From Last Time

- Willy owns a chocolate factory
- Near river bank
- 10% chance of flood
- If flood, worth $50,000
- No flood, worth $500,000
- Can buy $1 flood insurance for $0.10

Answer directly

Optimization:

$$
\begin{aligned}
MRS &= -\frac{MU_F}{MU_{NF}} \\
&= -\frac{0.1 \cdot \frac{1}{2}\frac{1}{\sqrt{c_F^*}}}{0.9 \cdot \frac{1}{2}\frac{1}{\sqrt{c_{NF}^*}}} \\
&= -\frac{0.1\sqrt{c_{NF}^*}}{0.9\sqrt{c_F^*}} = -p
\end{aligned}
$$

Budget Constraint

$$
\begin{aligned}
c_F &= 50,000 + x - 0.1x \\
c_{NF} &= 500,000 - 0.1x
\end{aligned}
$$

After some algebra

$$0.1c_F + 0.9c_{NF} = \text{Some large number}$$

What is p?

- p=Relative price of consumption when flood
- $p = \frac{0.1}{0.9}$
- $-\frac{0.1\sqrt{c^*_{NF}}}{0.9\sqrt{c^*_F}} = -\frac{0.1}{0.9}$
- $\frac{\sqrt{c^*_{NF}}}{\sqrt{c^*_F}} = 1$

Use full insurance theorem

- Note that price is fair
- $\pi = E(\widetilde{\text{flood costs}}) + V(\widetilde{\text{flood costs}}) > p$
- Will demand full insurance

Readings

- Kimball
- Insurance Services Office
- Newspaper items

Insurable Interest

- Before: Why Insurance?
- Now: How much? . . .
- and Who?

How much?

- Own a home in SB
- $1 million
- Land worth: $800K
- How much should insurance company insure?

Think about incentives

- Offer to insure $1 million
- If homeowner "accidentally" starts a grease fire . . .
- the home is destroyed.
- Gets $1 million from insurer
- Keeps land value $800K
- House value only $200K

Homeowner's Incentives

- Burn down house . . .
- Net $800K.

Insurable Interest

- "[S]ome significant relationship between the insured and the person, the object or the activity that is the subject of the insurance transaction."
- Maximum economic value of damage.

Adjust previous example

- Suppose neighbor wanted insurance . . .
- against original house.
- Neighbor could offer to cook dinner . . .
- OOPS—grease fire "accident"

Incentives

Neighbor has no "significant relationship

Are economists cynical?

- Yes
- There are “good neighbors”
- Avoid giving “good neighbors” bad opportunities

Cynicism vs. Providing Opportunity

- Medicaid "crowd out"
- Increase in Medicaid coverage . . .
- leads to decrease in private insurance

History

- Prohibitions on "wagering"
- Economics: encourages "for profit" property destruction
- This protects the insurer

Example 1

- "Prudent limitation"
- Do not encourage bad behavior
- House and land value: $300K
- Could build condos for $800K
- Value of condos: $1 million

- Value of land= $1M-$800K=$200K
- Value of home=$300K-$200K=$100K
- Prudent limitation=$100K

If house is insured for $150K . . .

homeowner has incentive for an "accident."

Conversion point

- When to convert?
- How much destruction

Example 2

- Comic book store
- Value: \$2.5 M
- Put in a Starbucks at cost of \$1 M
- Starbucks worth \$3 M

Convert?

- Land value is \$3 M- \$1 M=\$2 M
- Conversion threshold

$$\$2.5M - \$2M = \$500K$$

Insurers beware!

- If you offer insurance for more than \$500K . . .
- incentive for "accidents."

Example 3

- Comic books become less popular
- Value: $1.5 M
- Put in a Starbucks at cost of $1 M
- Starbucks worth $3 M

Incentives

- Conversion value is -$500K
- CONVERT!!!
- Don't offer insurance

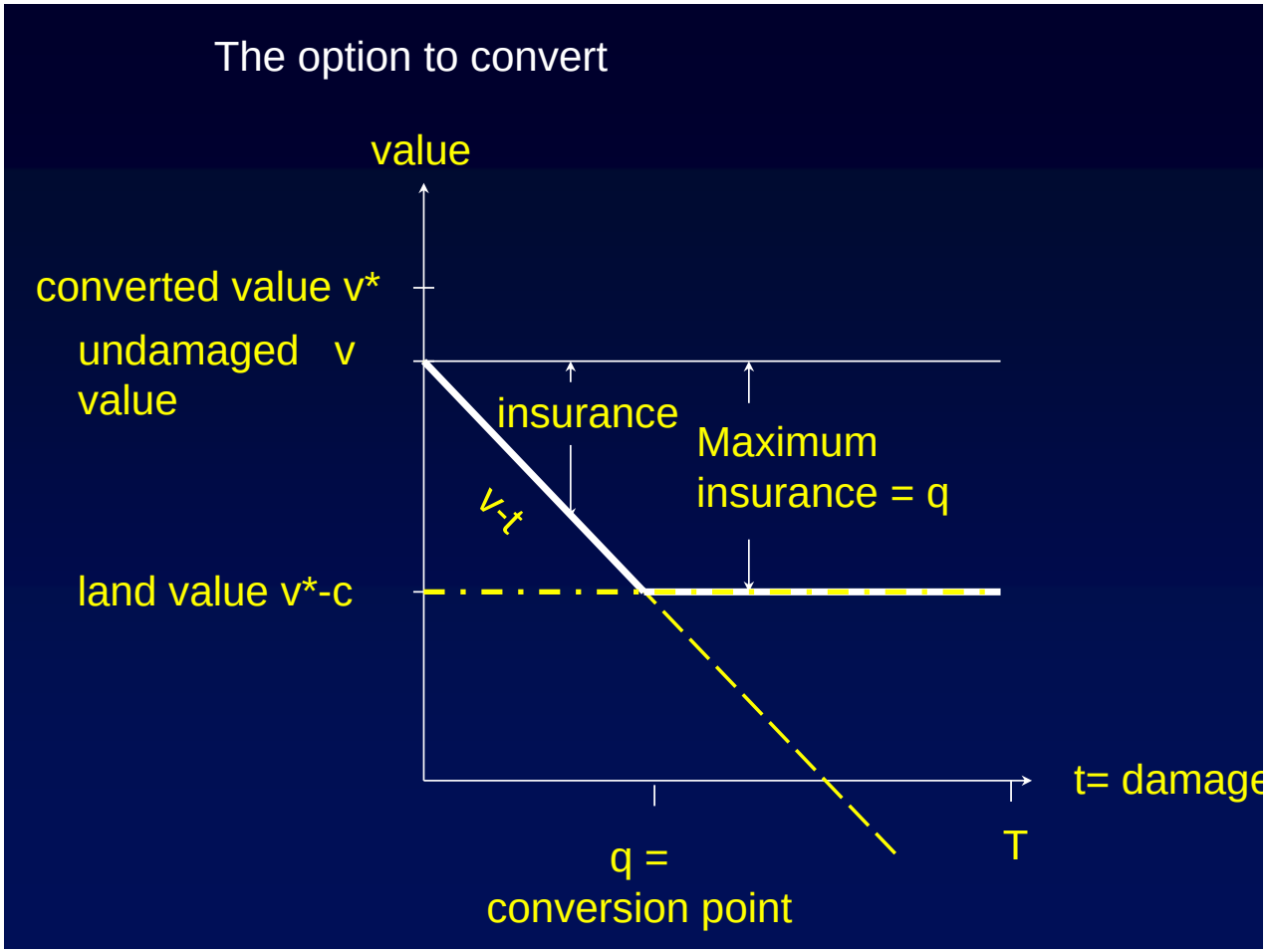
Example 4

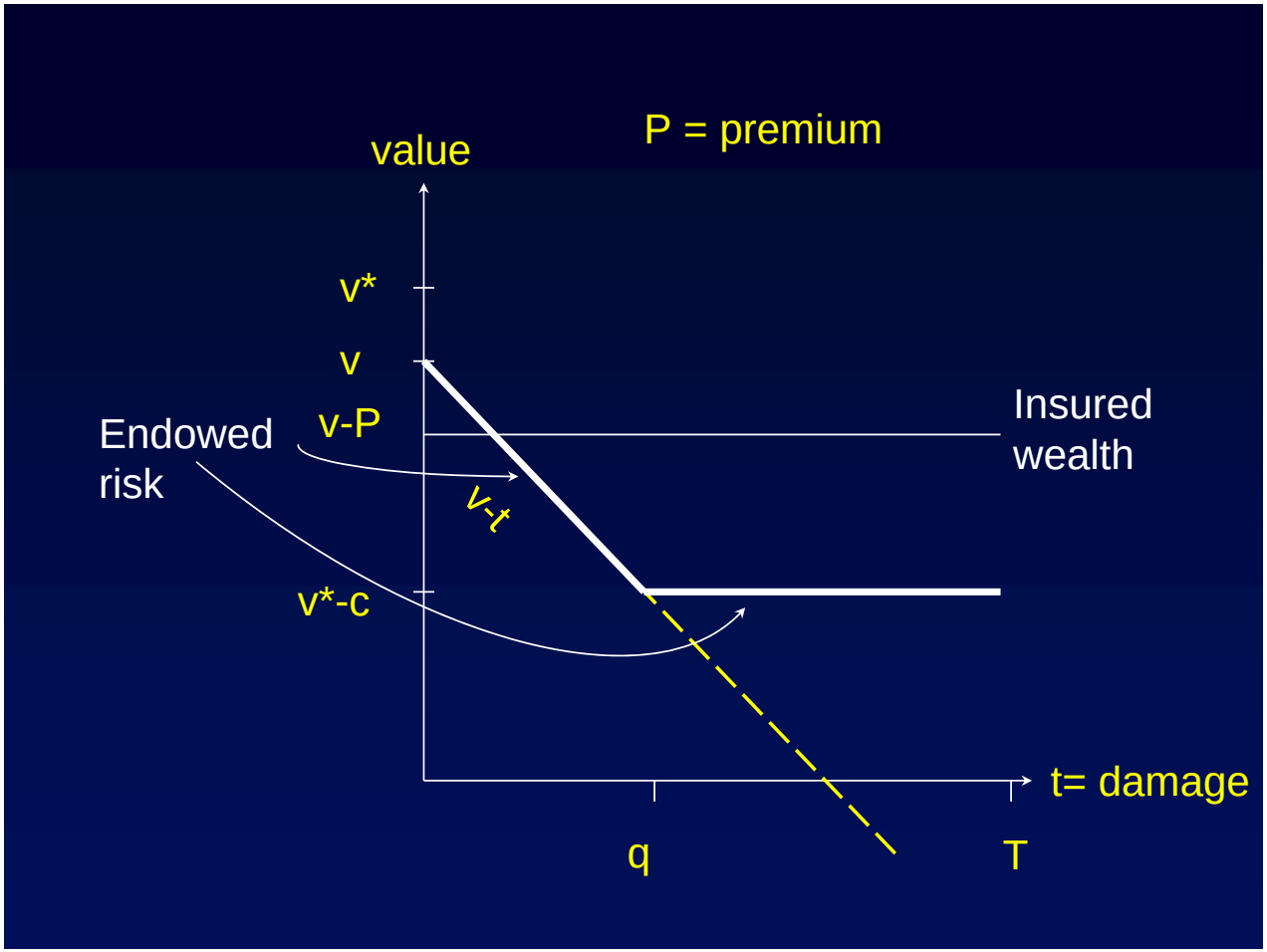
- $3 M shipment of dynamite
- Ownership split by two friends, 50-50
- One friend insures for $2 M

Incentives

- Insure more than ownership—incentive to destroy
- Only insure up to actual economic interest.

The option to convert




P = premium
value
v*
v
v-P
Endowed
risk
Insured
wealth
v-t
v*-c
t= damage
q
T

The consumer?

- Prudent interest protects insurers
- This is the supply
- What of the demand?

Legitimate demand

How much an "honest consumer" values insurance

What luck!

- Legitimate demand = Prudent Interest
- Insuring for more = More risk
- Risk averse don't like that

Tension?

- Supply curve: worry about the bad
- Demand curve: assume they are good

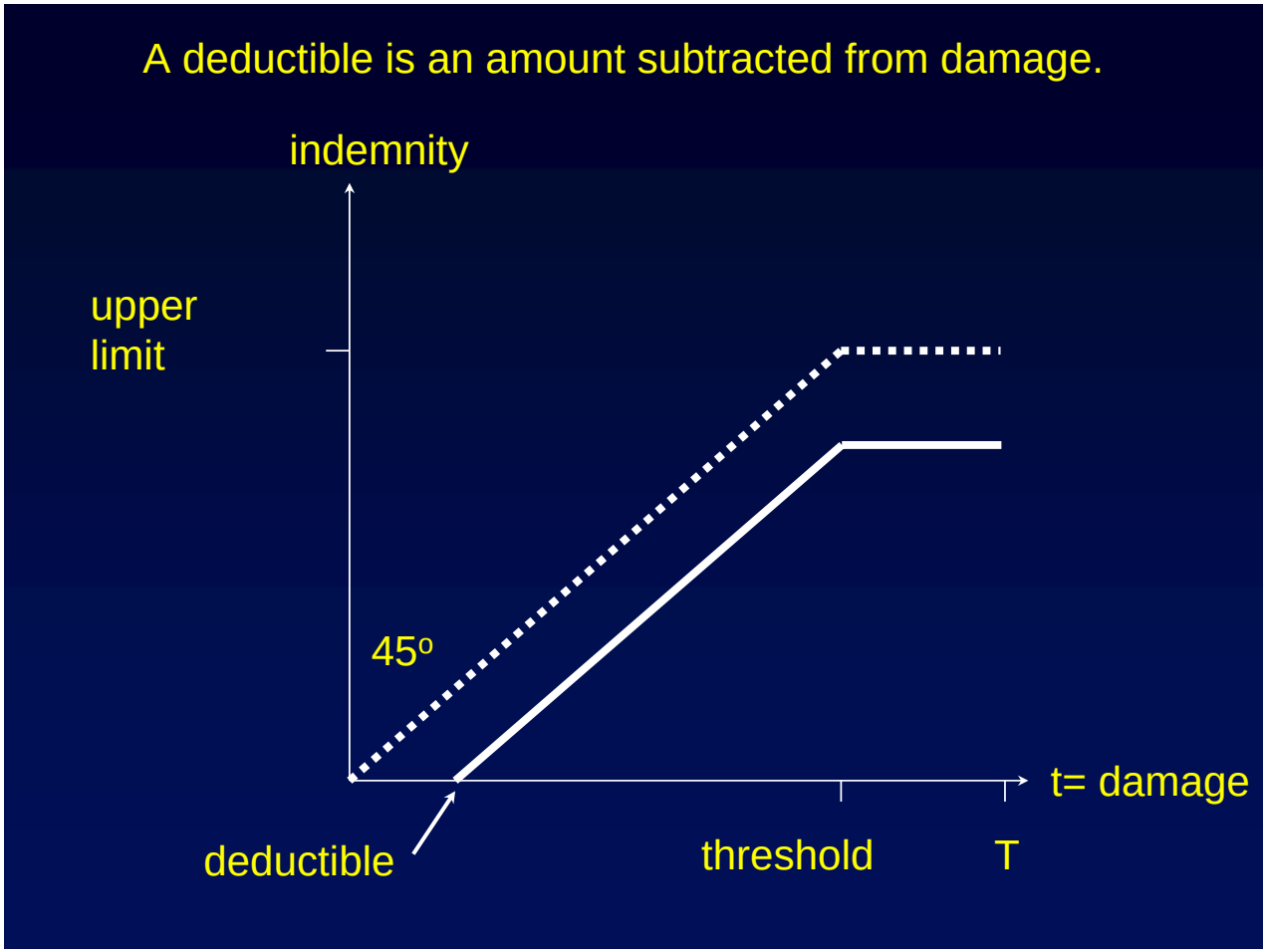
Theory is nice, but . . .

- Insurance contracts don't look like this
- How to assign value

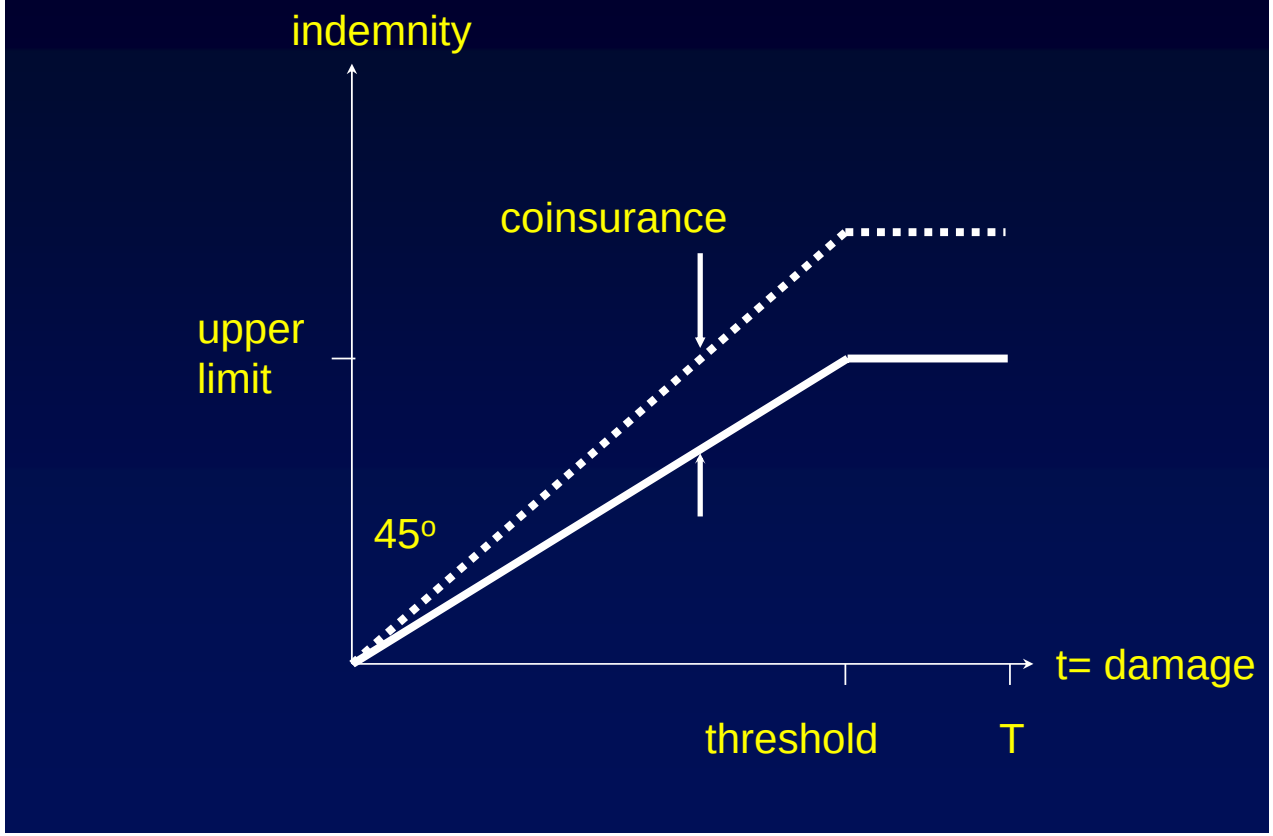
Real insurance contracts

- Deductibles
- Coinsurance

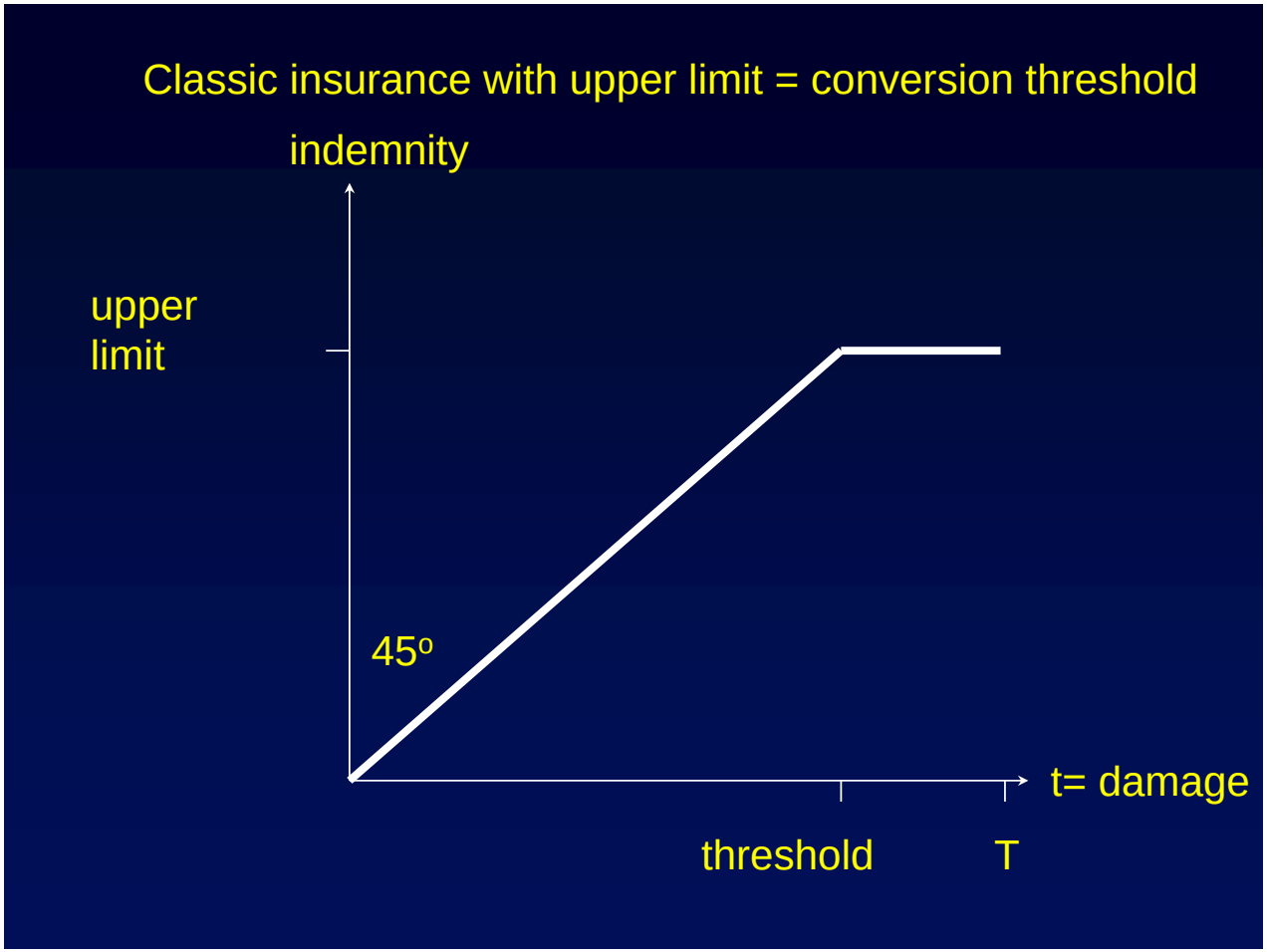
A deductible is an amount subtracted from damage.



Coinsurance means the client pays a fraction of damage.



Classic insurance with upper limit = conversion threshold



Upper limit?

- Maximum economic value of loss
- Can vary over length of contract
- Housing Market

If upper limit varies . . .

Upper limit can create more risk

Verifiability

- Land value debateable
- Restoration costs are easier
- “How much to fix a roof?”
- “How much to rebuild the same house?”

Conversion Values

Much harder to calculate

San Diego Fires

- Replacing vs. Rebuilding
- Cost of re-building house now . . .
- or after a natural disaster
- Common action problems
- Complicated contracts

Uninsured

- Despite theory of full insurance, many don't insure
- Too busy
- Too expensive?

Oakland Fire

- Underinsurance and Upward Conversion
- Better safety
- Better housing

Katrina

- What caused harm?
- Wind vs. Water?
- Little flood insurance
- Government intervention?

Two Weeks In

- Insurance Demand: Full Insurance Theorem
- Arrow-Pratt WTP: $\pi = E[\widetilde{x}] + \frac{r}{2}V(\widetilde{x})$
- Insurance Supply: Insurable Interest= Prudent Limitation
- Insurance rates always $= 1$
- Free markets work!

Rest of Class

- Insurance rate < 1
- Do markets work?
- Why don't they work?
- Topic by topic