

Public Economics

Lec 3: Public goods

Alessandro Martinello

alfa 4035B

alessandro.martinello@nek.lu.se



LUND UNIVERSITY

School of Economics and Management

AM's reminders

- **TBD theme of last lecture**
 - **Doodle**
- **Group essay:** Group situation?
 - Please register groups **here**
- **HA:**
 - **RG, ch.3, ex 1**
 - **RG, ch.3, ex 14**

Today's reading list

- **Rosen & Gayer** ch. 4
- **Recommended readings**
 - Coase (1974)
 - Samuelson (1954)
 - Fischbacher & Gächter (2010)

Definition of a public good

- ① Consumption of the good is **nonrival**
 - Resource cost of additional consumption = 0
 - An additional unit of consumption does not deteriorate the consumption opportunities available to others
- ② Consumption of the good is **nonexcludable**
 - Can't prevent anyone to access the good

Definition of a public good

- 1 Consumption of the good is **nonrival**
 - Resource cost of additional consumption = 0
 - An additional unit of consumption does not deteriorate the consumption opportunities available to others
- 2 Consumption of the good is **nonexcludable**
 - Can't prevent anyone to access the good

Examples

- Bar of chocolate
- Buffet
- Museum
- Fairytale
- Public illumination
- Radio broadcasting
- National defense
- Public roads

Definition of a public good

- 1 Consumption of the good is **nonrival**
 - Resource cost of additional consumption = 0
 - An additional unit of consumption does not deteriorate the consumption opportunities available to others
- 2 Consumption of the good is **nonexcludable**
 - Can't prevent anyone to access the good

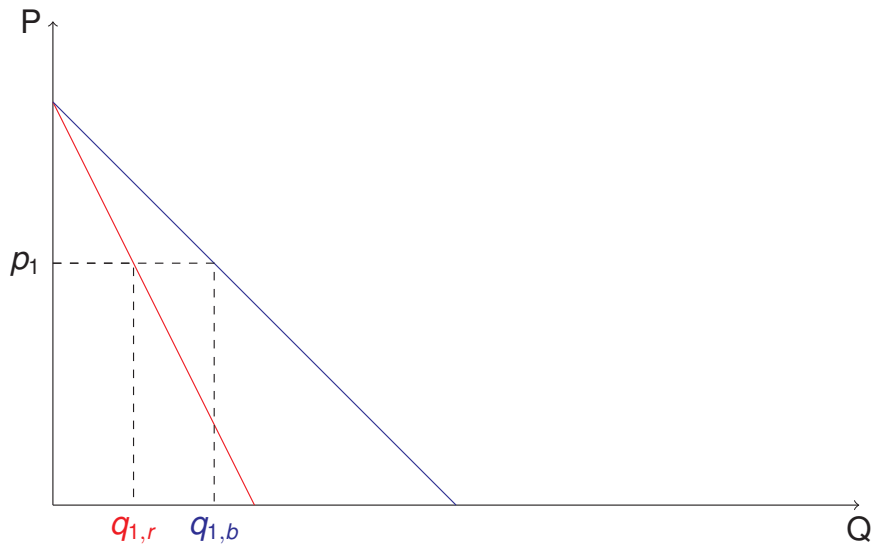
Examples

- Bar of chocolate X
- Buffet X
- Museum X
- Fairytale ✓
- Public illumination ✓
- Radio broadcasting ✓
- National defense ✓
- Public roads ...

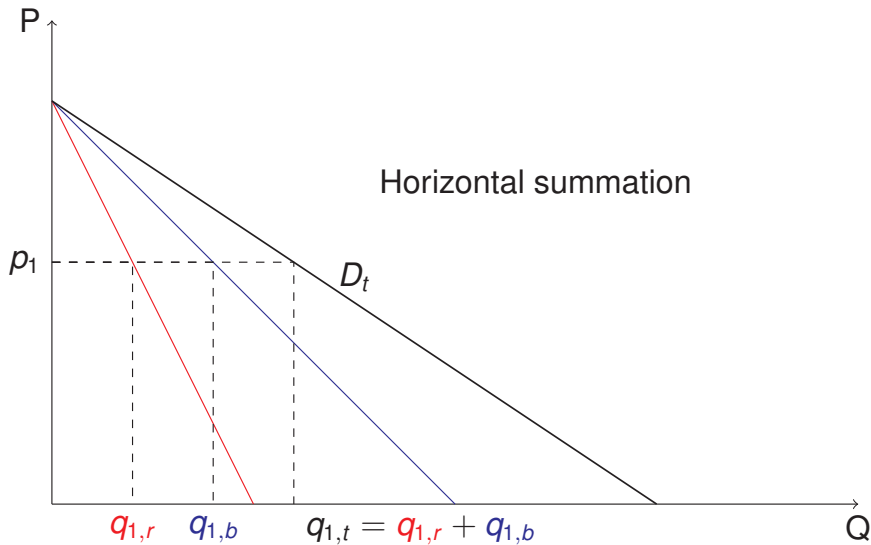
Distinctions

- **Some goods may satisfy one condition but not the other**
 - **Impure** public good
 - Buchanan's **theory of clubs**
- **Public goods not necessarily produced by state**
 - **Examples:** mercenaries, radio stations, lighthouse
- **Type of a good might not be stable over time**
 - Technology can change the status of a good (patent)

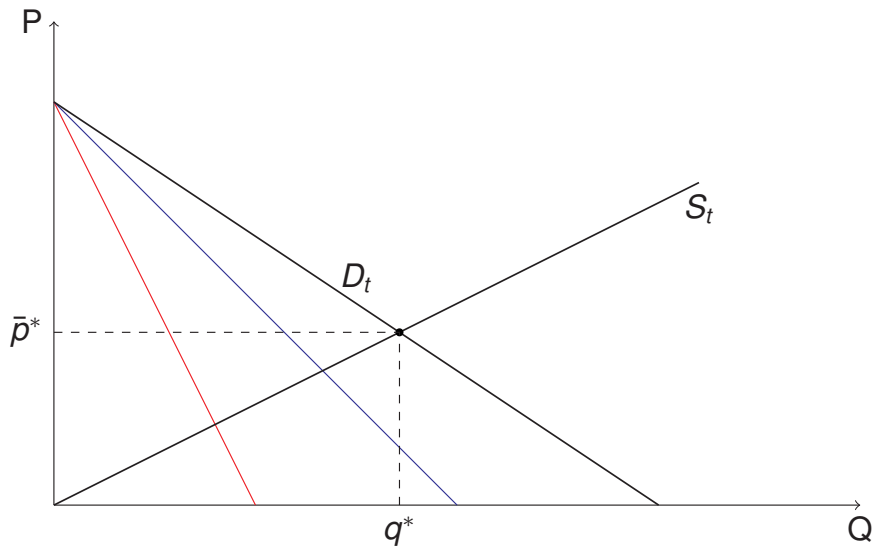
Demand for **private** good (recall)



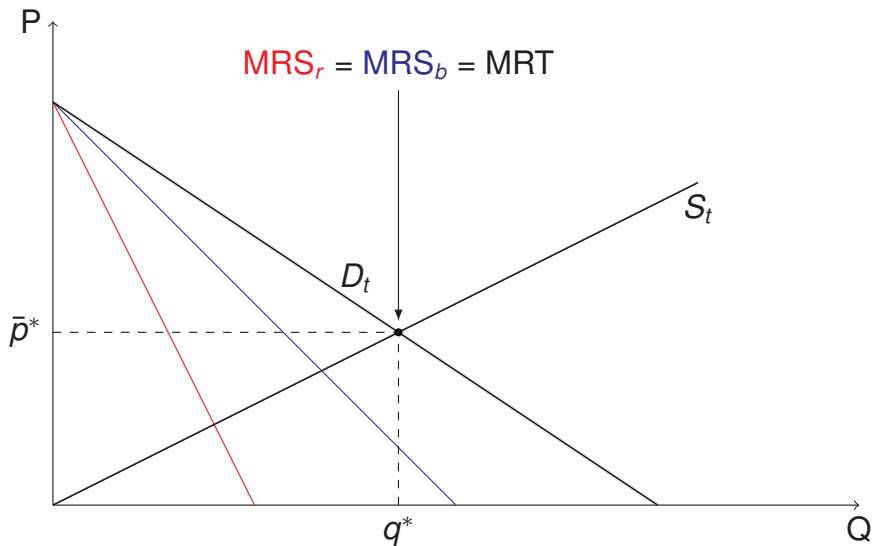
Demand for **private** good (recall)



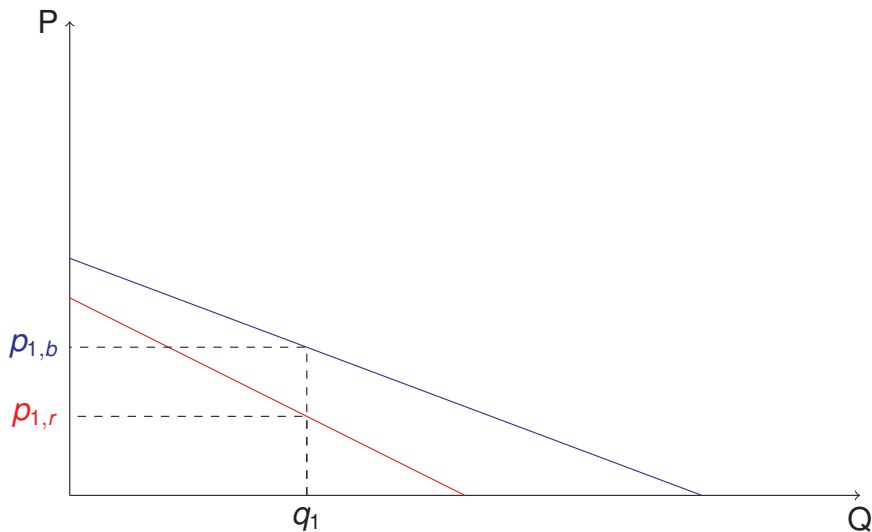
Demand for **private** good (recall)



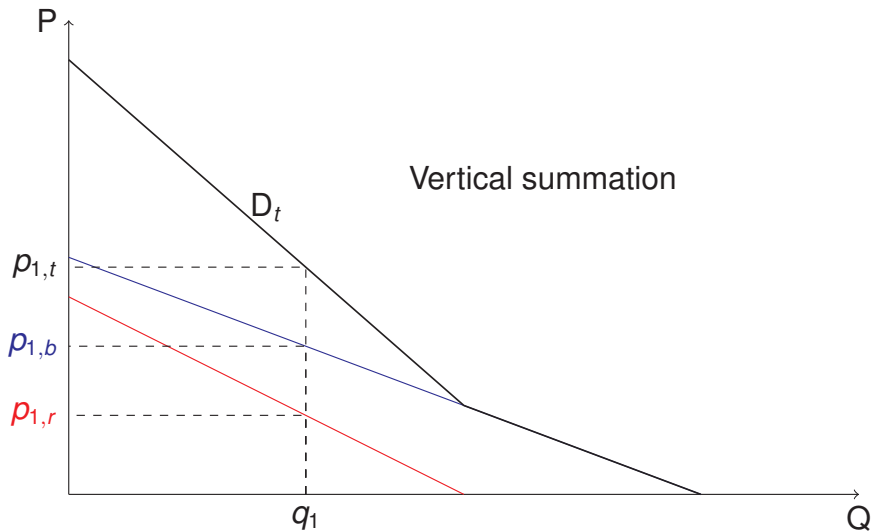
Demand for **private** good (recall)



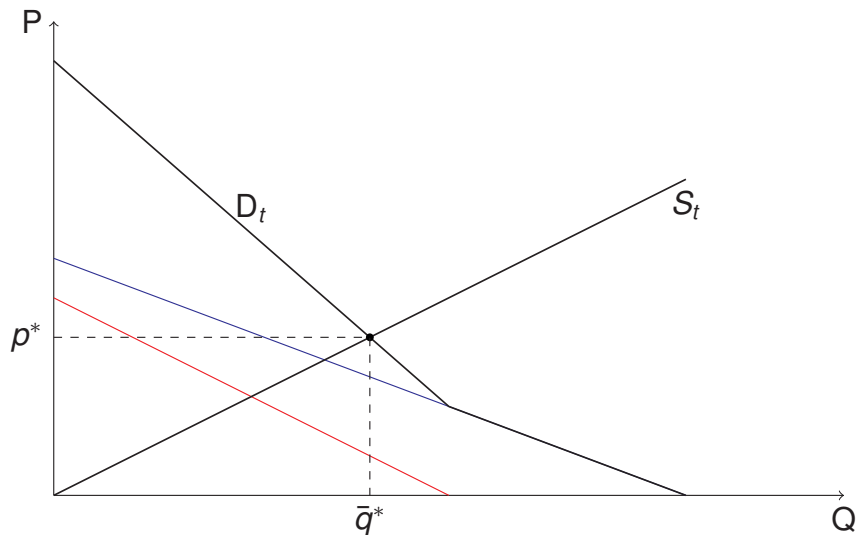
Demand for **public** good



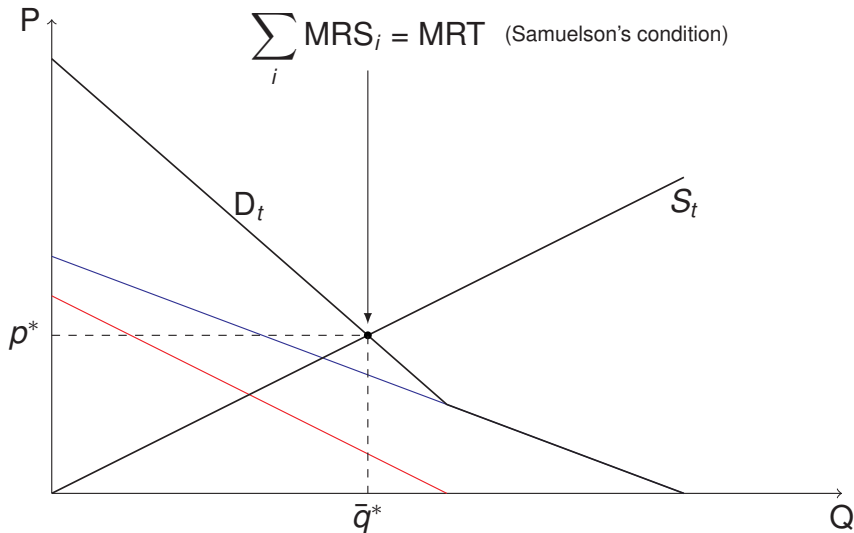
Demand for **public** good



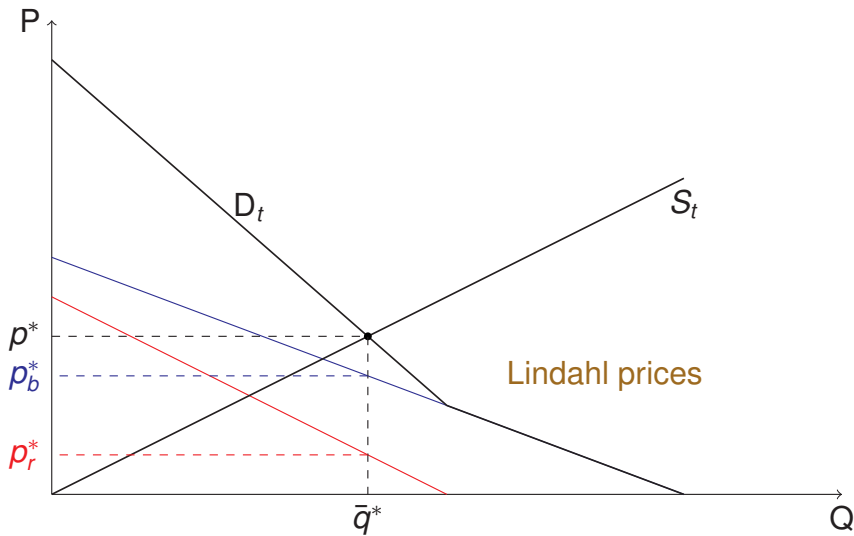
Demand for **public** good



Demand for **public** good



Demand for **public** good



Samuelson's theory of public expenditure

Making sense of formulas (Samuelson, 1954)

one always wants to maximize and (2) inputs or factors which everyone always wants to minimize, we are free to change the algebraic signs of the latter category and from then on to work only with "goods," knowing that the case of factor inputs is covered as well. Hence by this convention we are sure that $u_j^i > 0$ always.

narrow it to the class that any one of its indexes can be written $U = U(u^1, \dots, u^s)$ with $U_j > 0$.

2. *Optimal Conditions.* In terms of these norms, there is a "best state of the world" which is defined mathematically in simple regular cases by the marginal conditions

$$\frac{u_j^i}{u_r^i} = \frac{F_j}{F_r} \quad (i = 1, 2, \dots, s; r, j = 1, \dots, n) \text{ or} \quad (1)$$

$$(i = 1, 2, \dots, s; r = 1; j = 2, \dots, n)$$

$$\sum_{i=1}^s \frac{u_{n+j}^i}{u_r^i} = \frac{F_{n+j}}{F_r} \quad (j = 1, \dots, m; r = 1, \dots, n) \text{ or} \quad (2)$$

$$(j = 1, \dots, m; r = 1)$$

$$\frac{U_i u_k^i}{U_q u_k^q} = 1 \quad (i, q = 1, \dots, s; k = 1, \dots, n) \text{ or} \quad (3)$$

$$(q = 1; i = 2, \dots, s; k = 1).$$

[387]

- ① **Marginal willingness to pay is unobservable**
 - Hard to determine efficient provision (macro)
 - Lindahl prices unapplicable (micro)
- Same price for everybody \implies **Redistribution issues**
- + **Taxes distortionary**

② Public good is nonexcludable

- Why contribute?
- Cleaning shared kitchen, fill the printer, empty the dishwasher
- **Free-riding**

Free-riding: small class experiment

- Groups of 4 (random), each of you has 100 Kuwaiti dinars
- Decide how many to keep for yourself and how many to put in a common investment fund with people in your group
- **Do not talk or peek at what other people are doing**
- All dinars invested in the fund grow by 50%, then split equally among all members
- The person earning most money gets chocolate
- Identify yourself with last 4 digits of your mobile number

8144

Myself
40

Pool
60

Free-riding: idea

- **Efficient provision:** everybody contributes 100
 - **Public pool:** $400 \implies 600$
 - **Size of the pie:** 600
 - **Individual payoffs:** $\frac{600}{4} = 150$
- **Defection:** one person does not contribute
 - **Public pool:** $300 \implies 450$
 - **Size of the pie:** $450 + 100 = 550$
 - **Contributor's payoffs:** $\frac{450}{4} = 112.5$
 - **Defector's payoffs:** $\frac{450}{4} + 100 = 212.5$

Free-riding: consequences

Incentive to free-ride

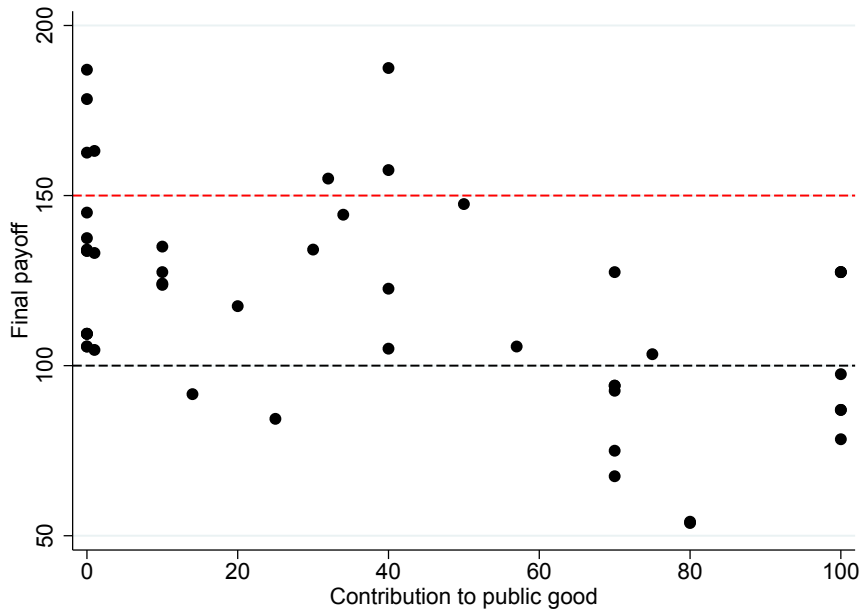
- Tax evasion, bus tickets, cigarettes on the streets
- Group essays, group presentations. . .

⇒ **underprovision of public good**

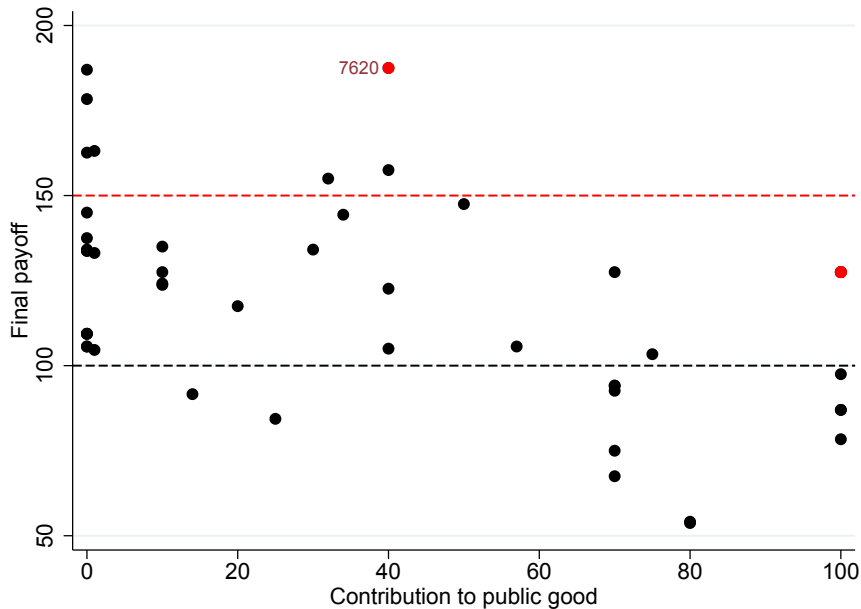
Your behavior

- Average contribution: 37.7%
- 13/45 people contributed 0
- 16/45 people contributed $> 50\%$
- Average pie size: 476.8 (max 600)

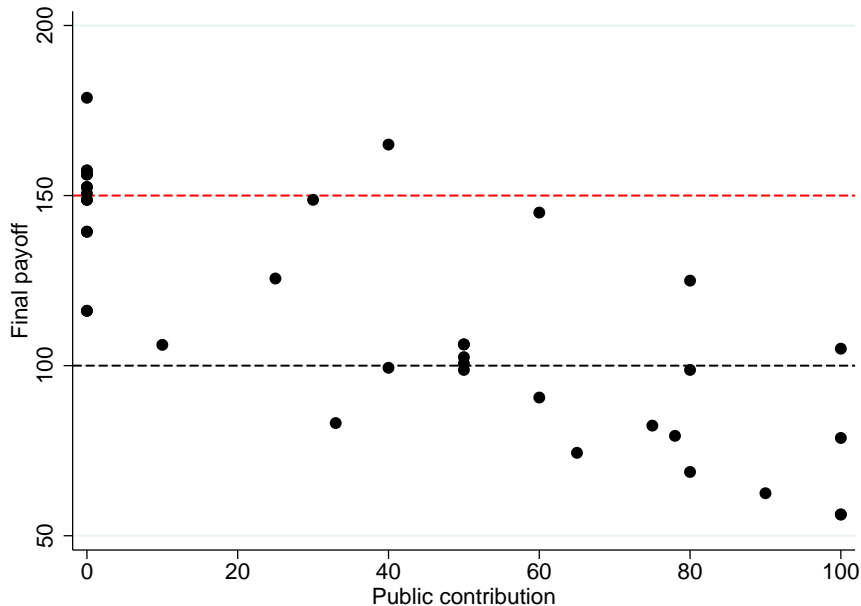
Experimental results: you



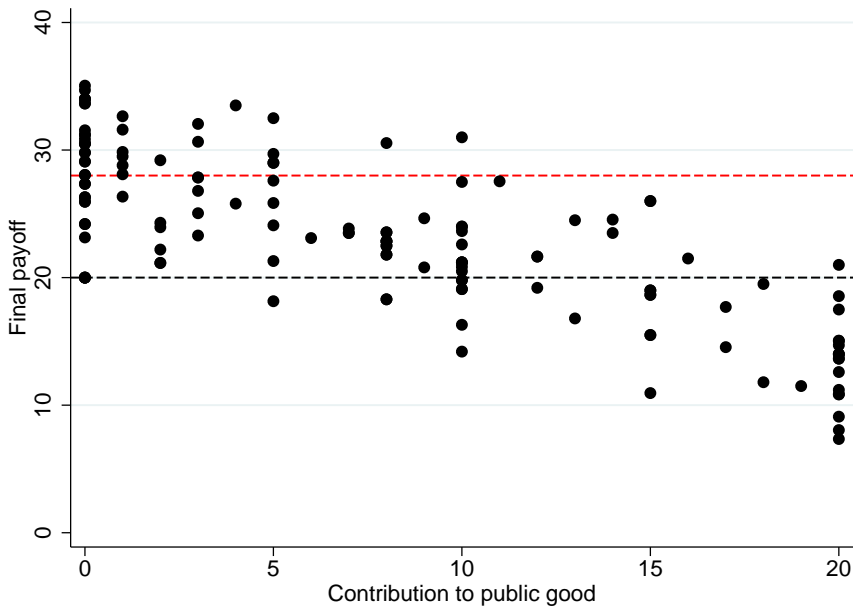
Experimental results: you



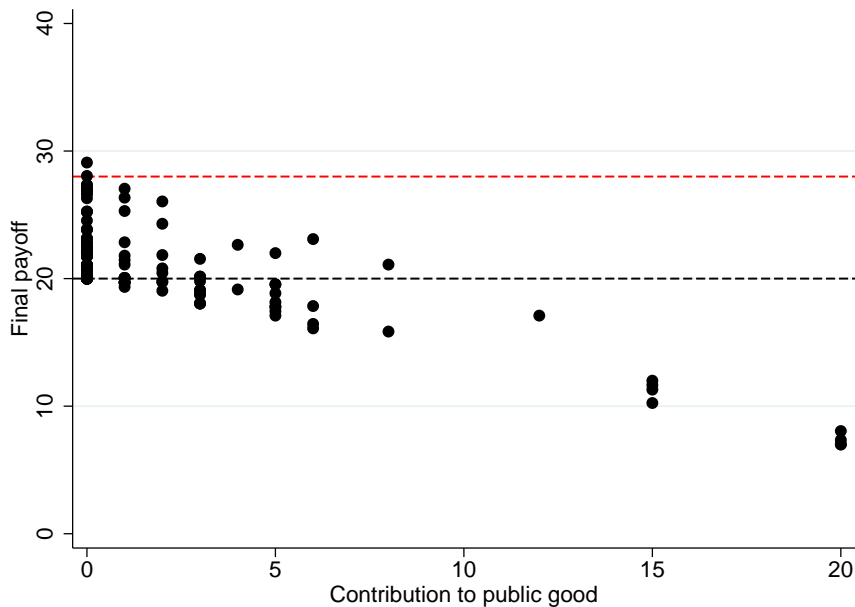
Experimental results: NEKG51-F14



Experimental results: AER, period 1



Experimental results: AER, period 10



Alternative pay mechanism

- **Sale of by-products**: commercials in TV
- **Bundling**: “organic” food
- **Technological change**: satellite encryption
 - Private contracts (efficiency?)

Clubs: (Buchanan, 1960's)

- Impure public good: **excludable**
 - Excludability used to finance impure public good
- Choose both optimal provision and membership
 - Optimal provision depends on member quantity & MRS

How to provide for public good?

Criteria

- How much to **produce**
- How to **finance** it

Private or public provision? (more on privatization lecture)

- **Private:** inefficient (under-)provision
 - Successful examples: lighthouse (Coase, 1974), crowdfunding
- **Public:** inefficient financing
- **Efficiency vs equity:** Welfare function?

Think: education, culture, public illumination

Crowdfunding



For next time

- **RG, ch.4, ex 3**
- **RG, ch.4, ex 8**
- **RG, ch.4, ex 13**