TOPIC 4

Allocation

Public Provision for Economic Efficiency

(c) *Asymmetric information and social insurance*

MICHAEL SACHS

Adjunct Professor | Southern Centre for Inequality Studies
Faculty of Commerce, Law and Management
University of the Witwatersrand | Johannesburg

michael.sachs@wits.ac.za www.michaelsachs.joburg

SOUTHERN CENTRE FOR INEQUALITY STUDIES
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Reading

- Barr, N. A. 2012. Economics of the Welfare State. 5th ed. Oxford ; New York: Oxford University Press.
  - Chapter 4: Insurance
  - Chapter 6: Insurance: Unemployment, sickness and disability
- Hindriks, Jean, and Gareth D. Myles. 2013. Intermediate Public Economics. 2nd ed. Cambridge, MA: MIT Press:
  - Chapter 10 Asymmetric information (especially 10.1 – 10.5)

Also

- Social Security Administration. 2019 'Social Security Programs Throughout the World: Africa, 2019'. (Guide to Reading the Country Summaries and South Africa Country Summary)
- Velasco, Andres. 2020. 'Are We All Keynesians Again'. Project Syndicate, 25 August 2020

TOPIC COMMENTARY

Discuss the following proposition: "To fight poverty and unemployment, South Africa should worry less about redistribution and strengthen its systems of social insurance"

The deadline is Monday 14 September at 9am.

1000 words, typed in Microsoft Word, emailed to michael.sachs@wits.ac.za

Outline

1. Thinking (some more) about public provision
2. Insurance
3. Adverse selection
4. Moral Hazard
5. Social insurance

Thinking (some more) about public provision

Public provision

- Colloquially we think of the state as providing "public goods"
- We have seen that a pure public good defined very narrowly (exclusion, rivalry)
- We asked the question: can a pure public good be provided privately (i.e. through the mechanism of market exchange).
- The answer was clearly no, so where there is a public good, some form of public provision seems essential.
- However, very little of what government's do count as pure public goods.
- Instead, there is widespread public provision of private goods (and club goods, and common pool resources)
- Why? Because public interventions are necessary across a range of market failures
- Moreover, in a second best world, where "distortions" are pervasive, intervening to correct one distortion may result in worsening another.
- In the next few slides we look at the logic of public provision as it applies more broadly over social and collective goods.

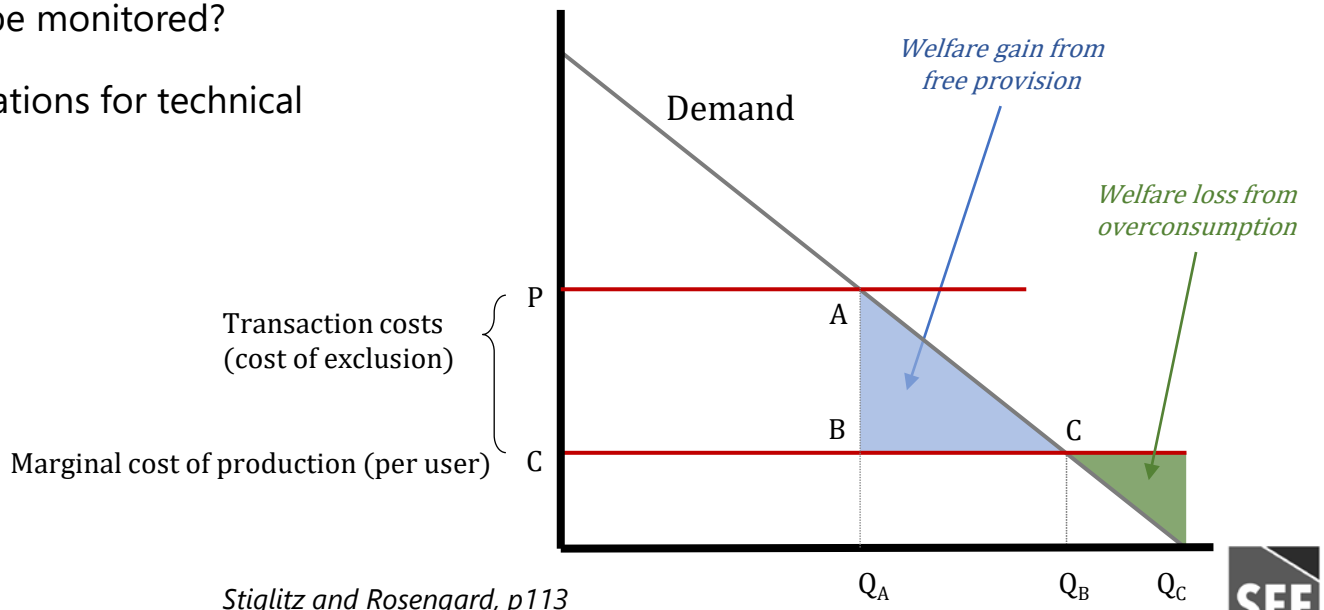
Exclusion: Is it socially desirable?

- The exclusion principle: "*The market can function only in a situation where the "exclusion principle" applies, i.e. where A's consumption is made contingent on A's paying the price, while B, who does not pay, is excluded. Exchange cannot occur without property rights, and property rights require exclusion*" *(Musgrave and Musgrave, p42)*
- If markets can operate, it is possible to "ration" or allocate goods and services through the price mechanism.
- Where this is possible, there is a strong case (which must still be argued) for using the market mechanism to achieve efficiency.
- But where exclusion and prices are not operating, is it feasible to create a market and, if it is feasible, is it desirable? Can and should price rationing operate?
- Social factors (property rights)
  - **Is exclusion socially desirable?**
  - Exchange requires property rights and property rights require exclusion
  - The question might be posed in normative terms: what property should be private and what should be public?
  - (crude discussions of socialism sometimes revolve around this!)
  - An extreme example, during a famine can we "exclude" those who are unable to pay.
  - Social/institutional basis of exclusion: assignment of property rights and equity consequences

Exclusion: Technically feasible?

- **Is exclusion technically feasible?**
  - In some cases, it is too costly to exclude users
  - What determines the cost of exclusion?
  - May depend on technical capacities (e.g. DSTV, etolls)
- If exclusion not feasible:
  - how should costs be allocated?
  - How should usage be monitored?
  - What are the implications for technical efficiency?

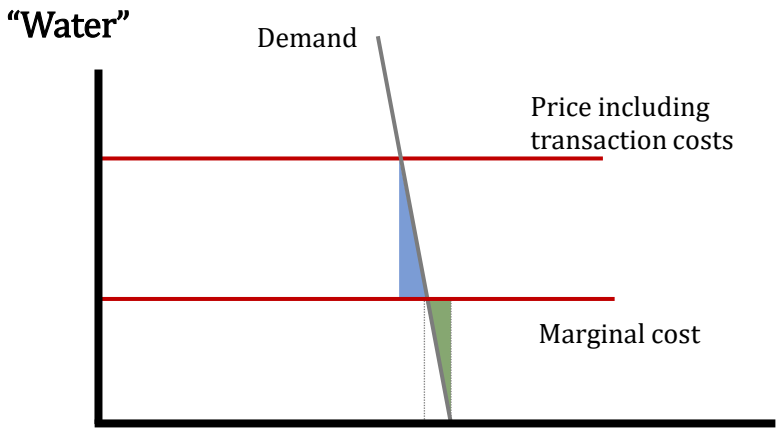
- **How much does exclusion cost?**
  - There are transaction costs associated with the price system even for a private good
  - Here, consumption is rival: There is a marginal cost associated with adding new consumers
  - Price mechanism requires usage monitoring
  - If these transaction costs are high, there could be a case for "free provision" – i.e.. Public provision from general taxation

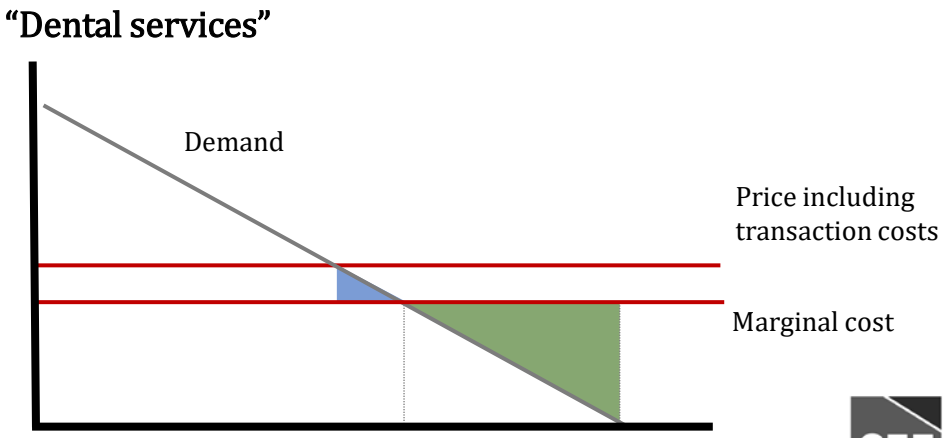


Stiglitz and Rosengard, p113

Exclusion: Efficiency enhancing?

- **Efficient demand**
  - inelastic demand may strengthen the case for public provision, even with nonrival goods with a high marginal cost
  - What is the balance between the efficiency gain and the cost?
  - e.g. water (cost of metering vs efficiency gain) or Dentistry services?





Stiglitz and Rosengard, p112

Equity and social merit

- **Merit goods**
  - Private goods that "are considered so meritorious that their satisfaction is provided for through the public budget"
  - Situations arise in which "an informed group is justified in imposing its decisions on others"
  - "Paternalism"?
- **Equity and social cohesion**
  - Distributional concerns: Ethical concern with distributional goals
  - Denying free access at the point of delivery would reinforce inequality in the distribution of endowments with negative effects on (dynamic) efficiency.
  - Some publicly provided private goods are regarded as important for political goals or building social cohesion (e.g. education)

- Note, in all the preceding discussion, we have not considered the efficiency implications of raising general taxation

Publicly provided goods

	Is exclusion costly?	Low cost of marginal user (nonrival)?	Is demand inelastic?	Distributional or other social concerns?
National defence				
Policing				
Roads and bridges				
Basic education				
Analogue TV (SABC)				
Digital TV (DSTV)				
Healthcare				
Household water supply				
Courts				
Sewerage and rubbish collection				
National parks				

Rationing publicly provided goods

- The market price system generates "rationing"
- Given that general taxation is limited, and there are many demands on the budget, free provision at the point of access of private goods might also need to be rationed
- This is particularly the case where demand is potentially unlimited (e.g. healthcare)
- Where universal access is granted, but limited funds are available, some form of rationing is inevitable.

	Advantages	**Disadvantages**
User charges	Those who benefit bear the cost	▪ Underconsumption ▪ Transaction costs
Uniform provision	Saves on transaction costs	▪ Some under consume, others overconsume ▪ High demanders may supplement with private consumption, increasing total transaction costs
Queuing	Fair allocation (equity)	▪ Opportunity cost of time ▪ Corruption

Stiglitz and Rosengard, p114

Redistribution in-kind provision: a smorgasbord of issues

- Redistribution in-kind: Transferring commodities to the poor at non-market prices or free at the point of delivery
  - Provision of in-kind distribution more effective where a commodity is
    - Not easily tradable (e.g. a house)
    - Not easily fungible (e.g. not food)
    - Not rejectable
  - In-kind transfers may be less efficient:
    - Overrides consumption preferences, transgresses consumer sovereignty, excess burden
    - Excess demand and non-price rationing
    - Problems of public production
- But how is this justified? Shouldn't we just give the poor cash?
  - May be warranted
    - Where there are significant externalities (e.g. TB treatment, education)
    - Where power-relations restrict choice (e.g. girls education)
    - Supply side disruptions (e.g. food rationing in war)
  - May sustain greater redistribution that cash transfers:
    - Political sustainability: Targeted redistribution of cash vs universal provision in-kind
    - Ensures revelation of need/self selection whereas cash is a universal equivalent (e.g. low cost housing)
    - Selective altruism on the part of the rich: cash transfers can be used to purchase "bads".
- Where efficiency arguments point to market allocation, distributional objectives are best achieved by income transfers (e.g. food), where efficiency arguments point towards public provision, equity goals are likely to be achieved more effectively by in-kind transfers (Barr)

Insurance

An insurer of last resort against aggregate risk Velasco*

- "Walter Bagehot, one of the earliest editors of The Economist, called on governments and central banks to be lenders of last resort. The current crisis has confirmed that when confronted with a shock this large, governments are also to be insurers of last resort.
- No private entity could simultaneously provide and finance the indispensable public-health response, pay furloughed workers' wages, save jobs by lending to cash-strapped firms, and make emergency transfers to vulnerable families. Only states can do that.
- Statisticians and economists distinguish between **idiosyncratic shocks** (affecting some people some of the time) and **aggregate shocks** (affecting everyone simultaneously).
- This helps fix priorities for what government should do in the future. Private insurance markets can work reasonably well if shocks are idiosyncratic. Your car insurer pays to repair your scraped fender, without government help, because most other insured people did not have a collision at the same time. So, part of the premia they pay goes to you.
- But private insurance is not foolproof. It works poorly in health care, for example, …
- In rich countries, varying combinations of private and public insurance protect most citizens against idiosyncratic risks – whether of illness, unemployment, or insufficient income in old age. The same cannot be said of emerging and developing countries, where social insurance systems are weak or limited to the formally employed.
- Too many families can lose the fruits of decades of hard work if a family member becomes ill or suffers an accident. A recent World Bank white paper on the subject concludes that "many social protection systems currently lack protection against catastrophic losses for those without a history of contributing to traditional social insurance plans.
- Filling this gap, precisely because private insurance cannot do it all, will require mobilizing more state resources."

* Velasco, Andres. 2020. 'Are We All Keynesians Again'. Project Syndicate, 25 August 2020. https://www.project-syndicate.org/commentary/states-must-be-insurer-of-last-resort-against-aggregate-risks-by-andres-velasco-2020-08?utm_source=project-syndicate.org&utm_medium=email&utm_campaign=authnote&.

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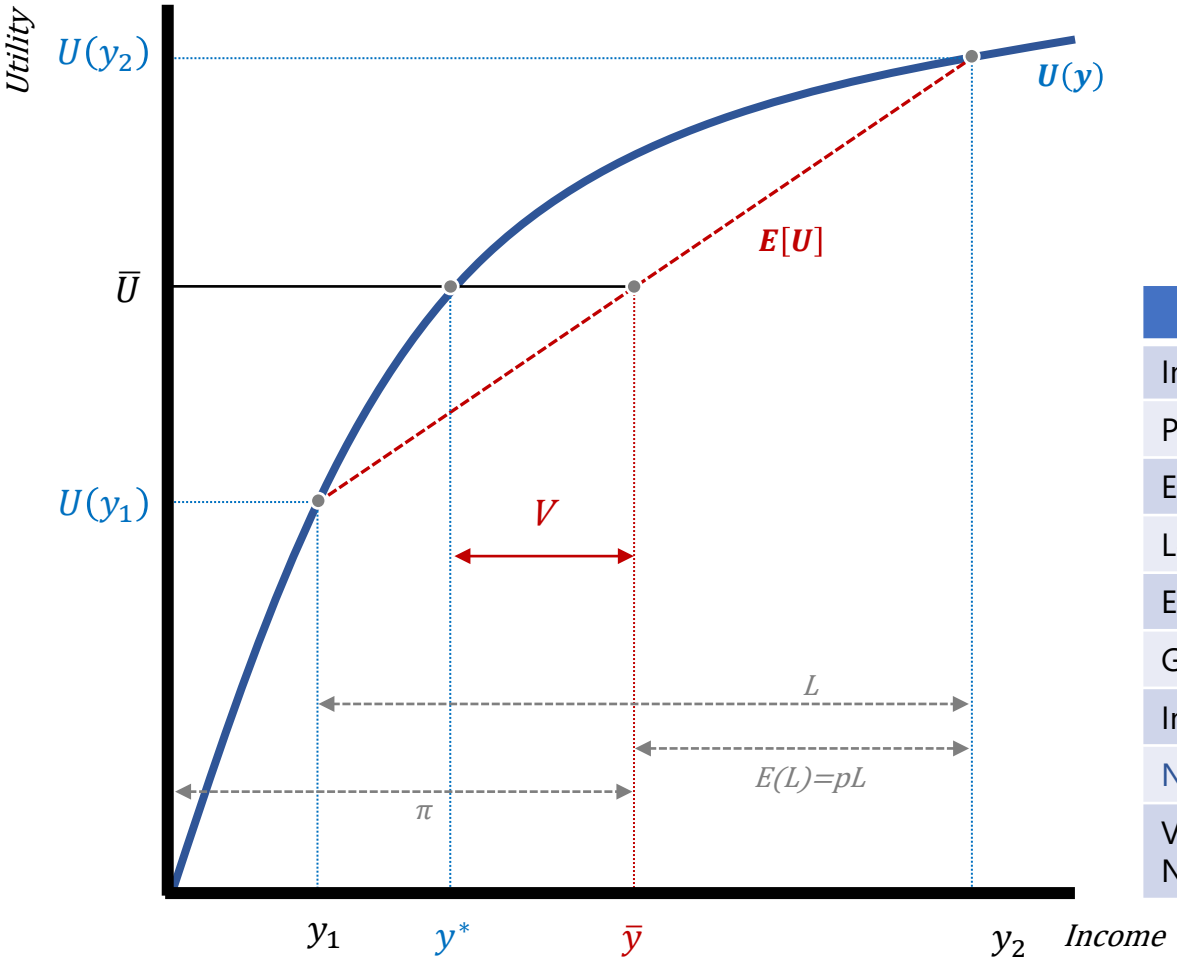
Insurance

- Insurance:
  - An institution for sharing risks (objective)
  - An *actuarial mechanism* organised in private markets (instrument)
- Social institutions don't necessarily need to function on an actuarial basis to serve the purpose of risk pooling and sharing
- But studying the actuarial mechanism can generate important insights about social insurance
- Supply:
  - To be in business a private insurance firm must charge a premium (price) that is equal to the average pay-out plus a mark-up for admin, profits etc
  - Under what conditions can insurance be provided by a private market
  - When and how is it necessary for the state to pool risk?
- Demand:
  - If private suppliers charge a mark-up on the average loss, their customers on average must be paying more in premiums than they get in pay-outs
  - Why do people demand insurance?

Demand for insurance

- Without insurance expected income is ($\bar{y}$) and expected utility is: $E[U] = \bar{U} = p_1 U(y_1) + p_2 U(y_2)$
- With insurance y* is guaranteed, and so U(y*) is certain: $U(y^*) = \bar{U}$
- A risk averse individual will be indifferent between an expected income of ($\bar{y}$) and a certain income of (y*). The risk premium (or value of certainty) is then: $V = \bar{y} - y^*$
- A rational person will pay a net premium (ϕ) that is less than V: $\phi = \pi - pL < V$



	Bad year	Good year
Income (y)	y_1=100	y_2 = R1000
Probability (p)	p_1 = 0.5	p_2 = 0.5
Expected income ($\bar{y}$)	R550	
Loss (L)	R900	0
Expected Loss E(L) = pL	R450	
Gross premium (π)	R550	R550
Insurance pay-out	0	R900
Net income (y*)	450	450
Value of certainty (V) = Net premium (ϕ)	R100	R100

Simple operation of actuarial insurance

- Suppose 100 people are flying to a football match in Barcelona
- Each person has a suitcase whose contents are worth R1000
- On average 1% of suitcases get lost in transit
- The expected loss E(L) is the insured loss L multiplied by the probability that the loss will occur p
  - E(L) = pL = R10
- The insurance company:
  - pL= 1% * R1000 = R10 from each person
  - Total amount collected: R10x100people = R1000
- When the group arrives in Barcelona, whoever lost their suitcase will be reimbursed R1000
- Note that
  - The insurance company did not provide for administrative costs or profit
  - But assuming the passengers are risk averse, they might have valued certainty at R2 in which case the company could have charged R11 giving $V(R2) > \pi(R11) - pL(R10)$
  - The risk was idiosyncratic (insurance against a plane crash was not offered)
  - The probability distribution of risk was well known and stable
  - The insured could not influence the outcome
  - Every passenger faced the same risk and this information is public

Private supply of insurance

- **Law of large numbers**
  - Individuals face risk, but probability distributions can be quantified across populations .
  - If N identically distributed and independent incomes are pooled, the variance of average incomes tends to zero as N tends to infinity.
- **Gains from trade**
  - Pooling ex ante
  - Paying ex post

Actuarial pricing

- In a competitive market, insurance will be supplied at a price that depends on: the probability of a claim (p), the size of the claim (L) and a competitive cost of provision (α)
  - Average pay-out = expected loss: $E(L) = p_i L$
  - Mark-up α
  - The actuarial premium $\pi_i = (1+\alpha)p_i L$
- We've seen that rational risk averse consumers would accept a premium such that $V > \pi - pL$.
- So, for private insurance to be supplied profitably, this value must exceed the competitive actuarial premium:

$$\begin{aligned} V &> \pi - pL \\ &> (1+\alpha)pL - PL \\ &> \alpha pL \end{aligned}$$

- What determines the mark-up (α)?
  - Administration (processing and reimbursement)
  - Marketing
- If α is high a private market might not exist: actuarial insurance might be incapable of achieving social policy objectives even though welfare gains are clear.
- Then there is a case for:
  - Regulation
  - Subsidy
  - Public provision
- Social insurance might reduce mark-ups through economies of scale, including the potential for standardization and the absence of marketing costs.

Private insurance and the probability of loss

$$\pi_i = (1+\alpha)\boldsymbol{p_i}L$$

- **Probabilities must be independently distributed potential outcomes**
  - Common shocks are uninsurable because p_i is no longer independently distributed
  - The individual risk must be idiosyncratic
  - The probability of me breaking a leg does not influence the probability of you breaking a leg
  - The probability of a person catching coronavirus changes dramatically anyone person in the insured population catches coronavirus.
  - An epidemic can quickly become a systemic/aggregate shock; there is no private insurance against coronavirus
- **The probability of loss must be less than one**
  - If $p_i = 1$ then $\pi_i = (1+\alpha)L$ then $\pi > L$
  - Where someone is certain to make a claim, the net premium will exceed the insured loss, so a rational person would not buy it
  - Private insurance avoids pre-existing conditions (this is a huge debate in the US)
  - For elderly people, p_i is not 1, but it is very close
  - Genetic screening?
- **Probability distribution must be estimable**
  - Risk not (Knightian) uncertainty
  - Rare conditions or rare events (fewer observations, higher variance)
  - Complexity (e.g. new diseases – uncertainty about impact, uncertainty about cost of treatment)
  - Long time horizons (e.g. insuring a young person for frail care 50 years hence)

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Adverse selection

Asymmetric information

- The first welfare theorem assumed perfect information: both the buyer and the seller in a transaction have the same information about the quality of the commodity exchanged
- Exchange transactions always involve some asymmetry in information between the buyer and the seller
  - But asymmetry is low when purchasing a simple commodity (think of an apple)
  - But when contracting for complex services the asymmetry can be high
    - Think of long term care for an elderly relative;
    - Note that in many societies the household rather than the market or government provides for this service
  - The question is how costly is it to verify the quality of a service?
  - Where information is costly, sellers are likely to be better informed
- Adverse selection (Hidden Knowledge)
- Moral hazard (Hidden Action)

Market for Lemons

- With perfect information
  - Plums sell at 2000 – 2400
  - Lemons sell at 1000 – 1200

Type of car	Value to Seller	Value to Buyer
50 Plums	R2000	R2400
50 Lemons	R1000	R1200

Varian (p738)

- If the attribute is hidden
  - Buyer willing to pay expected value of the car: V_B= (0.5)2400 + (0.5)1200 = R1800
  - When buyers offer R1800 only lemons are offered for sale
  - When only lemons are offered for sale, buyers won't offer more than R1200
- Gains from trade do not exploit all pareto-improvements

Choices reveal preferences, and actions convey information

- Choice to purchase insurance
- Willingness to enter into a contract
- Willingness to self-finance investment project
- Number of years of schooling

The fact that actions convey information affects equilibrium outcomes in a profound way

Adverse selection in insurance markets

The basic idea: Bicycle insurance

- A naïve insurance company offers a pay-out on the value of your bike if its stolen.
- There are two neighbourhoods: high crime and low crime
- The average pay-out (i.e. value of claims divided by insured population) is set at equal to the premium across the whole population (with a small mark-up for admin and profit
- But the average pay-out is
  - More than the premium in the high crime area, so all rational risk averse people will buy
  - Less than the premium in the low crime area, so few people will buy it
- If only people in the high crime area buy the insurance the company will not breakeven: it will go out of business as outflows (claims) are more than inflows (pay-outs)
- No insurance on bike theft is offered, even though everybody is prepared to pay for it.

Concepts and issues to note

- Private information concerns the agent's innate characteristics, or type, which he cannot choose or alter.
- Can mechanisms be designed by which individuals reveal attributes as well as preferences
- Screening: uninformed (buyer) is first mover
- Signalling: informed (seller) is the first mover
- *Self-selection*: the process by which individuals reveal information about themselves through the choices they make.

Adverse selection in an insurance market

- A competitive market for insurance with a large number of consumers
- For simplicity : $\alpha = 0$ $L = 1$ $p_i \sim [0,1]$ distributed uniformly
- Each individual knows their own p_i; Insurance companies don't know an individual's type, but they do know the probability distribution
- **Demand**
  - Buyers of insurance are risk averse — *$\delta > 0$ is a measure of risk aversion*
  - Willingness to pay $\tilde{\pi}(p_i) = [1+\delta]p_i$
  - Insurer's offer ($\bar{\pi}$) is accepted if $\bar{\pi} \leq \tilde{\pi}(p_i)$ => $[1+\delta]p_i \geq \bar{\pi}$
- **Supply**
  - Insurers offers to fully insure the loss at he same premium ($\bar{\pi}$) to all
  - Breakeven condition:

$$\bar{\pi} = E[p_i] = E[p_i : \tilde{\pi}(p_i) \geq \bar{\pi}]$$
$$= E[p_i : (1+\delta)p_i \geq \bar{\pi}]$$

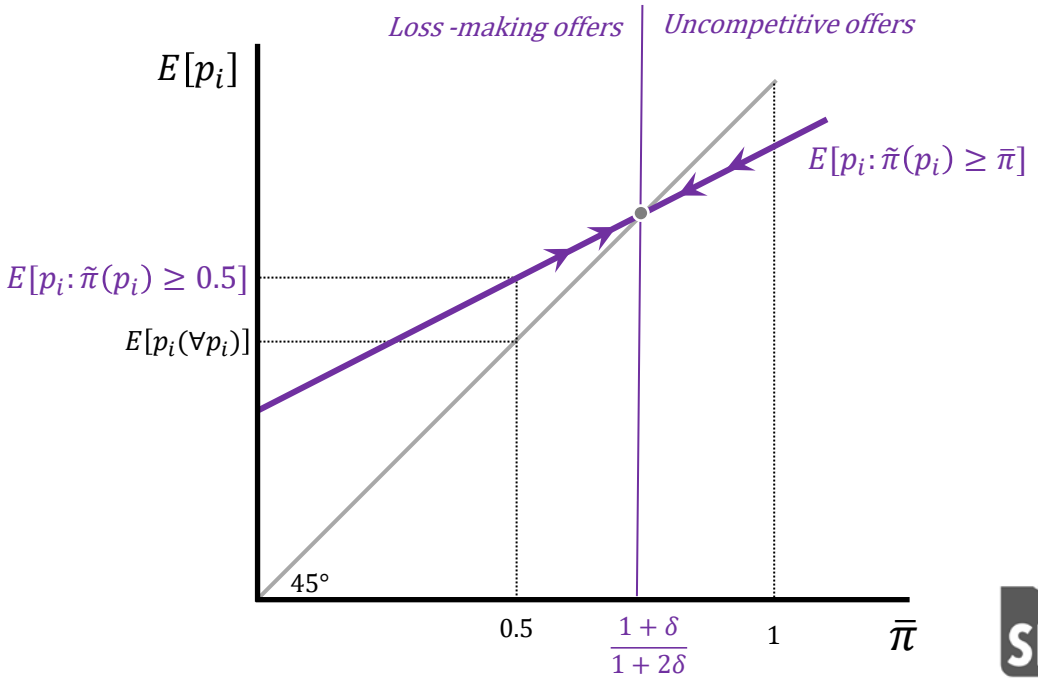
- **Equilibrium**
  - Competition will ensure that the premium offered is:
  - NB: With a uniform distribution:
    E[x: a<x< b] = (a+b)/2

$$\bar{\pi} = E[p_i : (1+\delta)p_i \geq \bar{\pi}]$$
$$= E\left[p_i : \frac{\bar{\pi}}{[1+\delta]} \leq p_i \leq 1\right]$$
$$= \frac{1}{2}\left[\frac{\bar{\pi}}{[1+\delta]} + 1\right] = \frac{1+\delta}{1+2\delta}$$

Adverse selection Market Failure

- So in equilibrium the premium will $\bar{\pi} = \frac{1+\delta}{1+2\delta}$
- Which will be taken out by those for whom $\tilde{\pi}(p_i) = [1+\delta]p_i \geq \frac{1+\delta}{1+2\delta}$
- Which implies private provision only for $p_i \geq \frac{1}{1+2\boldsymbol{\delta}}$
- But note that all consumers are willing to pay more than the breakeven condition
  - Willingness to pay of every individual: $\tilde{\pi}(p_i) = [1+\delta]p_i > p_i \; \forall p_i$
  - Breakeven condition across all buyers of insurance: $\bar{\pi} = E[p_i] = E[p_i : \tilde{\pi}(p_i) \geq \bar{\pi}]$

- So if insurers knew the hidden type of consumers they would be able to offer insurance to all.
- When a single premium is offered to all consumers, high risk consumers force up the premium and this drives out low-risk types from the market.
- With adverse selection, bad types always find it profitable to enter the market at the expense of the good
- The equilibrium is inefficient



Compulsory insurance

- Welfare can be improved if government forces all individuals to purchase insurance.
- Government could set the premium at 0.5 which is $E[p_i]$ if all consumers participate.
- Willingness to pay is replaced with compulsory payment
- High risk consumers will benefit from a lower premium: $0.5 < \frac{1+\delta}{1+2\delta}$
- Lower risk consumers will benefit from a premium that matches their risk profile.
- The very low risk are made worse off, they would rather have not insurance than pay the premium
- The net effect is a form of redistribution: The low-risk groups pay an actuarial premium plus a lump sum tax and the high risk group receives a lump-sum transfer
- Compulsory insurance is frequent:
  - Third party car insurance (but not in South Africa!)
  - Employee protection for injury
  - Health care insurance in a closed company group
  - Aircraft
  - Unemployment insurance

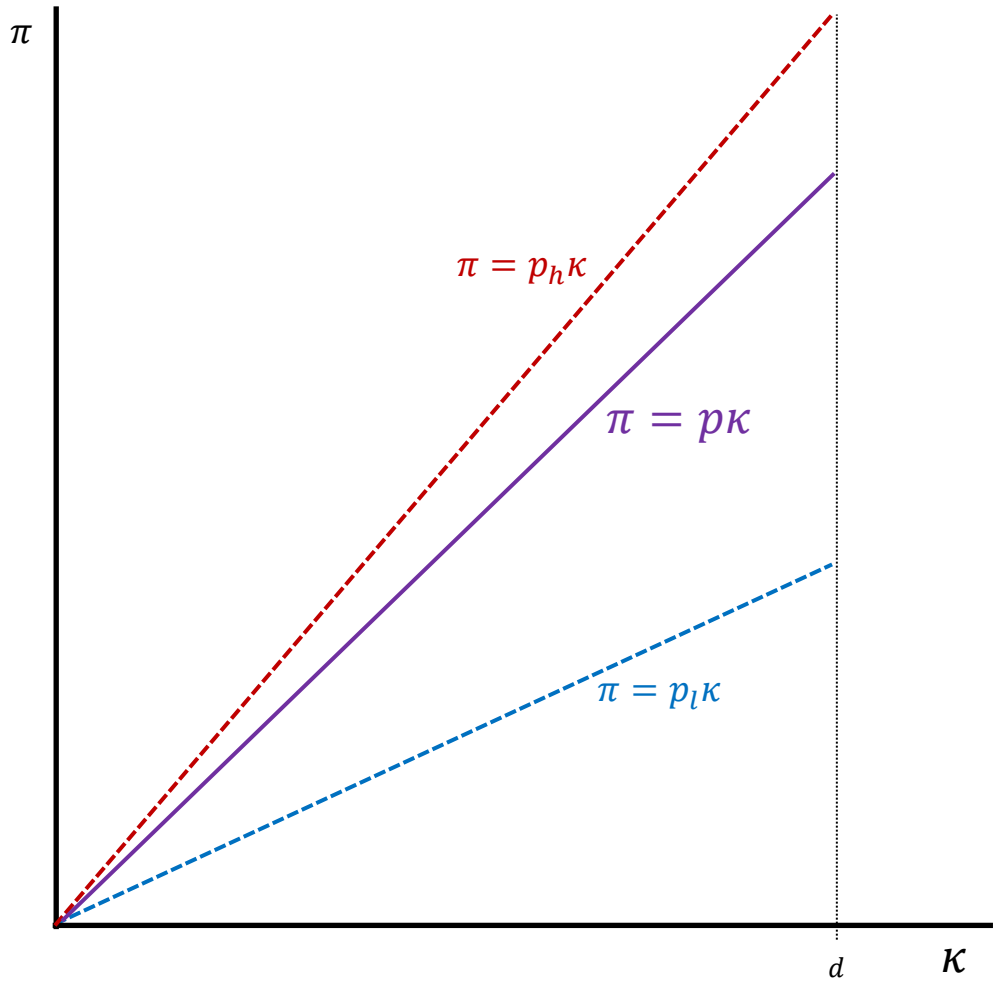
Screening for a Separating Equilibrium

- In the previous example we considered a sub-optimal "pooling equilibrium" where all consumers purchased the same product
- Can a private insurance company design a mechanism that allows them to distinguish between high risk and low risk consumers?
  - Offer a menu of contracts, and allow consumers to self select based on their own knowledge of their riskiness.
  - Offer higher risks full coverage at a high premium
  - Offer low risks partial cover at a lower premium though an "excess"
- This is called a "separating equilibrium"

Screening model

- Two types of agent
  - High-risk type p_h and Low-risk type p_l where $p_h > p_l$
  - The two types form proportions of the total population $\theta_h + \theta_l = 1$
  - Both types have the same fixed income **r** and are at risk of suffering the same damage **d**
- Insurance offers coverage κ (which is a proportion of d) and premium π
- Utility functions are concave, indicating risk aversion:
  - Expected utility no insurance: $V_i(0,0) = \boldsymbol{p_i} u(r-d) + (\mathbf{1} - \boldsymbol{p_i}) u(r)$
  - Expected utility with insurance: $V_i(\kappa, \pi) = \boldsymbol{p_i} u(r - d + \kappa - \pi) + (\mathbf{1} - \boldsymbol{p_i}) u(r - \pi)$
- Timing
  - Stage 1: All firms choose a menu of tailored contracts: $S_i = (\kappa_i, \pi_i)$
  - Stage 2: Consumers choose their most preferred contract

Actuarially fair contracts



- The full population probability of an accident is

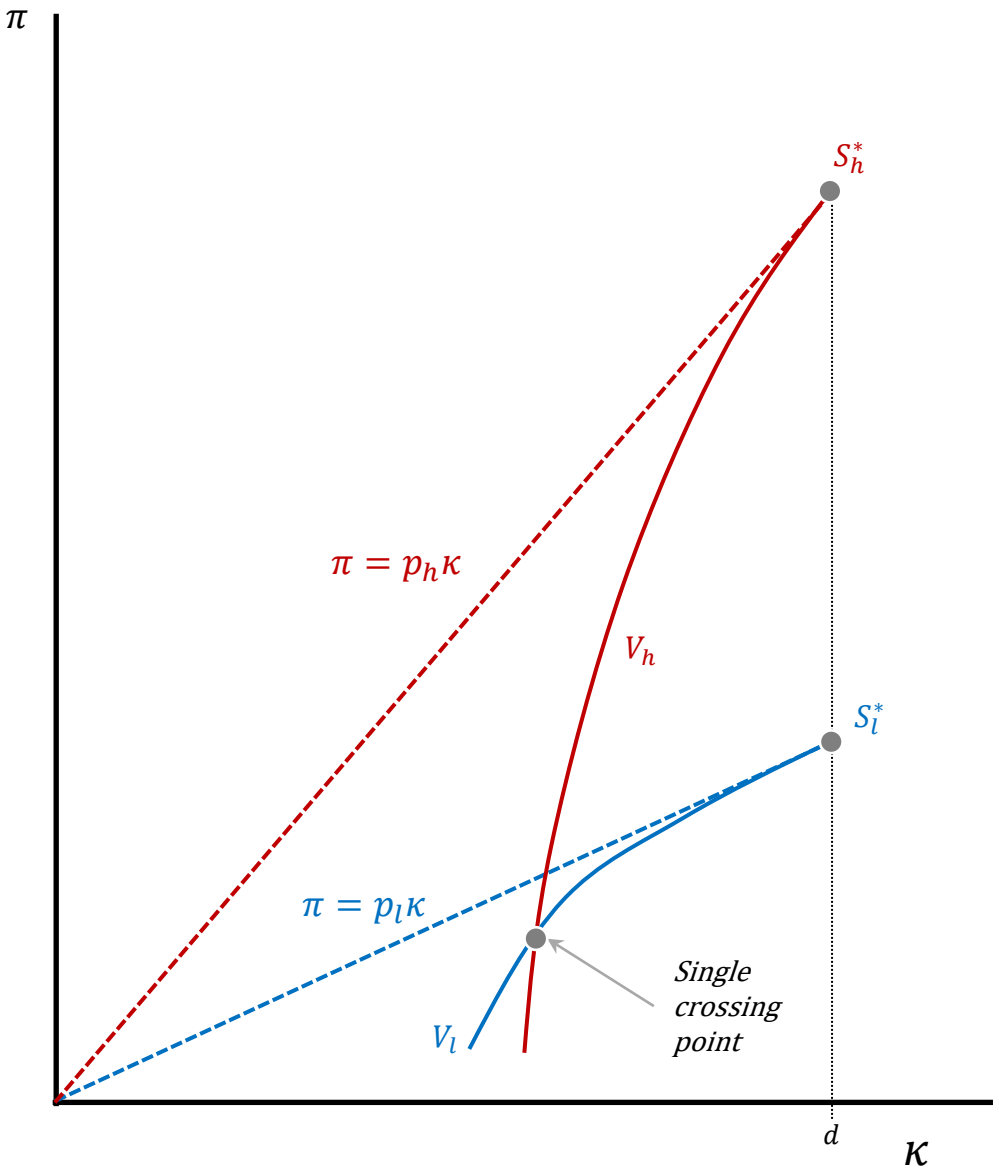
$$p = \theta_h p_h + \theta_l p_l$$

- So an actuarially fair contract offered to all must relate premium and coverage by

$$\pi = p\kappa$$

- But if we segregate the population into types, actuarially fair contracts would differ
- The slope of the curve depends on the probability of loss (pi)
- Where this the population line lies depends on the how large the weight of high or low risk types is in the population lies – i.e. it depends on (θ)

Perfect information



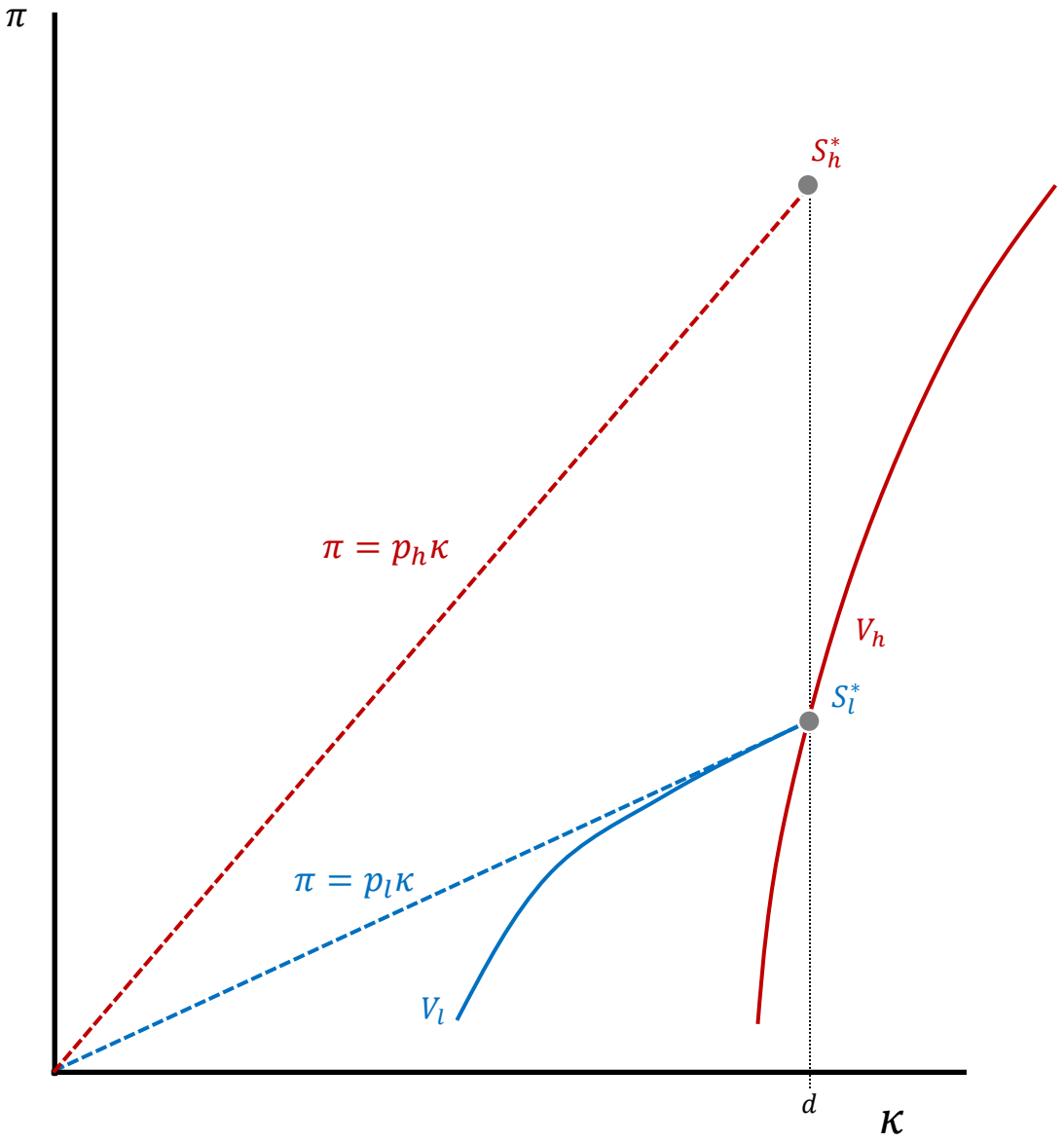
Indifference curves

- Consumers will pay a higher premium for greater coverage
- Concavity indicates risk aversion
- Willingness to pay for coverage increases with probability of damage
- High risk is willing to pay more for a small increase in coverage than low risk (and therefore has a higher slope)
- This means that there is a single crossing point

Contracts

- With full information p_i is known and contracts are offered along the *actuarially fair* lines
- These are equilibrium contracts. More generous offers operate a loss; less generous offers are competed away.
- Both types fully insure: $d = \kappa$ and pay the corresponding premium
- There is full coverage at a fair premium
  - $S_h = (\kappa_h, \pi_h)$: $S_h^* = (d, p_h d)$
  - $S_l = (\kappa_l, \pi_l)$: $S_l^* = (d, p_l d)$
- The outcome is pareto efficient

Imperfect information

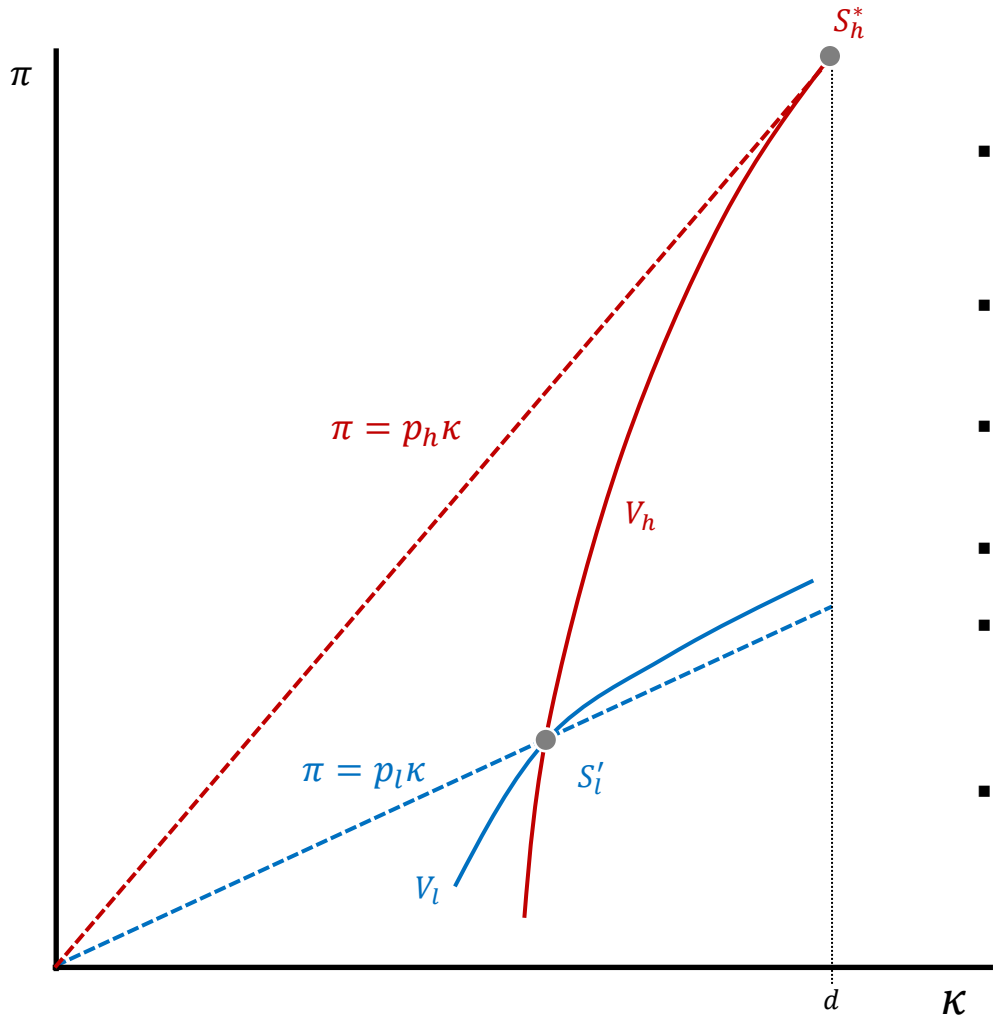


If types are not observable

- high risk types will gravitate to $\boldsymbol{S_l}$
- Here, premiums are based on low-risk but pay-outs will be the expected loss across the whole population
- The offer will be withdrawn and the only contract on the table will be S_h
- Adverse selection has crowded the low risk types out of the market once more.

Imperfect information: Separating contracts

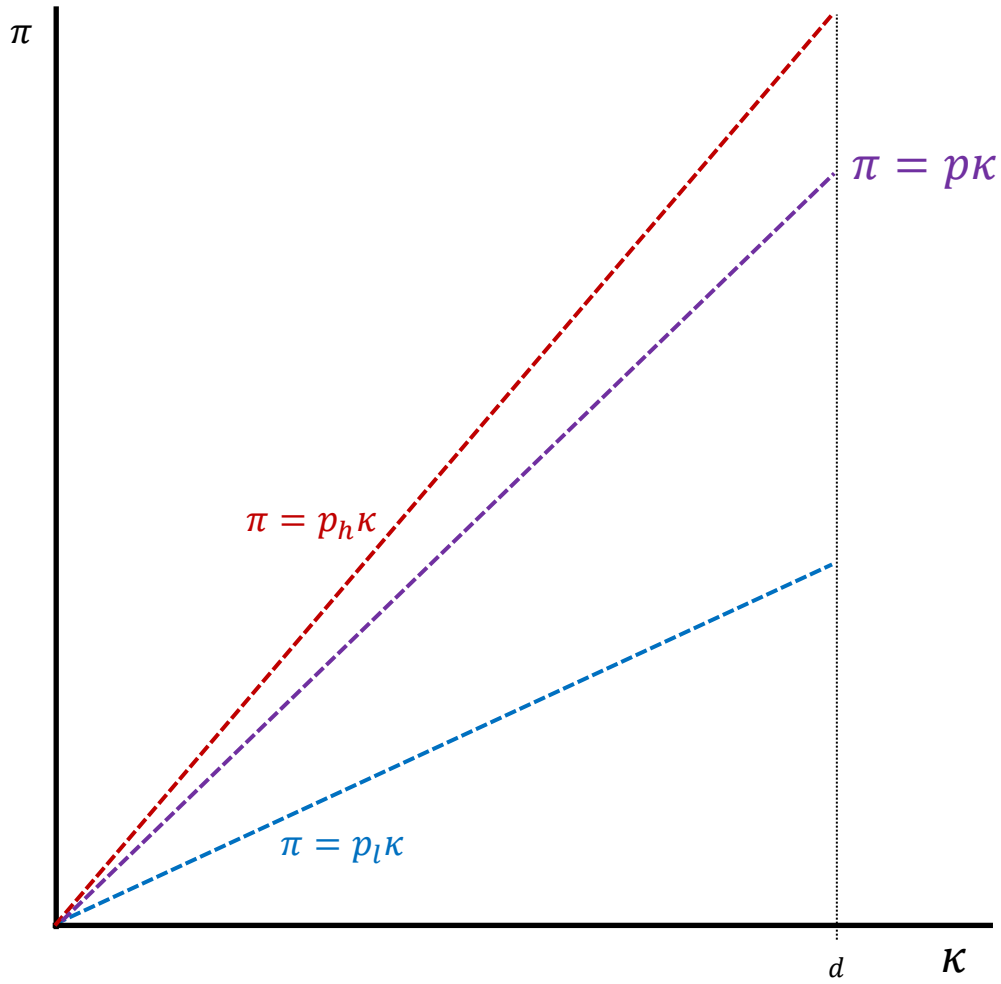
- The challenge is to design a contract that will attract the low-risk type, but does not attract the high risk type
- For self selection to work, the separating contracts must satisfy incentive compatibility constraints:



  - $V_l(S_l) \geq V_l(S_h)$ $\quad$ IC_U
  - $V_h(S_h) \geq V_h(S_l)$ $\quad$ IC_D
- S_h^* offered under perfect info does not satisfy ICD
  - $V_h(S_l^*) \geq V_h(S_h^*)$
- There is only one undominated pair of contracts that achieves separation (S_h^* and S_l')
- The high-risk type receives full cover at an actuarially fair premium
- The low risk type is restricted to partial cover;
- The extend of cover is restricted by the high-risk type's indifference curve, at the point where it intersects with the actuarially fair contract line.
- The good (low risk) type is constrained by the preferences and incentive compatibility of the bad (high-risk) type

Imperfect information: Pooling contract

- Is it possible to offer a single pooling contract that will be incentive compatible for both types, actuarially fair, and profitable for insurance companies?



- The full population probability of an accident is

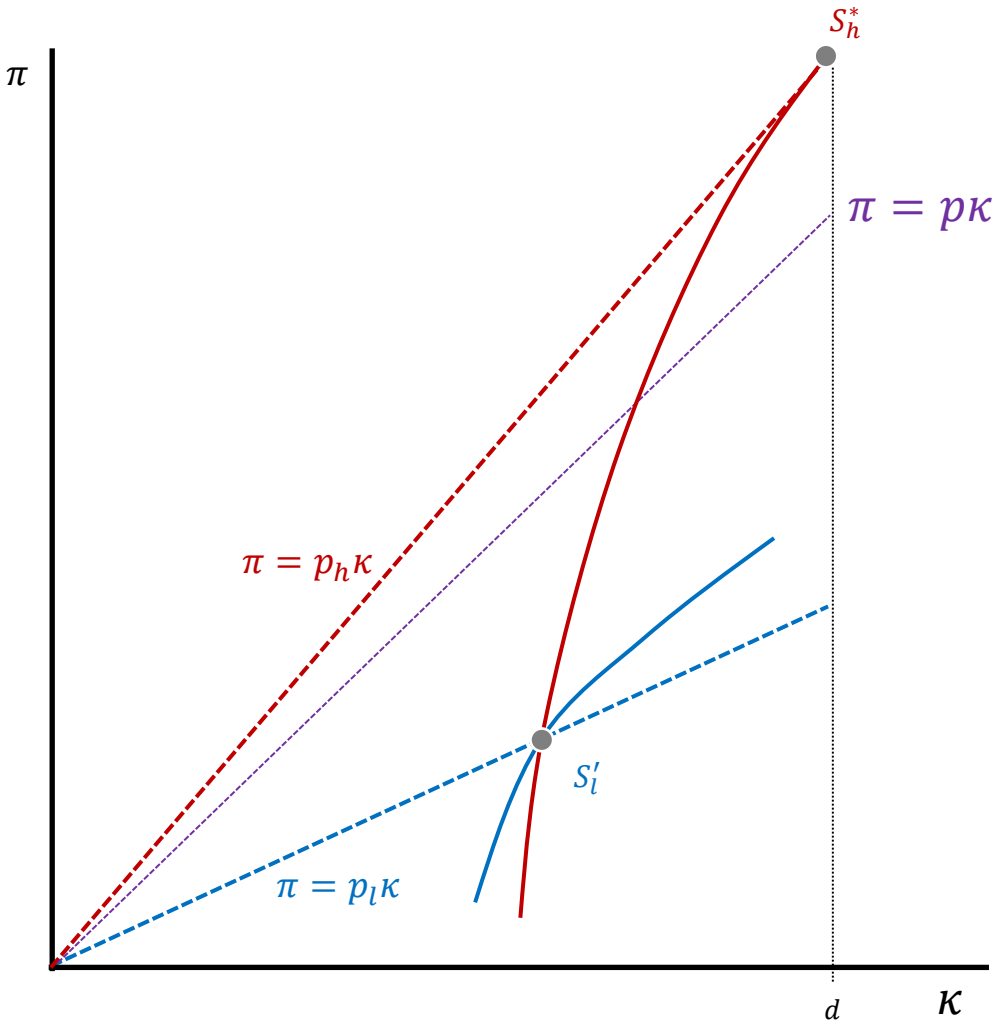
$$p = \theta_h p_h + \theta_l p_l$$

- So an (actuarially fair) contract offered to all must relate premium and coverage by

$$\pi = p\kappa$$

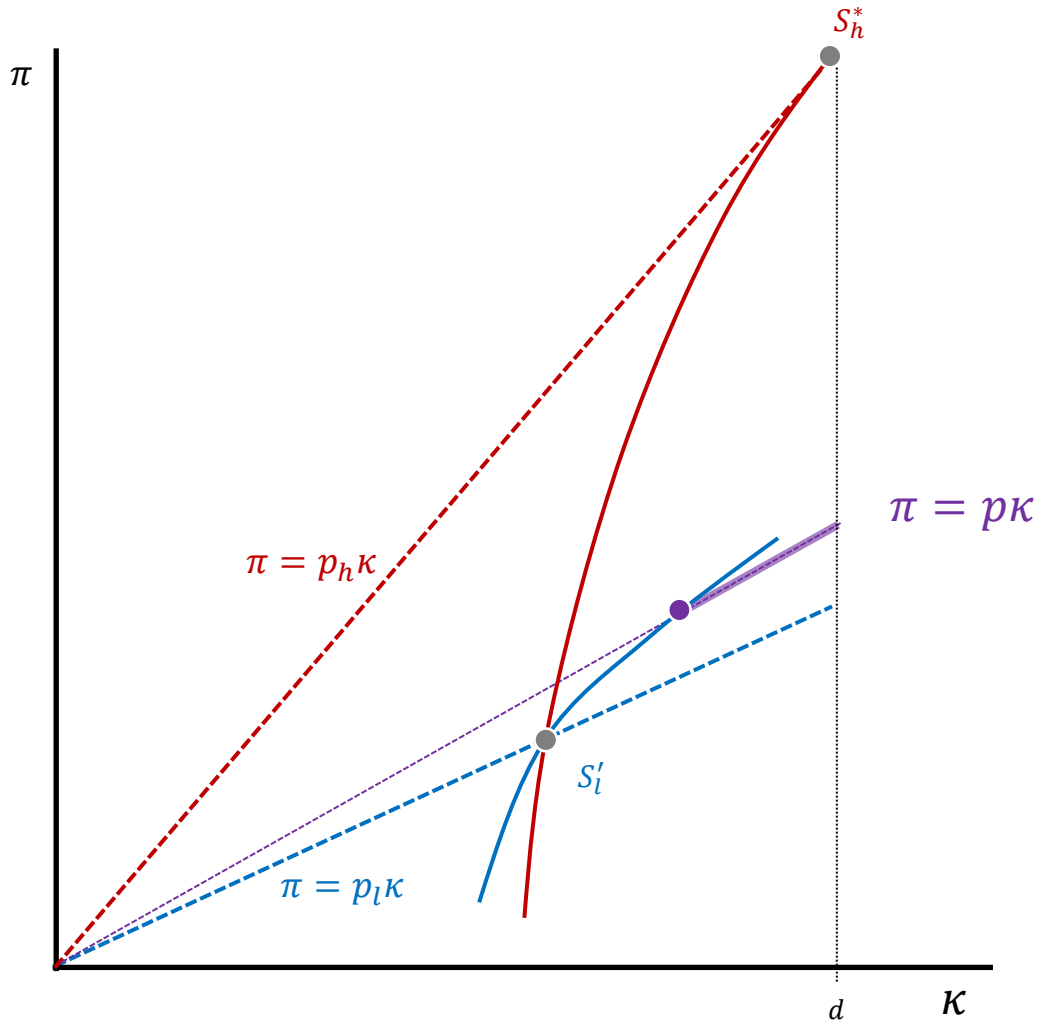
- Where this contract line lies depends on the how large the weight of high or low risk types is in the population

Imperfect information: Pooling contract



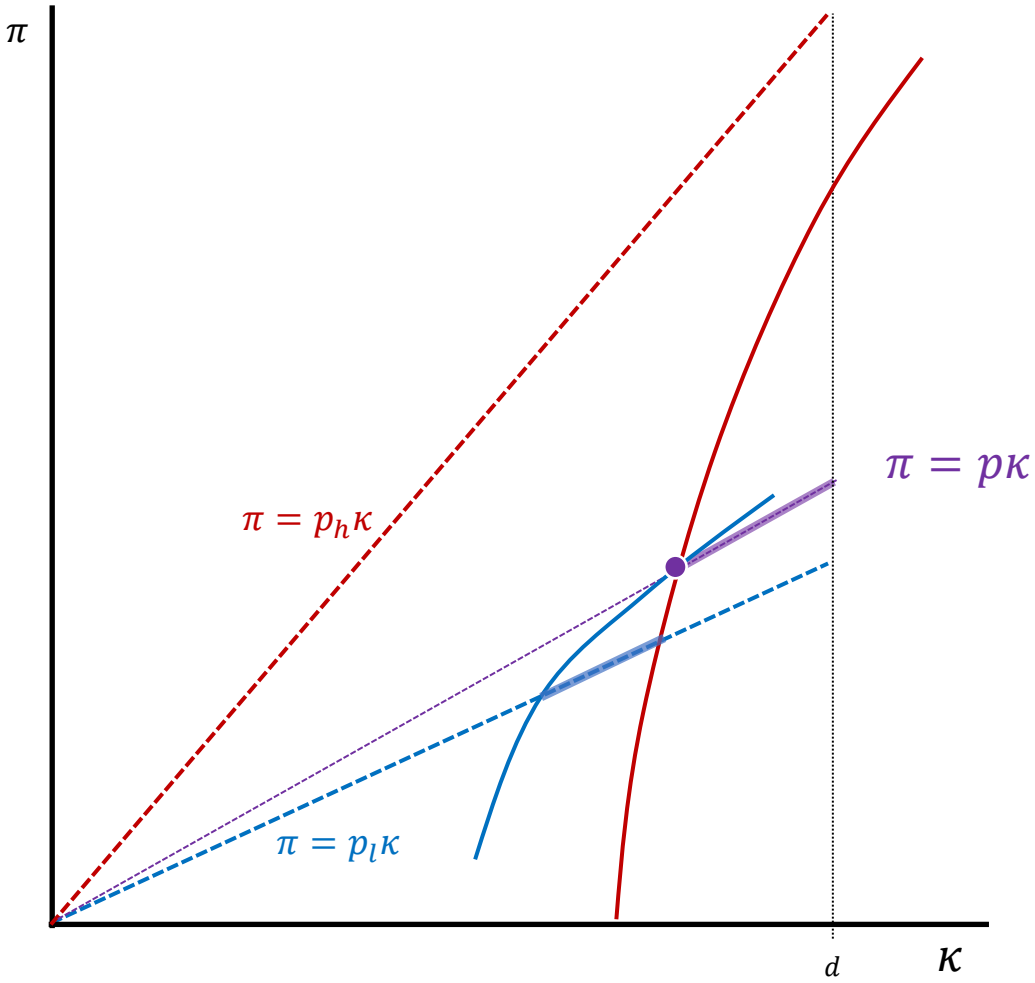
- If the weight of the high risk types in the population is high, a pooling equilibrium will not be possible
- Any contract offered along the population line will attract high risk types, but not low risk types, leading to adverse selection

Imperfect information: Pooling contract



- But if the weight of the low risk types is predominant, a pooling equilibrium may be possible
- If this is the case, the separating contracts will not be an equilibrium
- With competition will high risk customers will defect to the pooling contract

Imperfect information: No pooling equilibrium



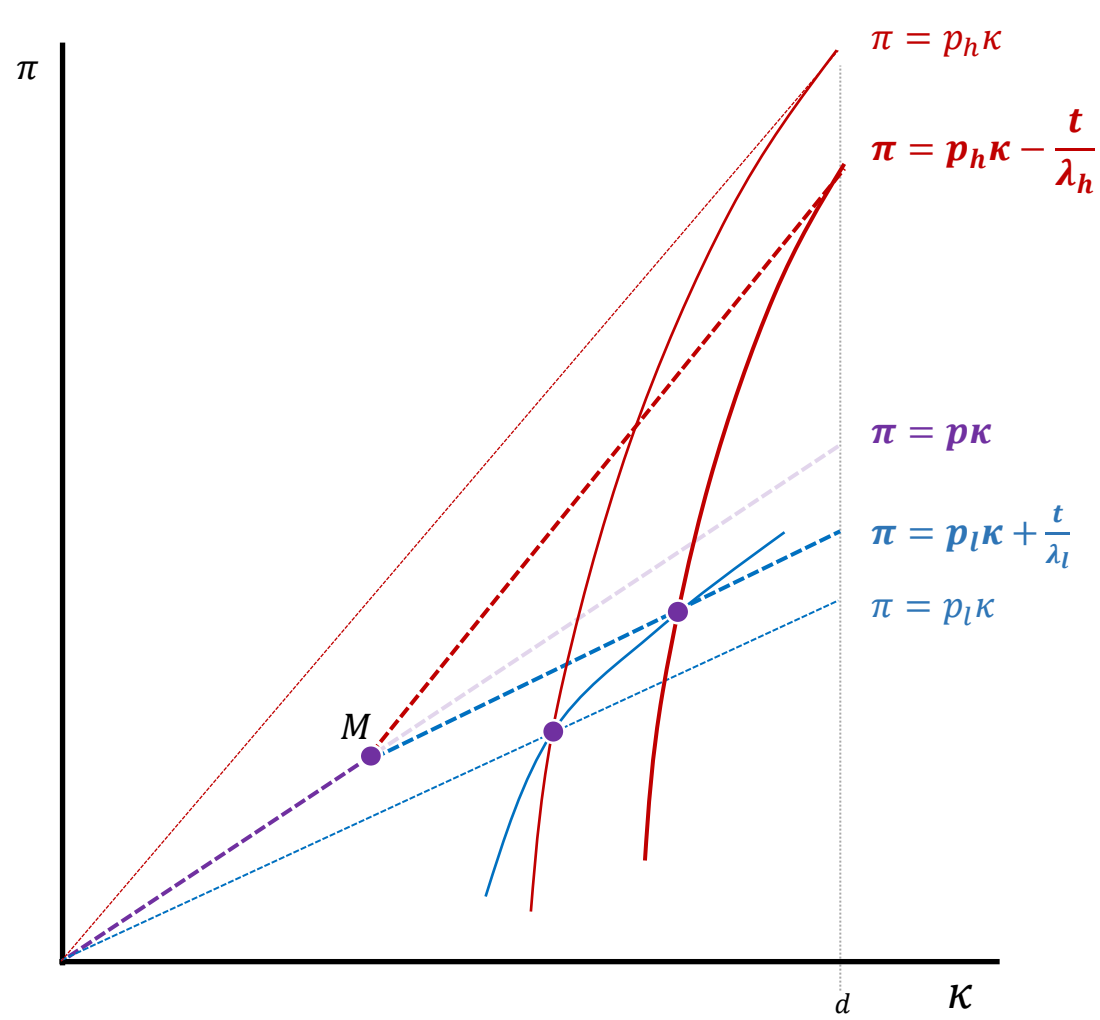
- But while in these condition the separating contracts cannot be an equilibrium
- … neither can the pooling contract … because more favourable separate contracts can be offered to the low risk types ..
- … and without the low risk types the pooling contract is not profitable

Summary

- There exists a pair of contracts that separate the population and are not dominated by any other separating contracts.
- On the one hand, they constitute an equilibrium if the proportion of high-risk consumers in the population is sufficiently large
- In this case low-risks prefer to separate and choose partial coverage rather than be pooled with many high risks and pay a higher premium.
- On the other hand, if the proportion of low-risk types is sufficiently large, there will be a pooling contract that is preferred by both types and profitable for an insurance company.
- In this case there is no separating equilibrium
- However, there is no pooling equilibrium in this model of the insurance market (or as Barr puts it "the pooling equilibrium is not stable")
- When there is no separating equilibrium there is no equilibrium at all
- Asymmetric information either:
  - Causes inefficiency by leading to a separating equilibrium in which the low risk have too little insurance cover, or
  - It results in there being no equilibrium at all.
- Attempts by insurances to recruit good risks and avoid bad risks are know as *cream skimming*
- *But note that adverse selection results in no coverage for low-risk people – but this means that high-risk people loose some of the benefit they could have obtained by pooling*

Imperfect information: Government intervention

- Types are not observable to government; like the private sector they can only make inferences by observing choices.
- But government can achieve a pareto-improvement by imposing a cross subsidy from low-risk to high risk types: Subsidize the high-risk premium and pay for it by taxing the low risk premium



- How can this be done if we don't know who is who?
- Impose minimum coverage for all at the average risk premium (M)
- This relaxes IC_D: High-risk types can now purchase additional insurance along the actuarially fair contract line from M
- The result is a pareto improvement
- Private insurance companies cannot do this as it requires collective action.
- Government is able to achieve a pareto improvement through its ability to coordinate a transfer

Moral Hazard

Moral Hazard

- Hidden action: one party can affect the quality of a traded good or contract variable by some action, and this action cannot be observed by the other party.
- With moral hazard, the insured person can influence the insurer's expected loss $p_i L$, without the insurers knowledge.
- This creates an incentive problem: once I am fully insured I have no incentive to lower the probability of a claim (p) or the size of the claim (L)
- Preventive activity z reduces the probability of the insured event, but is costly to the insured.
  - The efficient level of z is where MC_z = Marginal reduction in $p_i L$
  - But once the contract is signed, the insured bears none of the cost of $p_i L$, the benefits of z are dispersed across all premiums and it is costly for the insurer to monitor z

Four cases of moral hazard

- A fully insured person faces no marginal cost for a claim: the costs of a loss are socialized while the benefits of a claim remain private and this can lead to overconsumption.

Case 1 Endogenous p_i and high psychic cost. • Suicide does not present (large) moral hazard for life insurers • Insurance is incomplete because it doesn't cover the psychic cost of death! • Note, adverse selection might still be an issue	**Case 2** Endogenous p_i and low psychic cost • Classic moral hazard • Driving recklessly or parking outside
Case 3 Endogenous p_i and psychic gain • Planned pregnancy • Elective healthcare (hair transplant) • Insurance is generally not possible	**Case 4** Endogenous L at no cost • Third party payment problem • Neither doctor nor patient have incentives to limit claims against an insurer (and may have incentives to claim more) • The costs of excessive claims are borne across the pool of insured through higher premiums

- Inspection
- No claims bonus (higher premiums for frequent claimers)
- Deductibles (excess)
- Coinsurance (proportional excess)

Social Insurance

Welfare state as piggy bank Barr

- We can think of the modern welfare state as serving two functions:
  - **Robin hood**: a series of institutions that provide poverty relief, redistribute income and wealth, and reduce social exclusion.
  - **Piggy bank**: a series of institutions that provide insurance and offer a mechanism for redistribution over the life cycle.
- The welfare state exist for reasons additional to and separate from poverty relief, reasons that arise out of pervasive problems of imperfect information, risk and uncertainty.
  - High transactions costs or outright market failure suggest an important role for social insurance.
  - Information failures mean that actual insurance cannot cover important contingencies in a market system: unemployment, inflation or medical risks
  - Private institutions and private markets face intractable and predictable problems in redistributing income over the life cycle.
  - The state is necessary to provide insurance and consumption smoothing.
  - The welfare state has an efficiency function
- When it provides social insurance, it is often hard to distinguish between the “robin hood” and “piggy bank” function
  - Social insurance is not always constructed on an actuarial basis
  - Compulsory risk pooling inevitably means some form of transfer from low-risk to higher risk people
  - Many government programmes combine elements of risk pooling and redistribution

Social insurance

- Arrow: 'the failure of the market to insure against uncertainties has created many social institutions in which the usual assumptions of the market are to some extent contradicted"
- Institutions may arise that are effective in protecting against risk, but not "insurance" in an actuarial sense.
- These institutions include:
  - Social insurance schemes modelled on private actuarial schemes
  - Social assistance based on a means test
  - Universal benefits: where contingent benefits are tax financed without contributions
- The line between actuarial insurance and social insurance is fuzzy:
  - How actuarial is the insurance contribution?
  - What is the relationship between contributions and benefits?
  - Is the contribution effectively a tax or an insurance premium; or in other words is it a two-sided exchange or a transfer?
  - What are the behavioural implications of this?

Social insurance (2)

- Insurance in the sense that benefits are often related to contributions and are triggered by a contingent event
- Social insurance may rely on risk pooling, but where such arrangements not “actuarially-sound” they require subsidies from general taxation
- But social insurance usually rests on compulsion; and since low-risks cannot exit it is possible to break the link between premium and individual risk
- The uncertainty in contract is less specific and so protection can be given against private risks the market cannot insure. Social insurance can cope with addition to risk and also respond to aggregate/systemic shocks. Unforeseen risks and new contingencies can be introduced.
- Social insurance is both a technical instrument for dealing with market failure and a a redistributive devise

Insurance for income loss

- Methods available for income protection
  - Pure private arrangements: actuarial insurance and charity
  - Mixed: private arrangements that are regulated and/or publicly financed
  - Public: social insurance, social assistance or universal benefits
- Clusters of benefits provided in modern welfare states:
  - Unemployment: almost always compulsory, sometimes contributory; benefits for a particular length of time; severance pay
  - Work injury: covers loss of income for work-related injuries or occupational illness; short term and long term
  - Sickness and maternity: temporary incapacity; income replacement and medical bills
  - Old age: awarded on eh basis of age; sometimes depends on contributions
  - Disability: a pension covering absence from work;
  - Survivors: pension payable to surviving spouse, children or other dependents
  - Family allowances: cash support in to incomes of families with young children

Unemployment insurance and efficiency

- Uninsured losses due to unemployment may impose costs on others (family, or other (taxpayer financed) state benefits.
- Regulation or provision? Third party car insurance required in most countries (because of external costs); why should the state provide instead of just regulating?
  - Are the risks idiosyncratic or systemic?
    - Is p independently distributed? (Keynesians vs New Classical economists would disagree on this)
    - Some parts of the labour force (e.g. young workers) might have very high risk
  - Adverse selection: those most likely to become unemployed will be the first in the queue
  - Moral hazard
    - Probability of entering unemployment
    - Probability of leaving unemployment
    - How do we evaluate uninsured psychic costs?
    - To what extent does insurance reduce the cost of being unemployed?
  - Empirically, its very hard to buy private insurance that tops up public cover.
- Thus, unemployment is not a risk that accords well with the model of actuarial insurance

Unemployment insurance and incentives

- Do unemployment benefits raise the level of unemployment?
- A high replacement rate could create an unemployment trap, in which a person has little financial incentive to seek work.
- "When increases in benefits narrow the gap between in-work and out-of-work incomes, work becomes less attractive; the effect is to encourage dependency"
- It is sometimes argued that unemployment is more persistent in Europe than in Japan and USA because the former tend to have higher unemployment benefits
- Benefit structures:
  - Replacement rate
  - Duration
  - Conditions: e.g. "actively seeking work" or "acceptance of work offers"
- Broader labour market policies
  - Placement and counselling
  - Training
  - Role and power of trade unions
  - Flexicurity and "making work pay" policies (EITC)
- Therefore, simple relationship between the level of benefit and duration of unemployment is not empirically strong.