

LIABILITY

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Hunt Allcott

PASTURE 1: REGULATING RISK WITH LIABILITY

Draw Risk Reduction graph

Optimum at the intersection.

Question: Why not regulate with liability?

Push question: Force the firm to pay the damage, and it will equate MC with MED.

- The court payment may not equal marginal damage: could undercharge or overcharge
- Bankruptcy.
- Individuals face transactions costs in filing claims and suing in court.
 - This causes too little x
- Firms face transactions costs in going to court
 - This causes too much x
- The court itself is costly.
 - Since court is only triggered after an accident, this also causes too little x .

Question: what is the effect of limited liability?

Same as bankruptcy

Question: Why not regulate with government oversight?

- Government may not know $MC(x)$, so could mandate too much/too little precaution.
- Oversight is also costly.

Combinations of liability and direct regulation are common.

PASTURE 2: EXPECTED UTILITY

Question: How to model consumers' utility over uncertain events?

von Neumann-Morgenstern Utility:

$$U(x_A, x_B, \pi_A, \pi_B) = \pi_A u(x_A) + \pi_B u(x_B)$$

vNM utility is cardinal, not just ordinal.

Graph utility over money:

Question: which person is risk averse and which is risk-seeking?

The concave graph is risk averse: He would rather have the expected value with certainty than take the gamble.

The convex graph is risk seeking: He would rather have the gamble than the expected value.

$$\text{Expected payoff} = \pi_A x_A + \pi_B x_B$$

Certainty equivalent:

$$U(\text{CE}) = E[U] = \pi_A u(x_A) + \pi_B u(x_B)$$

Example: log utility, 50/50 chance at \$1 vs. e^{10} . ($e^{10} = \$22,026.47$)

Expected payment = \$11,014

$$E[U]=5$$

$$\ln(\text{CE}) = 5$$

$$\text{CE} = e^5 = \$148$$

So this person is highly risk averse!

Question: What business opportunity does risk aversion bring?

Selling insurance

Question: What business opportunity does risk seeking bring?

Selling gambles

PASTURE 3: IRREVERSIBILITIES

We may not know the value of the marshes in Louisiana. They could be quite valuable. Or they could just be some grass. More information will arrive in the future.

Question: What are similar examples of irreversible actions where we'll know more in the future?

Value of a rainforest ecosystem – potential pharmaceutical products.

Climate change – uncertain damages.

* Draw decision tree

Assume that if you don't build, you get 0.

Assume that if V, you don't want to build, but if NV, you do want to build.

Question: How to write this?

$$B-C-E < 0$$

$$B-C > 0$$

Expected value if must decide in period 0:

Question: What part of the tree is shut down if you have to build in period zero?

$$\text{Develop: } \pi \cdot (B-C-E) + (1-\pi) \cdot (B-C)$$

Not develop: 0

Develop if $\pi \cdot (B-C-E) + (1-\pi) \cdot (B-C) > 0$

Expected value if wait until period 1:

$$\beta \cdot \pi \cdot 0 + \beta \cdot (1-\pi) \cdot (B-C)$$

$$= \beta \cdot (1-\pi) \cdot (B-C)$$

Value of being able to wait to acquire more information:

$$\beta \cdot (1-\pi) \cdot (B-C) - \pi \cdot (B-C-E) - (1-\pi) \cdot (B-C)$$

$$= (1-\pi) \cdot (\beta-1) \cdot (B-C) - \pi \cdot (B-C-E)$$

Question: can you interpret this?

= (Probability you want to develop) * Loss from developing a period late + (Probability you don't want to develop) * (Avoided loss from developing when environmental value is high)

FINISHING ENVIRONMENTAL POLICY MECHANISM DISCUSSION

PASTURE 1: HYBRID PRICES AND QUANTITIES: SAFETY VALVES

Use the example on page 315.

PASTURE 2: TAKEAWAYS

Question: When do we prefer cap-and-trade vs. taxes vs. CAC?

	CAT	Tax	CAC	Notes
Large group of emitters	Yes			Liquid market
Concentrated group of emitters	No			Market power
Spatial differentiation in damages			Yes	CAT/Tax political feasibility
Abatement cost heterogeneity				Equimarginal Principle
Emissions costly to observe	No	No	Yes	Tech standard, e.g. cars
Property rights difficult to enforce	No			David Victor/Kyoto
Each site pollutes a lot				
"Pollution > transaction costs"				
Distortionary labor taxes	Yes	Yes	No	CAT yes if auction
Uncertain marginal costs of abatement				
Marginal damages more steeply	Yes	No		
sloped than marginal savings				
Marginal savings more steeply				
Sloped than marginal damages	No	Yes		
Leakage				

Technology developed by plants	Yes	Yes	No	Stifles plant innovation
Technology developed by vendors			Yes	BACT guarantees market
Regulator has poor info on abatement tech			No	

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