CH9 Externalities and Public Goods

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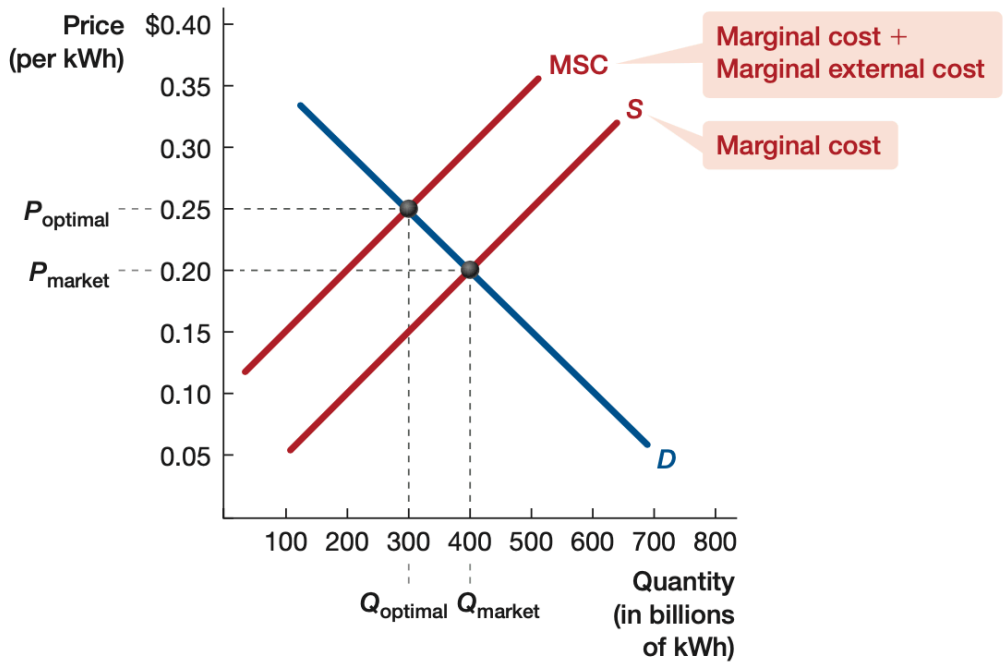
July 27, 2022

CH9 Review

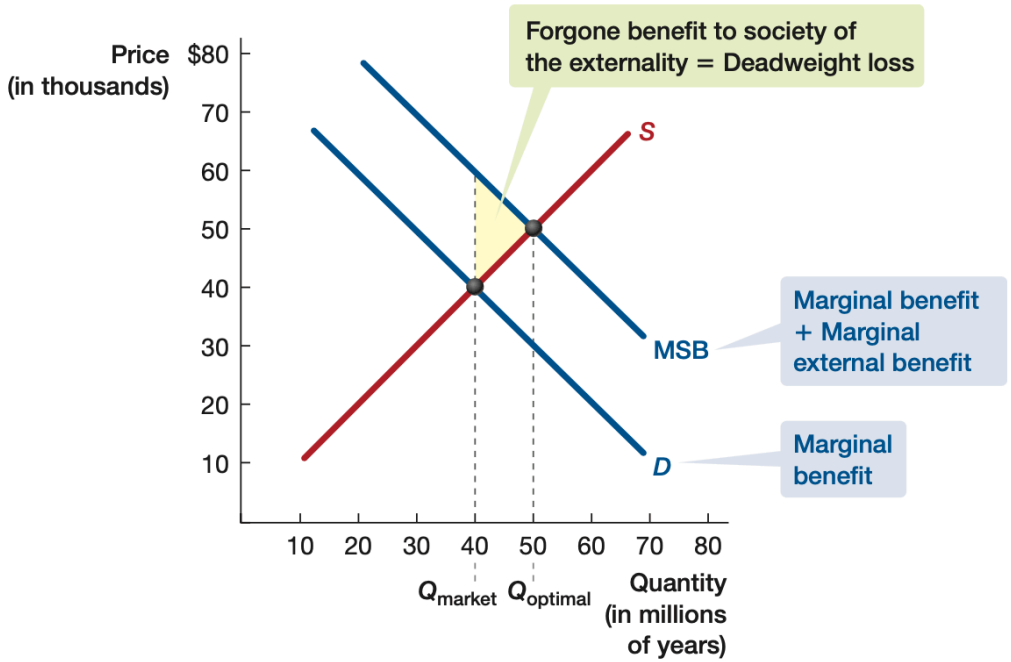
Externality

- An **externality** occurs when an economic activity has either a spillover cost or a spillover benefit on a bystander.
- When externality exists, the market outcome is no longer efficient and there would be deadweight loss.
- When there's a negative externality, $Q_{optimal} < Q_{market}$.



Externality (continued)

- When there's a positive externality, $Q_{optimal} > Q_{market}$.



- Pecuniary externalities exist when market transactions affect other people, but only through the market price. It does not creat market inefficiency.

The fundamental theme of the following solutions is to let prople **internalize the externalities.**

Private Solution to Externalities

- The **Coase Theorem** states that private bargaining leads to socially efficient outcome regardless of who has the legal property right.
  - The initial property right is an important determinant of the distribution of surplus.
  - There's an important assumption here: **transaction costs involved are not too high.**
- **Doing the right thing** involves a social enforcement mechanism that invokes a moral code to let people internalize the externalities.

Government solutions to Externalities

- **Command-and-control regulations** restrict the level of production or mandate the use of certain technology.
  - This typically provides few incentives for producers to search for more cost-effective ways.
  - Sometimes it might be necessary because we need quick and effective reactions to emergencies.
- **Market-based approaches** such as a corrective (Pigouvian) tax or subsidy harness the power of market force. (graphs as above)
  - This gives producers greater incentives to search for more cost-effective ways since the method for internalizing externalities is left to the producer themselves.

		Excludability	
		High	**Low**
Rivalry	**High**	Ordinary private goods (e.g., clothes, food, furniture)	Common pool resource goods (e.g., fish, water, natural forests, food at a picnic)
	Low	Club goods (e.g., cable TV, pay-per-view TV, Wi-Fi, music downloads)	Public goods (e.g., national defense, early warning systems, earth protection programs)

Figure: Four types of goods

Public Goods

- Public goods are non-excludable and non-rival.
- Public goods suffer free-rider problem.
- To construct the market demand curve of public goods, we sum the individual demand curve **vertically.**
- The provision of public goods should expand until marginal benefit = marginal cost.

Common Pool Resource Goods

- Common pool resource goods are non-excludable but rival.
- There's a classic negative externality since individuals use too much of the common pool resource. This could result in the tragedy of the commons.
- We could solve the tragedy by self / government regulation, or privatization of the resource (assign property rights).
- Once the property rights are assigned, there would be incentives for the owner to regulate the usage of resource to maximize the value.

CH9 Exercises

Exercise1: Problem9-4

Serene is a dance instructor who tends to play music very loudly at home while practicing. Her neighbor, Jennifer, is a teacher who needs a quiet environment to mark her students' assignments. Dancing gives benefits to Serene worth $120 daily. But Jennifer's marking progress is affected, and it costs her $50 every day.

a. Is it efficient for Serene to stop dancing with loud music on since it inconveniences Jennifer?

b. If Serene has the right to do whatever she prefers but both parties can negotiate with no cost involved, will Jennifer be able to mark assignments in a quiet environment?

Exercise1: Problem9-4 (continued)

c. Jennifer has the right to a quiet environment and Serene can only play music loudly with Jennifer's approval. Assume both parties can negotiate with no cost. Will Jennifer be able to mark assignment in a quiet environment?

Answer:

a. Since the benefit to Serene is \$120 and the cost to Jennifer is \$50, the net benefit to society is \$70. Thus, it is not efficient for Serene to stop dancing to loud music.

b. If both parties can negotiate with no cost involved, Serene would require a compensation of \$120 to allow a quiet environment for Jennifer to mark assignments. However, Jennifer would be willing to compensate Serene by offering a maximum of \$50. Therefore, private bargaining will not lead to a quiet environment.

Answer: (continued)

c. Serene will compensate Jennifer by offering at least \$50 daily to seek Jennifer's permission to endure the loud music. Serene is still able to earn a benefit of up to \$70 after compensating Jennifer. Therefore, Jennifer is still unable to mark assignments in a quiet environment.

Exercise2: Problem9-12

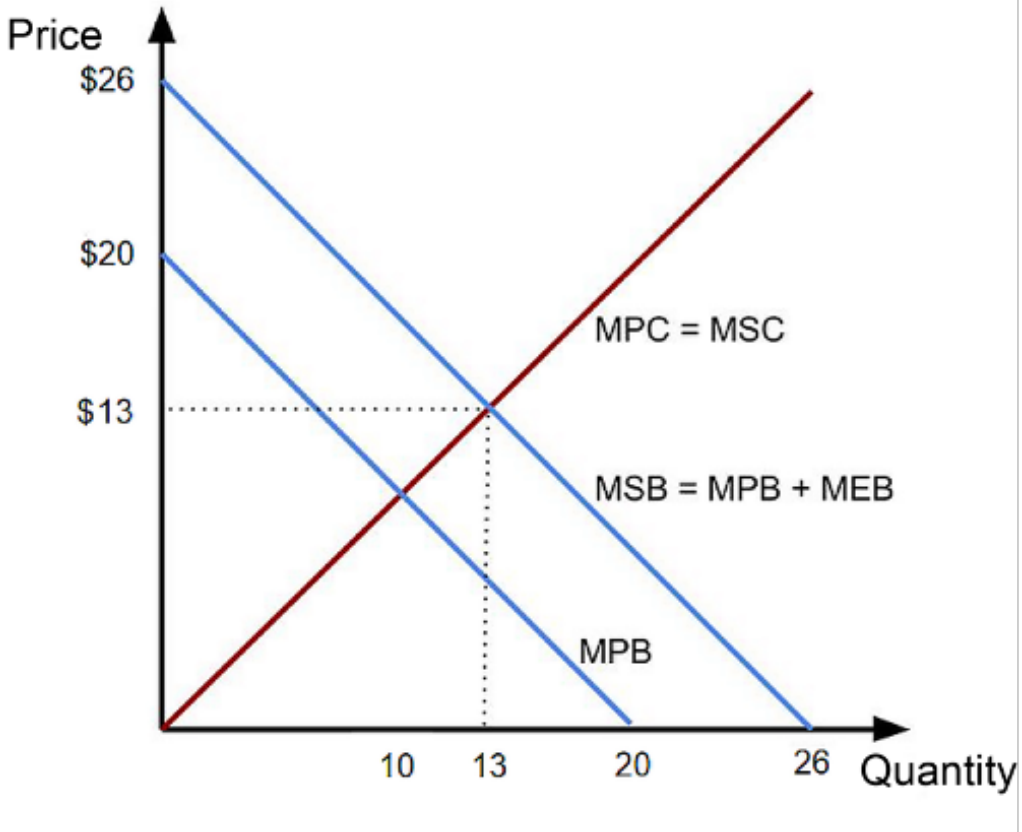
Suppose demand is $Q_D = 20 - P$ and supply is $Q_S = P$. There is a constant positive externality that causes the intersection between the marginal social benefit curve and the marginal cost curve to be at $Q = 13$. Find the value of this marginal external benefit and the maximum possible social surplus.

Answer:

- Marginal private benefit is MPB $= 20 - Q$.
- Marginal cost $=$ MC $= Q$.
- Marginal social benefit is marginal private benefit plus the external benefit, MSB $=$ MPB $+$ MEB $= 20 - Q +$ MEB.
- MSB and MC intersect at $Q = 13$.
- We get 20 - 13 + MEB $= 13$, MEB $= 6$.

Answer: (continued)

- $\text{MSB} = 26 - \text{Q}, \text{MC} = \text{Q}$.



- Maximum social surplus $= \frac{1}{2} \times (26 - 0) \times 13 = 169$

Exercise3: 共有資源管理 (出自吳聰敏老師課本)

下表為東港出海捕蝦之船隻數目與櫻花蝦總產量之關係，出海捕蝦之總產量由出海船隻平分。

船數	總產量（箱）
1	11
2	20
3	27
4	32
5	35
6	36
7	34
8	31
9	26
10	20

Exercise3: 共有資源管理 (continued)

a. 若不出海捕蝦，每艘船之漁民留在岸上工作可創造相當於三箱櫻花蝦之所得。若不進行任何管制，請問會有多少船隻出海捕蝦？

b. 若現有櫻花蝦產銷班對出海捕蝦船隻數目進行管理，且其目標是希望櫻花蝦總產量加上留在岸上工作合計之所得達到最大，應讓多少船隻出海捕蝦？

Answer:

a. 若平分產量後所得大於留在岸上工作的所得 (3 箱)，則漁民會選擇出海捕蝦。當 8 艘船出海時，平分後每艘船可得 3.875 箱；9 艘船出海時，平分後每艘船約可得 2.9 箱。由此可知會有 8 艘船出海。

b. 最大化總所得的條件為出海的邊際產量 = 留在岸上工作的所得 (3 箱)。由表中可知第 5 艘出海船隻的邊際產量即為 3 箱，因此最大化總所得的出海捕蝦船隻數目為 4 或 5 艘。