Internalities

Definition – Consumption of a good or service that impacts one's own well-being, but that is not considered when the decision is made. These impacts can help the consumer in the form of a positive internality or hurt in the form of a negative internality.

Sources: https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.33.3.202

Intuition – Internalities are all effects of consumption that for whatever reason are not considered upon a goods consumption. The person that feels the effects of the consumption of the good is also the person consuming the good. These effects can both be positive and negative. One of the reasons they exist is that consumers do not have perfect information about the product they are consuming, so they cannot consider the full effects that the good will have on them.

Mathematical / Technical –

- Marginal benefit is the true willingness to pay for each additional quantity of a good or service: $MB_{true}(Q)$.
- However, consumers may wrongly perceive their willingness to pay, due to myopia or lack of information. This is represented as $MB_{perc}(Q)$.
- The difference between the true and the perceived marginal benefits is defined as the internality, I, the incorrect amount attributed to each unit the good:

$$I(Q) = MB_{true}(Q) - MB_{perc}(Q)$$

- Marginal costs, or inverse supply, are given by $MC(Q)$.
- P^M & Q^M represent the price and quantity market outcomes, under the perceived demand, such that $MB_{perc}(Q) = MC(Q)$.
- Whereas, P^* & Q^* represent the price and quantity under the **true** demand, such that $MB_{true}(Q) = MC(Q)$.

Negative internality: $I(Q) < 0,\ MB_{true}(Q) < MB_{perc}(Q)$

- A tax can be imposed to correct it. The optimal tax is

$$tax = MB_{perc}(Q^*) - MC(Q^*)$$

- A **ban** should be imposed if & only if the true marginal benefit is lower than the marginal cost curve for all Q.

Positive internality: $I(Q) > 0,\ MB_{true}(Q) > MB_{perc}(Q)$

- A subsidy encourages more, the optimal subsidy is

$$subs = MC(Q^*) - MB_{perc}(Q^*)$$

- A **mandate**, requiring the good, should be imposed if & only if the true marginal benefit is greater than the marginal cost for all Q.

Real-world aspects – Goods that often have positive internalities are exercise and healthy eating. Whereas, goods associated with negative externalities are smoking cigarettes, drinking alcohol, or drinking sugary drinks. People may choose to do these things because they offer some short-term pain/pleasure or because they lack information. Without perfect information, they do not know the full extent these goods can have on themselves. For example, people may be more likely to drink sugary drinks because they like they taste of it, without fully considering the cost it will have on their health in the future.

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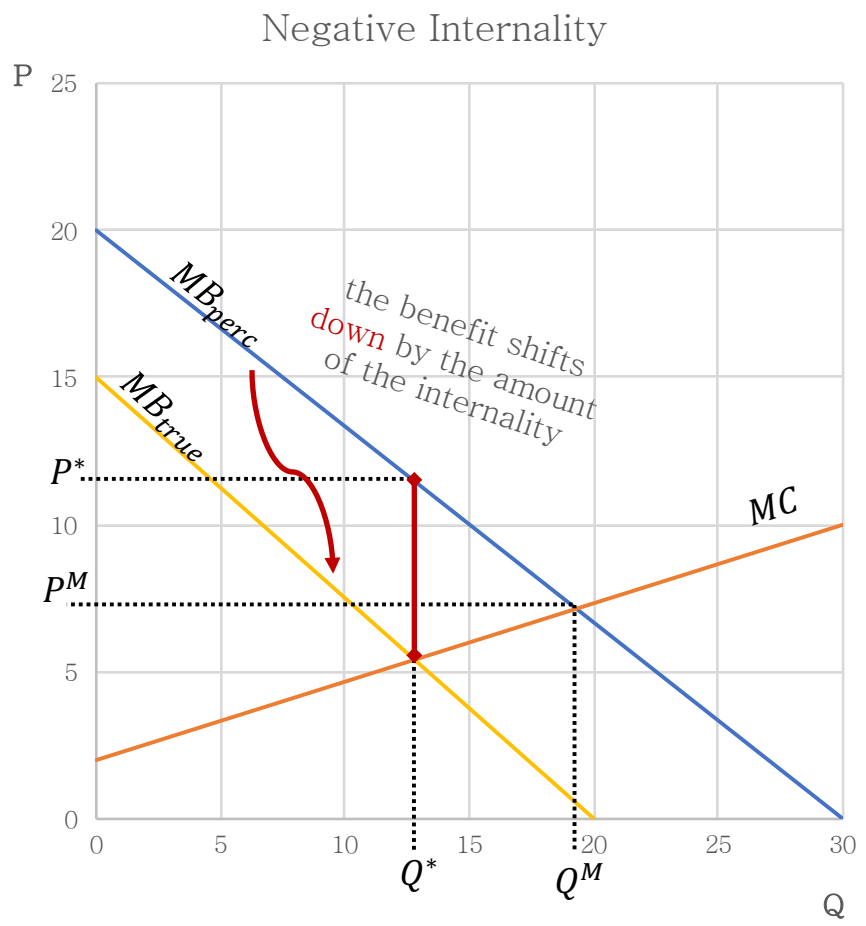
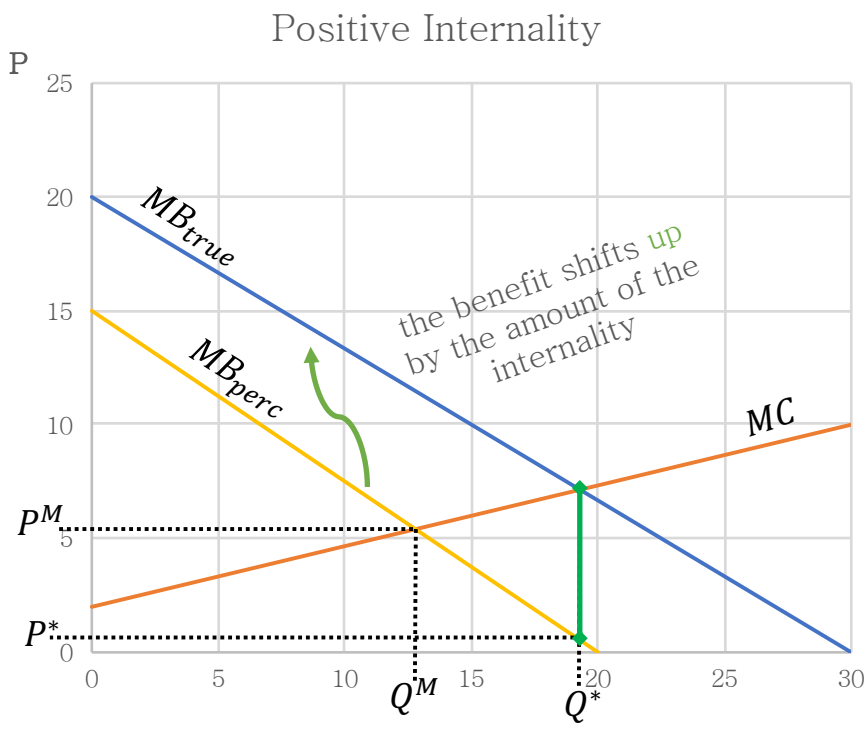
Graphical



For a negative internality, the true equilibrium is fewer goods sold at a higher price: $Q^* < Q^M$ & $P^* > P^M$. The tax, in red, is the size of the internality at the optimal quantity. An alternative intervention is information about the harms associated with the good.



For a positive internality the true equilibrium is a greater quantity of goods sold at a lower price: $Q^* > Q^M$ & $P^* < P^M$. The subsidy, in green, is the size of the internality at the optimal quantity. An alternative intervention is information about the benefits associated with the good.

Practice questions

1. The $MB_{perc} = 30 - 2Q$, the $MB_{true} = 10 - Q$ and $MC = Q$. What is the market equilibrium and what will be the quantity and price of the good at the optimal equilibrium? What tax is necessary in order to reach the optimal equilibrium?
2. The $MB_{true} = 20 - Q$, the $MB_{perc} = 15 - Q$ and $MC = Q$. What is the market equilibrium and what will be the quantity and price of the good at the optimal equilibrium? What subsidy is necessary in order to reach the optimal equilibrium?
3. The $MB_{perc} = 20 - Q$, the $MB_{true} = 5 - Q$ and the $MC = Q + 10$. What is the market equilibrium? Should this good be banned?

Numerical solutions: **1.** $P^M = 10$, $Q^M = 10$, $P^* = \$20$, $Q^* = 5$, $tax = 15$; **2.** $P^M = 7.5$, $Q^M = 7.5$ & $P^* = 10$, $Q^* = 5$, $subs = 5$; **3.** Yes.