# Stage 2 Economics (from 2021)

## Externalities and deadweight loss/welfare loss

Free market equilibrium is determined where the Marginal Private Benefit (MPB - the benefit derived directly by the consumer for consuming an additional unit) is equal to the Marginal Private Cost (MPC – the cost directly incurred by the producer of producing one additional unit). Without externalities the equilibrium position would also be the Social Optimal as Marginal Social Benefits (MSB – the benefit derived by society for an addition unit of demand) are equal to Marginal Social Costs (MSC – the cost incurred by society for an addition unit of supply).
However, if a market experiences externalities market equilibrium quantity will not equal Social Optimum quantity and there will be deadweight loss (DWL)/welfare loss.

**Externalitie**s are positive or negative impacts of production or consumption on third parties who are not involved in the decision to produce or consume. Externalities are classified as Production or Consumption externalities and can be positive or negative. Production externalities result in the Marginal Private Cost curve (S=MPC) not equaling the marginal social cost curve (MSC) and consumption externalities result in the Marginal Private Benefit Curve (D=MPB) not equaling the Marginal Social Benefit Curve (MSB).

**Positive Production Externalities (MSC<MPC)** – where a firm's production increases the wellbeing of others, but the firm is not compensated by those others. Examples include beehives established by honey producers increasing agricultural production through pollination and research and development by companies that leads to introduction of new technologies that other companies can benefit from.

**Negative Production Externalities (MSC>MPC) –** where a firm's decision to produce decreases the wellbeing of others, but the firm does not compensate those others. Examples include air and noise pollution from the production process, the dumping of waste and effects of deforestation.

**Positive Consumption Externalities (MSB>MPB) –** where an individual's consumption increases the wellbeing of others, but the individual is not compensated by those others. Examples include vaccination, education and creating a beautiful garden that others enjoy.

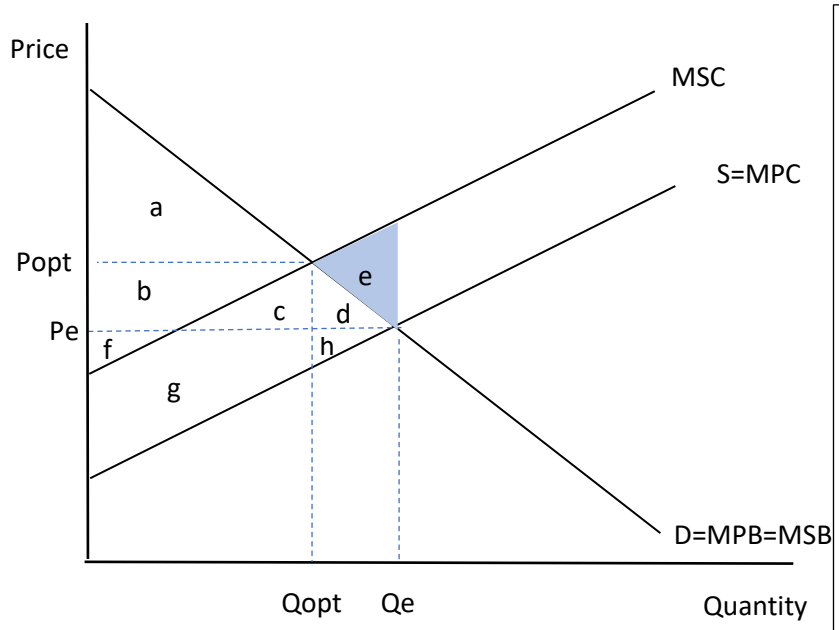
**Negative Consumption Externalities (MSB<MPB) –** where an individual's consumption decreases the wellbeing of others, but the individual does not compensate those others. Examples include excessive drinking of alcohol, smoking, obesity, motor vehicle pollution and using a noisy motorcycle.

**Definitions**

- **Consumer Surplus** - the highest price consumers are willing to pay for a good minus the price actually paid. In a competitive market, the price actually paid is the market equilibrium price determined by supply and demand
- **Producer Surplus** - the price received by firms selling their good minus the lowest price that they are willing to accept to produce the good.
- **Social Surplus** – Consumer Surplus plus Producer Surplus
- **Social Benefits** – Social Surplus plus Total External Benefits (or less Total External Costs)
- **Deadweight loss (DWL)/Welfare Loss** - the loss of economic efficiency in terms of utility for consumers /producers such that social optimal or allocative efficiency is not achieved

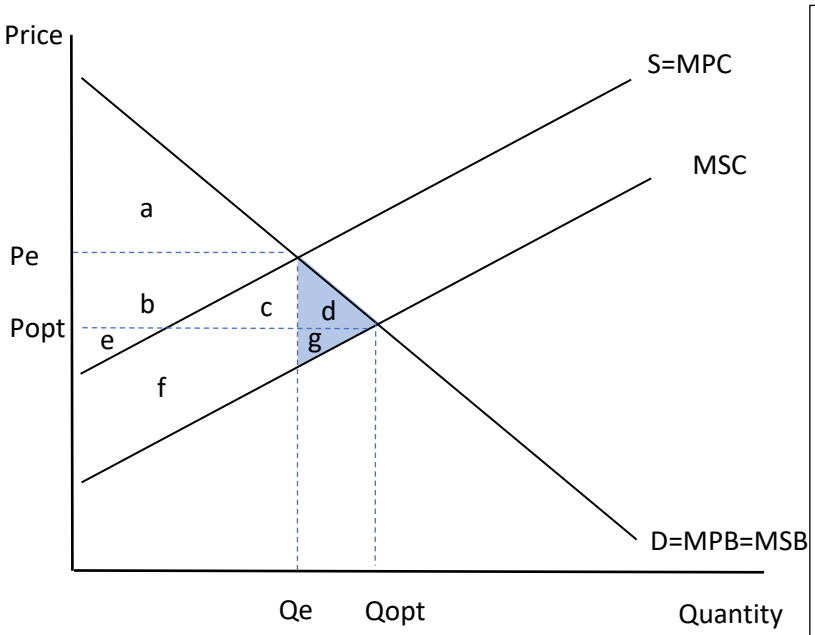
Ref: A981897

**Negative Production Externalities (MSC > MPC)**




***Explanation***
**At market equilibrium (Pe, Qe):**
Consumer surplus = *a+b+c+d*
Producer surplus = *f+g+h*.
Social surplus = *a+b+c+d+f+g+h*.
External cost of negative production externalities = *c+d+e+g+h*.
Total benefits to society (social surplus less the externality) = a+b+f-e.
**At the social optimal level (Popt, Qopt) (the allocative efficient level of output)**
social surplus and social benefits = a+b+f.
This greater than Qe (e)
***At market equilibrium there is a DWL/welfare loss = e. The market is not allocatively efficient. There is an over allocation of resources equal to the distance Qe to Qopt.***

**Positive Production Externalities (MSC < MPC)**




***Explanation***
**At market equilibrium (Pe, Qe):**
Consumer surplus = *a*
Producer surplus = *b+e*.
Social surplus = *a+b+e*.
External benefit of the positive production externalities = c+f.
Total Benefits to Society (social surplus plus the externality) = *a+b+e+c+f*.
**At the socially optimal level of output Qopt (allocative efficient level of output)**
Consumer surplus = *a+b+c+d*
Producer surplus = *e+f+g*.
Social surplus and social benefits = *a+b+c+d+e+f+g*. This is larger than at Qe (d+g).
***At market equilibrium there is a DWL/welfare loss = d+g. The market is not allocatively efficient. There is an under allocation of resources equal to the distance Qe to Qopt***.

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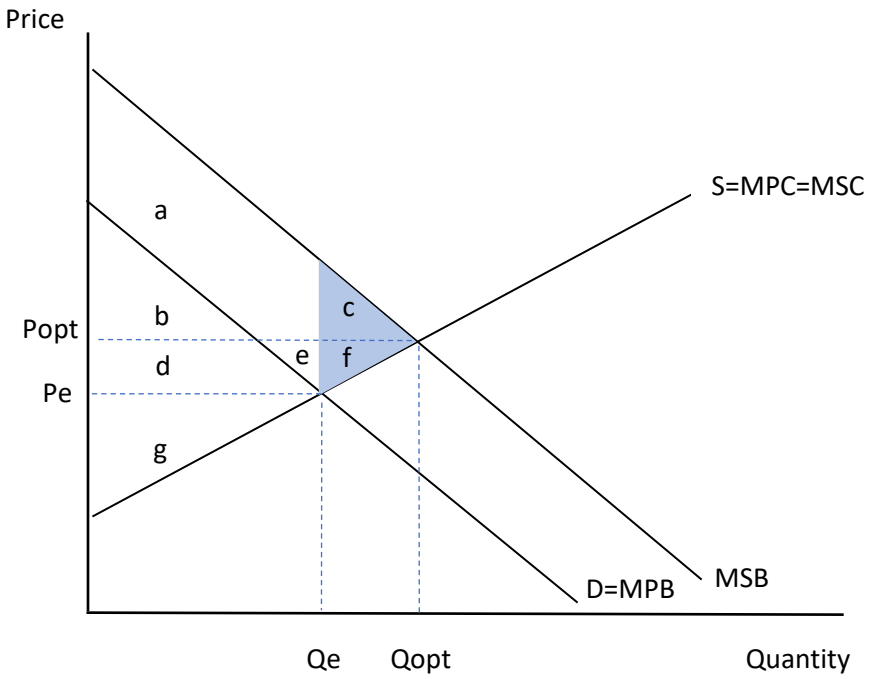
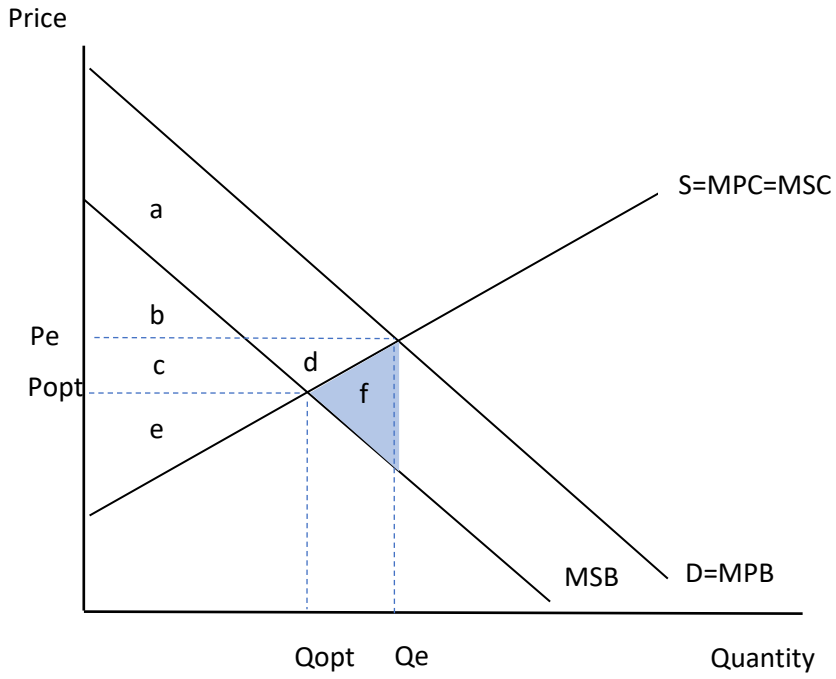
**Positive Consumption Externalities (MSB>MPB)**




***Explanation***
**At market equilibrium (Pe, Qe):**
Consumer surplus = *b+d*
Producer surplus = *g*.
Social Surplus = *b+d+g*.
External benefit of positive consumption externalities = *a + e*.
Total Benefits to Society (Social surplus add the externality) = *b+d+g+a+e*.
**At the Social Optimal level (Popt, Qopt)**
Consumer surplus = *a+b+c*
Producer surplus = *d+e+f+g*.
Social surplus (and Total social benefits) = *a+b+c+d+e+f+g*. This is larger than at Qe (c+f).
***At market equilibrium there is a DWL/welfare loss = c+f. The market is not allocatively efficient. There is an under allocation of resources equal to the distance Qe to Qopt***.

**Negative Consumption Externalities (MSB < MPB)**




**Explanation**
**At market equilibrium (Pe, Qe)**
Consumer surplus = *a+b*
Producer surplus = *c+d+e*.
Social surplus = *a+b+c+d+e*.
External costs of negative consumption externalities = a+d+f.
Total benefits to society (Social surplus less the externality) = b+c+e-f
**At the Social Optimal level (Popt, Qopt)**
Consumer surplus = *b+c*
Producer surplus = *e*
Social surplus (and Total social benefits) = b+c+e. This is larger than at Qe (f).
***At market equilibrium there is a DWL/welfare loss = f. The market is not allocatively efficient. There is an over allocation of resources equal to the distance Qe to Qopt***.

Ref: A981897