

Adverse Selection

Health Economics Lecture 4



Outline

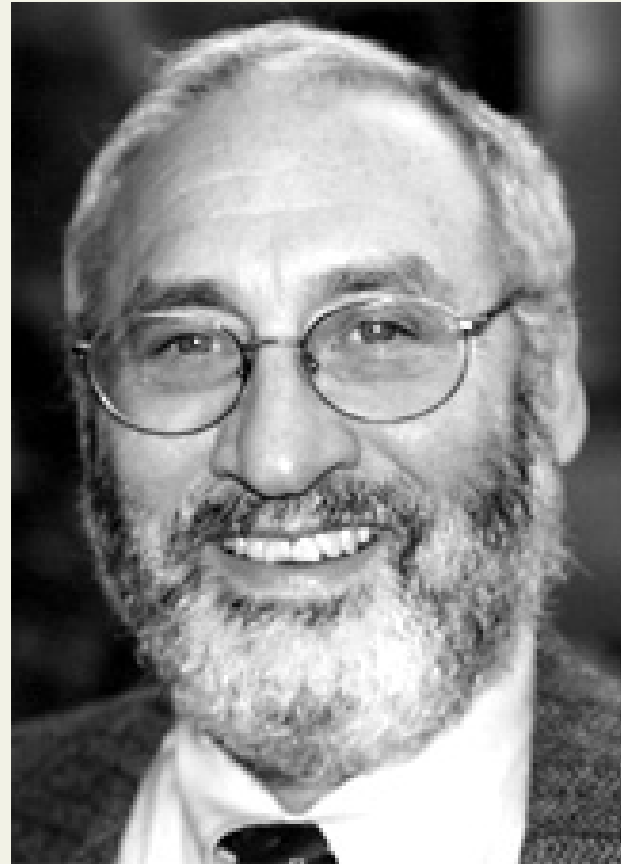
- Motivation
- What adverse selection is
- How it happens
- Rothschild and Stiglitz Model
- How to solve the problem

Policy Motivation=Classic Debate

- Experience Rating
 - Different people pay different rates
 - E.g. Discounts for non-smokers
 - Incentivizes self-protective behavior
 - Erodes the base of insurance cycle
 - Leads to an “insurance system” death spiral
- Community Rating
 - I.E. Everybody pays the same insurance rate
 - Transfers money from healthy to sick
 - “We’re all in this together”

Joseph Stiglitz

- 2001 Nobel Prize
- Joint with Spence and Akerlof
- For analysis of markets with asymmetric information



Adverse selection defined

- Adverse selection occurs because of information asymmetry where one side of a trade uses their information advantage to exploit the other and destroys the market, so nobody will trade
 - Used car dealers
 - Know more about the car than the customer
 - Buyers of health insurance
 - Trade their money for an indemnity if they fall sick
 - They know more about their health than the insurer

Advantageous Selection (Cherry Picking)

- New enrollees in MCOs “happened” to have incurred 20-30% lower costs in the prior year
 - Last year’s utilization is best predictor of next year’s expenditure
- How does this happen?
 - MCOs target the healthy
 - Advertisements in “Fitness Magazine”
 - Offices next to Gold’s Gym
 - The healthy target the MCOs
 - People who know they are going to be sick don’t want the MCO hassle
 - Self-select to FFS despite higher premium
 - Opposite of “Adverse Selection”

How adverse selection happens

- Multiple insurance firms competing for customers
- Insurance involves a transfer of money from the healthy to the sick
- Imagine a firm that could find a way to skim off only patients who never got sick.
 - No pre-existing conditions
 - Blood tests
 - Genetic tests
 - Medical exams
 - REALLY LOW PREMIUMS
 - No payments
- Meanwhile other firms with medium sick and very sick patients have fewer healthy patients to finance the system
 - They will want to skim off healthy patients too

Rothschild and Stiglitz Theory of Adverse Selection

- A theory of how the insurance contract itself leads to “experience rating”
 - High coverage, High Premiums
 - Attracts sicker patients
 - Low coverage, Low Premiums
 - Attracts healthier patients
- If healthy patients in firm A and sick patients in firm B, no cross subsidy occurring
 - Firm B will go bankrupt

Notation: Accident and Insurance

- Accident occurs with probability p
- With Accident vs. Without Accident
 - Without Accident
 - Have wealth “ w ”
 - With Accident
 - Have wealth “ $w-d$ ”
- With Insurance vs. Without Insurance
 - Premium is α_2
 - Net indemnified loss is $\alpha_1 = (\text{premium} + \text{damage} - \text{indemnity})$
 - Without Accident
 - Have wealth minus premium “ $w - \alpha_2$ ”
 - With Accident
 - Have wealth – damages – premium + indemnity
 - Also expressed as wealth minus “net indemnified loss” or “ $w - \alpha_1$ ”
- Insurance contract is a piece of paper that says (α_2, α_1) :
 - Pay Premium (α_2) Experience indemnified loss of (α_1)

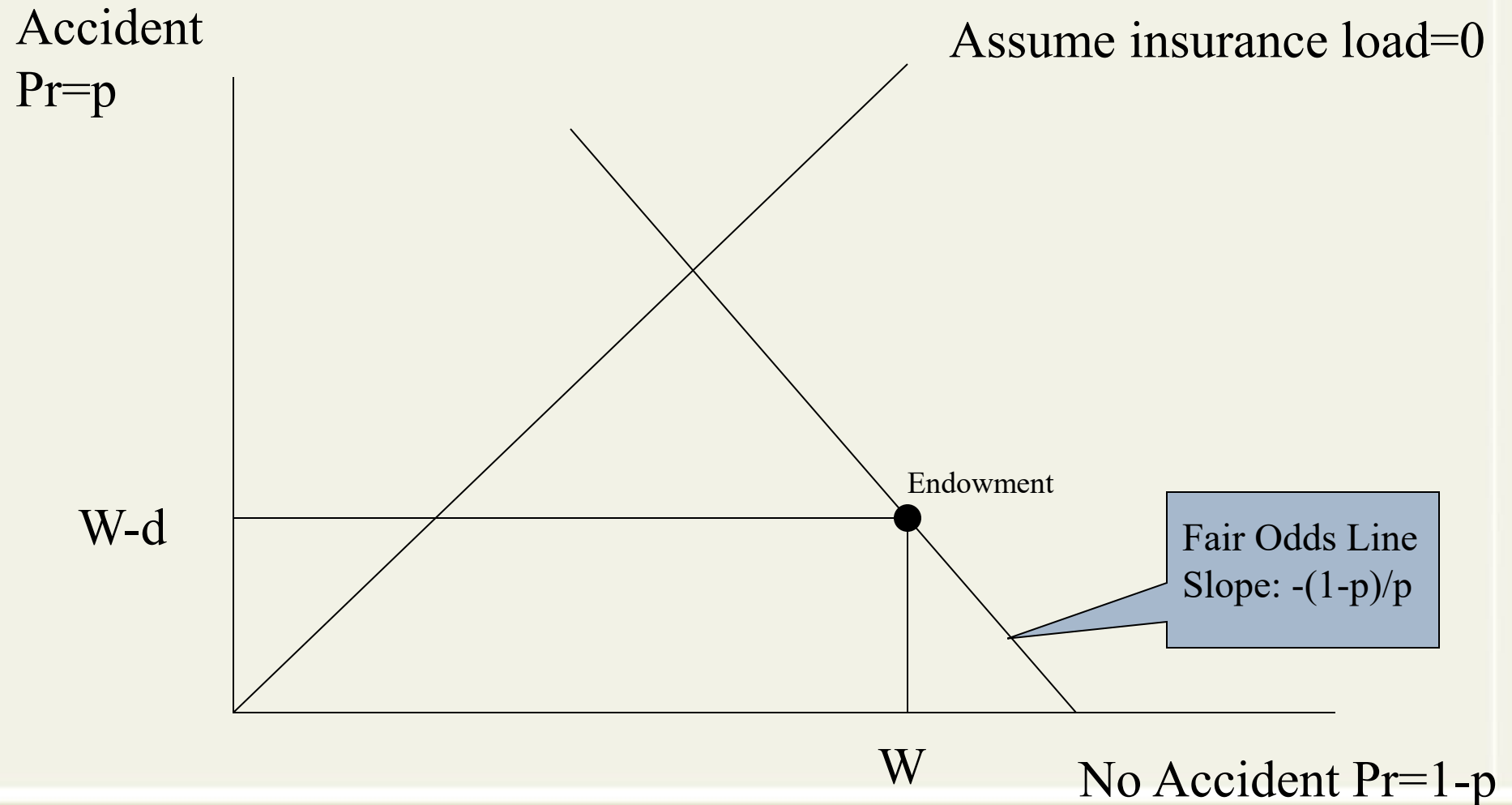
Payment Grid

	With Accident Probability p	Without Accident Probability $(1-p)$
No Insurance	$W-d$	W
Insurance	$W-\alpha_1$	$W-\alpha_2$

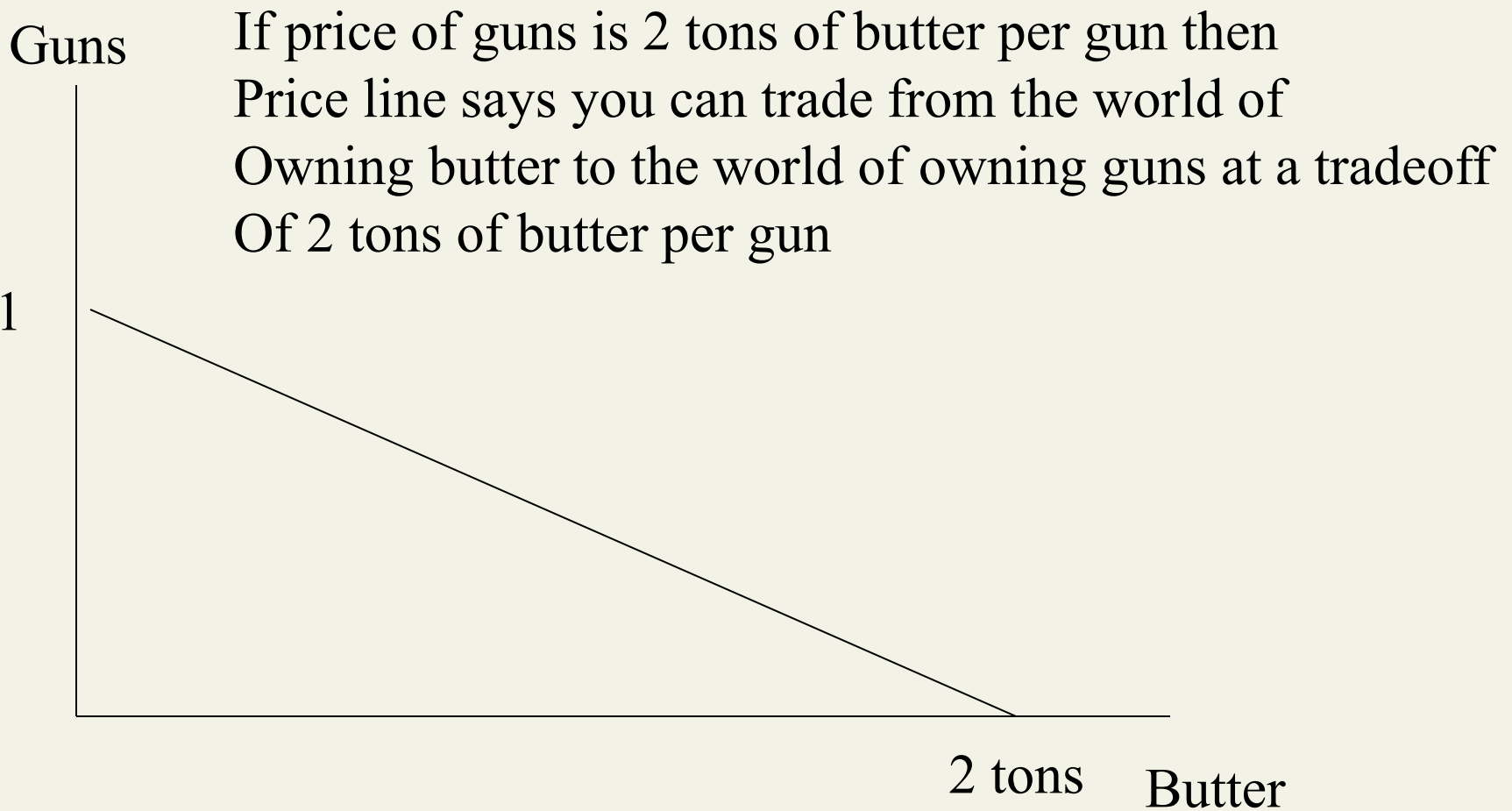
Customer checks expected utility

	With Accident Probability p	Without Accident Probability $(1-p)$	Expected Utility
No Insurance	$W-d$	W	$(p) \times (W-d)$ $+ (1-p) \times W$
Insurance	$W-\alpha_1$	$W-\alpha_2$	$(p) \times (W-\alpha_1) +$ $(1-p) \times (W-\alpha_2)$

Fair Odds Lines

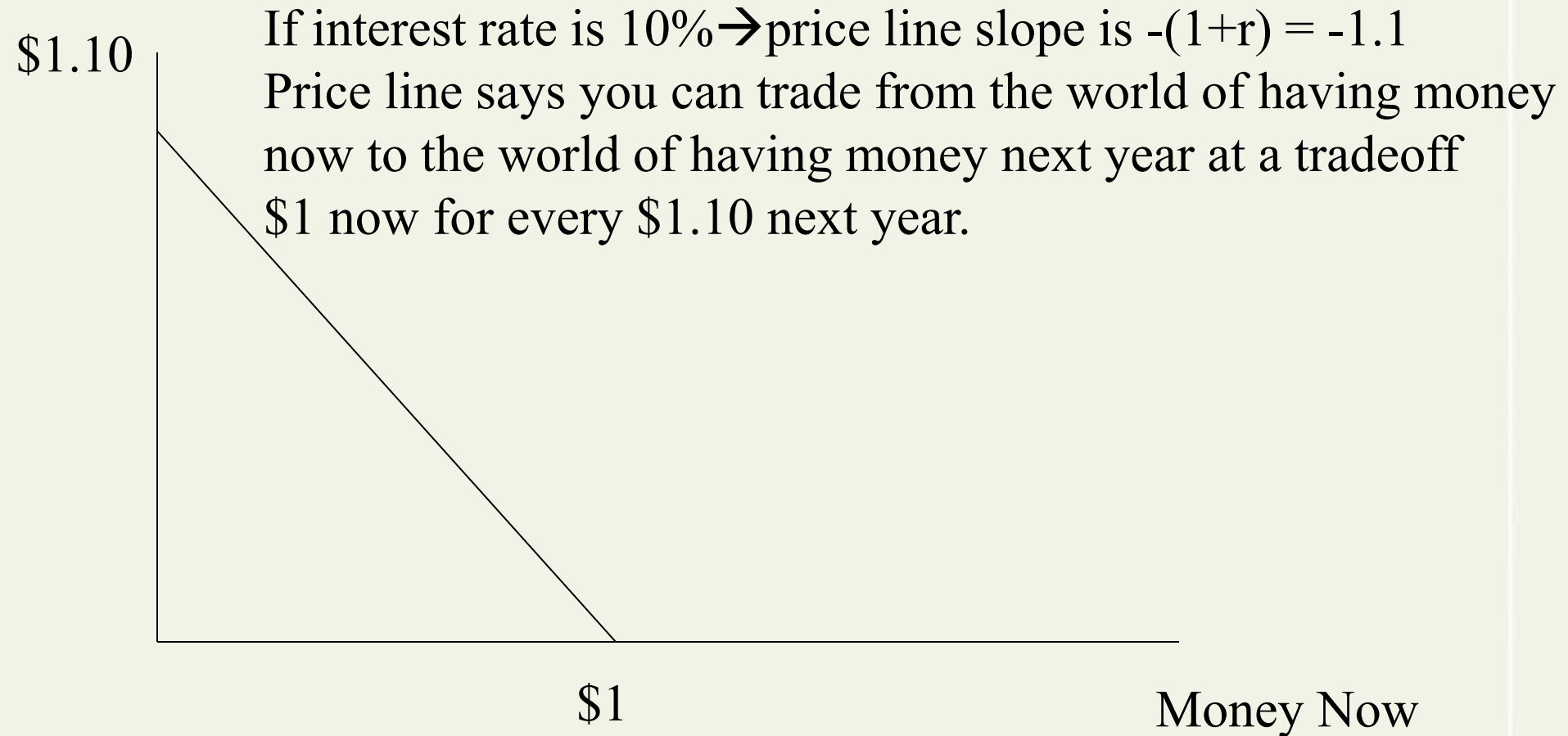


Price lines in economics



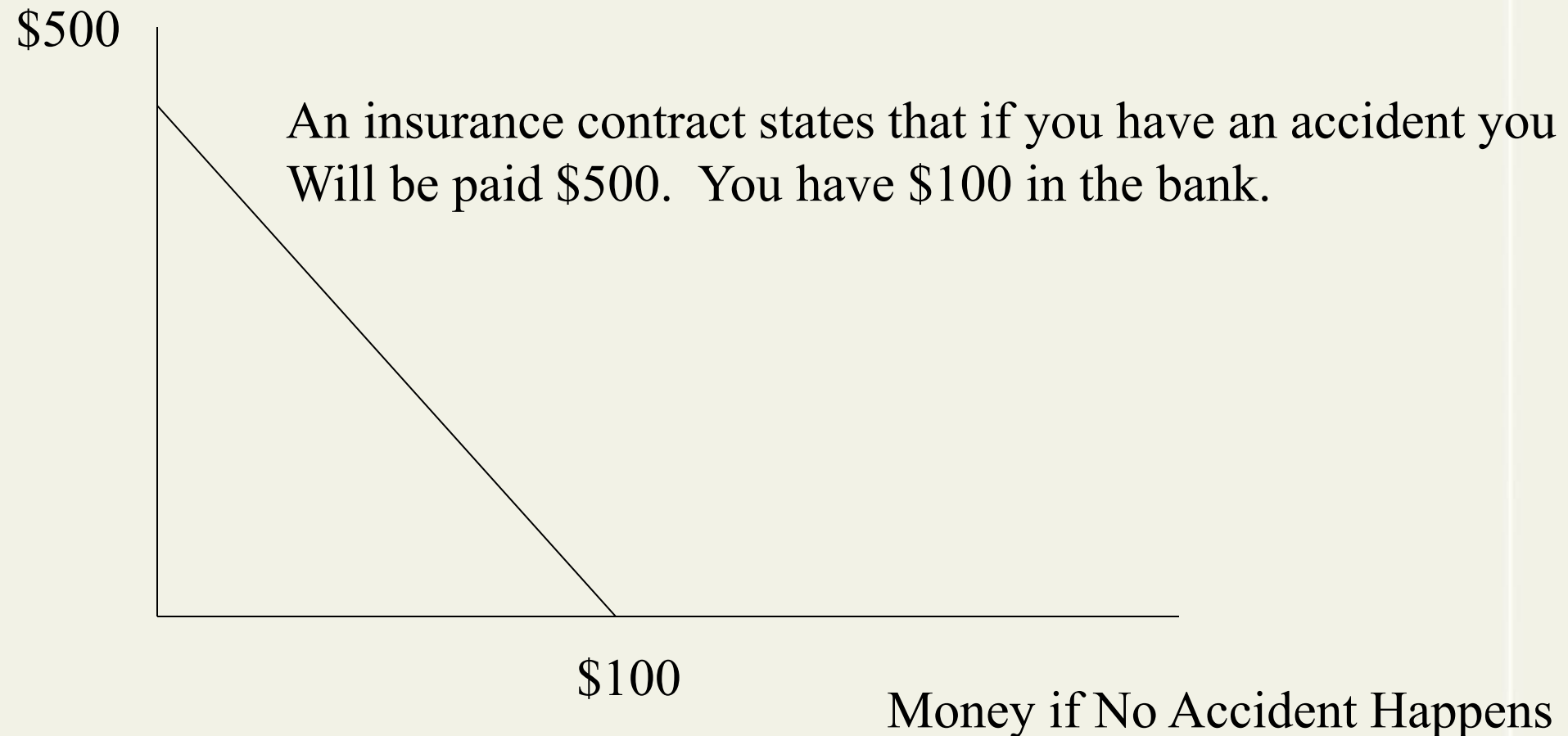
Price lines in economics

Money Next Year



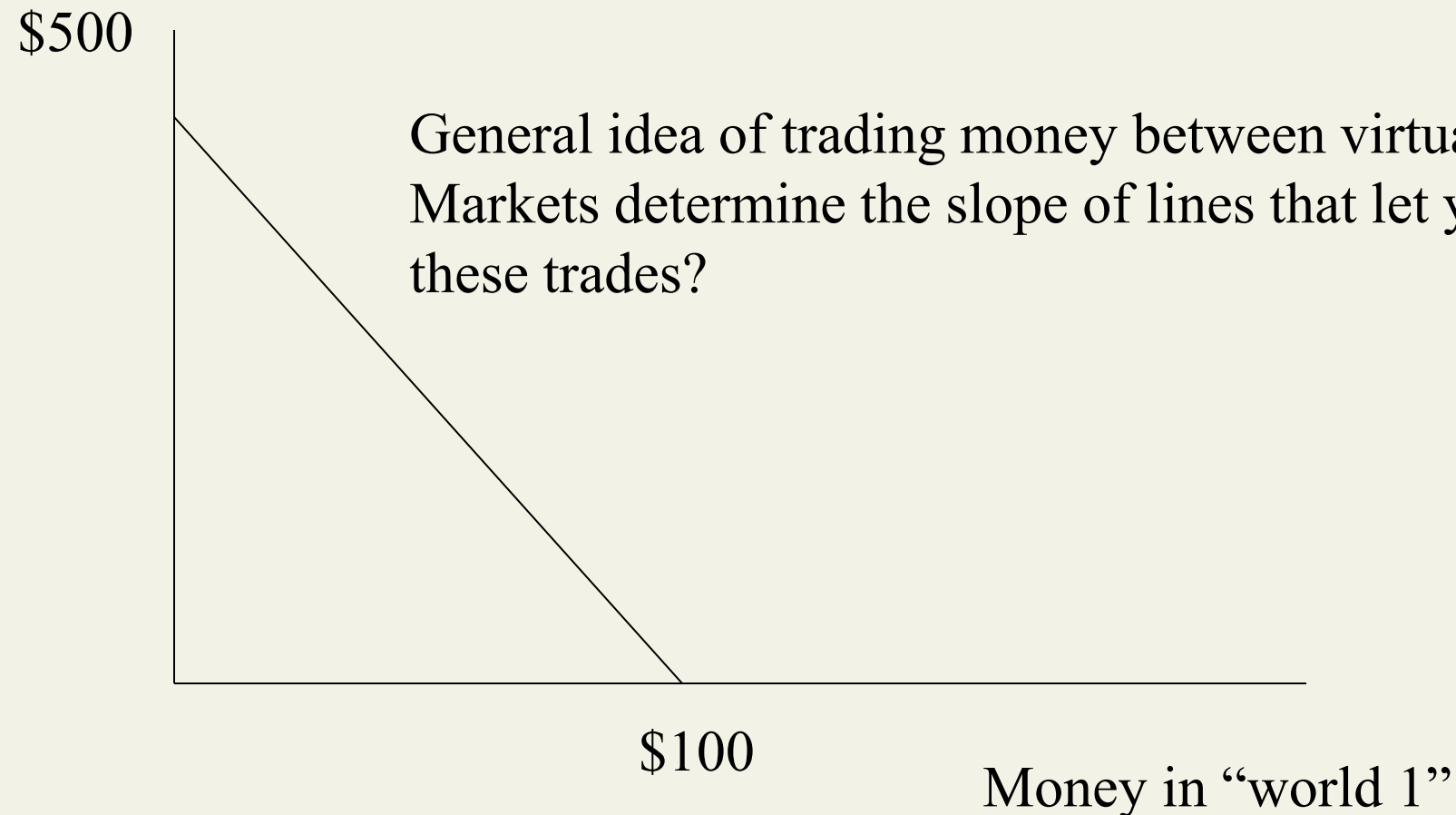
Price lines in economics

Money if an Accident Happens



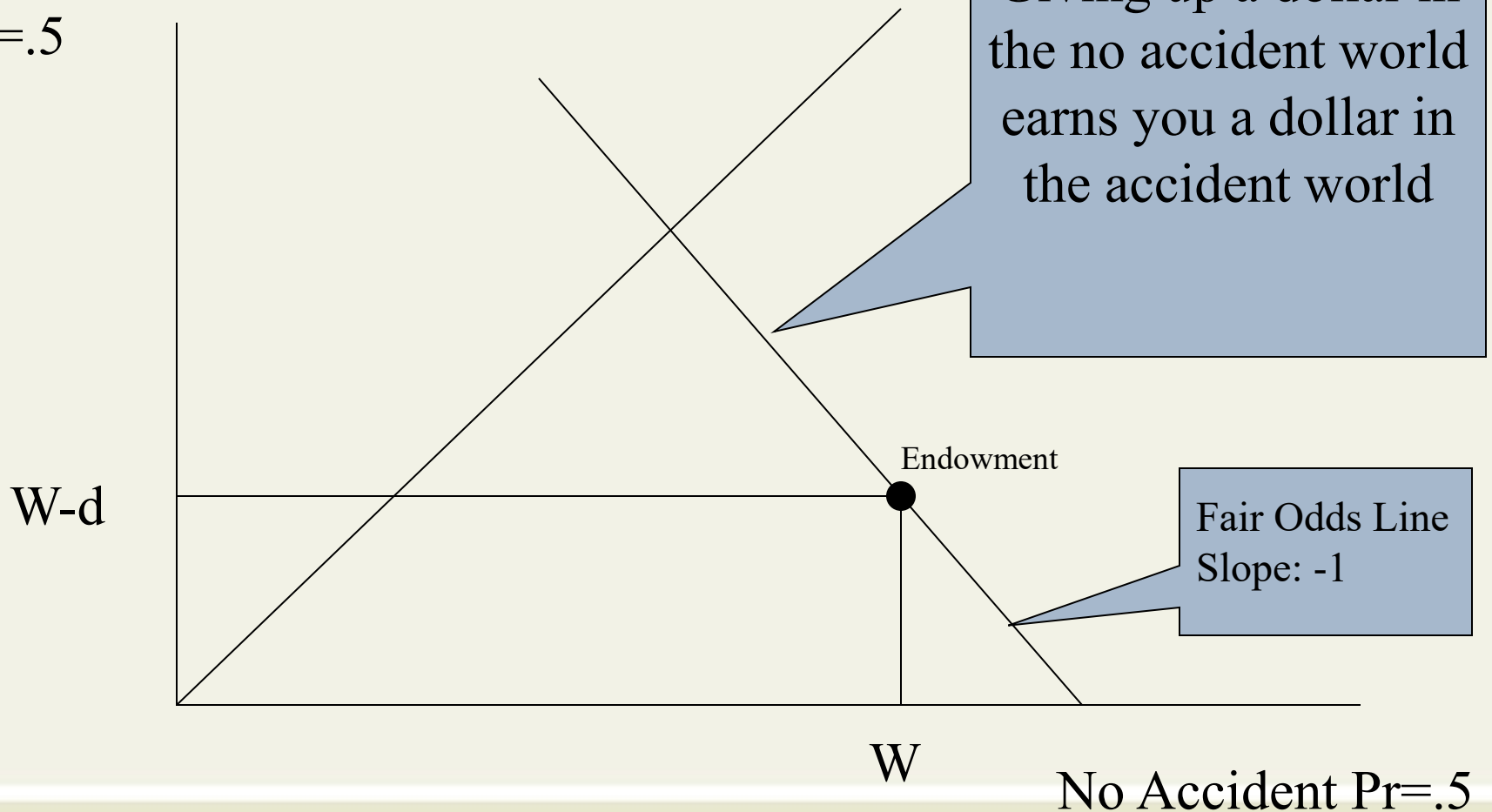
Price lines in economics

Money in “world 2”



Fair Odds Lines

Accident
Pr=.5



Giving up a dollar in the no accident world earns you a dollar in the accident world

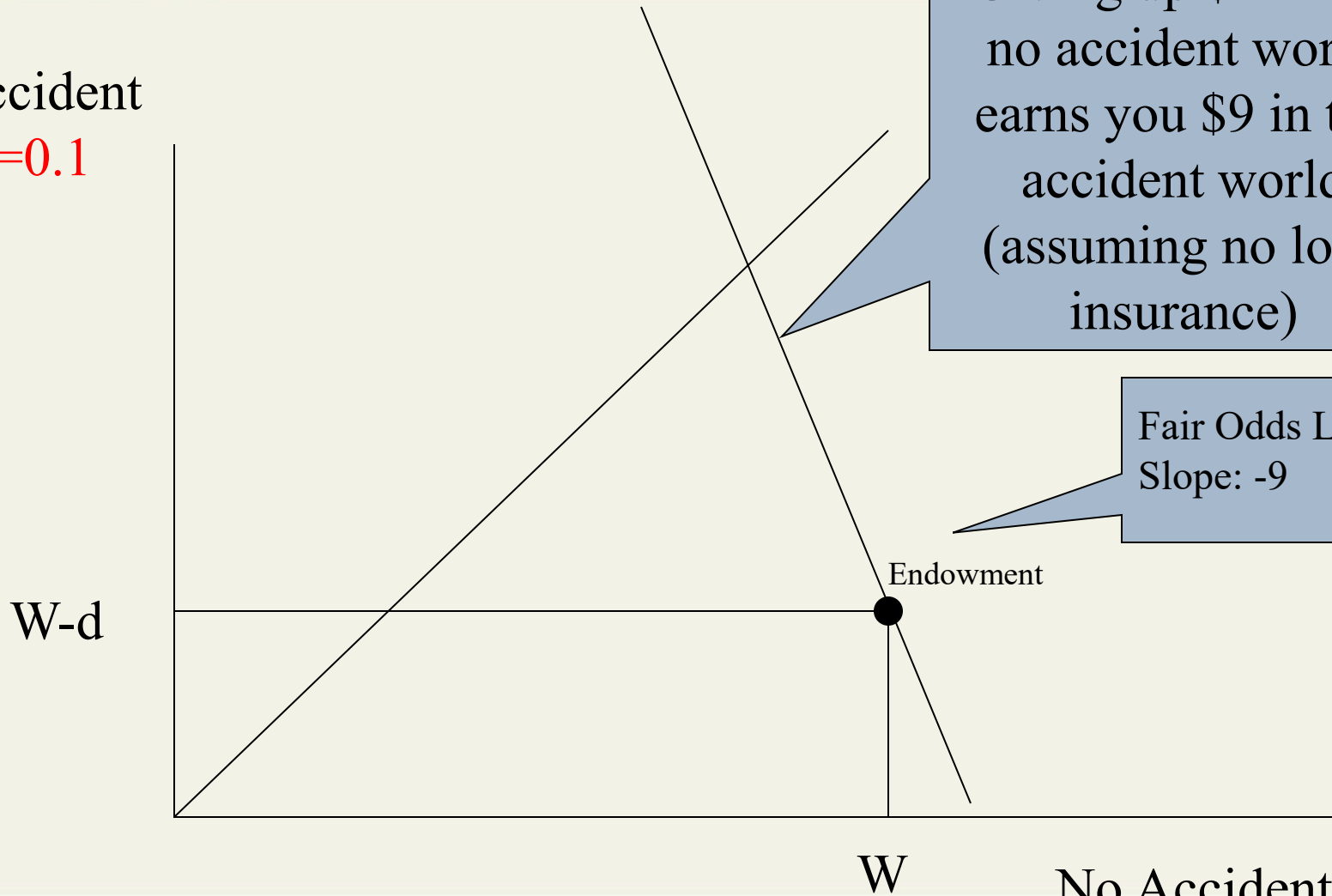
Fair Odds Line
Slope: -1

W

No Accident Pr=.5

Fair Odds Lines

Accident
 $Pr=0.1$



Giving up \$1 in the no accident world earns you \$9 in the accident world (assuming no load insurance)

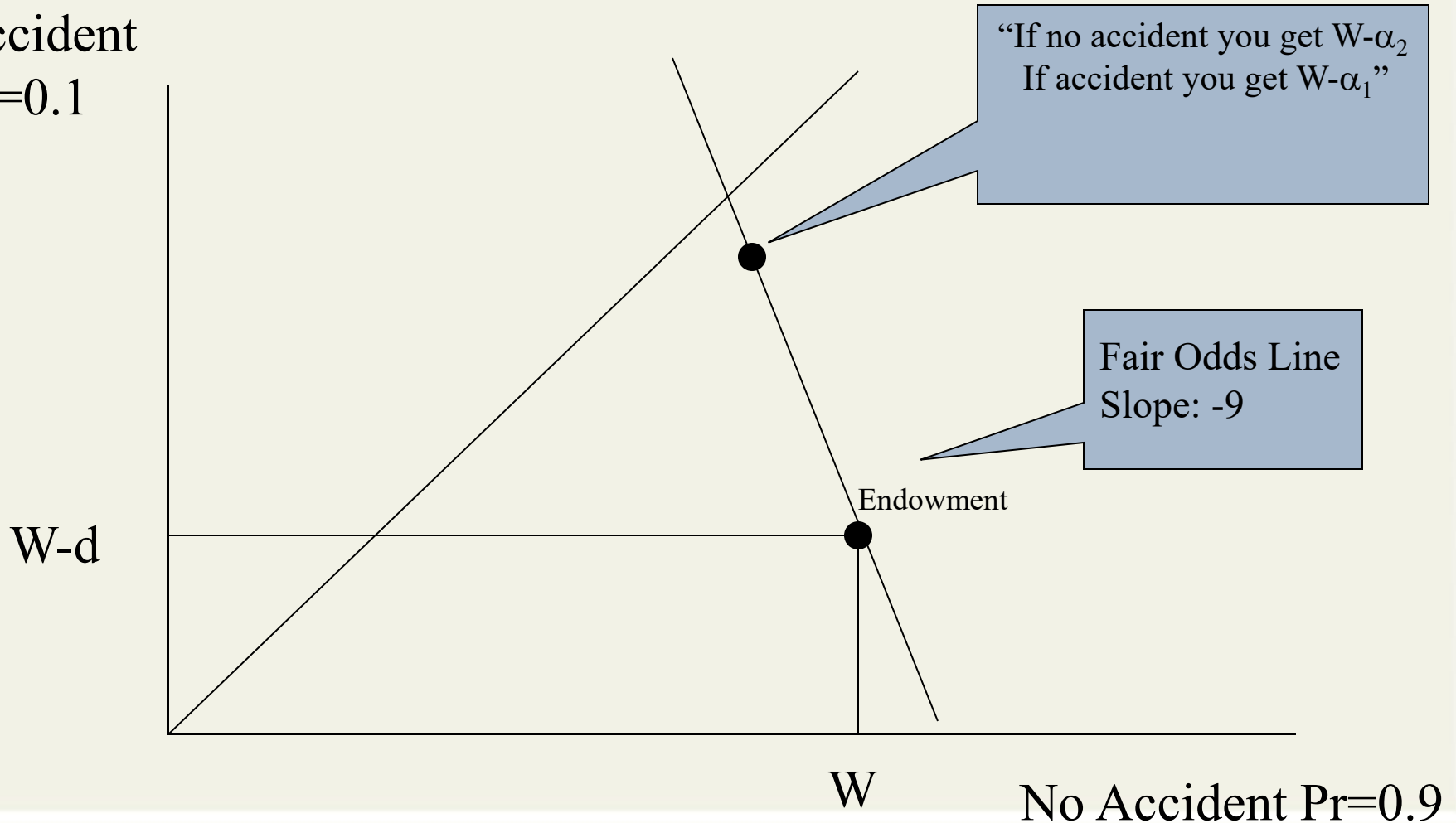
Fair Odds Line
Slope: -9

W

No Accident Pr=0.9

An Insurance Contract Offer is a Point

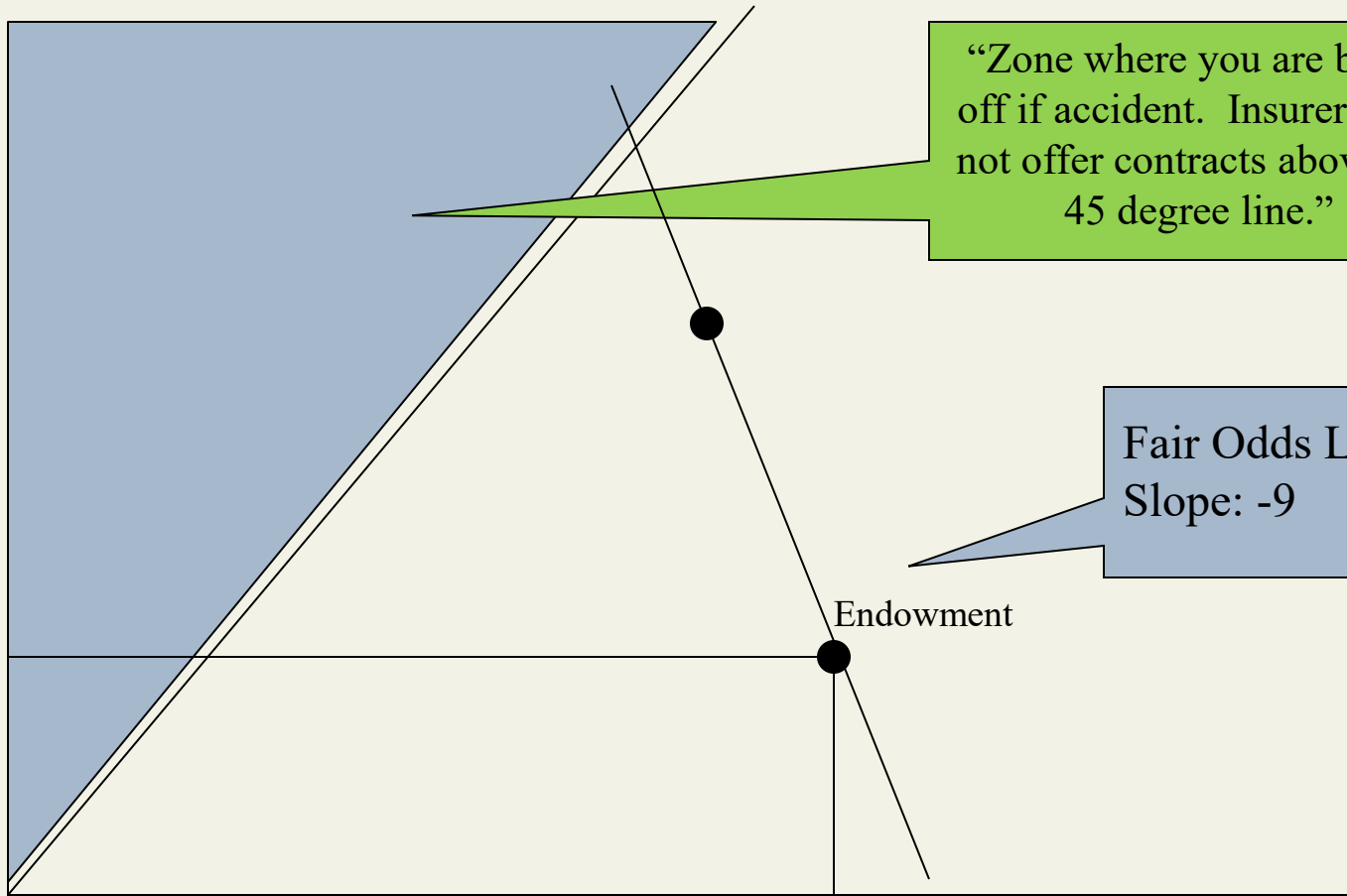
Accident
Pr=0.1



Irresistible moral hazard zone

Accident
Pr=0.1

W-d



“Zone where you are better off if accident. Insurers will not offer contracts above the 45 degree line.”

Fair Odds Line
Slope: -9

W

No Accident Pr=0.9

Where do you want to go?

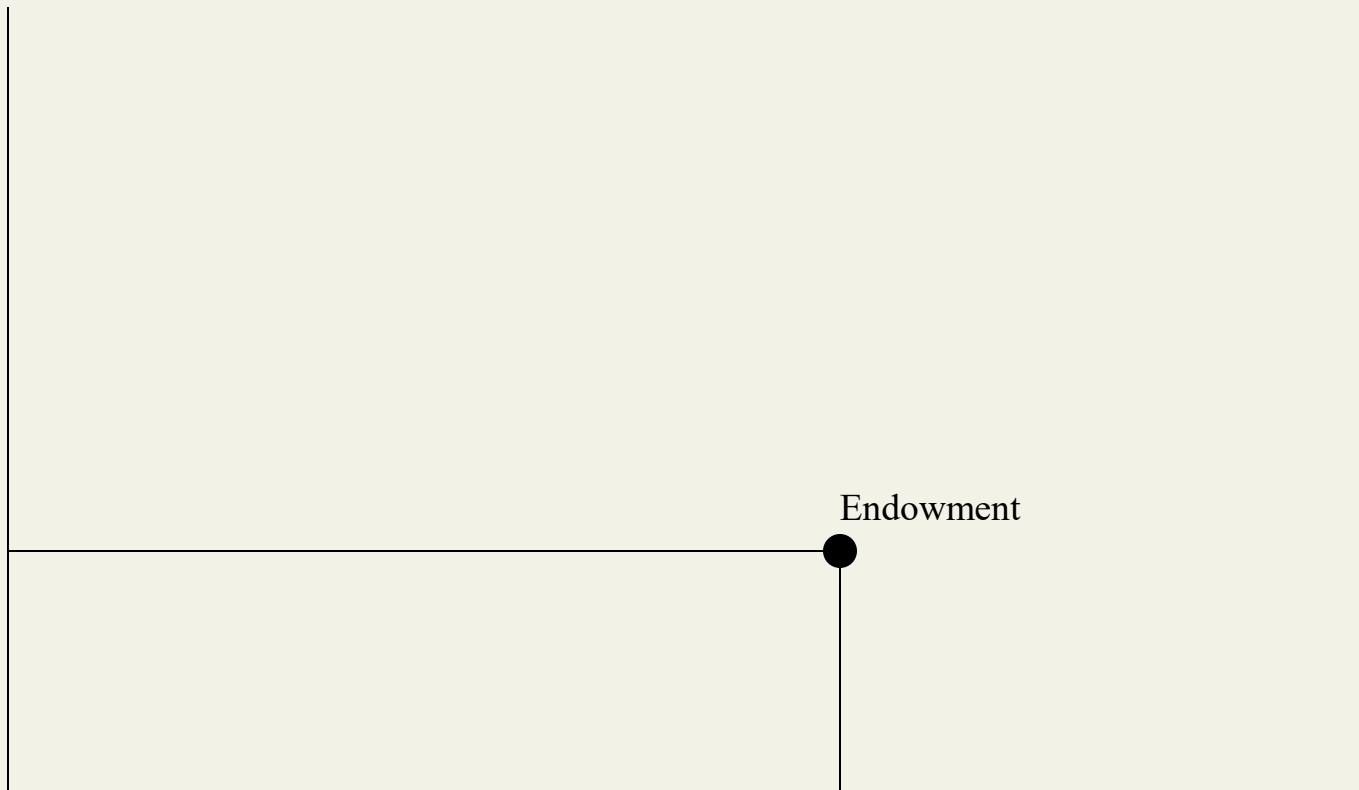
Accident
 $Pr=p$

$W-d$

Endowment

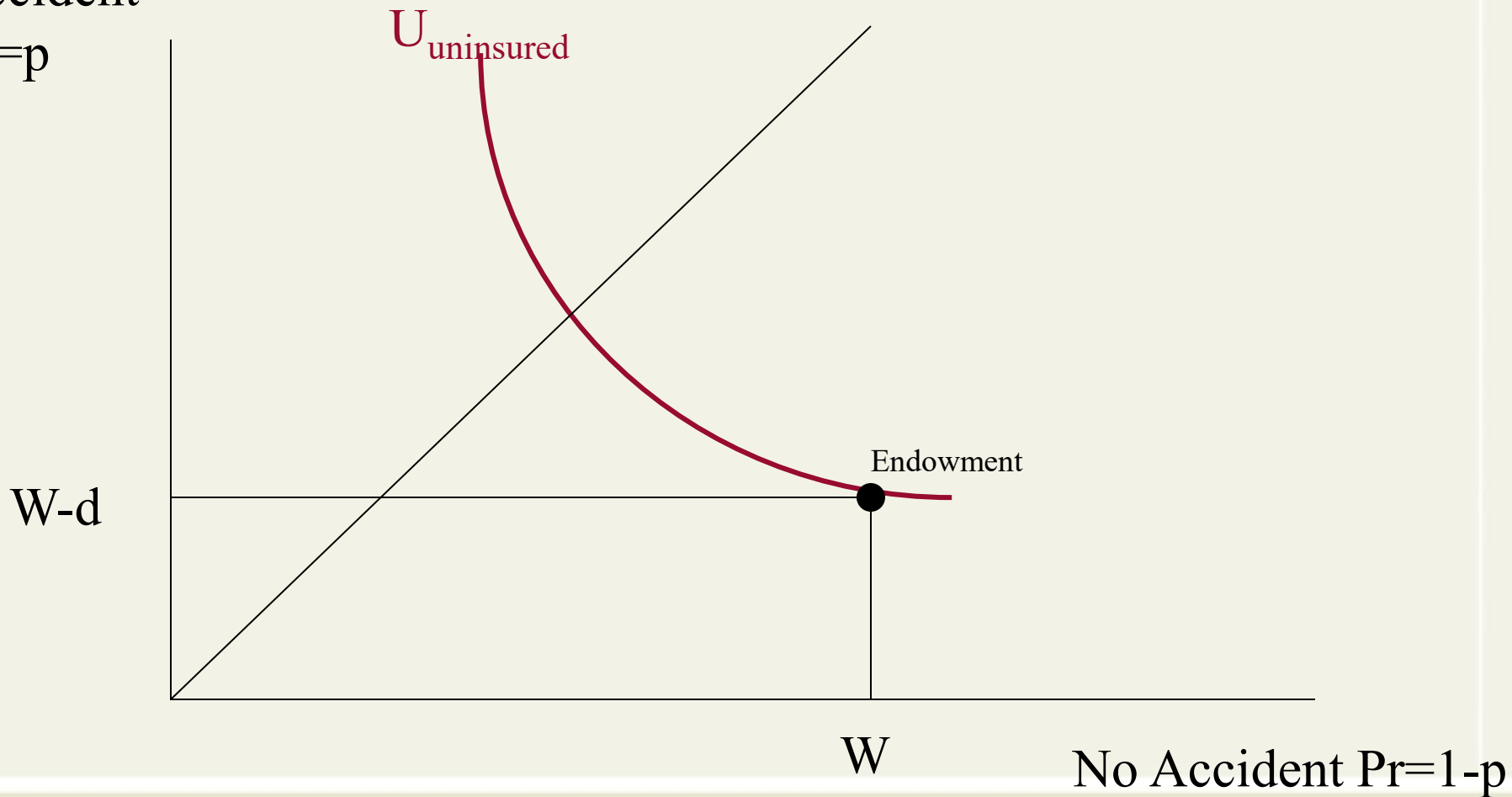
W

No Accident $Pr=1-p$

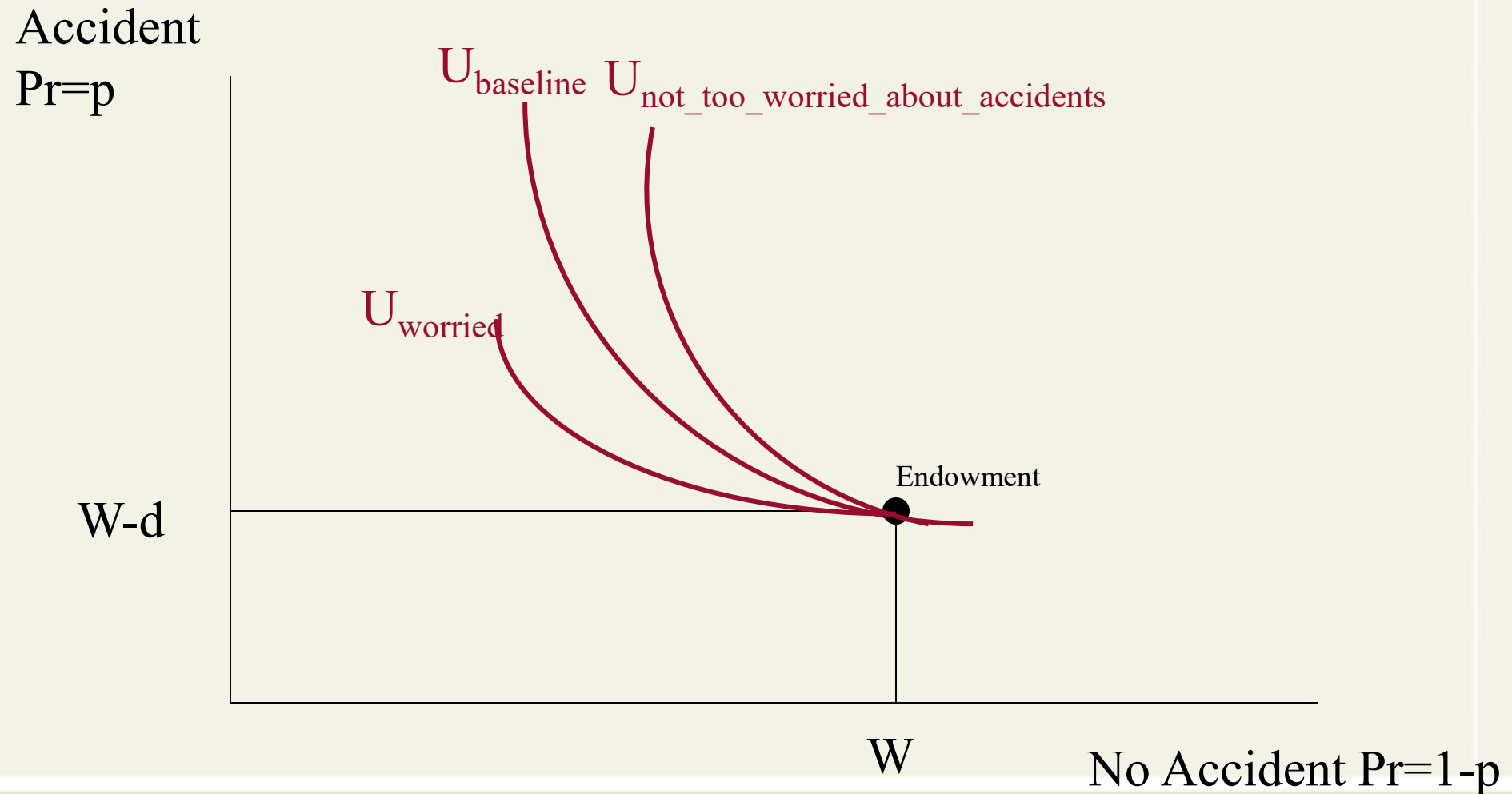


Indifference curve

Accident
Pr=p

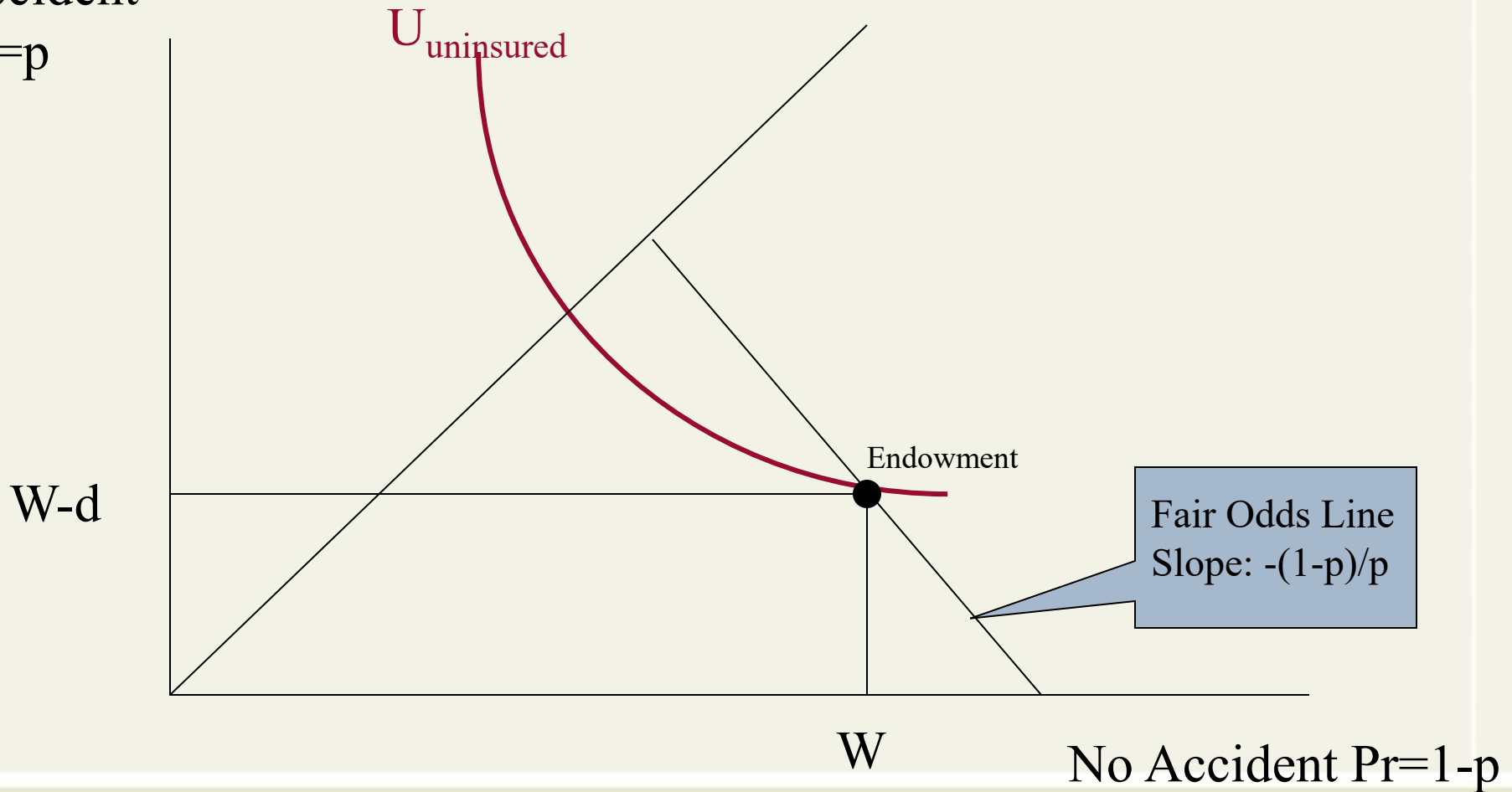


Different utility functions for different people

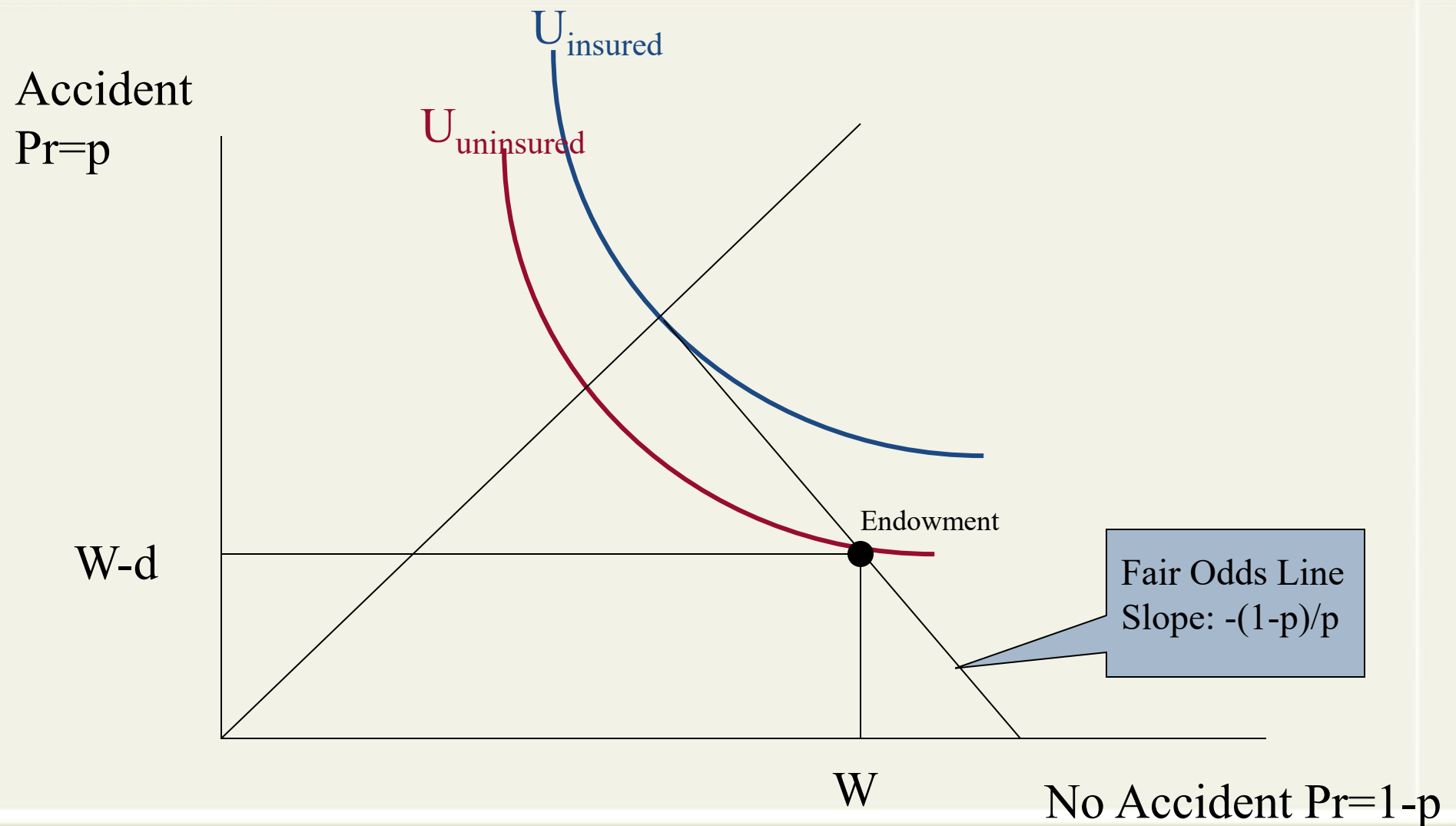


Insurance Model

Accident
Pr=p



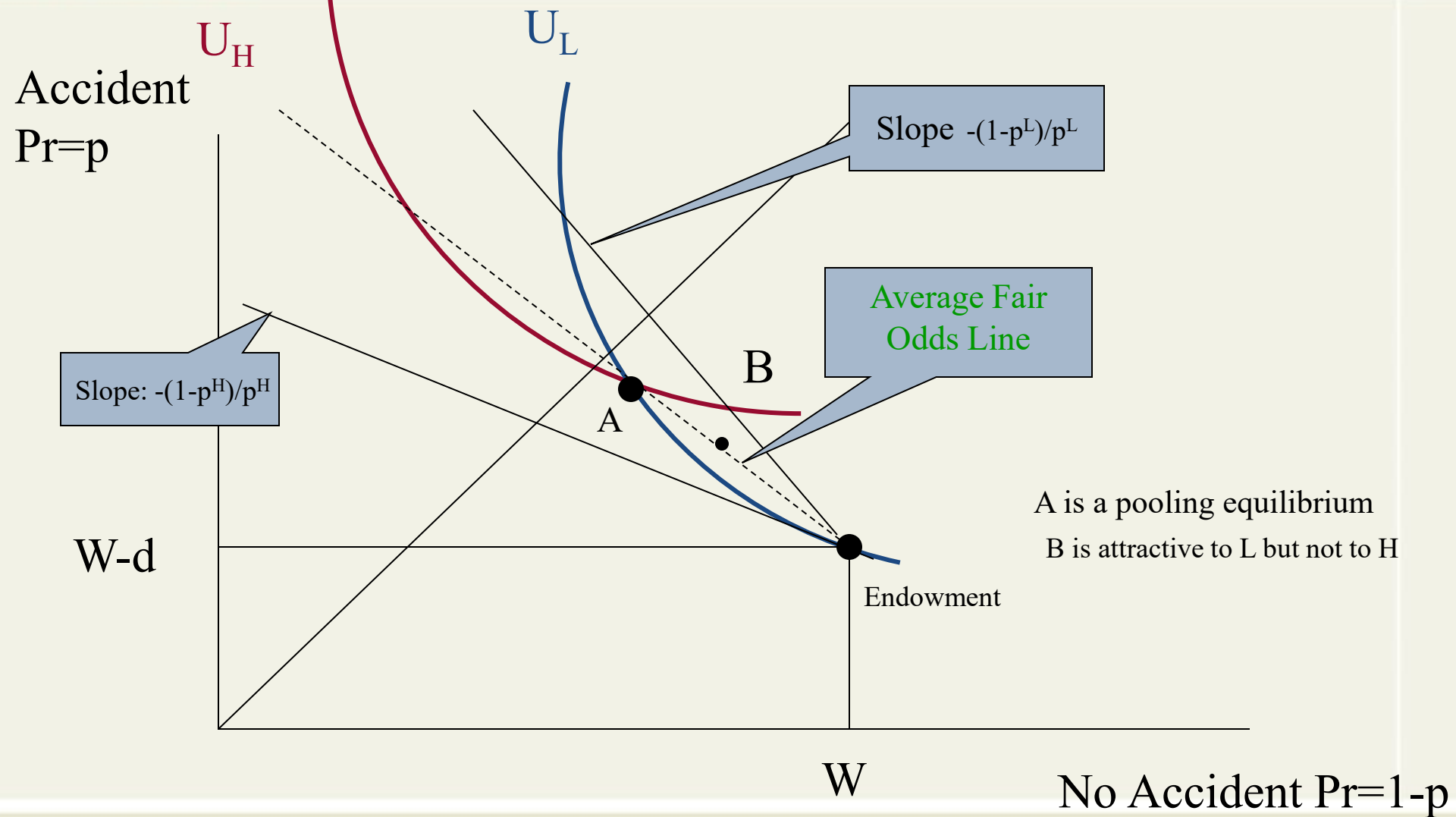
Insurance Model



Two Kinds of People

- To understand adverse selection we will introduce heterogeneity
 - 1000 High risk patients: Prob of Accident= p^H
 - 1000 Low risk patients: Prob of Accident= p^L
 - Each will have a different fair odds line
 - Low risk will need bigger indemnity offer
 - Indifference curve tilted to show preferences towards no accident state
- How can the market serve them both?

Insurance Model



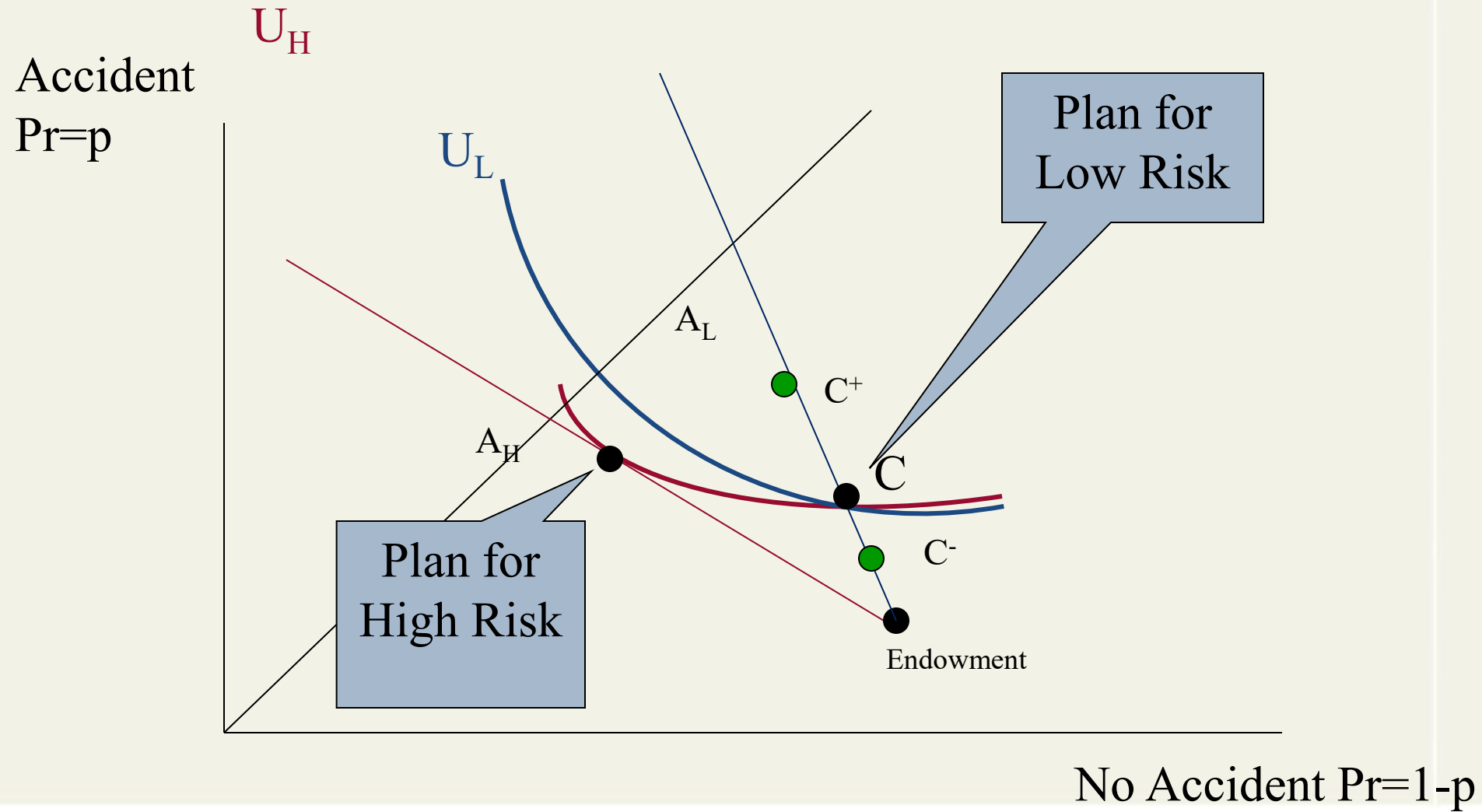
Conditions for Pooling Equilibrium

- Pooling equilibrium occurs at the intersection of average fair odds line and same indifference curve of the low risk group that intersects the endowment
 - Point is on the average fair odds line of the population.
 - This is the population weighted average of each sub-population's fair odds line.
 - Point is on the particular indifference curve of the low risk group that intersects the endowment

Lessons

- High risk people know they are high risk and their utility surface climbs more steeply the more they can protect the “world with accident” scenario
- If there is to be a single insurance contract in the market, it requires cross subsidy from L to H
- Pooling equilibrium is unstable against an entrant trying to skim low risk types
 - If community rating is desired, then regulation is necessary to prevent these entrants
- Insurance for low risk (point B) is still profitable because it is below fair odds line for L
- Insurance at point A is not profitable without the participation of the low risk because it is above the fair odds line for H

Separating Equilibrium



Conditions for Separating Equilibrium

- Separating equilibrium has
 - 1) a plan for the high risk agents that is the point of tangency between their highest indifference curve and their fair odds line.
 - 2) a plan for low risk agents that is where the high risk agents indifference curve intersects the low risk agents fair odds line

An Equilibrium

- Two contracts offered
 - A_H appeals to high risk only
 - Low risk can do better at point C
 - C appeals to low risk only
 - High risk indifferent between C and A_H
- What if an entrant tried to offer C^+ and maintain only low risk patients?
 - Such good insurance would attract high risk patients whose costs would not be supported
 - Death Spiral
- What if an entrant tried to offer C^- ?
 - No high risk patients
 - No low risk patients either, C is better than any C^-

Summary of Adverse Selection

- There is information asymmetry in insurance markets
- Firms that gain information about risk types will use it to partition the market
 - Can partition the market simply by offering high priced generous benefits
- Market segmentation undermines cross subsidy from low to high risk

Which equilibrium is better?

- People who are drawn to Rawlsian ideas prefer pooling equilibria
- Libertarians prefer separating equilibria
 - If high risk and low risk types were fixed for life no reason to compel cross subsidies from healthy to sick. (Law of the jungle)
 - If everybody spent 32 years low risk and 32 years high risk things might be different
 - 33rd birthday=acquire high risk type
 - Sudden shift in demand for insurance
 - Pooling equilibrium helps soften the transition

Most broken part of insurance systems

- What we really want is insurance against becoming unexpectedly uninsurable
 - Sudden transition to high risk type
 - Current health legislation outlaws denial of coverage due to pre-existing conditions

Insurance reform

- Hard to legislate against offering higher benefits for higher premia
 - Disease → sudden desire to pay high premiums for high coverage
 - Current legislation charges a surtax on the high coverage packages (to raise money)
 - Proposed legislation charges surtax on Medigap
 - Wrong assumption that these are luxuries
- Need to specify the premium and indemnity of the guaranteed renewable package

Why control adverse selection?

- To maintain pooling equilibria
- The ultimate separating equilibrium is where everyone is self-insured, and we are denied the utility benefits of insurance

Control of adverse selection

- Subsidize (don't tax) the more generous package and tax (don't subsidize) the less generous package
 - Find companies that are full of high risk patients and use tax money (from low risk people) to recreate the pooling equilibrium
 - Learn the true type of each patient and retrospectively or prospectively compensate a plan that has “higher risk” patients
- Reinsurance contracts for back up if death spiral starts
- Single payer insurance