**Public Goods**

Consider two good: haircuts, national defense

Similarities:

1. People benefit from both goods
2. Both goods have opportunity costs

Differences:

1. Haircuts are not shared in consumption

People consume various quantities of haircuts per period

National defense is shared

1. It is easy to deny haircuts to those unwilling to pay the price

It is difficult to deny defense protection in a similar way

Markets determine the allocation of haircuts but not defense

National Defense is a **Public Good**

1. **Public goods** are nonrival

Consumption of a given quantity by one person does not decrease the amount consumed by others

1. **Public goods** are non-excludable

Costly to exclude those not willing to pay for the good

Society must forgo output to produce either good

The cost of haircuts is closely related to the number of people consuming the good,

For national defense, there is no strong relationship between number of people consuming the good and opportunity cost

[Handout on public goods](http://milesfinney.net/433/handout/pubgoods.html)

**Demand for public/private goods**

To generate market demand for **private goods**, we sum the different quantities demanded across consumers

Society’s demand for **public goods** derived by summing willingness to pay across consumers for shared output levels

Suppose market for haircuts consist of two consumers:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Quantity Demanded/month | | |
| **Price** | **Consumer A** | **Consumer B** |  |
| $50 | 1 | 2 |  |
| $35 | 2 | 3 |  |
| $20 | 3 | 4 |  |
| $10 | 4 | 5 |  |

Individual Demand Curves

price

$50

$35

$20

$10

dB

dA

4

2

3

1

haircuts/month

Demand curve formed by consumers equating marginal willingness to pay (PMB) to price

Haircuts is a **Private Good**

Each consumer may adjust quantity to maximize well being

Market Demand:

|  |  |
| --- | --- |
| **Price** | **QD market (A+B)** |
| $50 | 3 |
| $35 | 5 |
| $20 | 7 |
| $10 | 9 |

Market Demand

price

$50

$35

$20

$10

D = SMB

9

7

5

3

haircuts/month

If the market price is $35

Consumer A will equate PMB with price at 2nd haircut

Consumer B will equate PMB with price at 3rd haircut

Total quantity demanded at a given price is the sum of individual consumers’ quantities demanded

Market demand is the SMB curve

**Pure Public Good**

Everyone consumes same physical amount of good

Consumers cannot adjust individual quantities demanded to price

Consumers may value goods differently however

Assume a condo complex with three residents

Each has individual demand for security guards

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Monthly Salary** | **A** | **B** | **C** |  |
| 400 | 0 | 0 | 1 |  |
| 300 | 0 | 1 | 2 |  |
| 200 | 1 | 2 | 3 |  |
| 100 | 2 | 3 | 4 |  |

All residents will jointly benefit from each guard hired

Residents A, B, C

price

$1000

$800

dC

$600

$300

dB

$400

dA

$200 0

4

$100

2

3

1

guards/month

Social marginal benefit is the sum of **private** benefits at individual quantities

|  |  |
| --- | --- |
| guards | SMB = ∑PMB |
| 1 | 900 |
| 2 | 600 |
| 3 | 300 |
| 4 | 100 |

What is the difference in how the “market” demand for **public** versus **private goods** is constructed?

**Markets underallocate public goods**

Suppose the monthly cost of guard is $600

Markets function by individuals transacting on the basis of **private** willingness to pay (PMB) and privately recognized costs (PMC)

How many guards would the market allocate to the condo complex?

If residents cooperated and revealed **private** willingness to pay, 2 guards would be hired

|  |  |  |
| --- | --- | --- |
| **Guard** | **SMB** | **SMC** |
| 1 | 900 | 600 |
| 2 | 600 | 600 |
| 3 | 300 | 600 |
| 4 | 100 | 600 |

At 2 guards

1. Allocation maximizes social net benefits; efficiency is satisfied: SMB=SMC
2. Each resident is paying a different price per guard

The socially efficient number of guards could be hired if each resident paid his/her “Lindahl Price”

Each would pay for each guard what their PMB is for the 2nd guard

|  |  |
| --- | --- |
| **Resident** | **PMB for 2nd guard** |
| A | 100 |
| B | 200 |
| C | 300 |

For **public goods**, efficiency is reached where people consume same quantity but pay different prices

For **private goods**, efficiency is reached where people consume different quantities but pay the same price

Which solution is more stable?

The **public goods** solution requires cooperation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Guard** | **SMB** | **Total Social Benefit** | **SMC** | **Total Social Cost** | **Social Net Benefit** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |

**Free Rider**

Person who seeks to enjoy the benefits of a **public good** without paying for it

Under voluntary scheme, a person’s net benefits may increase if he lies about willingness to pay

**Resident A:**

Scenario I: Suppose Resident A truthfully reveals willingness to pay (along with the other two residents)

Equilibrium would be two guards hired

|  |  |
| --- | --- |
| Resident A | |
| **Guard** | **PMB** |
| 1 | 200 |
| 2 | 100 |
| 3 | 0 |

Resident A pays PMB of $100 for each of the two guards

Resident A’s net benefit at two guards:

|  |  |
| --- | --- |
| A's total benefit |  |
| A's total cost |  |
| A's net benefit |  |

Scenario II: Resident A lies and indicates he does not benefit at all from guards

Residents B and C truthfully reveal willingness to pay

The [revealed willingness to pay](http://milesfinney.net/433/handout/resident.xlsx) for guards has now fallen.

|  |  |  |
| --- | --- | --- |
| **Guard** | **Social Marginal Benefit** | **Revealed Social Marginal Benefit** |
| 1 | 900 | 700 |
| 2 | 600 | 500 |
| 3 | 300 | 300 |
| 4 | 100 | 100 |

Only one guard will be hired; given that only $500 is available to hire the second guard

Each guard costs $600

Resident A’s net benefit at one guard:

|  |  |
| --- | --- |
| A's total benefit |  |
| A's total cost |  |
| A's net benefit |  |

The difference in net benefits indicates A does not have an individual incentive to truthfully reveal willingness to pay

Resident A has incentive to Free Ride

A’s lying causing social inefficiency:

At one guard SMB (=900) > SMC (=600)

**Notes**

1. Free riding is not a strategy everyone in a group can follow. Why?
2. Free riding problem increases as the size of the group increases. Why?

Example of free riding: Firework Display, Voting, Public Television

[Video of Tennessee Firefighting Incident](https://www.youtube.com/watch?v=PwJrPa8Ps7A)