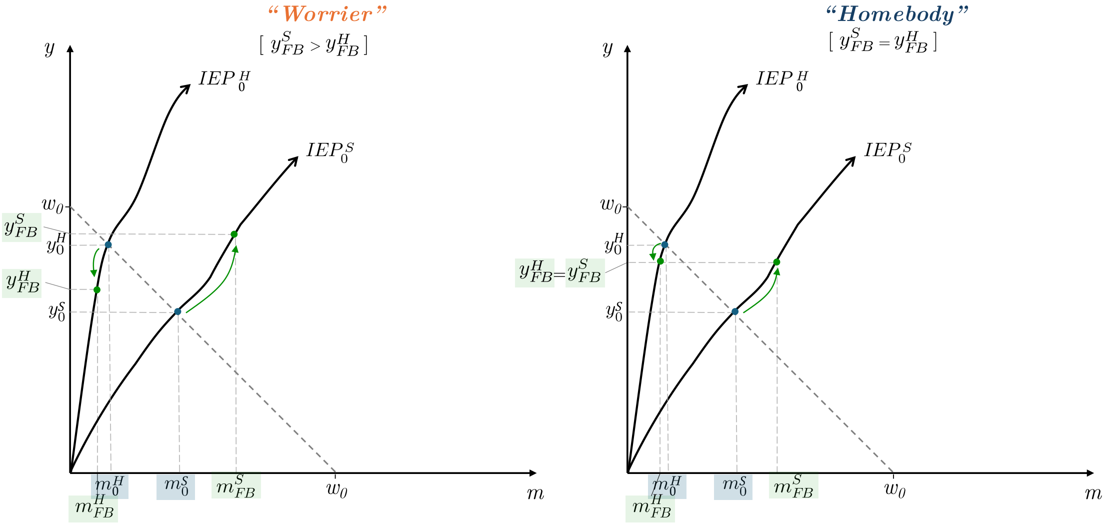

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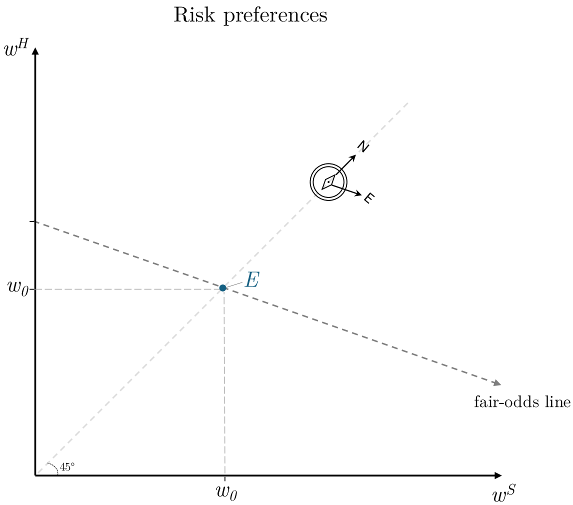

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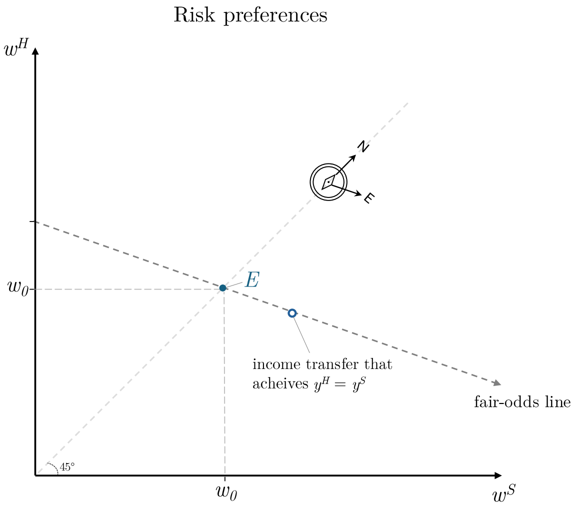

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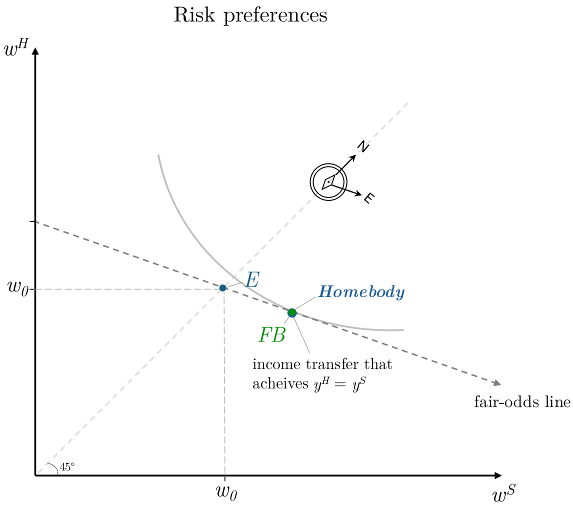
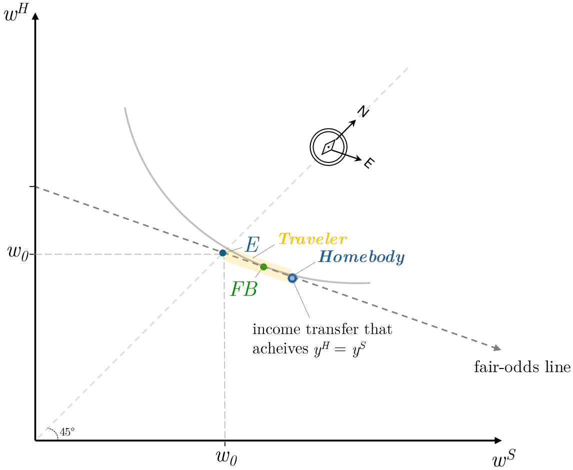
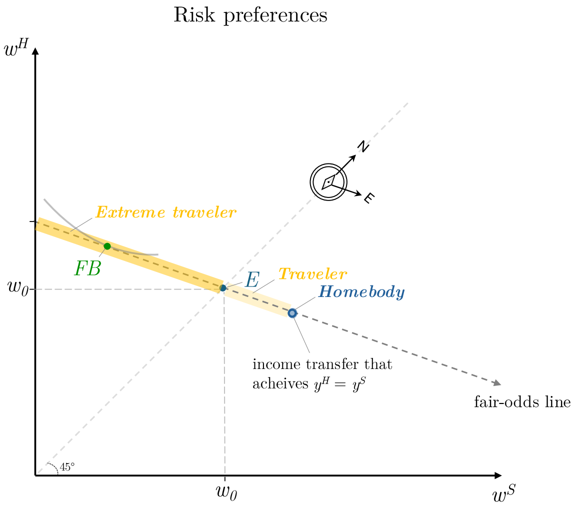


Consumer types

Risk preferences

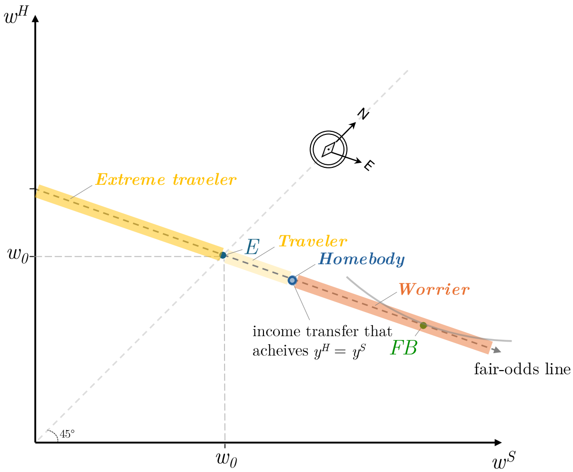


Consumer types



Consumer types

Risk preferences



V

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Spec.	Description	Parametrization of $b(m;l)$	Implied demand for healthcare $m^*(l,c)$
(1)	*Homebody* with elasticity of demand for healthcare lower when sicker	$(m-l)-\frac{1}{2\omega}(m-l)^2-\frac{\omega}{2}$	$l+\omega(1-c)$
(2)	*Worrier* with elasticity of demand for healthcare constant in health status	$(m-l)-\frac{1}{2\tilde{\omega}l}(m-l)^2-\frac{\tilde{\omega}l}{2}$	$l+\tilde{\omega}l(1-c)$

$\Rightarrow$ Ask what this model implies 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)*				Decomposition of moral hazard utiliz.	
	Ψ_N	Ψ_{under}	Ψ_{over}	$SCMH$	MH_{under}	MH_{over}
Panel A. Marone & Sabety 2022						
Panel B. Einav et al. 2013						

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Panel A. Marone & Sabety 2022						
(1) *Homebodies*	0.94	0.10	–	-0.04	0.04	0.96
(2) *Worriers*	0.94	0.06	0.03	-0.03	0.04	0.96
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Panel B. Einav et al. 2013						
(1) *Homebodies*	0.97	0.09	–	-0.06	0.01	0.99
(2) *Worriers*	0.97	0.04	0.04	-0.04	0.01	0.99

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Implications I

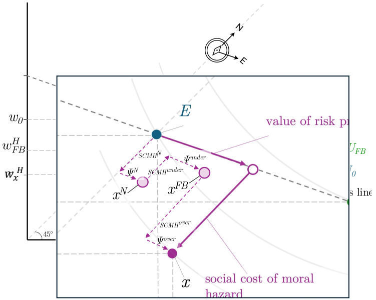
- Parameterization of utility critical for normative implications of moral hazard utiliz.
  - ↳ income elasticity of demand for healthcare
  - ↳ consumer's "type" of state-preferences (H vs W vs T/ET)
    - ⇒ **both** are today essentially ad-hoc assumptions for lack of better/other evidence

Implications I

- Parameterization of utility critical for normative implications of moral hazard utiliz.
  - ↳ income elasticity of demand for healthcare
  - ↳ consumer's "type" of state-preferences (H vs W vs T/ET)
    - ⇒ **both** are today essentially ad-hoc assumptions for lack of better/other evidence

- Don't do an incorrect decomposition of welfare
  - → incorrectly conclude that preventing changes in behavior will eliminate DWL

    (only true with perfectly income-inelastic demand for healthcare)



Implications II

⇒ In centrally planned health insurance, target the **right** level of utilization: m_{FB} not m_0

↳ key thought experiment :

[no] would consumer have been willing to pay for this absent insurance?

[yes] 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

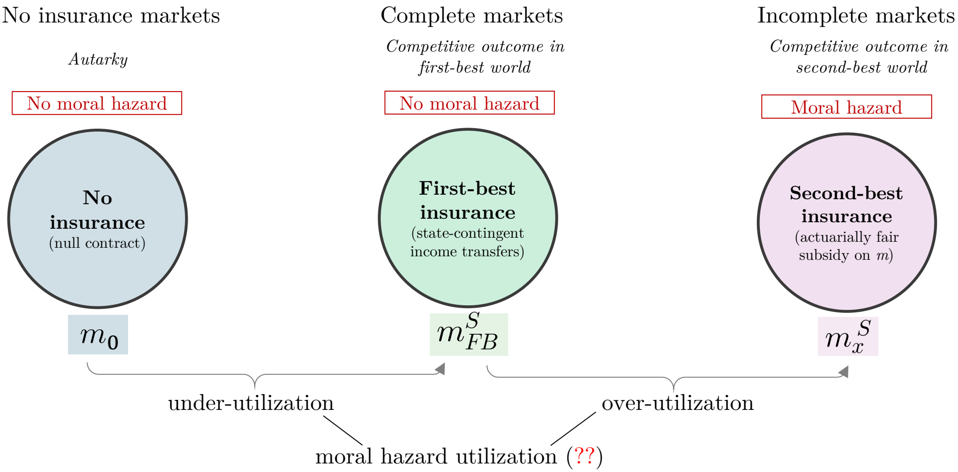
- Unlike with **selection**, no reason to think govt has an advantage over private firms in realm of **moral hazard** and optimal insurance design

↳ 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



Population Demographic Characteristics

Sample demographics	Mean	Percentile				
		10	25	Median	75	90
Demographics						
Number of adults	1.9	2.0	2.0	2.0	2.0	2.0
Number of children	0.6	–	–	–	1.0	2.0
Average age of household adults	43.4	26.5	32.5	43.4	54.1	61.1
Initial income, w_0 (\$000)	59.6	34.3	43.2	55.4	71.7	93.4
Risk aversion parameter, ψ	1.1	0.1	0.3	0.7	1.5	2.4
Spec (1) moral hazard parameter, ω (\$000)	1.1	0.2	0.2	0.3	1.0	2.9
Spec (2) moral hazard parameter, $\tilde{\omega}$	0.3	0.0	0.1	0.1	0.3	0.8

Notes: This table shows the distribution of consumer demographics and types used in our numerical analysis. The population consists of 10,000 consumers (households). Spec (1) and Spec (2) are in reference to the parameterizations of utility.

▸ Resulting Characteristics ▸ EFRSC Demographics ▸ EFRSC Resulting Characteristics ▸ Back

Resulting Population Characteristics

	Mean	Percentile				
		10	25	Median	75	90
Resulting characteristics						
CE of equal-odds gamble between \$0 and \$100 (\$)	48.7	47.0	48.2	49.1	49.6	49.9
Prob. of realizing health state in which $w_0 < m^{FB}(l)$	<0.01	–	–	–	–	<0.01
Utilization under null contract, $\mathbb{E}[m^*(l, x_0)]$ (\$000)	4.5	0.7	1.7	3.3	6.0	10.0
full insurance, $\mathbb{E}[m^*(l, x_{full})]$ (\$000)	5.7	0.9	2.1	3.9	7.6	12.6
FB contract, $\mathbb{E}[m^{FB}(l)]$ (\$000)	4.5	0.7	1.7	3.3	6.1	10.0

Notes: "CE" stands for certainty equivalent. "FB" stands for first best.

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Slutsky income vs substitution effects

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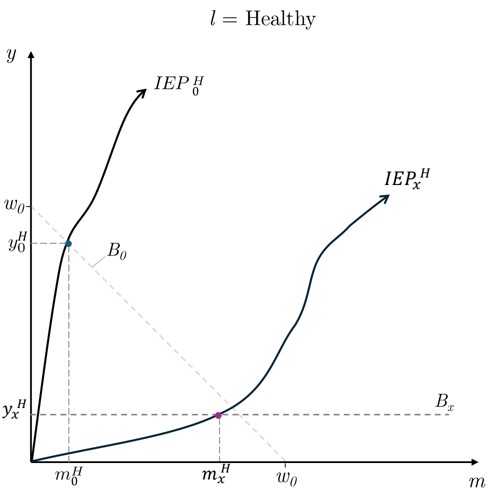

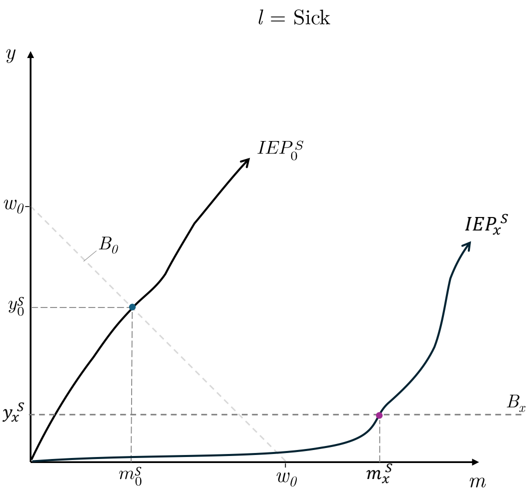

Slutsky income vs substitution effects

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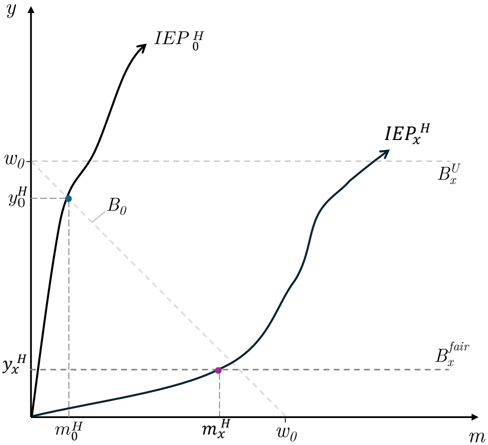
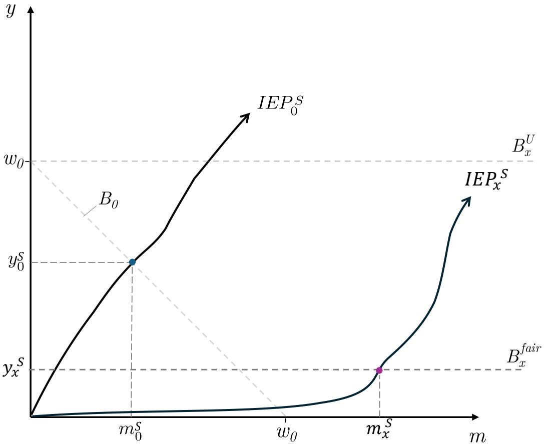
l = Healthy



l = Sick



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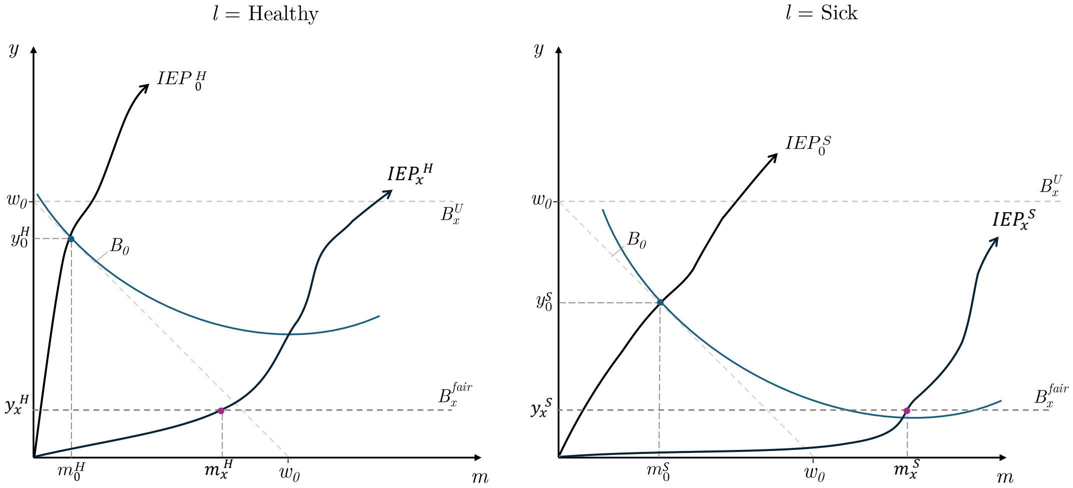

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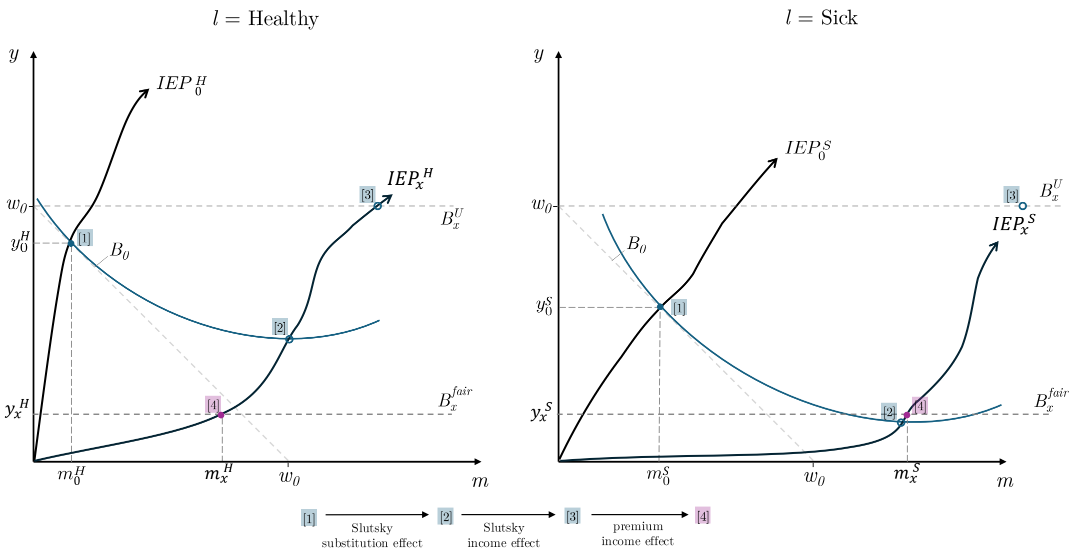

Slutsky income vs substitution effects

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