Externalities (Partial Equilibrium) I

Introduction

- What is the cost of driving down to workplace from your home?
- Economist Herbert Mohring (1999) studies the "cost" of **congestion**
- Costs – internal; external
- Internal: fuel, wear and tear on your car, and any tolls, as well as the cost of your time spent driving (you could have spent that time doing something productive)
- External: there are other costs that you are much less likely to consider because you do not bear them yourself
  - "In deciding how and when to travel, most travelers take into account the congestion they expect to experience; few consider the costs their trips impose on others by adding to congestion"

Introduction

- Mohring found that "the average peak-hour trip imposes costs on other travelers equal to roughly half of the cost directly experienced by those taking the average trip."

- In UK this cost can vary from £2bn (cost of delays) to £28bn (if we include noise, pollution etc.)

- Markets with ***externalities*** and markets with ***public goods*** are two kinds of markets that are unlikely to ***allocate resources efficiently***.

Externality

- **Definition**: The effect that an action of any decision maker has on the well-being of other consumers or producers, beyond the effects transmitted by changes in prices.
- Externalities arise due to the actions of one consumer or producer affect other consumers' or producers' costs or benefits in a way not fully reflected by market prices

- ***Perfect Competition***: CS+PS is maximized. Since there are no externalities or public goods in a perfectly competitive market, the private costs and benefits that decision makers face are the same as the social costs and benefits.

- Social and private values of a good differ leading to "market failure" – ***equilibrium may not be economically efficient***

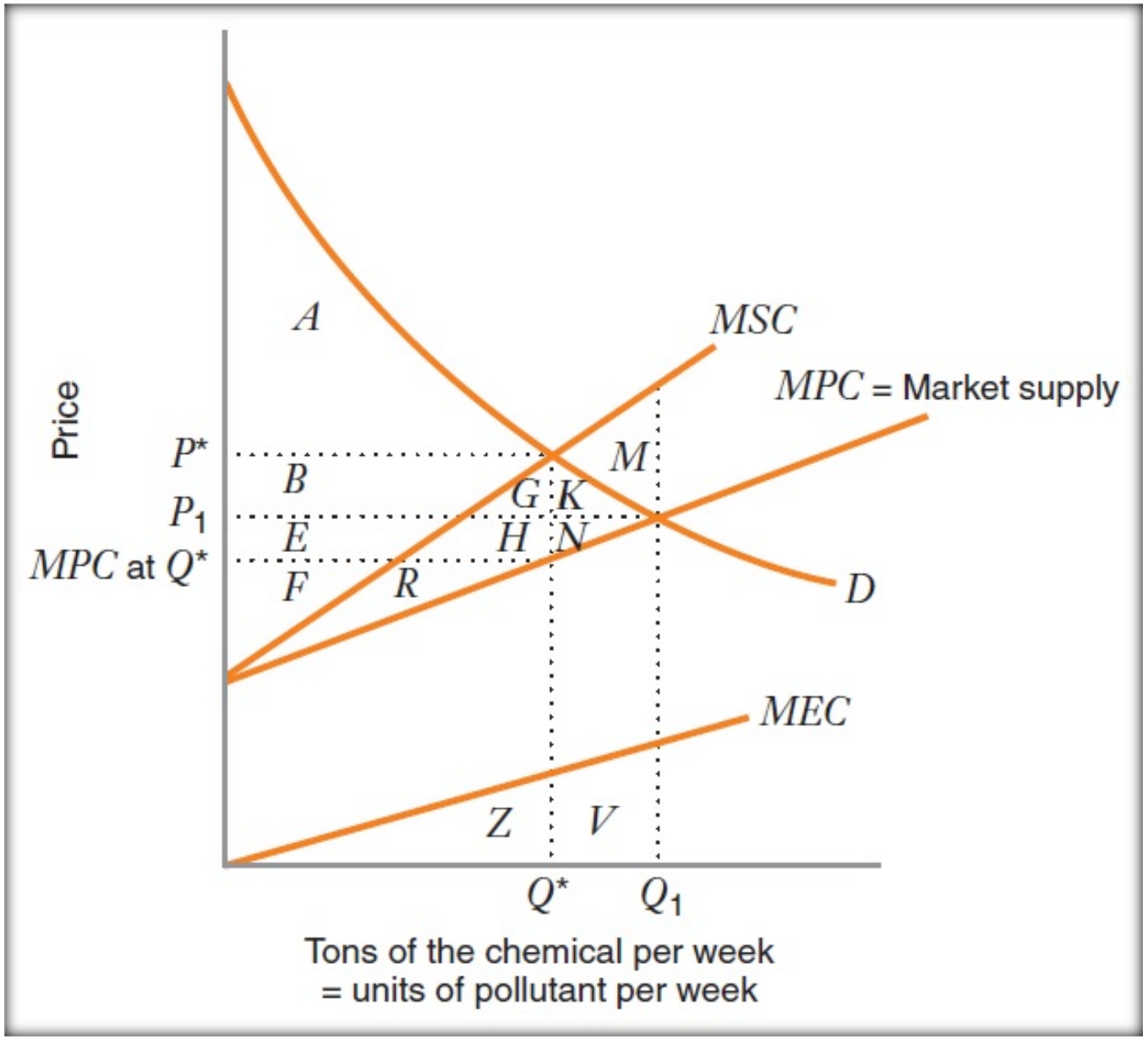
Externality

- Types of externalities
  - Positive Production (Laser)
  - Negative Production (Fly-ash)
  - Positive Consumption (Vaccine)
  - Negative Consumption (Automobile)

- Cost of negative environmental externalities to the US economy for 6 major pollutants was $184bn (15% of US GDP) in 2002

- The social costs of air pollution from these compounds—what Muller, Mendelsohn, and Nordhaus call *gross external damages* (GED)—include negative effects on human health, social costs of reduced visibility, reductions in agricultural and timber yields, and degradation of recreational areas.

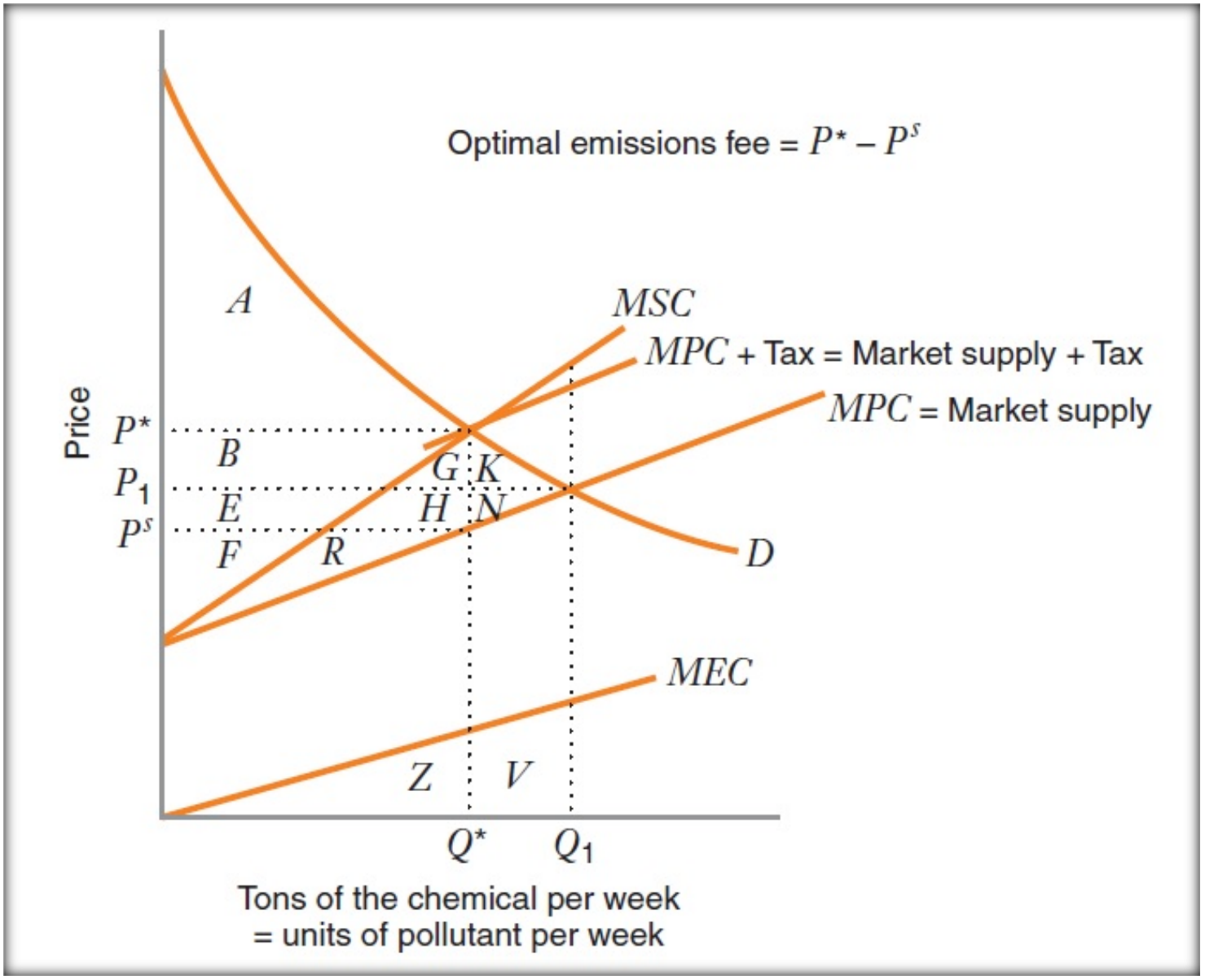
Negative Externality & Economic Efficiency



Negative Externality & Economic Efficiency

	Equilibrium (price = P_1)	**Social Optimum (price = P^*)**	**Difference between Social Optimum and Equilibrium**
Consumer surplus	$A + B + G + K$	A	$-B - G - K$
Private producer surplus	$E + F + R + H + N$	$B + E + F + R + H + G$	$B + G - N$
−Cost of externality	$-R - H - N - G - K - M$	$-R - H - G$	$M + N + K$ (external cost savings)
Net social benefits (consumer surplus + private producer surplus − cost of externality)	$A + B + E + F - M$	$A + B + E + F$	M (increase in net benefits at social optimum)
Deadweight loss	M	Zero	M

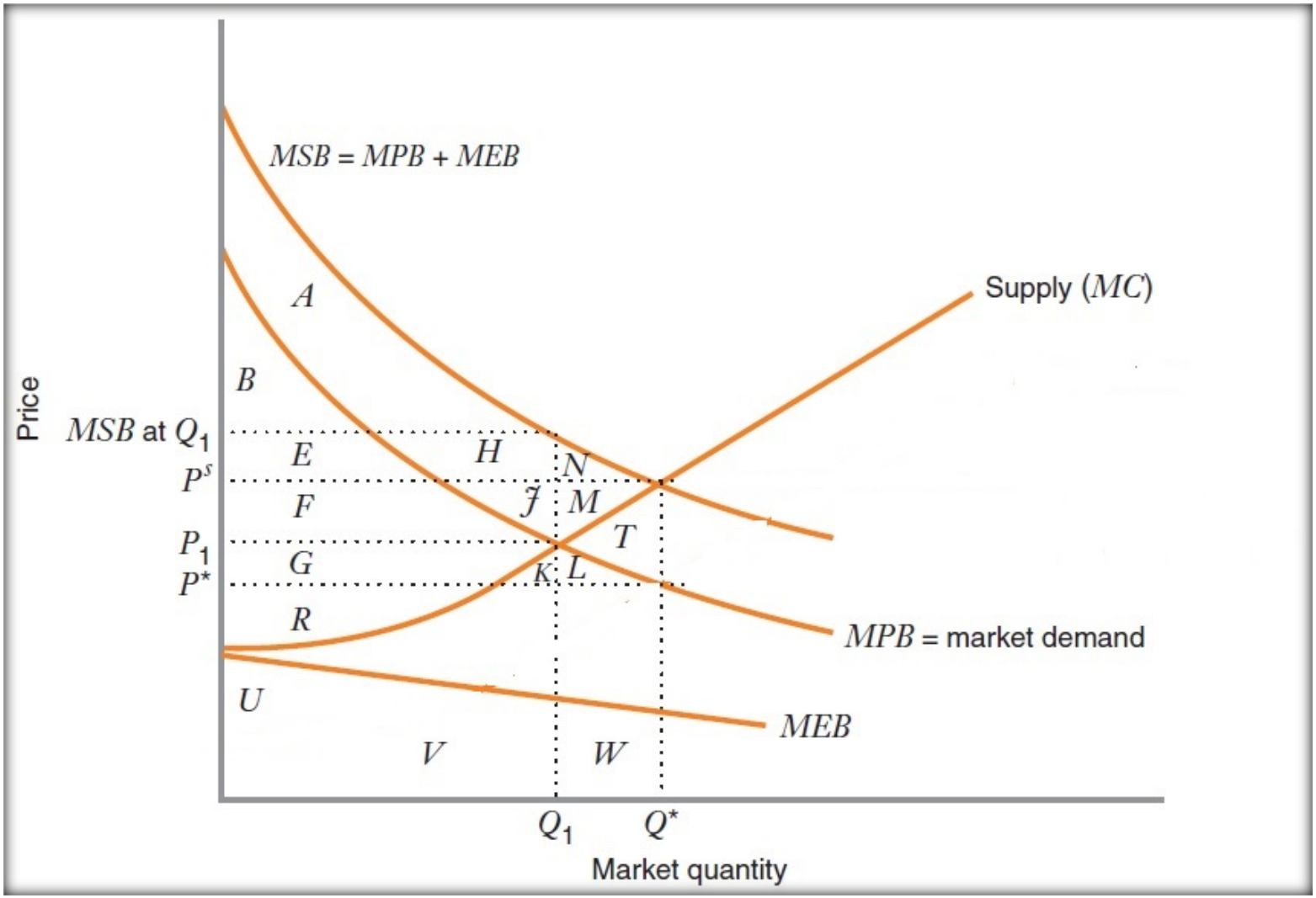
Negative Externality & Tax



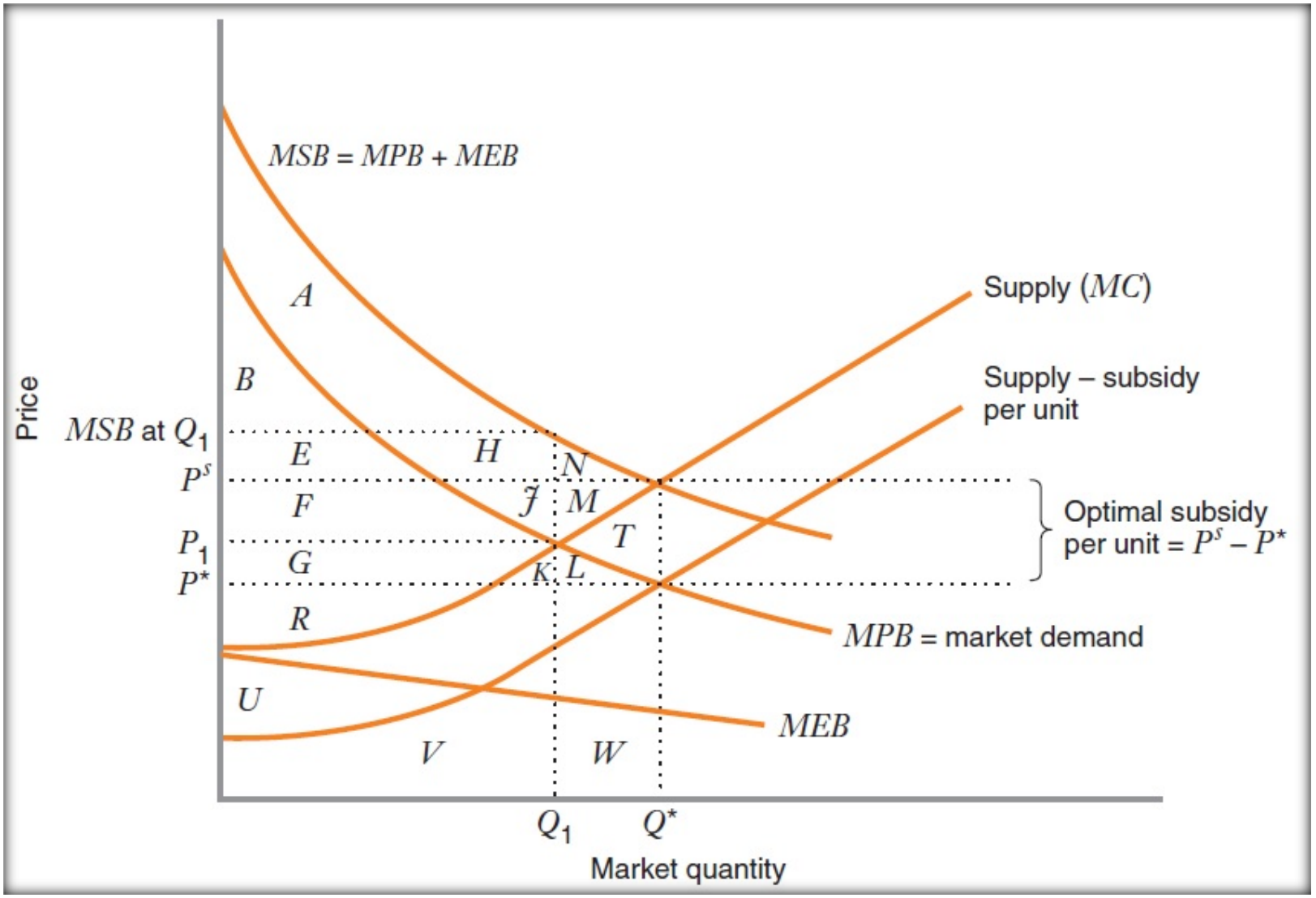
Negative Externality & Tax

	Equilibrium (with tax)
Consumer surplus	A
Private producer surplus	$F + R$
−Cost of externality	$-R - H - G$
Government receipts from emissions tax	$B + G + E + H$
Net social benefits (consumer surplus + private producer surplus + Government receipts − cost of externality)	$A + B + E + F$

Positive Externality & Economic Efficiency



Positive Externality & Economic Efficiency



Positive Externality & Economic Efficiency

	Equilibrium (no subsidy)	Social Optimum (equilibrium with subsidy)	Difference in Benefits between Social Optimum and Equilibrium with No Subsidy
Private consumer surplus	$B + E + F$	$B + E + F + G + K + L$	$G + K + L$
Producer surplus	$G + R$	$F + G + R + \mathcal{J} + M$	$F + \mathcal{J} + M$
Benefit from externality	$A + H + \mathcal{J}$	$A + H + \mathcal{J} + M + N + T$	$M + N + T$
−Government cost from subsidy	zero	$-F - G - \mathcal{J} - K - L - M - T$	$-F - G - \mathcal{J} - K - L - M - T$
Net social benefits (private consumer surplus + producer surplus + benefit from externality − government cost)	$A + B + E + F + G + H + \mathcal{J} + R$	$A + B + E + F + G + H + \mathcal{J} + M + N + R$	$M + N$

Reference

1. David Besanko & Ronald Braeutigam; Microeconomics; 5th Edition; Wiley (Chapter 17)