Deadweight Loss

1. What is Deadweight Loss?

Deadweight Loss is a **loss to society** that happens when **supply and demand are not in equilibrium** because of **market inefficiency**.

Main Idea

When the market does not work efficiently, **some possible benefits for buyers and sellers are lost**.

Causes of Deadweight Loss

Deadweight loss can be created by:

- **Rent controls**
- **Price controls**
- **Minimum wages**
- **Taxes**

Explanation

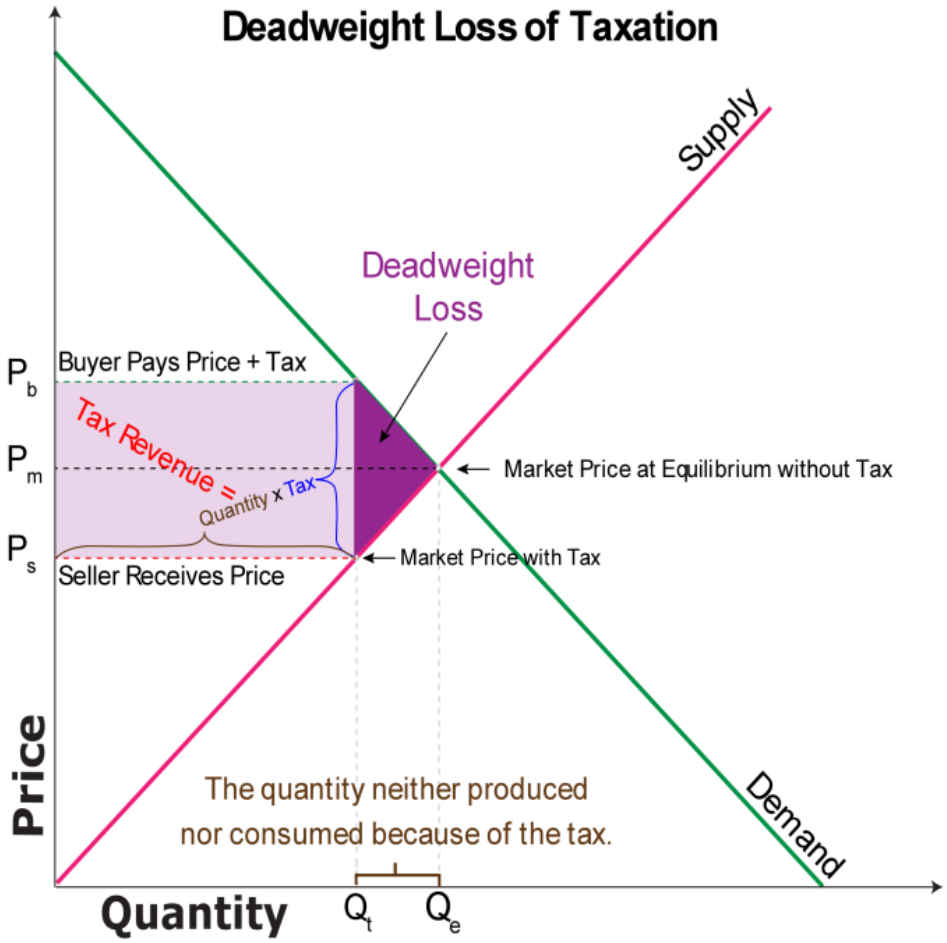
- If the **price of a product is not correctly reflected in the market**, people change their buying and selling behavior.
- This change **reduces economic efficiency**.
- As a result, the **economy suffers a loss**, which is called **Deadweight Loss**.

Deadweight Loss of Taxation

Deadweight Loss of Taxation occurs when the **government imposes taxes** and this **prevents the market from reaching equilibrium**.

Because of taxes:

- Economic efficiency decreases.
- The market cannot reach the **optimal level of production and consumption**.
- This creates a **loss to society**, called **Deadweight Loss of Taxation**.



Deadweight Loss of Taxation (Diagram Explanation)

1. Axes of the Diagram

First understand the two axes.

Vertical Axis (Y-axis) → Price

Horizontal Axis (X-axis) → Quantity

This means:

Moving up → price increases

Moving right → quantity increases

2. Two Important Curves

The diagram has two lines.

Demand Curve (Downward Sloping)

The Demand curve slopes downward.

It shows that when price falls, people buy more.

Example:
Cake price ₹500 → few buyers
Cake price ₹200 → many buyers
So demand slopes downward.

Supply Curve (Upward Sloping)
The Supply curve slopes upward.
It shows that when price increases, producers supply more.
Example:
Cake price ₹200 → seller produces less
Cake price ₹500 → seller produces more
So supply slopes upward.

3. Market Equilibrium (Before Tax)
Look at the point where Demand and Supply intersect.
This point is called Market Equilibrium.
It gives two things:
Equilibrium Price = Pm
Equilibrium Quantity = Qe
Meaning:
Buyers and sellers agree on price
Maximum trade happens
Market works efficiently
So no deadweight loss exists here.

4. Government Introduces a Tax
Now the government puts a tax on the product.
Because of tax:
Buyers must pay higher price
Sellers receive lower price
So the price splits into two parts.

5. Two New Prices Appear

After tax, the graph shows two prices.
Price Paid by Buyers (Pb)
This is the top price.
Buyers now pay:
Original price + tax
So buyers pay more money.

Price Received by Sellers (Ps)
This is the bottom price.
Sellers receive:
Market price − tax
So sellers get less money.

6. Quantity Falls After Tax
Before tax:
Quantity traded = Qe
After tax:
Quantity traded = Qt
Important point:
Qt < Qe
This means:
Some buyers and sellers stop trading.

7. Tax Revenue of Government
Look at the rectangular shaded area.
This is called Tax Revenue.
Tax Revenue =
Tax per unit × Quantity sold after tax
This money goes to the government.
So this part is not a loss.

8. Deadweight Loss (The Triangle)
Now look at the small triangle in the middle.

This triangle is called Deadweight Loss.
Why?
Because it represents trades that no longer happen.
These buyers and sellers:
were willing to trade
could have benefited
But because of tax:
the trade does not happen
So the benefit is lost forever.

Situations Where Deadweight Loss Occurs

1. Deadweight Loss under Monopoly

One situation where deadweight loss occurs is **monopoly**.

Explanation

- A **monopolist** produces output where **Marginal Revenue (MR) = Marginal Cost (MC)**.
- The **price** is then determined from the **demand curve** at that quantity.
- The monopolist earns **profit = Total Revenue − Total Cost**.

Problem

- A monopolist produces **less output than the optimal level**.
- Because of lower production, **some beneficial trades do not happen**.
- This results in **Deadweight Loss**.

2. Deadweight Loss due to Price Restrictions and Taxes

Deadweight loss also occurs due to:

- **Price restrictions**
- **Taxes**
- **Subsidies**

Tax Incidence

Tax Incidence means **how the burden of tax is shared between buyers and sellers**.

Both buyers and sellers **suffer deadweight loss**.

Important Point

The tax burden depends on:

- **Elasticity of Demand**
- **Elasticity of Supply**

Effect of Tax on Price

A tax creates a **difference between:**

- **Price paid by buyers**
- **Price received by sellers**

Burden on Buyers

The **tax burden on buyers** is:

- The difference between
  Price paid with tax and **Price in competitive equilibrium**.

Buyers bear **more burden when demand is less elastic**.

Burden on Sellers

Sellers bear **more tax burden when supply is less elastic**.

Deadweight Loss from Tax

Deadweight loss from tax measures the **total loss of surplus**.

It includes:

- **Loss of consumer surplus**
- **Loss of producer surplus**

Important Point

The size of deadweight loss depends on **elasticity of demand and supply**.

- If **elasticities are small (less elastic)** →
  Quantity changes very little → **Deadweight Loss is small**
- If **elasticities are large (more elastic)** →
  Quantity changes more → **Deadweight Loss is larger**

How Deadweight Loss is Created

Deadweight loss can be created by **government laws and taxes**.

1. Minimum Wage

- **Minimum wage laws** force employers to pay higher wages.
- Some workers may **lose jobs**.
- This creates **Deadweight Loss**.

2. Price Ceilings (Rent Control)

- **Price ceilings** such as **rent control** set prices below market level.

Effects:

- **Shortage for consumers**
- **Lower earnings for producers**

This situation creates **Deadweight Loss**.

3. Taxes

Taxes also create deadweight loss.

Reason

- Taxes increase the **final price of goods** above the **equilibrium price**.
- Because of higher prices:
  - Consumers buy **less**
  - Producers sell **less**

Result

- **Producers earn lower profit**
- **Consumers pay higher prices**

This reduces **total market benefits**, creating **Deadweight Loss**.

Deadweight Loss Formula

Deadweight Loss = $0.5 \times (P2 - P1) \times (Q1 - Q2)$

Where:

- **P1** = Original price of the good or service
- **P2** = New price after tax
- **Q1** = Original quantity

- **Q2** = New quantity after tax

Example of Deadweight Loss of Taxation
Situation

- A **cake shop** opens in your neighborhood.
- The shop sells **one cake for ₹350**.

You think the cake is worth **₹370**, so you are **willing to buy it**.

Government Tax
Now suppose the **government imposes a tax on food items**.
Because of the tax:

- Price of cake increases to **₹400**.

Consumer Reaction
At **₹400**, you feel the cake is **too expensive**.
So you **decide not to buy it**.

Result

- Many consumers may also **stop buying cakes**.
- Demand for cakes **falls**.
- The **shop owner loses sales and profit**.

If demand keeps falling, the **cake shop owner may have to close the business**.
This loss caused by taxation is called **Deadweight Loss**.