Regret-Minimizing Mechanism Design

Yingni Guo

The Econometrica Session: Advances in Economic Theory
Jan 2025

Roadmap

- Robust Monopoly Regulation (2025, joint with Eran Shmaya)
- Regret-Minimizing Project Choice (2023, joint with Eran Shmaya)
  - Previous work and key findings
  - What we do
  - Thoughts for future work

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- The optimal policy for maximizing consumer welfare is:
  - to set the price equal to the marginal cost, and
  - to subsidize the supplier for his fixed construction cost, ensuring that a firm is willing to provide the bridge.

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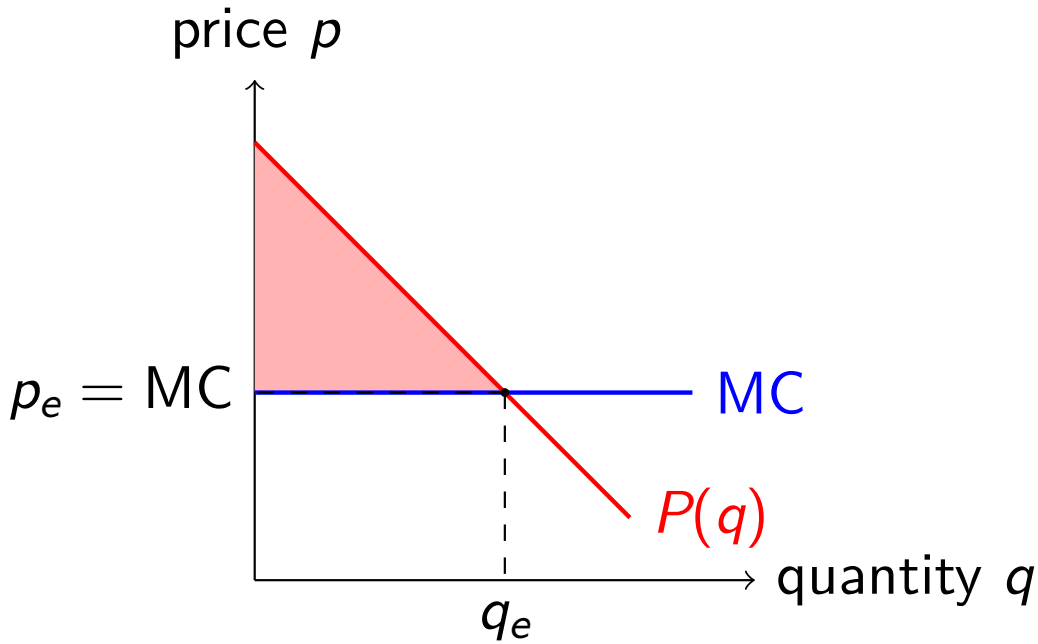

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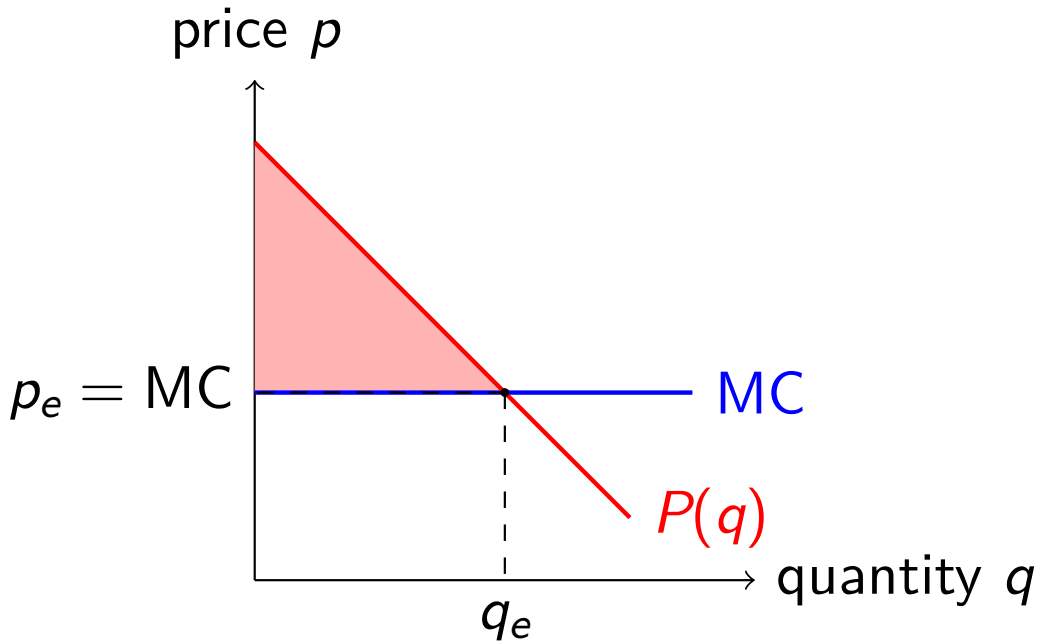

- Production is efficient
- Total consumer surplus is (pink triangle − fixed cost)

Baron and Myerson (1982)

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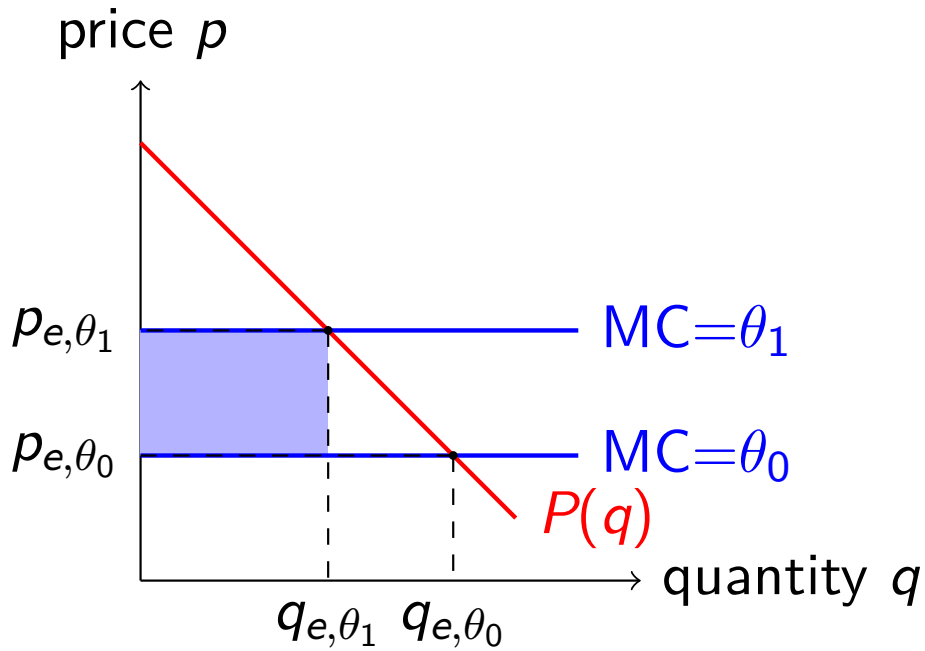

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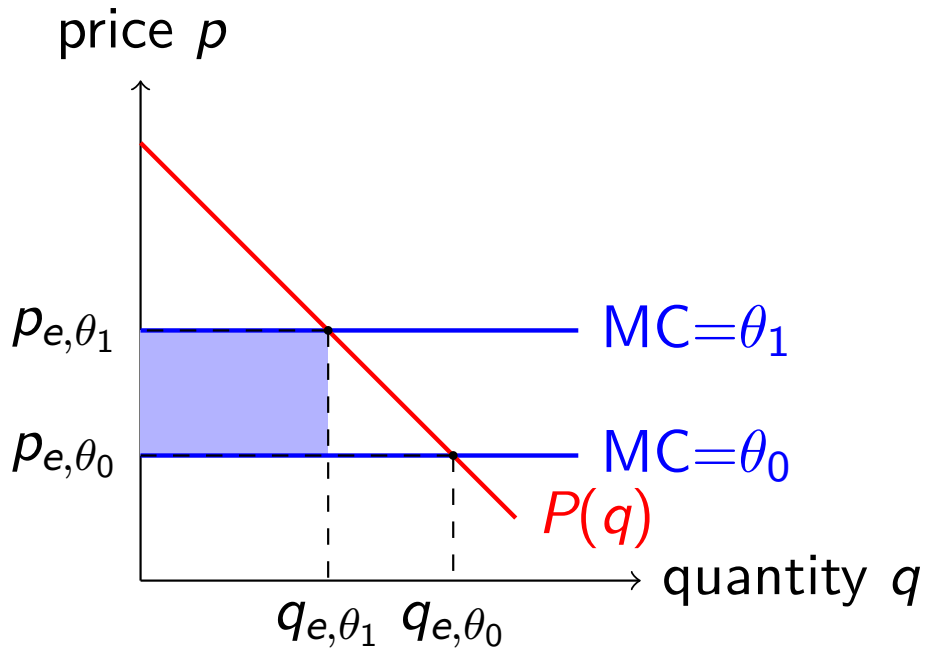

- If pricing at MC and being subsidized FC, θ_0 will mimic θ_1.
  Type θ_0 will extract surplus of the blue box, and underproduce

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Second-best solution for marginal cost $\theta \in [\theta_0, \theta_1]$:

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- lower cost types get a lower price than higher cost types
- local upwards IC constraints bind and informational rents are easily computed
- there is no distortion at the bottom (lowest cost types)
- the highest cost types get no rent: the participation constraint binds at the top
- the firm may charge a price even higher than the unregulated price

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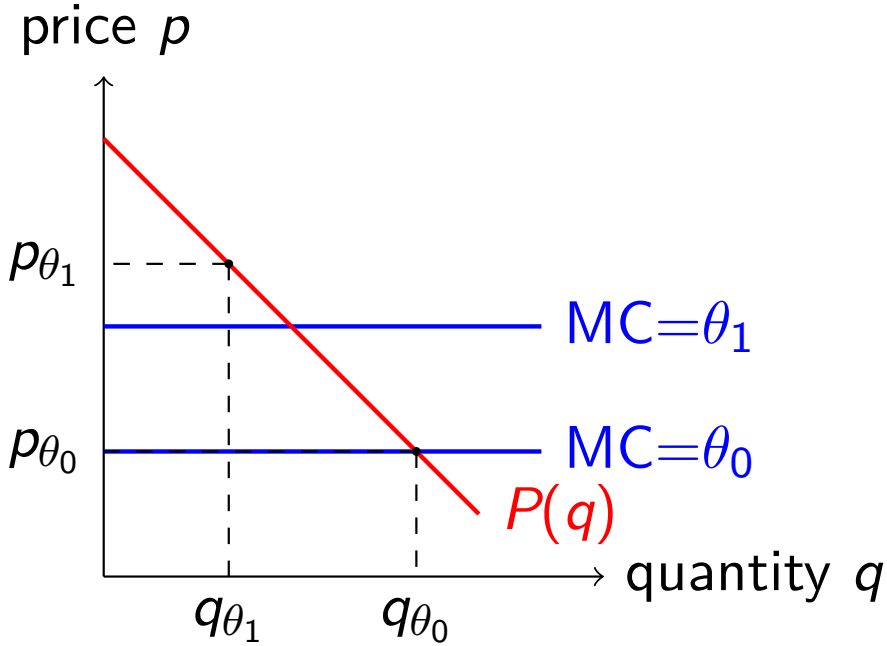

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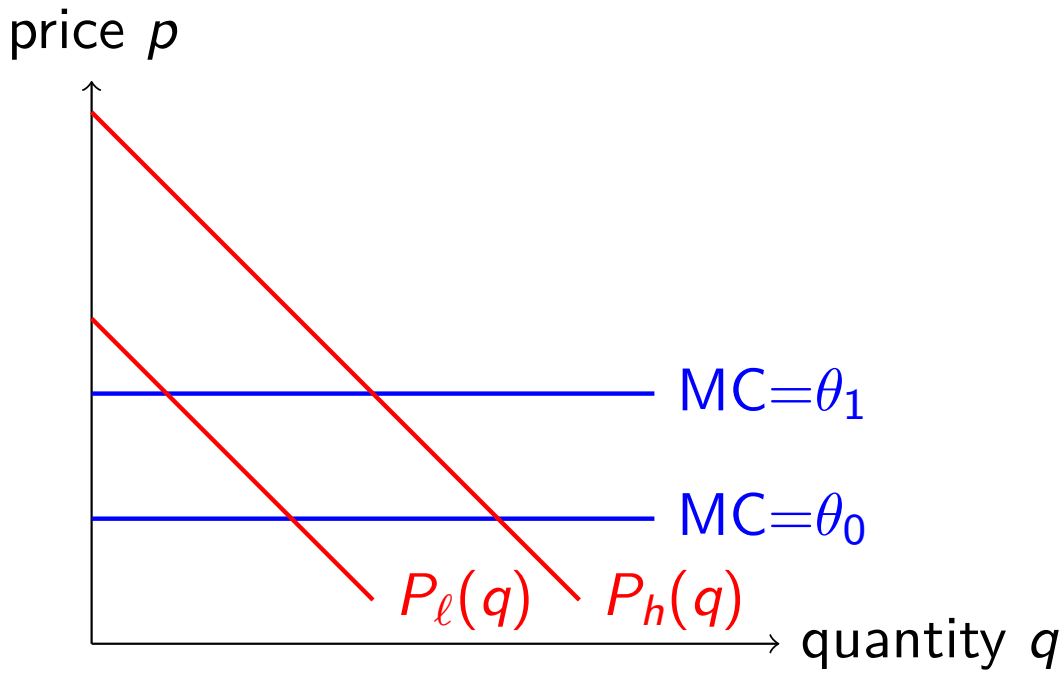

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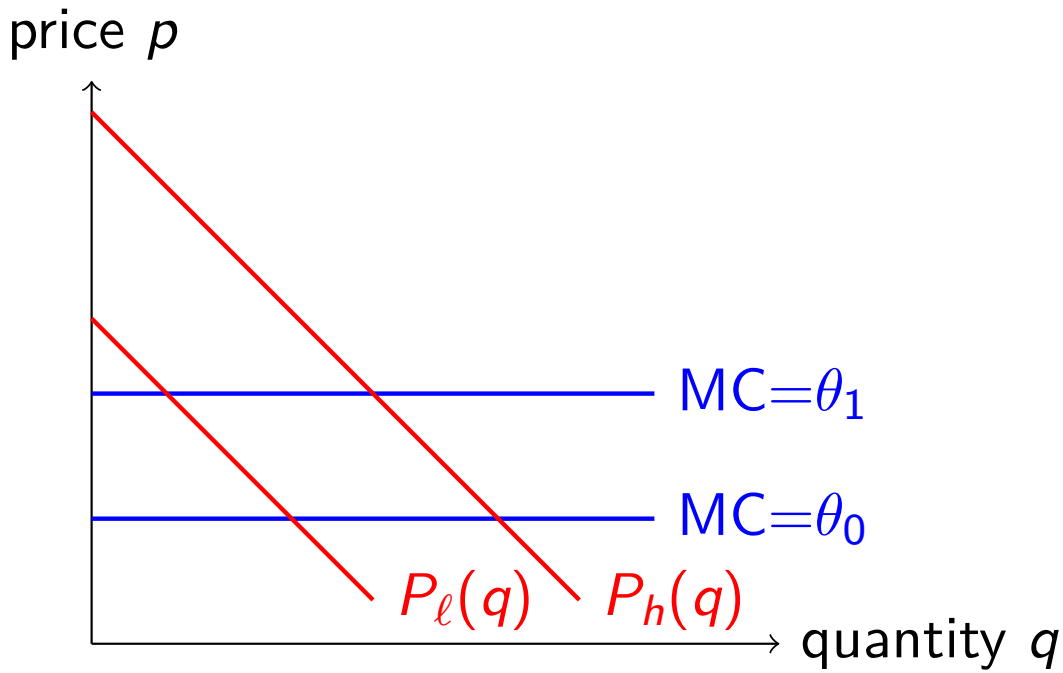

- *Perhaps the most interesting result is that it could be optimal to make the firm charge a price below marginal cost.* (Armstrong and Rochet (1999), p. 972)

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- If he wants a policy that works "fairly well" in all circumstances, what shall this policy look like?

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$$\text{consumer surplus} \; + \; \alpha \; \text{firm's profit}, \; \alpha \in [0, 1]$$

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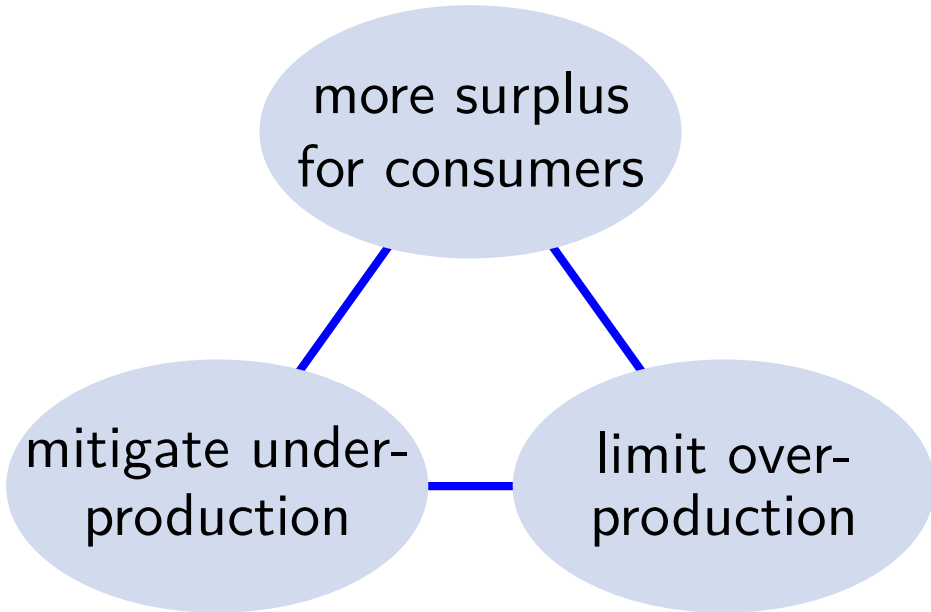
What we find: three concerns

We decompose the regulator's problem into three concerns:



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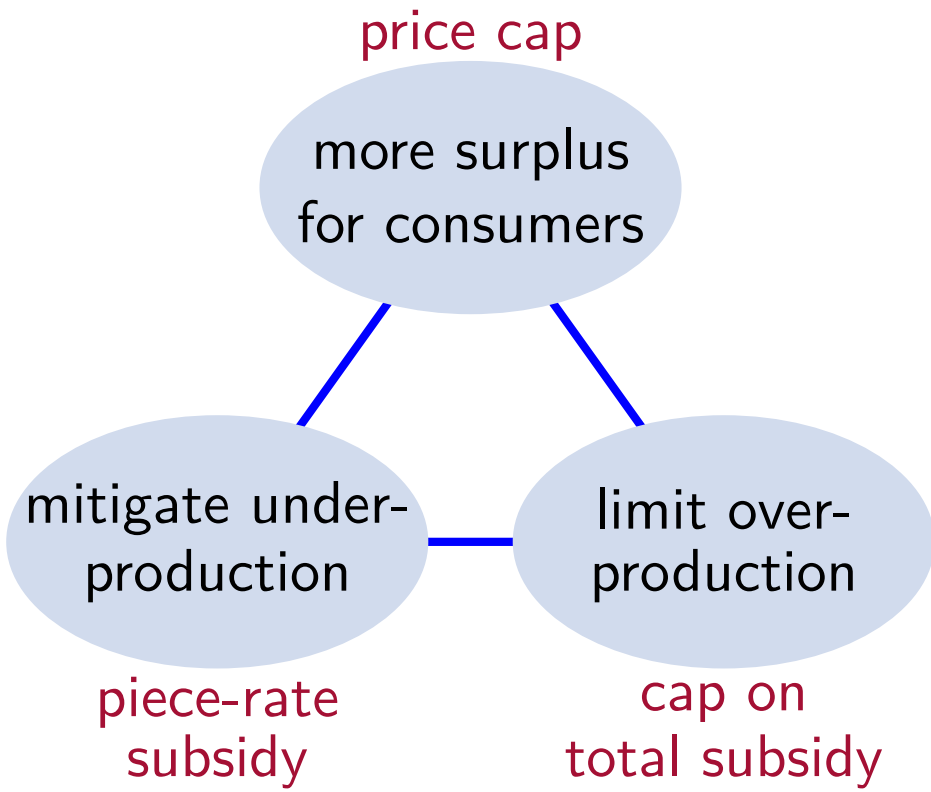
  overproduction induced by subsidy is under control

What we find: three concerns and three instruments



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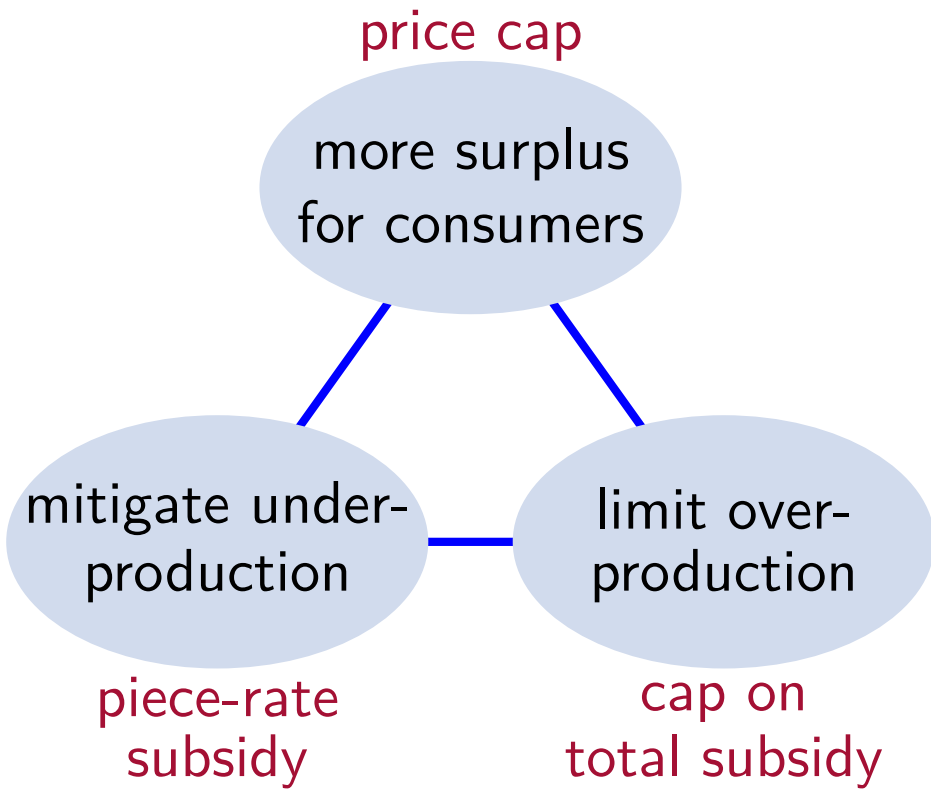

- A price cap alone is optimal when consumer values are homogenous enough or redistribution incentive is strong enough

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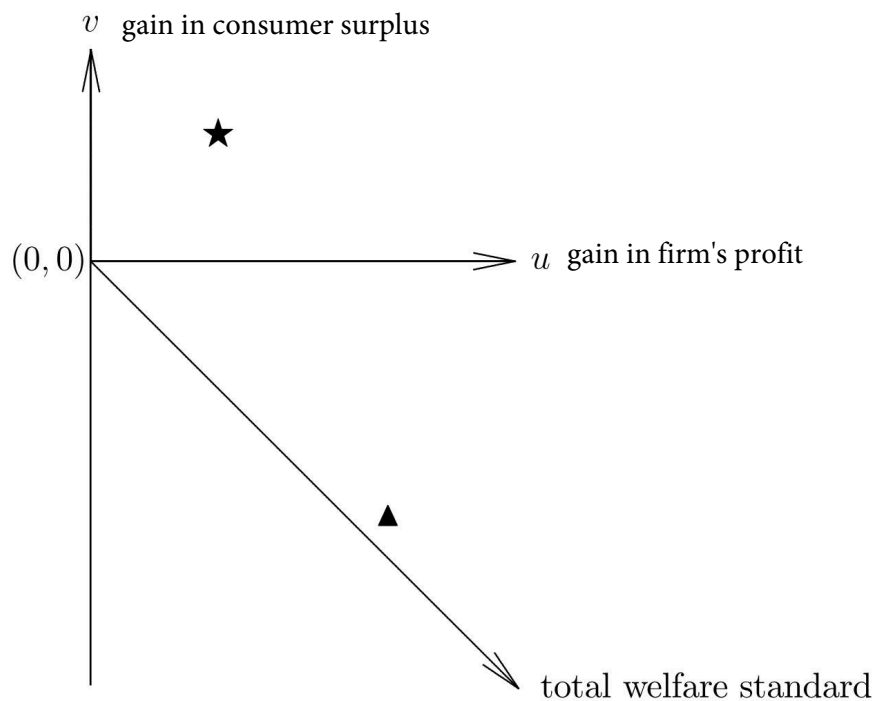
FIGURE 1.—The impact of welfare standard on chosen mergers.

Project choice: Armstrong and Vickers (2010)



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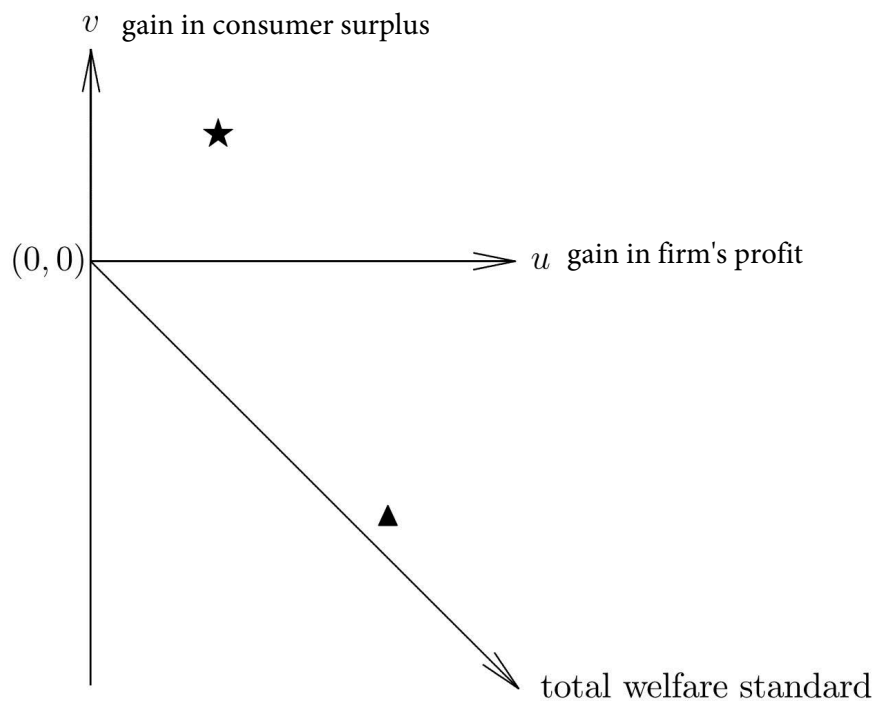

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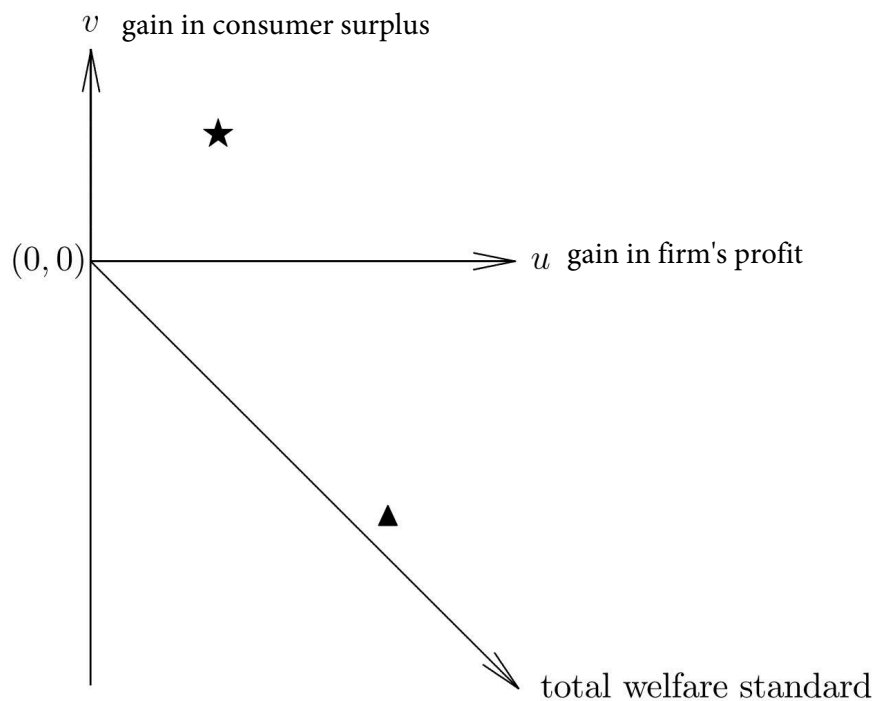

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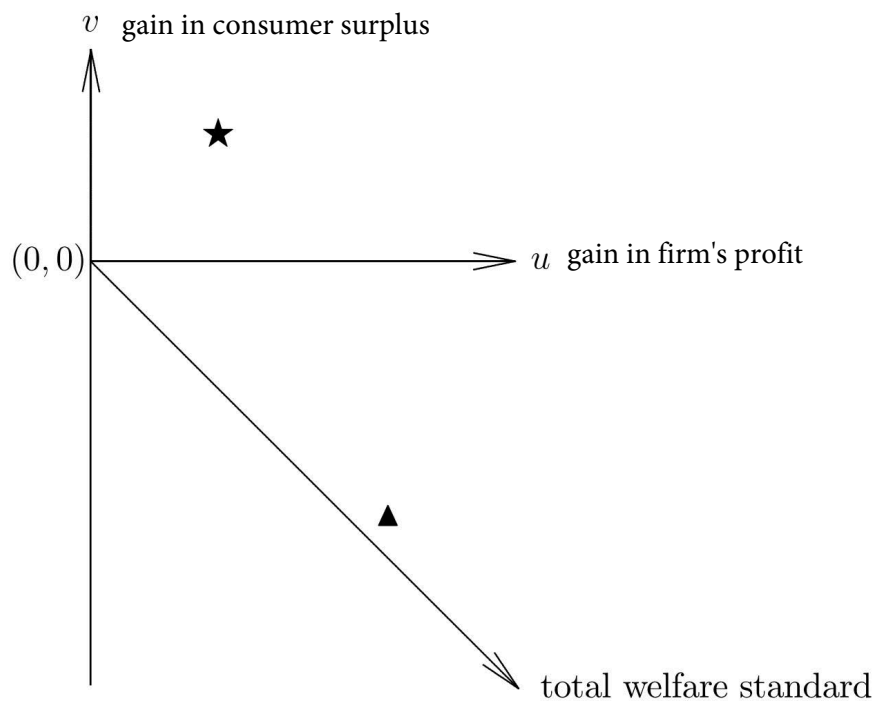

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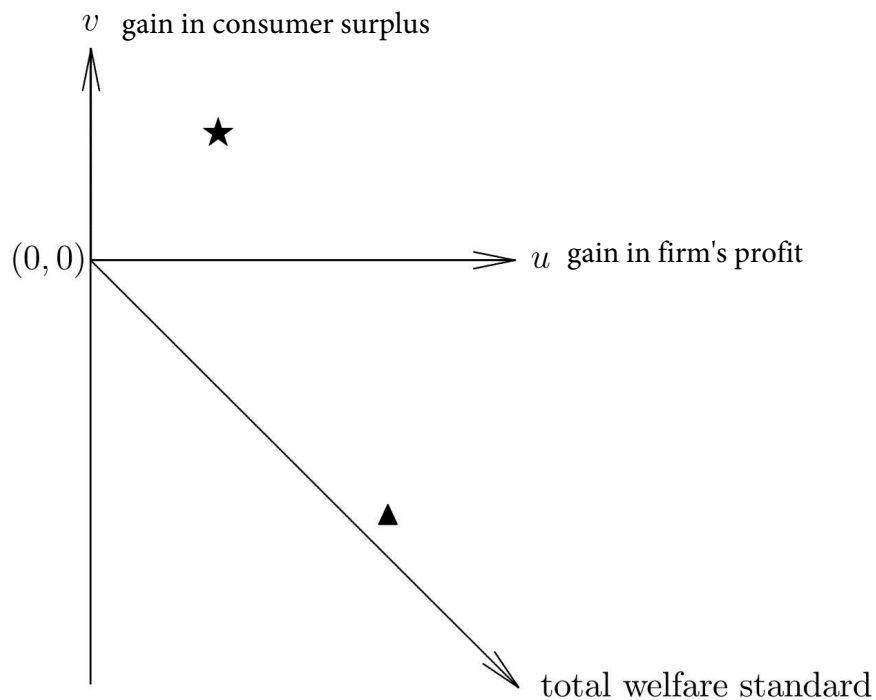

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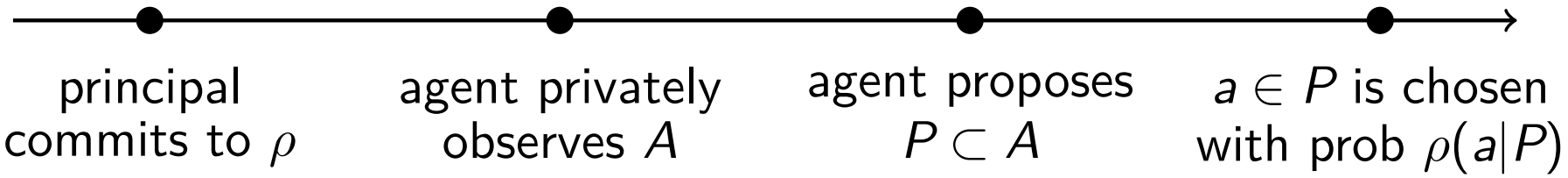
- Proposing bias: the agent has a tendency to propose his favorite project and hide his less preferred ones

Project choice: timeline



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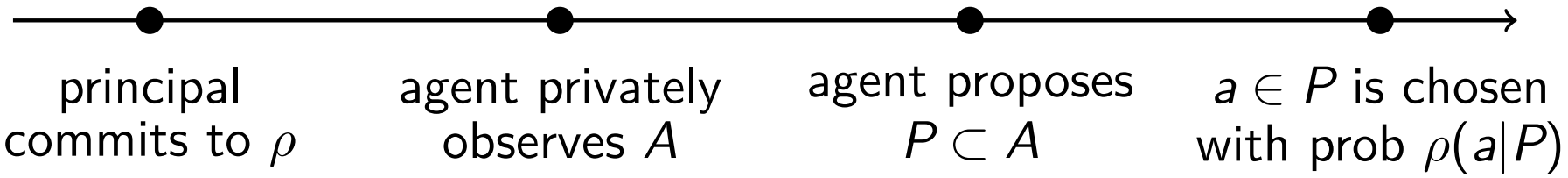

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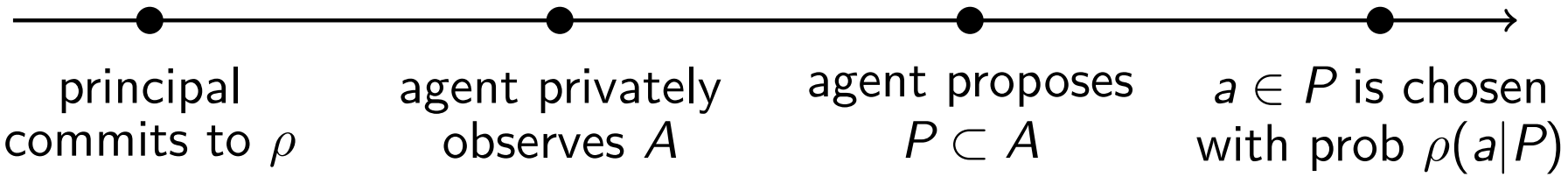

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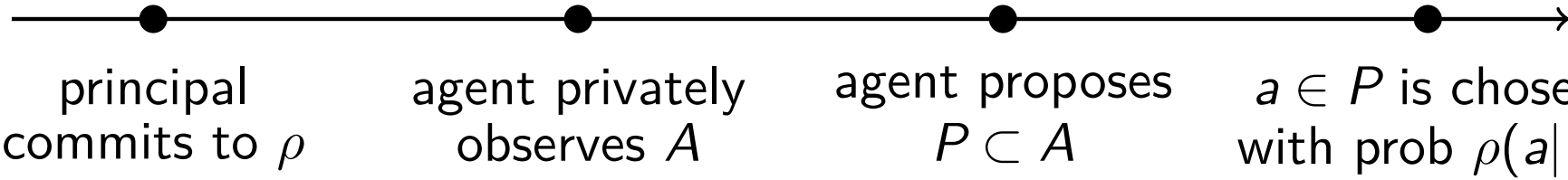

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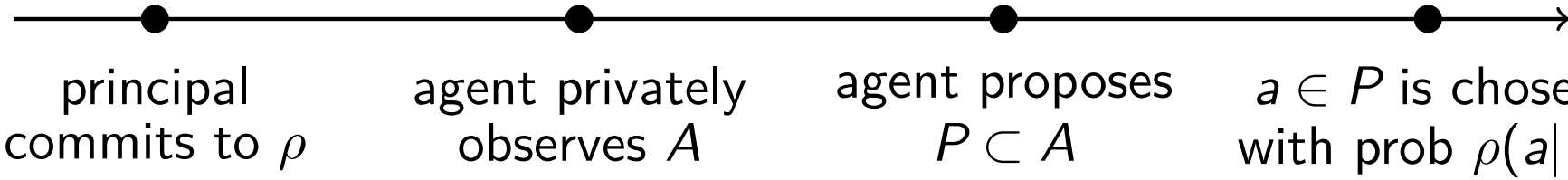

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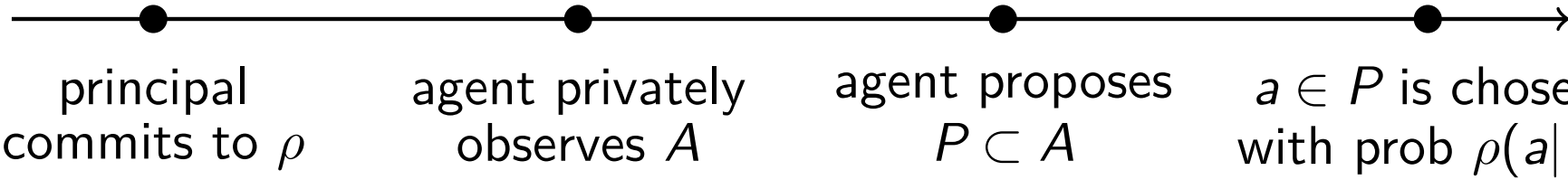

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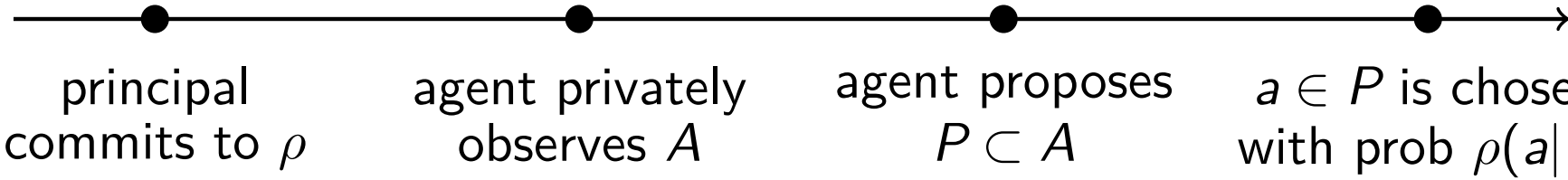

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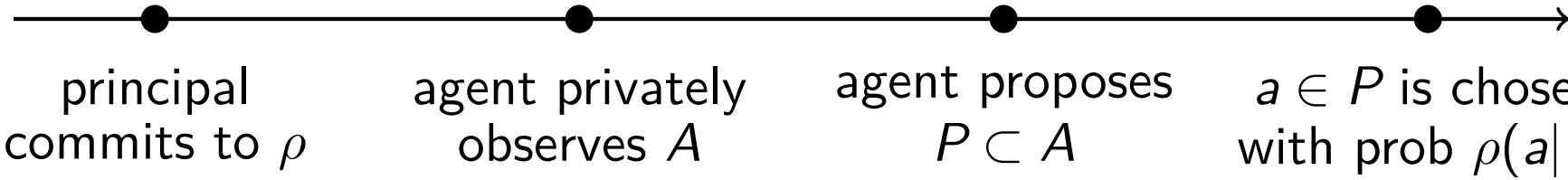

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Strategic role of multiproject proposals

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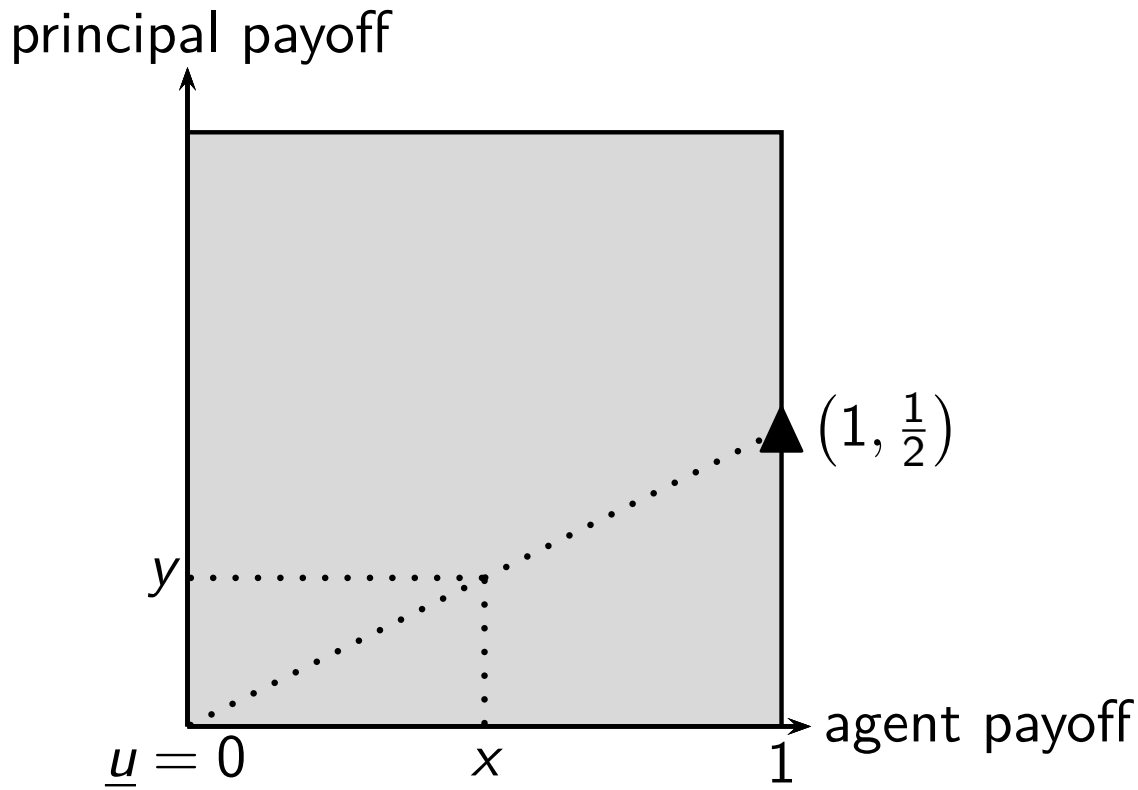

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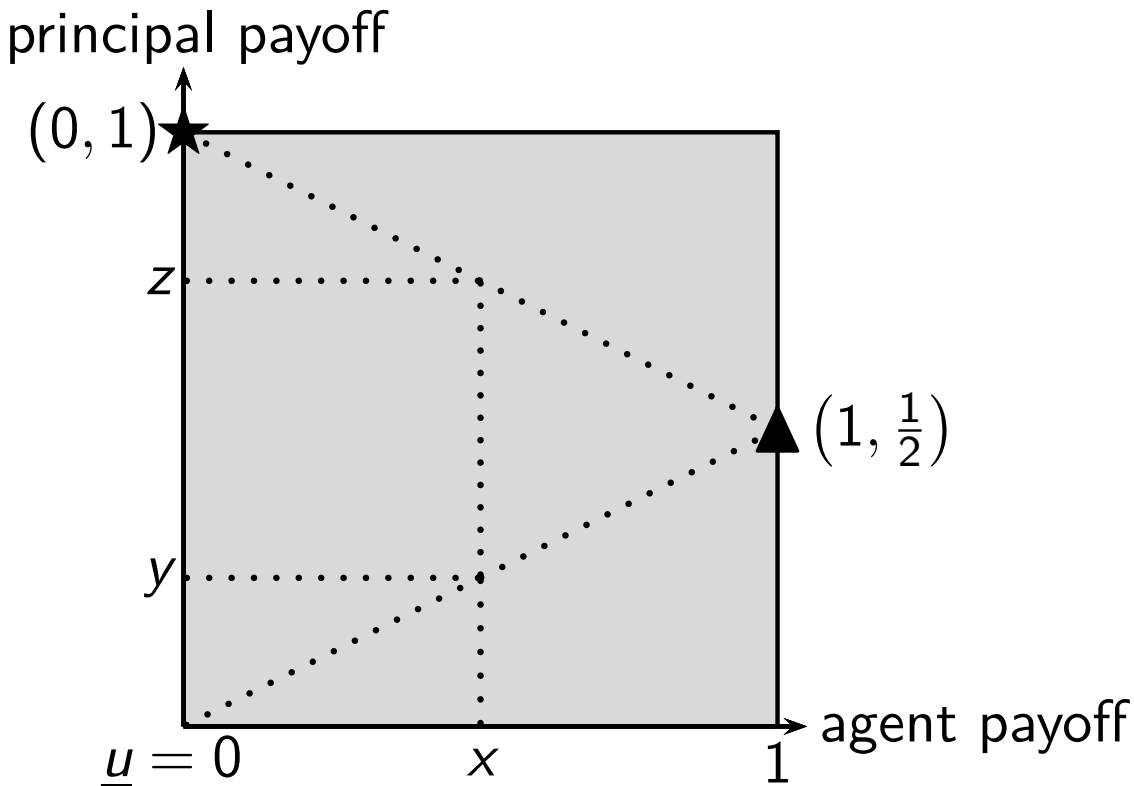
- Multiproject environment allows the agent to also propose ★, a better fallback option than rejection. The principal's payoff goes up to z



Two is enough

- To incentivize the agent to propose multiple projects, he is provided the maximal payoff from proposing each project alone
- Two is enough:
  - one that gives the agent his maximal payoff from proposing each project alone
  - one that the principal likes the most

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- *All relevant information asymmetries can be difficult to characterize precisely.* (Armstrong and Sappington (2007), p. 1607)

  It is unclear how to formulate a prior.

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