

Asymmetric Information

Safelite AutoGlass

Managerial Microeconomics

Lessons from Last Time

- Principal-agent relationships are pervasive.
- In many principal-agent relationships, agents may take hidden actions which are non-observable.
- Incentives can mitigate the moral hazard problem, but introducing risk into agents' pay is inefficient.
- Monitoring can also mitigate the moral hazard problem, but monitoring itself is costly.
 - And who monitors the monitor?

Tully LLC

- Half of you will take the role of Tully LLC, who hopes to hire Frey Entertaining to provide catering services.
 - High quality services are worth \$9,000;
 - Medium quality services are worth \$6,000;
 - Low quality services are worth \$0.
- You do not know the quality of Frey Entertaining.

Frey Entertaining

- Half of you will take the role of Frey Entertaining. You are either
 - High quality with probability $\frac{1}{3}$;
 - Medium quality with probability $\frac{1}{3}$;
 - Low quality with probability $\frac{1}{3}$.
- The cost of providing catering service is
 - \$6,000 if you are high quality;
 - \$4,000 if you are medium quality;
 - \$500 if you are low quality.
- Frey does know the quality and cost of the services it provides.

Bargaining Breakdown

- The expected value of the catering services is

$$\frac{1}{3} \times \$9000 + \frac{1}{3} \times \$6000 + \frac{1}{3} \times \$0 = \$5000.$$

- The expected cost of providing catering services is

$$\frac{1}{3} \times \$6000 + \frac{1}{3} \times \$4000 + \frac{1}{3} \times \$500 = \$3500.$$

- So why can't we make a deal?

The Lemons Problem

- Since the expected value of catering services is \$5,000, Tully will not be willing to pay more.
 - But then the high quality caterer will not be willing to deal!
- But without the high types in the market, the expected value of services is only \$3,000, so Tully will not be willing to pay more.
 - But then the medium quality caterer will not be willing to deal!
- There is no price at which Tully and the caterers willing to take that price can strike a mutually beneficial deal.

Asymmetric Information

- Many principal-agent relationships have asymmetric information:
 - CEOs may know more about the true state of the firm than shareholders (or potential acquirers).
 - Employees know their true skill whereas managers are uninformed.
 - Lawyers know their true skill at courtroom litigation.
- Asymmetric information constitutes a major impediment to striking efficient bargains:
 - If one agent has information the other does not, he will be tempted to use it during negotiations.
 - The uninformed agent will, however, be wary since he knows he is uninformed.

Quality Guarantees and Incentives

- A firm may also try to guarantee the quality of its product:
 - Used car sellers offer “certified pre-owned” cars with warranties.
 - “Satisfaction guaranteed or your money back!”
- More generally, a firm may also agree to an incentive contract, where pay is (partly) based on performance.
 - Athletic teams may contract with broadcasters, and pay may be partially based on ratings.
- Efficiency wages can work too: Only workers that are likely to succeed will take jobs that offer a high salary but more likely termination.

Reputation

- Many firms alleviate the hidden information problem by developing a reputation for quality.
- Firms may also take costly actions to signal quality:
 - Banks invest in fancy buildings;
 - Firms invest in costly advertising;
 - Like Superbowl ads!
 - Firms pay for independent verification of quality.
- What sort of firms are most likely to develop reputations?

Lannister Agriculture

- Lannister Agriculture needs to hire farmers, who can be either capable or inept.
- A farmer's success produces \$100 in value for Lannister, while failure produces nothing.
- A capable farmer succeeds $\frac{3}{4}$ of the time, while an inept farmer succeeds $\frac{1}{4}$ of the time.
- A capable farmer earns a wage w of \$25 by working other land, while an inept farmer earns \$9.
- The utility function of either farmer is \sqrt{w} .
- What contract will you offer?

Sorting Applicants

- Call the payment for success s and failure f .
- Lannister faces two incentive constraints:

- ① Capable farmers should be willing to take the contract:

$$\frac{3}{4}\sqrt{s} + \frac{1}{4}\sqrt{f} \geq \sqrt{25}.$$

- ② Inept farmers should not be willing to take the contract:

$$\frac{1}{4}\sqrt{s} + \frac{3}{4}\sqrt{f} \leq \sqrt{9}.$$

- Thus, the optimal contract for Lannister is

$$s = 36 \text{ and } f = 4.$$

Incentives Contracts

- Hidden information can also be solved via incentives.
 - Much like the moral hazard problem!
- Offering pay based on performance screens out low types who know they will likely perform poorly.
 - As with moral hazard, this variability in pay is inefficient.
- Insurance contracts are a common example: an agent who accepts a higher deductible is saying he thinks he is a good driver, and so he is charged a lower rate.

The Costs of Asymmetric Information

- The *expected* income of a capable worker for Lannister is 28, but a capable worker on his own has an income of 25.
- Why is the expected wage higher?
- As in the moral hazard problem, asymmetric information leads to inefficient risk—the cost of which is borne by the firm.
- Identifying capable employees and then offering only them jobs alleviates this cost—but identifying capable employees is hard!

Safelite AutoGlass

- Why was the productivity of Safelite installers so low?
- How did the Performance Pay Plan work?
- How is it likely to change employee behavior?
- What are possible side-effects?
- Should Safelite implement the reduction in the guaranteed rate?

Productivity Before PPP

- Technicians are not highly motivated:
 - Pay is not based on number of windshields installed—moral hazard.
 - Payment scheme does not attract high-productivity workers.
 - High turnover of workers.
- Warehouse technicians are also unmotivated—they sometimes provide the wrong windshields!
- The DCC managers also have weak incentives:
 - They assign jobs inefficiently;
 - Bad directions/addresses are provided.

The Performance Pay Plan

- Before the PPP, worker wages were \$10-12/hour...
- ... Afterwards, pay was expected to rise to \$15/hour.
 - The goal was not to reduce wages!
- However, the base pay would only be \$7/hour—fully half of a worker's pay would be from commission.
- In addition to pay for the number of windshields installed, they were also paid for additional services sold (such as new wiper blades).

The Direct Effects of PPP

- Will PPP solve the moral hazard and retention problems identified earlier?
- Moral hazard: Workers will now be incentivized to install windshields faster.
 - Note that the contract rewards performance, not effort: High travel times and/or difficult windshield repairs can lower pay significantly even though the worker is putting in effort.
- Asymmetric information: Better workers should prefer Safelite—the higher pay for higher performance is a better deal for them.
- More variability in worker pay: Average pay will have to be higher to compensate for the increased volatility.

The Indirect Effects of PPP

- Quality of installations is likely to fall.
 - Since quality is not compensated, but quantity is, expect a strong shift in output.
- Customer service quality is likely to fall (for similar reasons).
- Volatility in outcomes due to warehouse dispatcher/technician behavior: how to incentivize those upon whom the installers depend?

Solving the Quality Problem

- Monitoring: Safelite eventually chose to monitor whether windshield installations failed, and whether customers were pleased (through random phone interviews).
- Incentives: And provided bonuses for quality installation and customer service.
- More generally, when providing incentives, principals face a multitasking problem whenever there are multiple tasks an employee must perform:
 - Principals must be careful to align agent behavior with desired output.

The Team Production Problem

- The productivity of an installer relies on the warehouse dispatchers and technicians—how do you motivate them?
- The installers themselves can monitor the quality of the services they use! And they have a strong incentive to do so well.
- Later, Safelite switched to team incentives, to help incentivize the warehouse staff to increase productivity as well.
 - Going to team incentives weakens the individual incentives. . .
 - But many times team monitoring will solve the internal incentive problem.

Reducing the Guaranteed Rate

- So should Safelite reduce their guaranteed rate? What is the trade-off?
- The benefit is straightforward: they provide high-powered incentives to increase productivity.
- But it also significantly increases downside risk for employees.
 - Productive but risk-averse workers may leave.
 - Need to make sure that incentives are right—it should not end up being a pay cut (for most workers).

Outcomes for Safelite

- Safelite chose not to reduce the guaranteed rate in order to reduce turnover;
- Nevertheless, turnover shot up in the following year.
- Worker productivity went up dramatically—by nearly 40%.
 - This was due to both higher productivity from a given worker...
 - And attracting more productive workers.
- PPP drove labor costs from 12.3% of sales to 10.8% of sales, causing a significant increase in profitability.

Conclusions

- Hidden information can profoundly influence bargaining outcomes:
 - It may lead to bargaining breakdowns, as in the lemons problem.
 - It may require offering contracts so that only the “right” parties take them:
 - With Safelite, we saw that highly incentivized contracts attracted the “right” kind of worker.
- Many times both hidden information and moral hazard must be considered.
- If a worker is required to fulfill multiple objectives, be wary of giving incentives for only some of them!
- Team incentives may be considered for some settings.