

# Lesson 2

# The Land-Owner Problem

- A land-owner wants to hire a farmer to manage his land. What is the optimal contract?
  - Question: define the optimal contract
- Three contract choices
  - Fixed wage
  - Sharecropping
  - Land rental
- Which one is the optimal contract?

# Definition

- Principal's profit

$$\pi_P = p \times Q - C - M$$

With  $M = 0$  or  $M = \infty$

- Agent's profit

$$\pi_A = C - f(e)$$

- Production

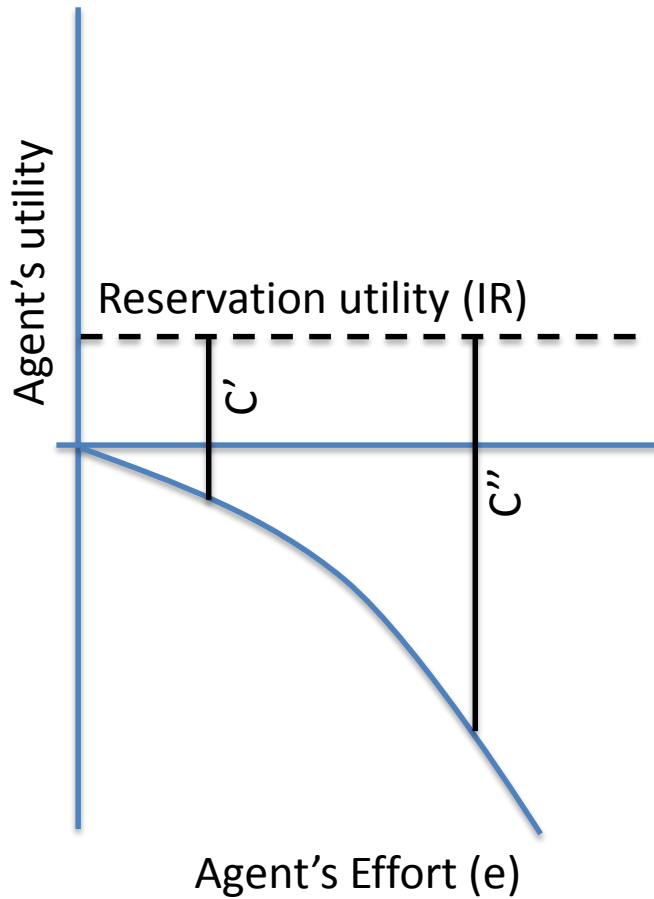
$$Q = g(e) + \varepsilon$$

# Fixed wage

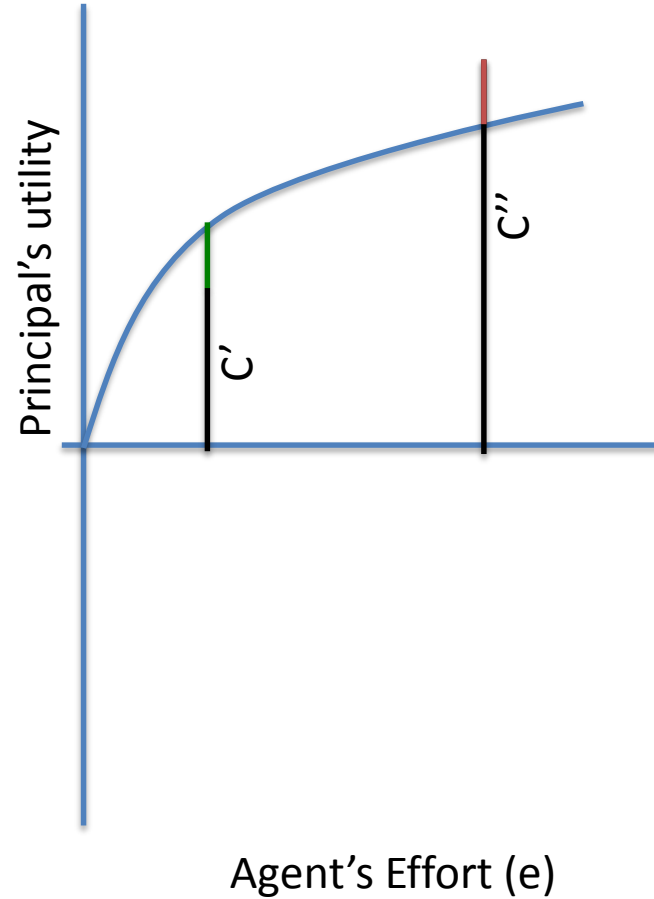
- The principal offers a compensation  $C$  that is independent of agent effort.
  - In case of shirking, the principal can fire the agent
- If the principal cannot observe effort and the state of nature:
  - The agent shirks and blames  $\varepsilon$  for the low production
- If the case of free monitoring of  $(e, \varepsilon)$ 
  - Choose the optimal  $e$  and set  $C$  equal to the IR constraint

# Fixed Wage

AGENT



PRINCIPAL



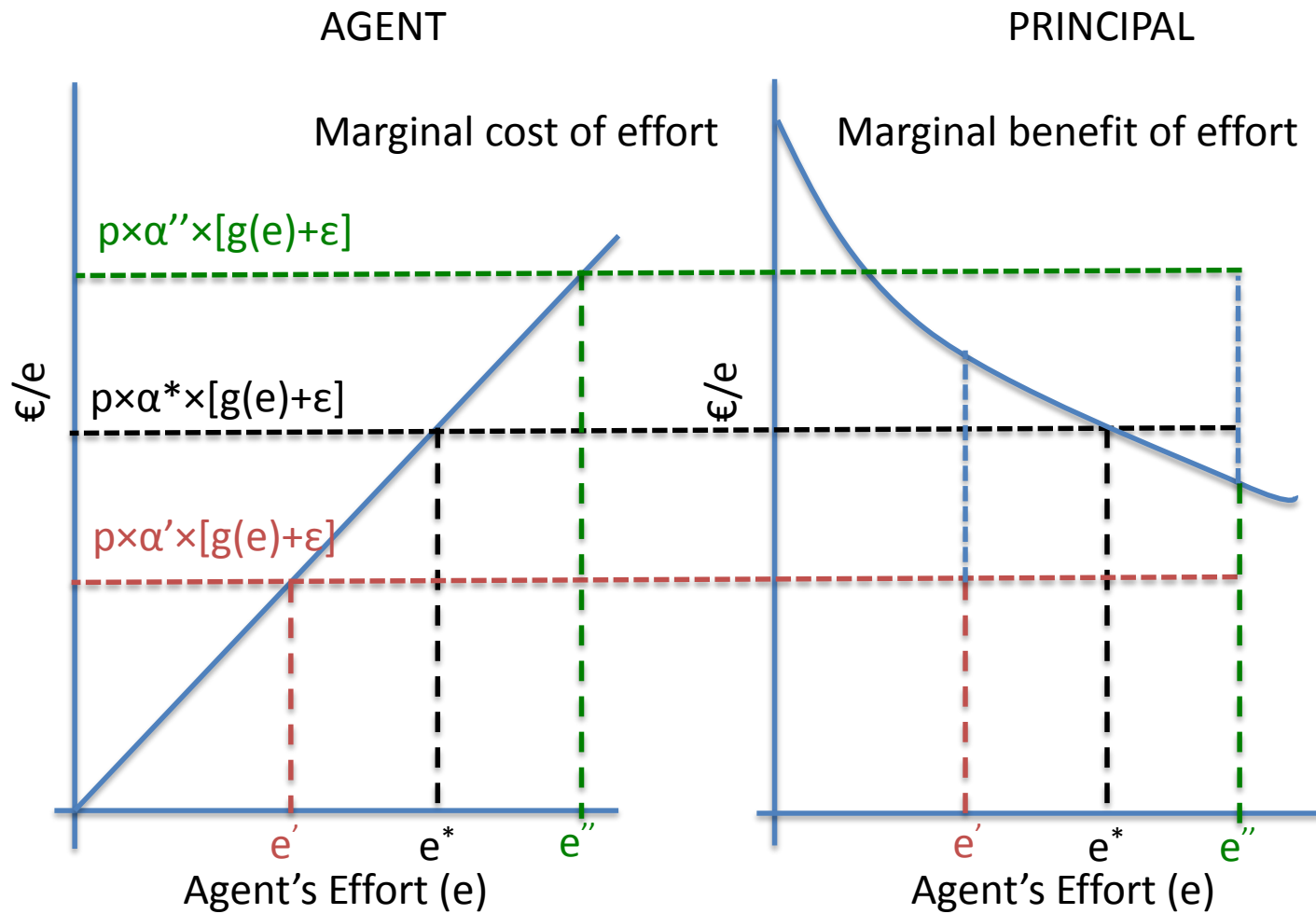
# Fixed Wage

- It is NOT a self-enforcing contract
  - Tight monitoring is required
  - It is feasible only if the cost of observing  $e$  is low
- If  $e$  is freely observable, the agent gains the reservation utility only
  - No rents
- The principal does NOT maximize agent's effort
  - Too costly

# Sharecropping

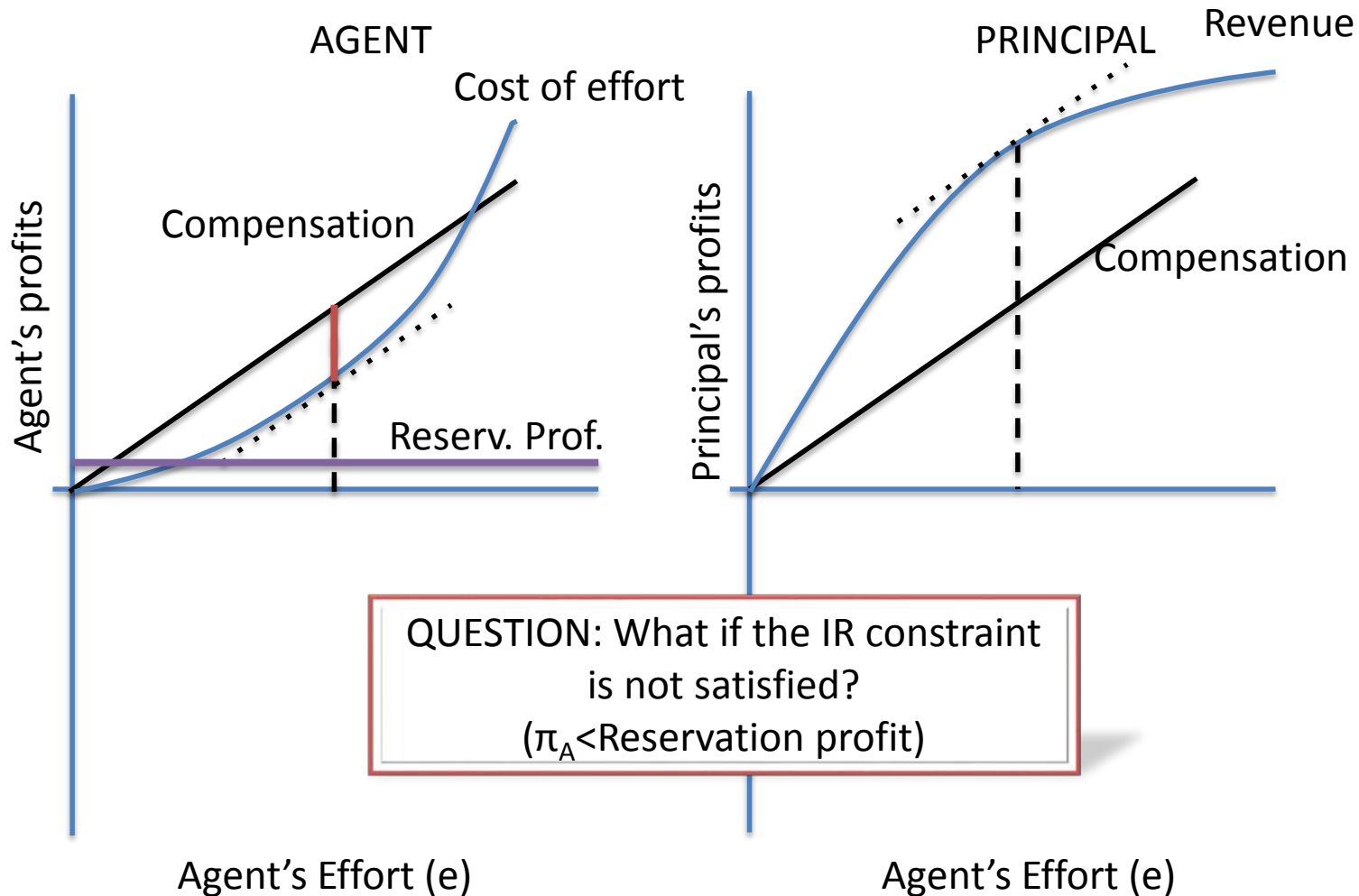
- What if  $e$  and  $\varepsilon$  are not observable?
- In sharecropping, the agent's compensation is a share of the production  $C = p \times \alpha \times Q$
- Now  $C$  is proportional to  $Q$  and the agent has incentive to produce effort

# Sharecropping (IC)





# Sharecropping (IR)



# Sharecropping

- What if the principal cannot observe  $Q$ ?
- What if  $\varepsilon$  is 'large'?

# Sharecropping

- If  $Q$  is not observable, the agent could steal part of the production and blame  $\varepsilon$  for the low production  
$$C = p \times \beta \times Q + p \times (1 - \beta) \times \alpha \times Q$$
- If  $\varepsilon$  is 'large', the correlation between compensation and effort is low.
  - The agent could shirk and hope for 'good weather conditions' (if weather is bad, he won't be paid anyway)
- Is sharecropping a self-enforcing contract?

# Land Rental

- What if  $e$ ,  $\varepsilon$  and  $Q$  are not observable?
  - The landowner lives far away
- The landowner does not have the information to organize the transaction (design attributes)
- Maybe the farmer should organize production (decide effort)

# Land Rental

- The farmer pays a fixed rent ( $R$ ) to the landowner and organize production as he/she wish.
  - Who is the principal now? Why?
- Being  $R$  independent of  $e$ , the optimal effort level is independent of the rent
- $R$  affects the IR constraints only.
  - If  $R$  is too low, landowner does not accept the contract
  - If  $R$  is too high, the farmer may obtain negative profits

# Land Rental

- What if the farmer does not know land 'quality' (expected yield)?
  - Adverse selection problem
- What if  $\varepsilon$  is large?
  - The role of risk aversion

# The Land-Owner Problem: Conclusions

- The optimal contract depends on information
  - What anyone can or cannot observe
- Maximizing agent's effort is not necessarily the most profitable option
  - Effort is costly, monitoring is costly
- Self-enforcing mechanisms are conditional on information too.

# Contract Check-List

- When designing a contract, keep in mind:
  - Who are the parties?
  - What are their objectives?
  - What constraints are they facing?
  - Who knows/observe what
  - Who is bearing the risk of the transaction?
  - What is the cost of failure?



# Separation Theorem

- Unlike IOF, the Separation Theorem does not hold
  - The production decision affects the distribution of the benefits
  - Making ‘the biggest pie’ is not always compatible with individual incentives.

# Conclusions

- Collective action is an opportunity for farmers.
- Private incentives might be misaligned with the collective goal
- The design of the agreement must consider the potential for opportunism.

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