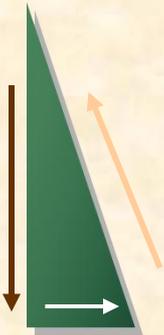


Chapter 17

Markets with Asymmetric Information

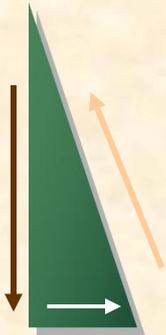
Topics to be Discussed

- Quality Uncertainty and the Market for Lemons
- Market Signaling
- Moral Hazard
- The Principal-Agent Problem



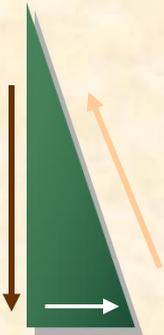
Topics to be Discussed

- Managerial Incentives in an Integrated Firm
- Asymmetric Information in Labor Markets: Efficiency Wage Theory



Introduction

- We will study how imperfect information influences resource allocation and the price system.

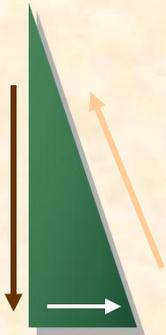


Quality Uncertainty

高参考价值的真题、答案、学长笔记、辅导班课程，访问：www.kaoyancas.net

and the Market for Lemons

- The lack of complete information when purchasing a used car increases the risk of the purchase and lowers the value of the car.

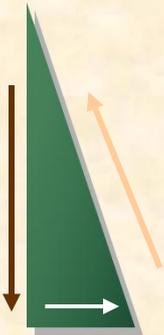


Quality Uncertainty

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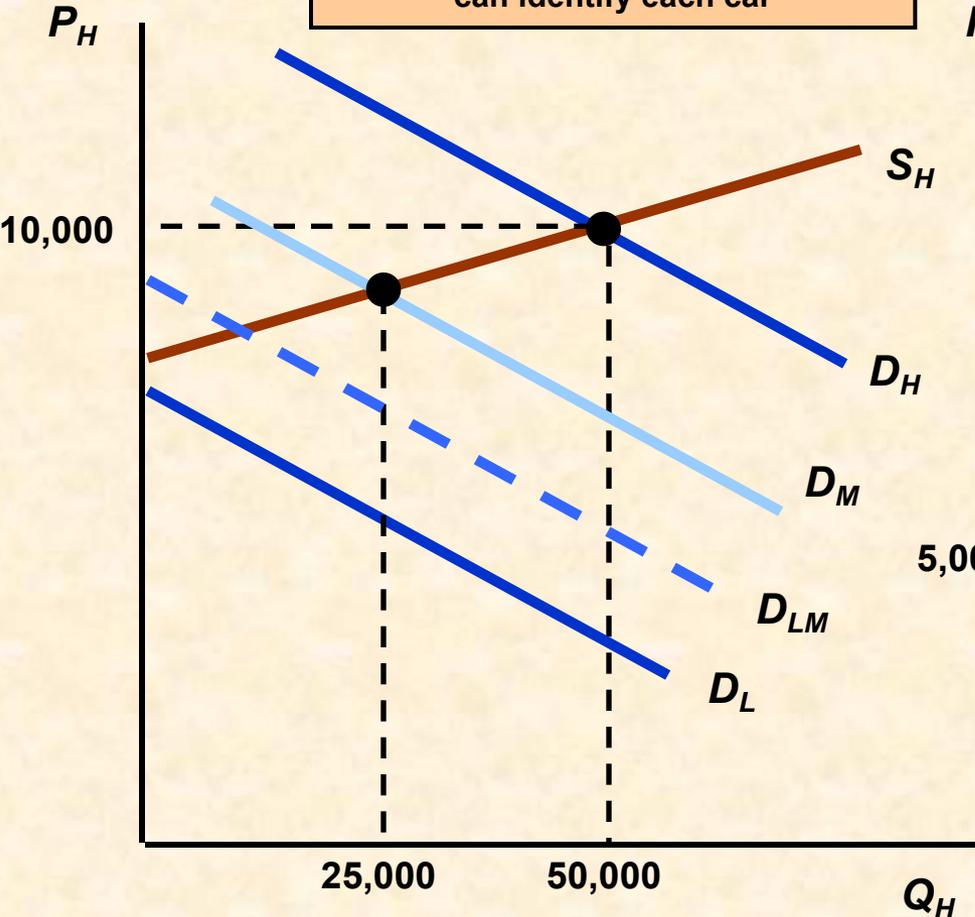
and the Market for Lemons

- The Market for Used Cars
 - Assume
 - ◆ Buyers and sellers can distinguish between high and low quality cars
 - ◆ There will be two markets

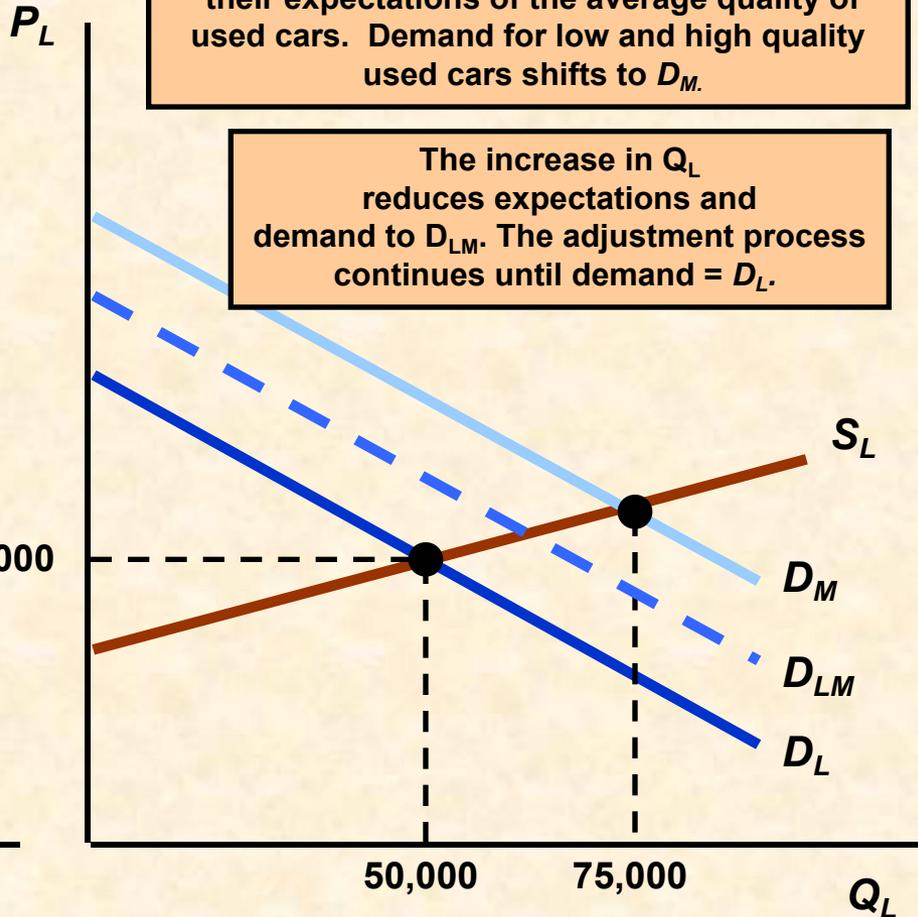


The Lemons Problem

The market for high and low quality cars when buyers and sellers can identify each car



With asymmetric information buyers will find it difficult to determine quality. They lower their expectations of the average quality of used cars. Demand for low and high quality used cars shifts to D_M .



The increase in Q_L reduces expectations and demand to D_{LM} . The adjustment process continues until demand = D_L .

Quality Uncertainty

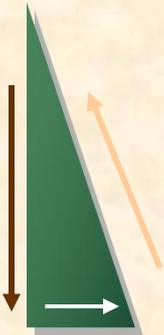
高参考价值的真题、答案、学长笔记、辅导班课程，访问：www.kaoyancas.net

and the Market for Lemons

■ The Market for Used Cars

● With asymmetric information:

- ◆ Low quality goods drive high quality goods out of the market.
- ◆ The market has failed to produce mutually beneficial trade.
- ◆ Too many low and too few high quality cars are on the market.
- ◆ Adverse selection occurs; the only cars on the market will be low quality cars.



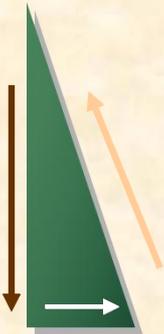
Implications of Asymmetric Information

The Market for Insurance

■ Medical Insurance

● Question

- ◆ Is it possible for insurance companies to separate high and low risk policy holders?
- If not, only high risk people will purchase insurance.
- Adverse selection would make medical insurance unprofitable.



Implications of Asymmetric Information

The Market for Insurance

■ Automobile Insurance

● Questions

- ◆ What impact does asymmetric information and adverse selection have on insurance rates and the delivery of automobile accident insurance?
- ◆ How can the government reduce the impact of adverse selection in the insurance industry?



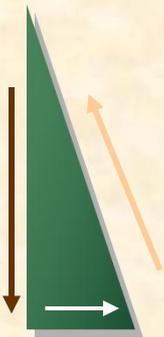
Implications of Asymmetric Information

■ The Market for Credit

- Asymmetric information creates the potential that only high risk borrowers will seek loans.

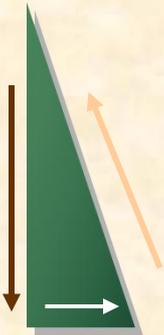
- **Question**

- ◆ How can credit histories help make this market more efficient and reduce the cost of credit?



Implications of Asymmetric Information

- The Importance of Reputation and Standardization
 - Asymmetric Information and Daily Market Decisions
 - ◆ Retail sales
 - ◆ Antiques, art, rare coins
 - ◆ Home repairs
 - ◆ Restaurants



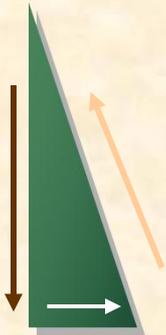
Implications of Asymmetric Information

■ Question

- How can these producers provide high-quality goods when asymmetric information will drive out high-quality goods through adverse selection.

● Answer

- ◆ Reputation

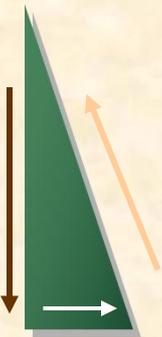


Implications of Asymmetric Information

■ Question

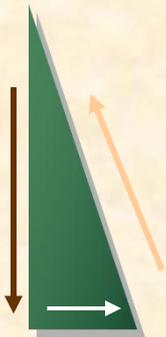
- Why do you look forward to a Big Mac when traveling even though you would never consider buying one at home.

- Holiday Inn once advertised “No Surprises” to address the issue of adverse selection.



Lemons in Major League Baseball

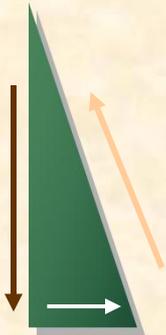
- Asymmetric information and the market for free agents
 - If a lemons market exists, free agents should be less reliable (disabled) than renewed contracts.



Player Disability

Days Spent on Disabled List per Season

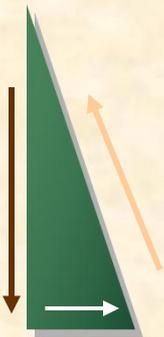
	Precontract	Postcontract	Percentage Change
All Players	4.73	12.55	165.4
Renewed players	4.76	9.68	103.4
Free agents	4.67	17.23	268.9



Lemons in Major League Baseball

■ Findings

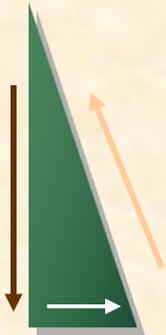
- Days on the disabled list increase for both free agents and renewed players.
- Free agents have a significantly higher disability rate than renewed players.
- This indicates a lemons market.



Lemons in Major League Baseball

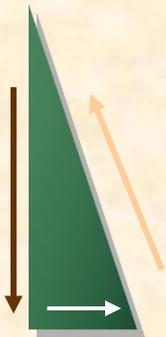
■ Question

- If you are a team owner, what steps would you take to reduce the asymmetric information for free agents?



Market Signaling

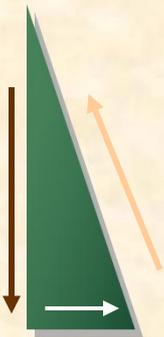
- The process of sellers using *signals* to convey information to buyers about the product's quality helps buyers and sellers deal with asymmetric information.



Market Signaling

■ Strong Signal

- To be effective, a signal must be easier for high quality sellers to give than low quality sellers.
- Example
 - ◆ Highly productive workers signal with educational attainment level.



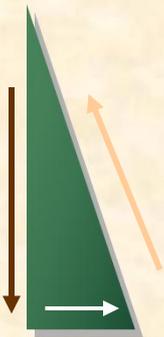
Market Signaling

■ A Simple Model of Job Market Signaling

- Assume

- ◆ Two groups of workers

- Group I: Low productivity-- AP & $MP = 1$
- Group II: High productivity-- AP & $MP = 2$
- The workers are equally divided between Group I and Group II-- AP for all workers = 1.5



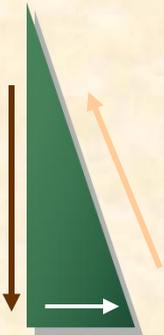
Market Signaling

■ A Simple Model of Job Market Signaling

- Assume

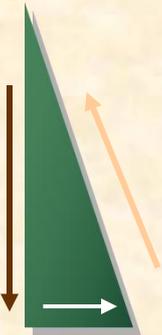
- ◆ Competitive Product Market

- $P = \$10,000$
- Employees average 10 years of employment
- Group I Revenue = $\$100,000$ ($10,000/\text{yr.} \times 10$)
- Group II Revenue = $\$200,000$ ($20,000/\text{yr.} \times 10$)



Market Signaling

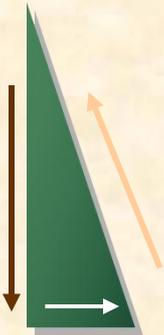
- With Complete Information
 - $w = \text{MRP}$
 - Group I wage = \$10,000/yr.
 - Group II wage = \$20,000/yr.
- With Asymmetric Information
 - $w = \text{average productivity}$
 - Group I & II wage = \$15,000



Market Signaling

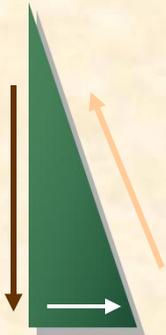
■ Signaling With Education to Reduce Asymmetric Information

- y = education index (years of higher education)
- C = cost of attaining educational level y
- Group I-- $C_I(y) = \$40,000y$
- Group II-- $C_{II}(y) = \$20,000y$



Market Signaling

- Signaling With Education to Reduce Asymmetric Information
 - Assume education does not increase productivity
 - Decision Rule:
 - ◆ y^* signals G_{II} and wage = \$20,000
 - ◆ Below y^* signals G_I and wage = \$10,000

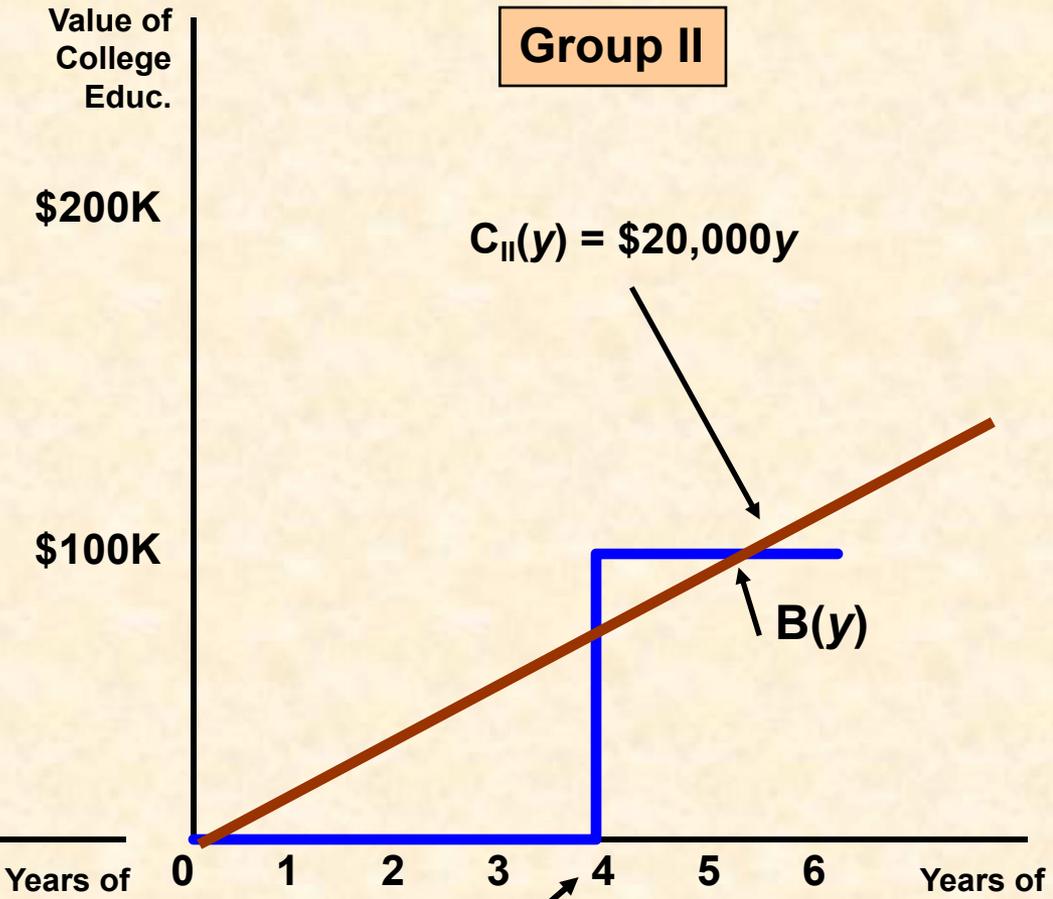
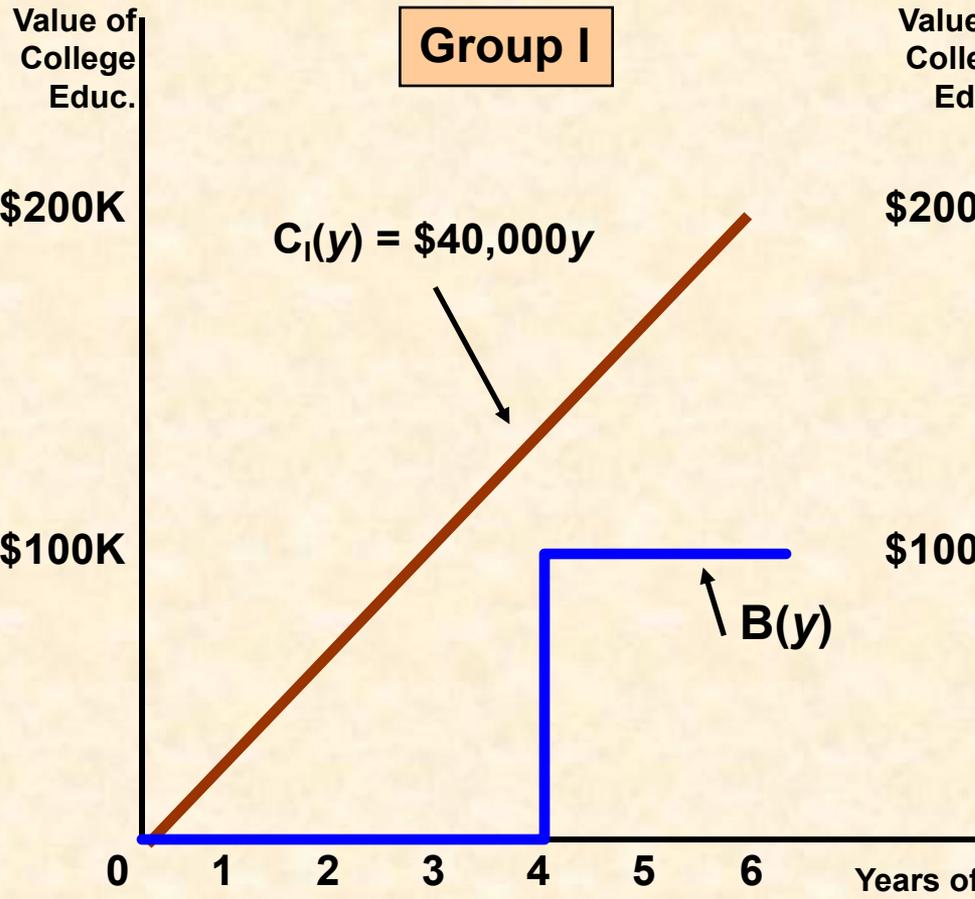


Signaling

$B(y)$ = increase in wage associated with each level of education

How much education should a person obtain?

The education decision is based on benefits/cost comparison.



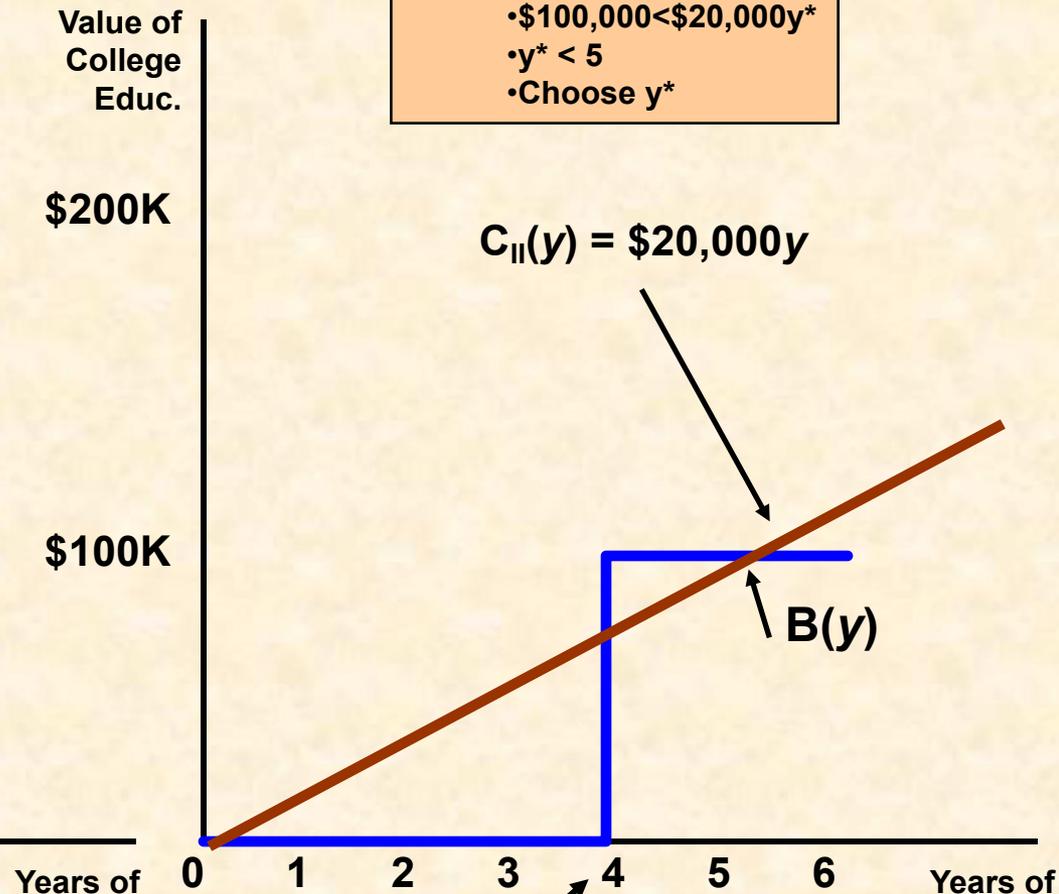
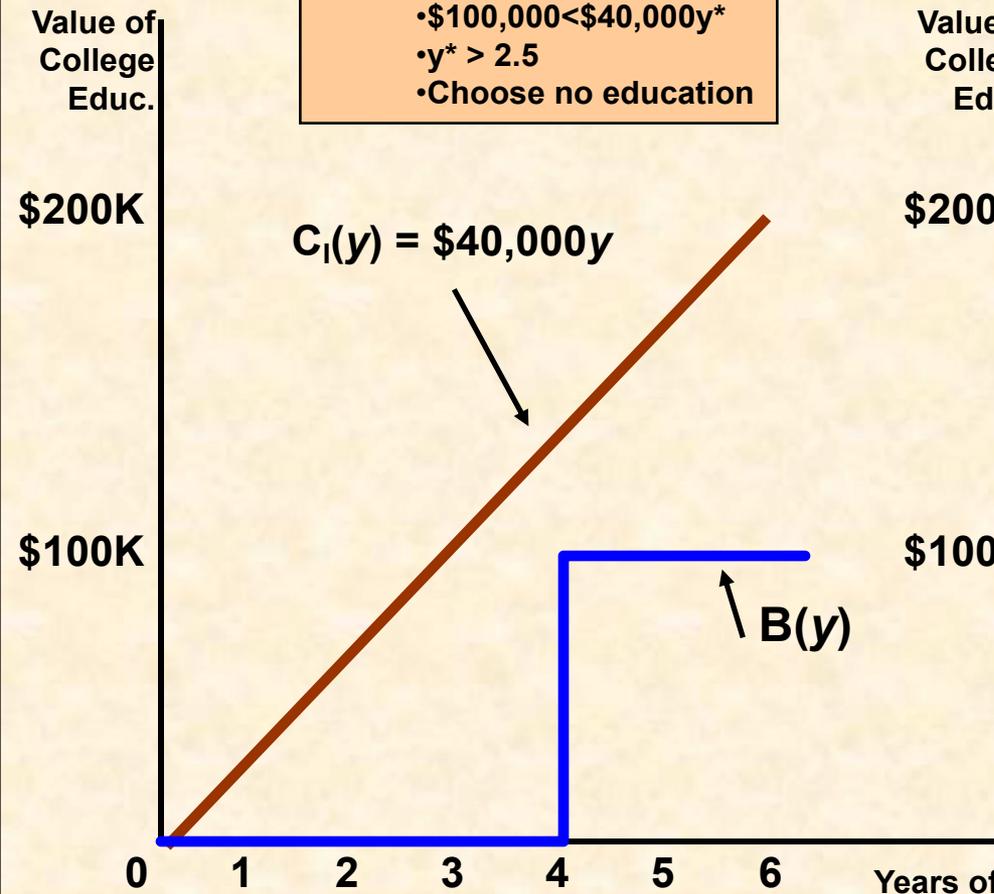
Optimal choice of y for Group I $y=4$ Optimal choice of y for Group I $y=5$

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Signaling

- Benefits = \$100,000
- Cost
 - $C_I(y) = 40,000y$
 - $\$100,000 < \$40,000y^*$
 - $y^* > 2.5$
 - Choose no education

- Benefits = \$100,000
- Cost
 - $C_{II}(y) = 20,000y$
 - $\$100,000 < \$20,000y^*$
 - $y^* < 5$
 - Choose y^*



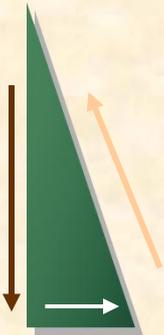
Optimal choice of y for Group I

Optimal choice of y for Group I

Signaling

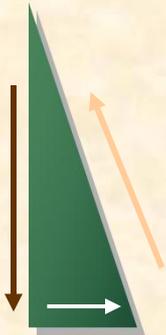
■ Cost/Benefit Comparison

- Decision rule works if y^* is between 2.5 and 5
- If $y^* = 4$
 - ◆ Group I would choose no school
 - ◆ Group II would choose y^*
 - ◆ Rule discriminates correctly



Signaling

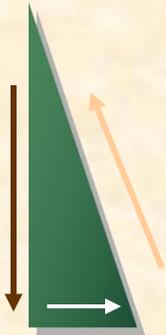
- Education does increase productivity and provides a useful signal about individual work habits.



Working into the Night

■ Question

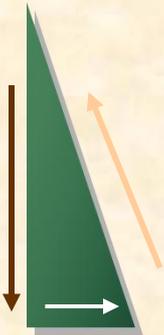
- How can you signal to your employer you are more productive?



Market Signaling

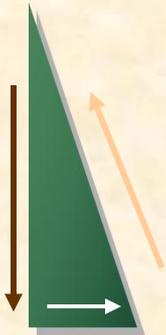
■ Guarantees and Warranties

- Signaling to identify high quality and dependability
- Effective decision tool because the cost of warranties to low-quality producers is too high



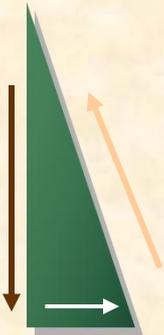
Moral Hazard

- *Moral hazard occurs when the insured party whose actions are unobserved can affect the probability or magnitude of a payment associated with an event.*



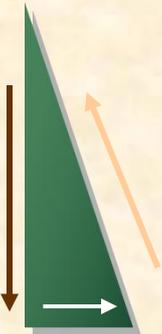
Moral Hazard

- Determining the Premium for Fire Insurance
 - Warehouse worth \$100,000
 - Probability of a fire:
 - ◆ .005 with a \$50 fire prevention program
 - ◆ .01 without the program

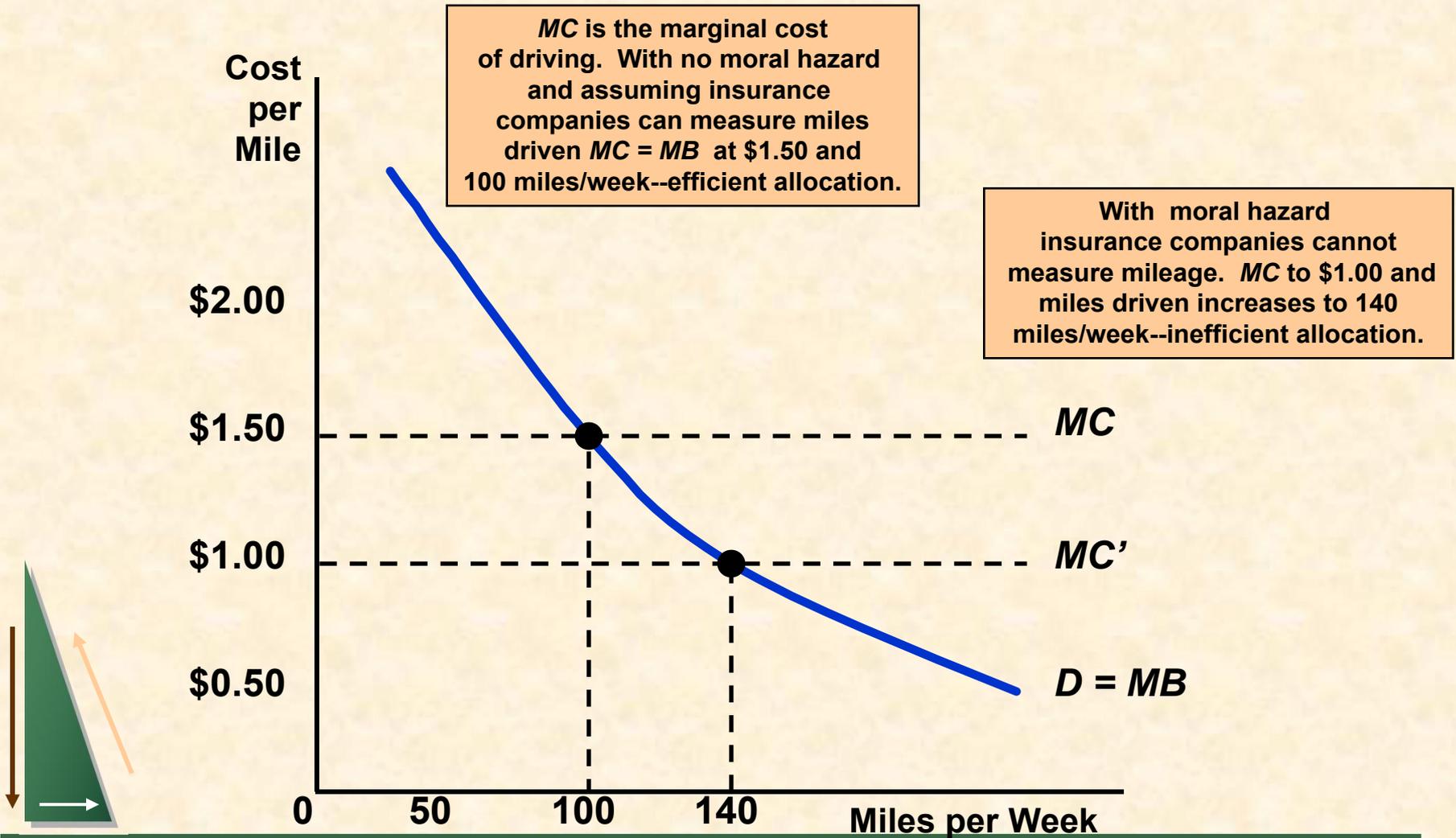


Moral Hazard

- Determining the Premium for Fire Insurance
 - With the program the premium is:
 - ◆ $.005 \times \$100,000 = \500
 - Once insured owners purchase the insurance, the owners no longer have an incentive to run the program, therefore the probability of loss is .01
 - \$500 premium will lead to a loss because the expected loss is not \$1,000 ($.01 \times \$100,000$)



The Effects of Moral Hazard



Reducing Moral Hazard

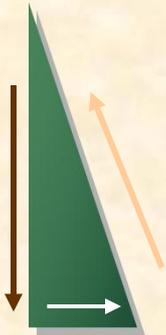
--Warranties of Animal Health

■ Scenario

- Livestock buyers want disease free animals.
- Asymmetric information exists
- Many states require warranties
- Buyers and sellers no longer have an incentive to reduce disease (moral hazard).

■ Question

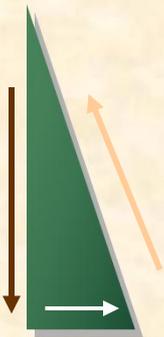
- How can this moral hazard be reduced?



Crisis in the Savings and Loan Industry

■ Question

- How many people know the financial strength of their bank?
- Why not?
- Deposit insurance, moral hazard, and failures in the S&L industry



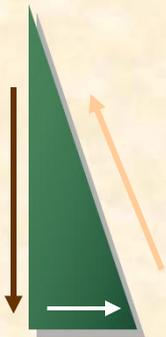
Crisis in the Savings and Loan Industry

■ Cost of the S&L Bailout

- 1,000+ failed institutions
- \$200 billion (1990)
- Texas alone--\$42 billion (1990)
- Agency expenditures--\$100 million (1990)

■ Question

- How can this moral hazard be reduced?



The Principal--Agent Problem

■ Agency Relationship

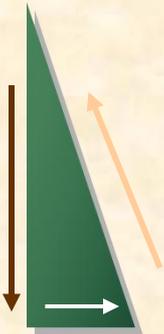
- One person's welfare depends on what another person does

■ Agent

- Person who acts

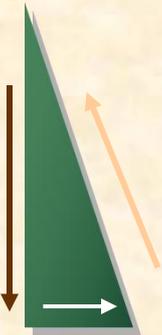
■ Principal

- Person whom the action effects



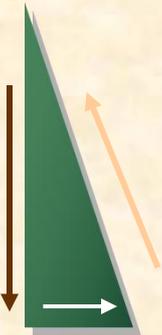
The Principal--Agent Problem

- Company owners are principals.
- Workers and managers are agents.
- Owners do not have complete knowledge.
- Employees may pursue their own goals and reduce profits.



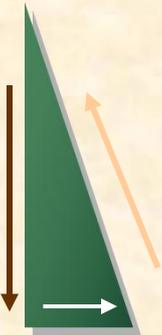
The Principal--Agent Problem

- The Principal--Agent Problem in Private Enterprises
 - Only 16 of 100 largest corporations have individual family or financial institution ownership exceeding 10%.
 - Most large firms are controlled by management.
 - Monitoring management is costly (asymmetric information).



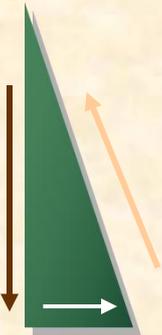
The Principal--Agent Problem

- The Principal--Agent Problem in Private Enterprises
 - Managers may pursue their own objectives.
 - ◆ Growth
 - ◆ Utility from job



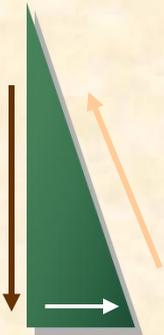
The Principal--Agent Problem

- The Principal--Agent Problem in Private Enterprises
 - Limitations to managers' ability to deviate from objective of owners
 - ◆ Stockholders can oust managers
 - ◆ Takeover attempts
 - ◆ Market for managers who maximize profits



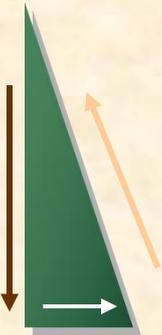
The Principal--Agent Problem

- The Principal--Agent Problem in Public Enterprises
 - Observations
 - ◆ Managers' goals may deviate from the agencies goal (size)
 - ◆ Oversight is difficult (asymmetric information)
 - ◆ Market forces are lacking



The Principal--Agent Problem

- The Principal--Agent Problem in Public Enterprises
 - Limitations to Management Power
 - ◆ Managers choose a public service position
 - ◆ Managerial job market
 - ◆ Legislative and agency oversight (GAO & OMB)
 - ◆ Competition among agencies

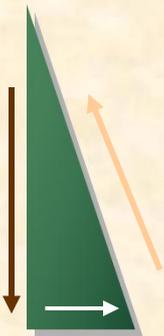


The Managers of

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Nonprofit Hospitals as Agents

- Are non profit organizations more or less efficient than for-profit firms?
 - 725 hospitals from 14 hospital chains
 - Return on investment (ROI) and average cost (AC) measured



The Managers of

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Nonprofit Hospitals as Agents

Return On Investment

1977

1981

For-Profit

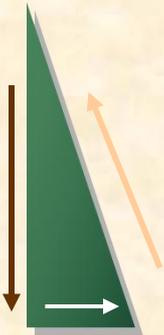
11.6%

12.7%

Nonprofit

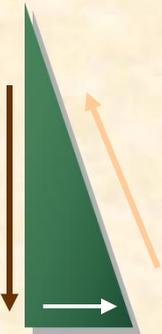
8.8%

7.4%



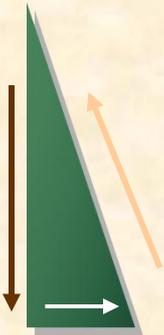
Nonprofit Hospitals as Agents

- After adjusting for differences in services:
 - AC/patient day in nonprofits is 8% greater than profits
 - Conclusion
 - ◆ Profit incentive impacts performance
 - Cost and benefits of subsidizing nonprofits must be considered.



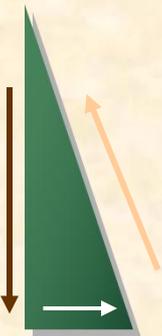
Nonprofit Hospitals as Agents

- Incentives in the Principal-Agent Framework
 - Designing a reward system to align the principal and agent's goals--an example
 - ◆ Watch manufacturer
 - ◆ Uses labor and machinery
 - ◆ Owners goal is to maximize profit
 - ◆ Machine repairperson can influence reliability of machines and profits



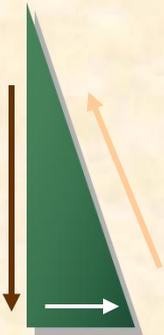
The Principal-Agent Problem

- Incentives in the Principal-Agent Framework
 - Designing a reward system to align the principal and agent's goals--an example
 - ◆ Revenue also depends, in part, on the quality of parts and the reliability of labor.
 - ◆ High monitoring cost makes it difficult to assess the repair-person's work



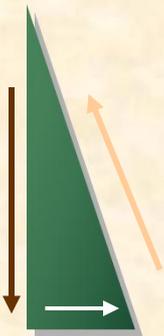
The Revenue from Making Watches

	Poor Luck	Good Luck
Low effort ($a = 0$)	\$10,000	\$20,000
High effort ($a = 1$)	\$20,000	\$40,000



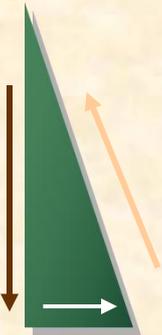
The Principal-Agent Problem

- Incentives in the Principal-Agent Framework
 - Designing a reward system to align the principal and agent's goals--an example
 - ◆ Repairperson can work with either high or low effort
 - ◆ Revenues depend on effort relative to the other events (poor or good luck)
 - ◆ Owners cannot determine a high or low effort when revenue = \$20,000



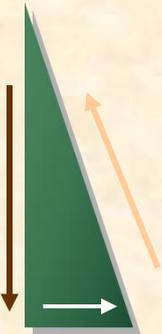
The Principal-Agent Problem

- Incentives in the Principal-Agent Framework
 - Designing a reward system to align the principal and agent's goals--an example
 - ◆ Repairperson's goal is to maximize wage net of cost
 - ◆ Cost = 0 for low effort
 - ◆ Cost = \$10,000 for high effort
 - ◆ $w(R)$ = repairperson wage based only on output



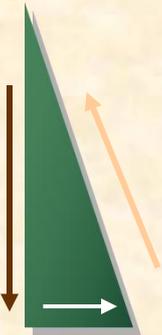
The Principal-Agent Problem

- Incentives in the Principal-Agent Framework
 - Choosing a Wage
 - ◆ $w = 0; a = 0; R = \$15,000$
 - ◆ $R = \$10,000$ or $\$20,000, w = 0$
 - ◆ $R = \$40,000; w = \$24,000$
 - $R = \$30,000; \text{Profit} = \$18,000$
 - Net wage = $\$2,000$



The Principal-Agent Problem

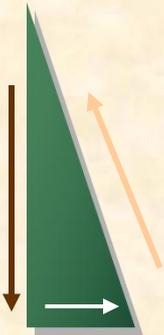
- Incentives in the Principal-Agent Framework
 - Choosing a Wage
 - ◆ $w = R - \$18,000$
 - Net wage = \$2,000
 - High effort



The Principal-Agent Problem

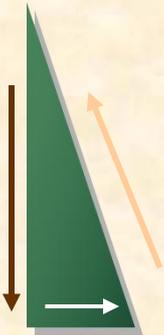
■ Conclusion

- Incentive structure that rewards the outcome of high levels of effort can induce agents to aim for the goals set by the principals.



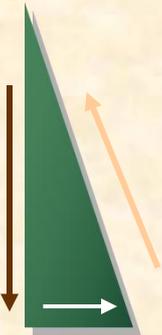
The Principal--Agent Problem

- Asymmetric Information and Incentive Design in the Integrated Firm
 - In integrated firms, division managers have better (asymmetric) information about production than central management



The Principal-Agent Problem

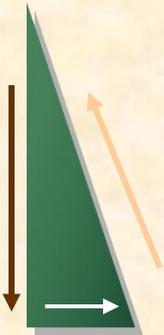
- Asymmetric Information and Incentive Design in the Integrated Firm
 - Two Issues
 - ◆ How can central management illicit accurate information
 - ◆ How can central management achieve efficient divisional production



The Principal-Agent Problem

■ Possible Incentive Plans

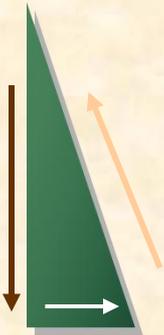
- Bonus based on output or profit
 - ◆ Will this plan provide an incentive for accurate information?



The Principal-Agent Problem

■ Possible Incentive Plans

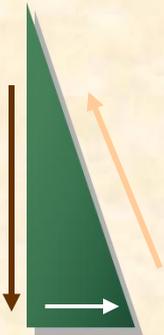
- Bonus based on how close the managers get to their forecasts of output and profits
 - ◆ Q_f = estimate of feasible production level
 - ◆ B = bonus in dollars
 - ◆ Q = actual output
 - ◆ $B = 10,000 - .5(Q_f - Q)$
- Incentive to underestimate Q_f



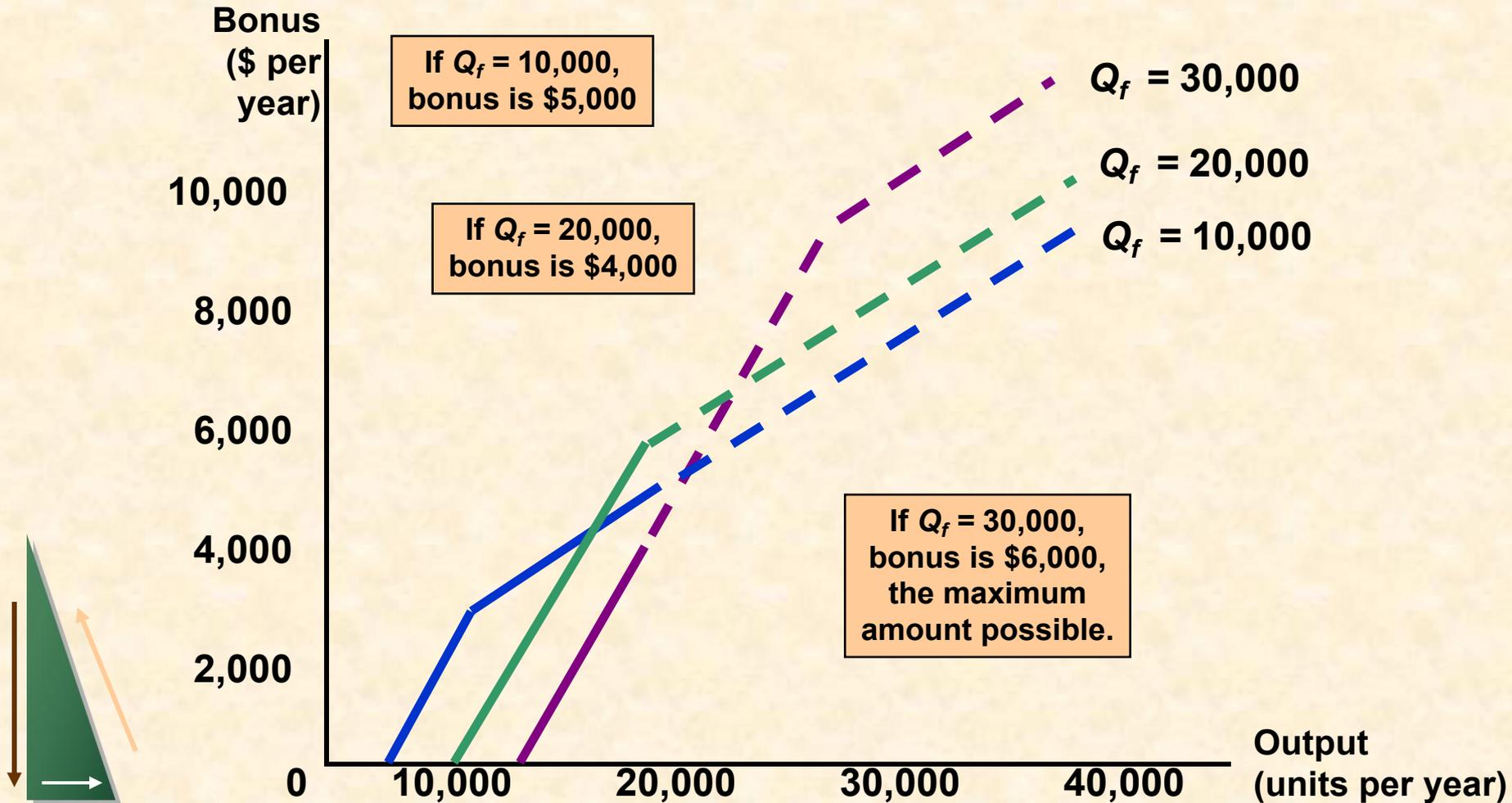
The Principal--Agent Problem

■ Possible Incentive Plans

- Bonus still tied to accuracy of forecast
 - ◆ If $Q > Q_f$; $B = .3Q_f + .2(Q - Q_f)$
 - ◆ If $Q \leq Q_f$; $B = .3Q_f - .5(Q_f - Q)$



Incentive Design in an Integrated Firm

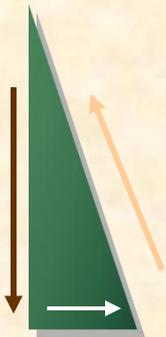


Asymmetric Information in Labor

高参考价值的真题、答案、学长笔记、辅导班课程，访问：www.kaoyancas.net

Markets: Efficiency Wage Theory

- In a competitive labor market, all who wish to work will find jobs for a wage equal to their marginal product.
 - However, most countries' economies experience unemployment.

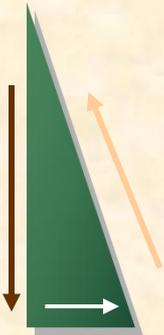


Asymmetric Information in Labor

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Markets: Efficiency Wage Theory

- The *efficiency wage theory* can explain the presence of unemployment and wage discrimination.
 - In developing countries, productivity depends on the wage rate for nutritional reasons.

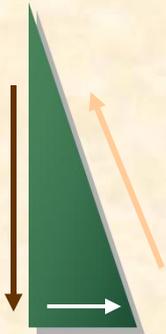


Asymmetric Information in Labor

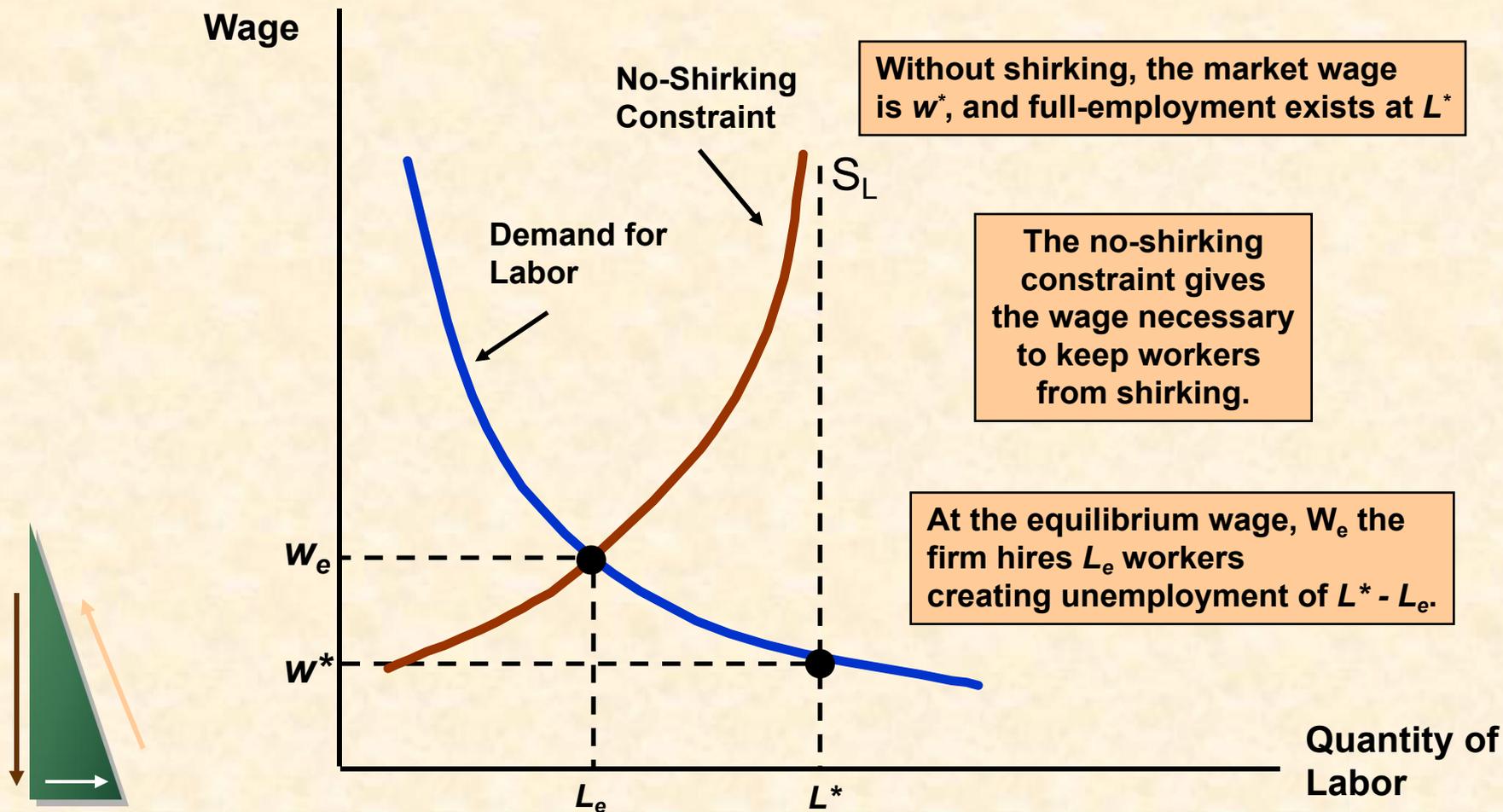
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Markets: Efficiency Wage Theory

- The *shirking model* can be better used to explain unemployment and wage discrimination in the United States.
 - Assumes perfectly competitive markets
 - However, workers can work or *shirk*.
 - Since performance information is limited, workers may not get fired.



Unemployment in a Shirking Model



Efficiency Wages at Ford Motor Company

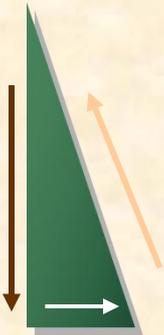
- Labor turnover at Ford
 - 1913: 380%
 - 1914: 1000%
 - ◆ Average pay = \$2 - \$3
 - ◆ Ford increased pay to \$5



Efficiency Wages at Ford Motor Company

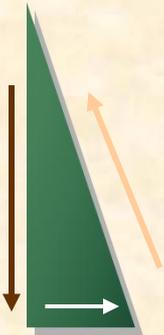
■ Results

- Productivity increased 51%
- Absenteeism had been halved
- Profitability rose from \$30 million in 1914 to \$60 million in 1916.



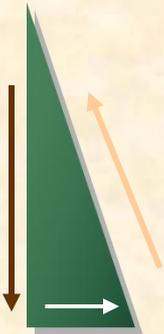
Summary

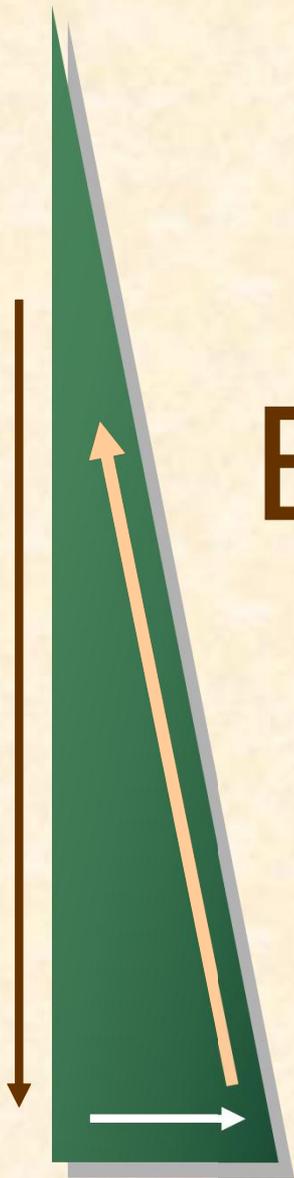
- Asymmetric information creates a market failure in which bad products tend to drive good products out of the market.
- Insurance markets frequently involve asymmetric information because the insuring party has better information about the risk involved than the insurance company.



Summary

- Asymmetric information may make it costly for the owners of firms to monitor accurately the behavior of the firm's manager.
- Asymmetric information can explain why labor markets have substantial unemployment when some workers are actively seeking work.





End of Chapter 17

Markets with Asymmetric Information