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14.03/003 Microeconomic Theory & Public Policy Fall 2025

Lecture slides 17: Externalities part I – The Coase theorem, property rights, and social interactions

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Externalities: Definition

An indirect *cost* or *benefit* to an uninvolved third party that arises as an effect of another party's (or parties') activity (source: Wikipedia, 2022/11/01)

- Externalities arise when an economic actor does not face the "correct price"
- Economic efficiency demands that *social* cost of marginal unit be equal to its *social* benefit
- If there are externalities, the *private* cost (benefit) of the marginal unit produced/consumed will not equal the marginal social cost (benefit)

Externalities: Examples

- CO_2 emissions
- Water, air, noise pollution
- Fishing, grazing, logging in shared seas, pastures, forest land
- Speeding

Externalities?

- Getting a COVID (or measles, or polio, etc.) vaccination?
- Developing a valuable idea?
- Being polite?
- Carrying a licensed firearm?
- Joining/participating in a social media platform?

Four perspectives on externalities

1. **Today: Property rights perspective: The Coase Theorem**
2. **Today: Collective choice externalities**
3. Next week: Classic pricing problem
4. Next week: Empirical applications
   - Mass transit
   - Regulating pollution

Externalities – The Coase Theorem

The Coase Theorem

Are externalities such as those above never internalized by the market?

- Until Ronald Coase's 1960 paper, "The Problem of Social Cost," most economists would have said yes
- Coase made them reconsider that view

"The Problem of Social Cost" Ronald Coase, 1960

Let us first reconsider the case of Sturges v. Bridgman... In this case, a ***confectioner*** *(in Wigmore Street) used two mortars and pestles in connection with his business (one had been in operation in the same position for more than 60 years and the other for more than 26 years).*

"The Problem of Social Cost" Ronald Coase, 1960

*A **doctor** then came to occupy neighbouring premises (in Wimpole Street). The confectioner's machinery caused the doctor no harm until, eight years after he had first occupied the premises, he built a consulting room at the end of his garden right against the confectioner's kitchen. It was then found that the noise and vibration caused by the confectioner's machinery made it difficult for the doctor to use his new consulting room. "In particular . . . the noise prevented him from examining his patients by auscultations for diseases of the chest. He also found it impossible to engage with effect in any occupation which required thought and attention."*

"The Problem of Social Cost" Ronald Coase, 1960

The doctor therefore brought a legal action to force the confectioner to stop using his machinery. The courts had little difficulty in granting the doctor the injunction he sought. (Coase, 1960, pp 8-9)

Is this reasoning complete?

- Baker's machinery disturbed the doctor's medical practice
- Doctor could not treat patients while the baker's machinery was running.
- The standard economic reasoning at the time, voiced by the court was
  - Baker should have to compensate the doctor for the harm his machinery was doing
  - Why? Baker's equipment was causing the externality
- Having the baker provide compensation would correct the externality imposed on the doctor

Coase's example revisited

- You and your roommate share a room in an MIT dormroom
  - You'd like to study for your 14.03/003 exam
  - Your roommate, not in 14.03, wants to warm up for the MIT Annual Heavy Metal Festival
- Suppose
  - Your value to study in a quiet room is V_Q.
  - Your roommate's value of "making the rubble bounce" is V_M.
- **What's the "efficient" thing to do?**

Suppose MIT gives you the right to a quiet room

- If $V_Q > V_M$, you use that right and force your roommate to stop the music
- If $V_M > V_Q$, you should trade the right with your roommate: Any price $p \in (V_Q, V_M)$ will make you both strictly better off
- **Outcome is efficient**

Suppose MIT gives your roommate the right to a loud room

- If $V_M > V_Q$, your roommate uses that right (and you are in trouble for your 14.03 exam...)
- If $V_Q > V_M$, your roommate should trade the right with you: any price $p \in (V_M, V_Q)$ will make you both strictly better off
- Outcome is efficient

Coase's example revisited

– **Suppose you and your roommate can trade the rights to noise/quiet**

1. Does it matter what MIT decides, from the viewpoint of economic efficiency?
2. *Does it matter in any other way?*

The essence of the Coase theorem

- From the standpoint of fairness/equity, what matters is to whom the rights are allocated
- But from the economic efficiency standpoint, what matters is that the social cost-minimizing action is taken $C^* = \min\{V_M, V_Q\}$
- As long as the property right is clearly allocated and enforceable, and the economic actors can bargain over this right at negligible cost, the allocation that results is economically efficient
- The social planner does not need to know the private costs or benefits of the economic actors – does not have to measure the externality!
- Of course, the allocation of property rights still affects who bears the cost. So, it *matters* to whom we assign the property rights

The Coase Theorem

The Coase theorem says that externalities get resolved iff:

1. Property rights are complete
2. Negotiating is costless

To "solve" the externality, create a market where property rights are traded

- This market "internalizes" the externality
- Example: Rights for CO2 emissions traded among countries
- Coasean solutions can be decentralized: there is no need for a social planner to know the details of each firm. Parties transact to price and resolve the externality

The Coase Theorem

- The Coase theorem is often misinterpreted to mean that the market will solve all externalities
- The Coase Theorem does not imply that
- The Coase theorem implies that the market can *potentially* solve externalities *if* property rights are clearly assigned *and* negotiation is feasible
- In some cases, negotiation is clearly infeasible
  - Airlines cannot realistically negotiate with individual homeowners for overflight rights to their houses
  - You cannot negotiate with all other drivers on the Mass Pike to get out of your way if you're in a hurry, even if you'd gladly pay them each $10 to pull over for a second

The Coase Theorem

- The problem of remedying externalities can be thought of as two separate problems
  1. *What* should be done (sound insulation, quiet machines)?
  2. *Who* should pay for it (doctor, baker)?
- The answer to the second question is independent of the the first. The first is about efficiency, the second about distribution (similar to shifting the endowment)
- As per the Second Welfare Theorem, the questions of how to maximize the economic pie and how to divide the pie are separable
- Both questions matter – but there is not a tradeoff between them
- Key insight: *Resolving an externality may not require regulating the externality out of existence (or even at all) but rather assigning property rights so that affected parties can achieve an efficient resolution*

The smoky Edgeworth box —
A Coase Theorem application

from the lecture notes of Ted Bergstrom

The smoky Edgeworth box

- Externalities are naturally a general equilibrium (GE) problem because – they are about agents facing the "wrong" prices for their actions
- It is therefore useful to view to the subject of externalities through the lens of the GE model

The smoky Edgeworth box

- Ed and Fiona's whose utility is defined over two goods: beans and tobacco smoke
  - Both Ed and Fiona like beans
  - Ed likes to smoke and has an unlimited supply of free tobacco
  - Fiona hates smoke. Ed's smoking poses an externality on Fiona
  - So, tobacco is a 'good' for Ed and a 'bad' for Fiona
- Write their utility functions as

$$U^E(S, B_E), \quad U^F(S, B_F).$$

- The set of feasible allocations (S, B_E, B_F) satisfies

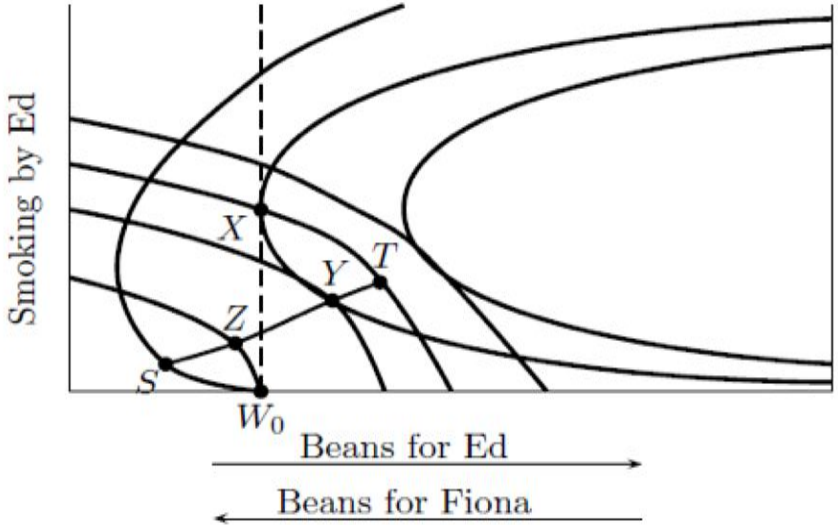
$$B_E + B_F = W_E + W_F,$$

  where W_i is the wealth of i measured in terms of the numeraire good
- In this case, there is only one such good, Beans. We can normalize its price at 1

The smoky Edgeworth box

- To represent the exchange possibilities for Ed and Fiona, Bergstrom proposes an Edgeworth Box where the $x-$axis represents beans and the $y-$axis represents smoking
- This special Edgeworth box lacks a roof because Ed has an inexhaustible supply of tobacco

Figure 5.1: A One-Sided Externality



Four perspectives on externalities

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2. **Collective choice externalities**
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4. Empirical applications
   - Mass transit
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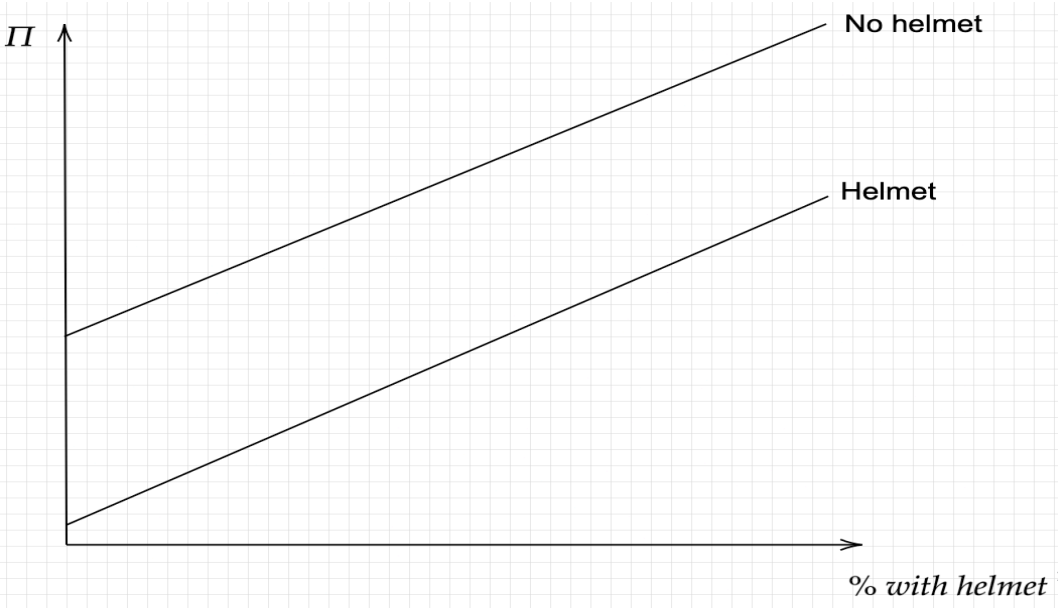
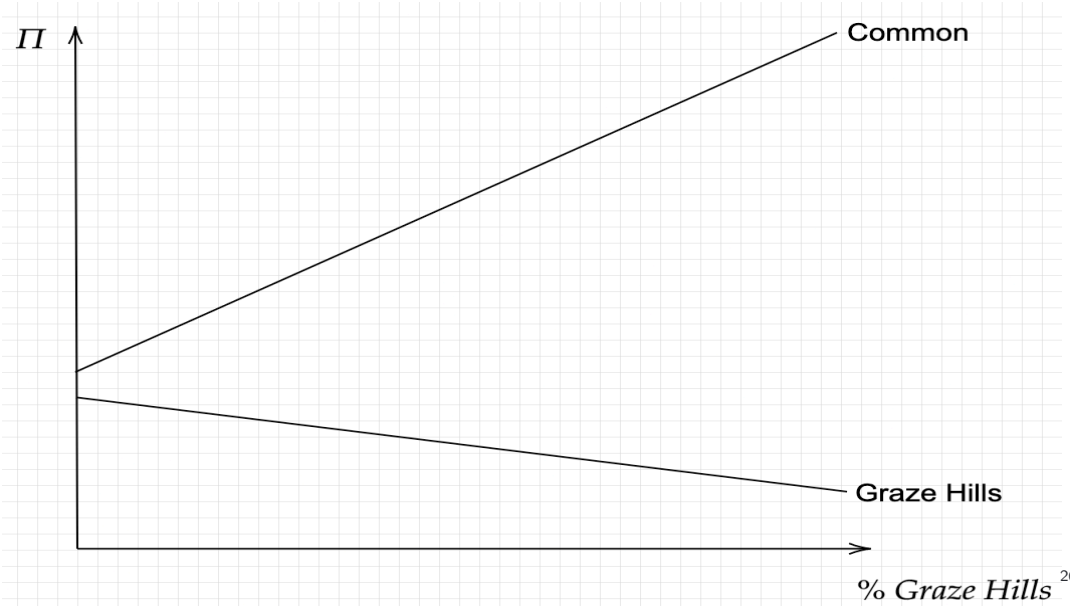
Externalities, social interactions, and collective choice

Thomas Schelling, *Micromotives and Macrobehavior*, 1978

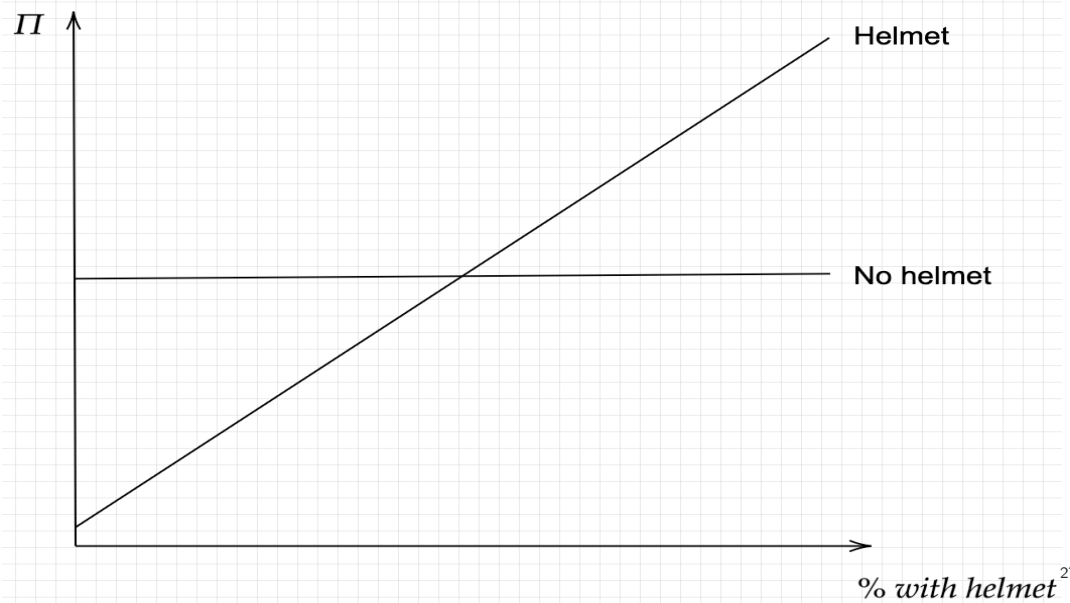
Who will wear a hockey helmet?



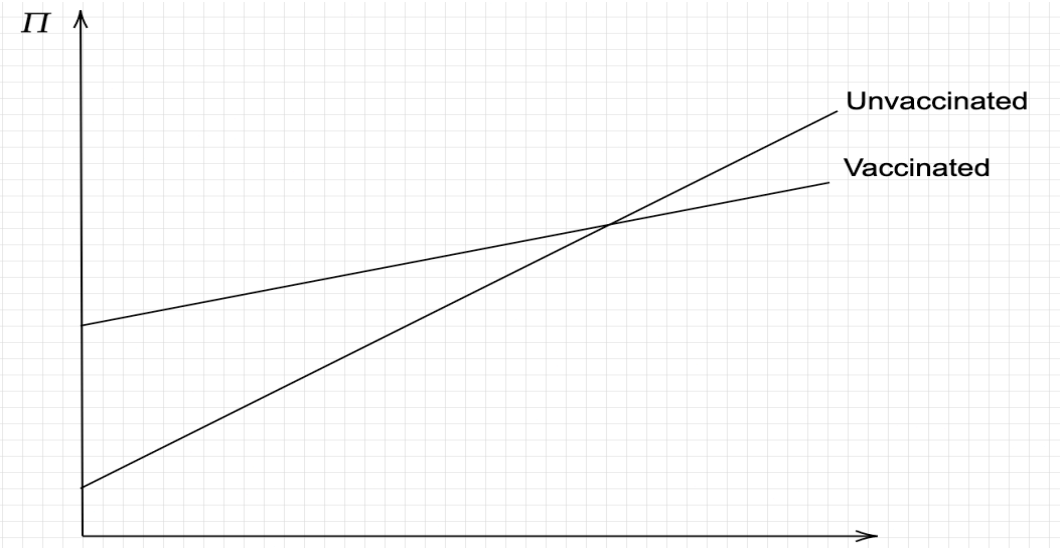
Tragedy of the commons: Graze the common or the hills?



Should you wear a ski helmet?



Who will get vaccinated?



FOMO as a social externality —

"When product markets become collective traps: The case of social media"

by Bursztyn, Handel, Jimenez-Duran, and Roth, 2024

Summary

Externalities are ubiquitous

- Arise when an economic actor does not face the "correct price" for her actions
- Externalities are not limited to traditional side effects of production and consumption, e.g., pollution, noise, congestion, speeding, carrying a firearm
- Can also occur in social interactions where groups of rational actors ends up at an undesirable equilibrium due to mis-coordination, social spillovers, FOMO
- Law and policy has a crucial role in "internalizing" externalities
- Taxing externalities can potentially *reduce* distortions
- Nevertheless, these remedies are always contentious