

Lecture – 13A & 13B

Energy Resources, Economics and Environment

Public and Private Goods / Bads

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Public Goods and Bads

- Excludability
- Rivalry

Excludability

- A good is excludable if it is feasible and practical to selectively allow consumers to consume the good
- A bad is excludable if it is feasible and practical to selectively allow consumers to avoid consumption of the bad

Rivalry

- A good (bad) is rival if one person's consumption of a unit of a good (bad) diminishes the amount of the good (bad) available for others to consume

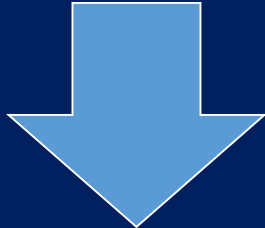
Public/ Private Goods/ Bads

	Non Rival	Rival
Excludable		
Non- Excludable		

Pure Private Goods/ Bads

	Non Rival	Rival
Excludable		
Non- Excludable		

Pure Public Goods/ Bads

	Non Rival	Rival
Excludable		
Non- Excludable		

Classify as Public/ Private

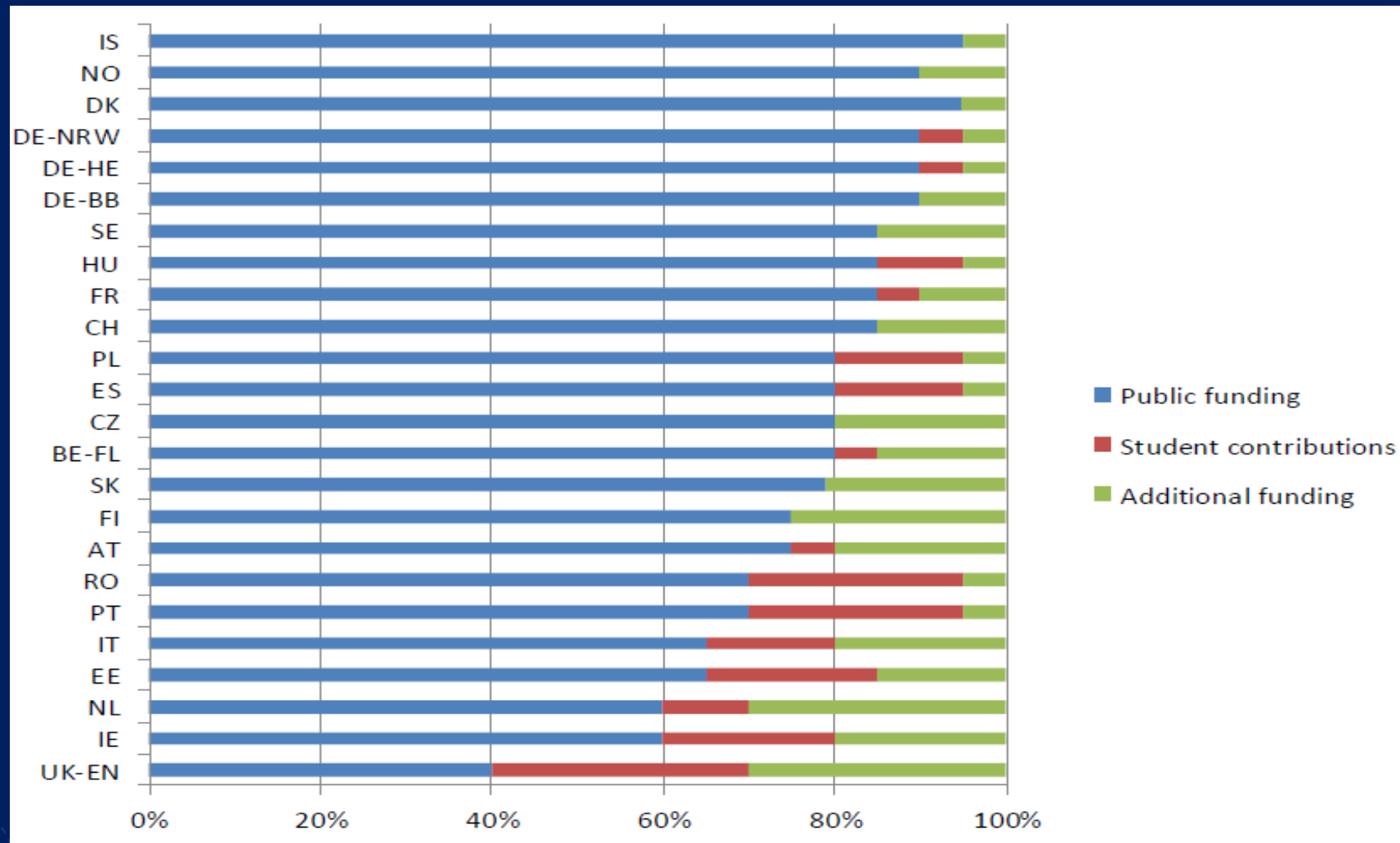
- Pizza
- Higher Education
- Ice Cream
- Lighthouse
- Television Broadcast
- Radio Broadcast
- Basic Research
- Worldwide web
- Weather Forecast
- Newspaper
- Freeway/ Highway
- Metro Rail
- Air Pollution
- National Defence
- Garbage
- Green House Gases
- Parks
- Powai Lake
- BMC water supply
- Noise
- Police



Should the public pay for higher education?

Is Higher Education a Public Good?

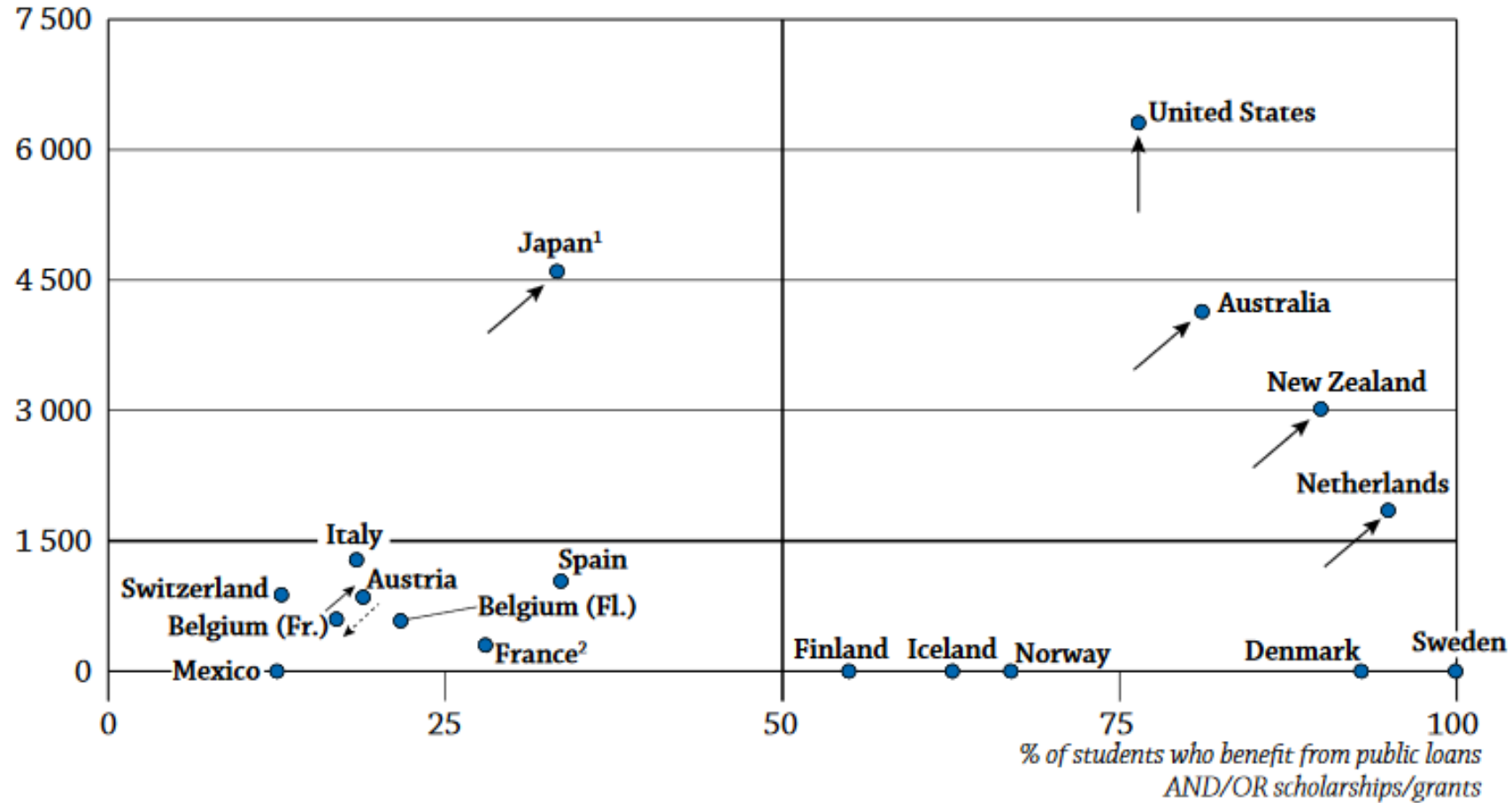
Higher Education Funding in Europe



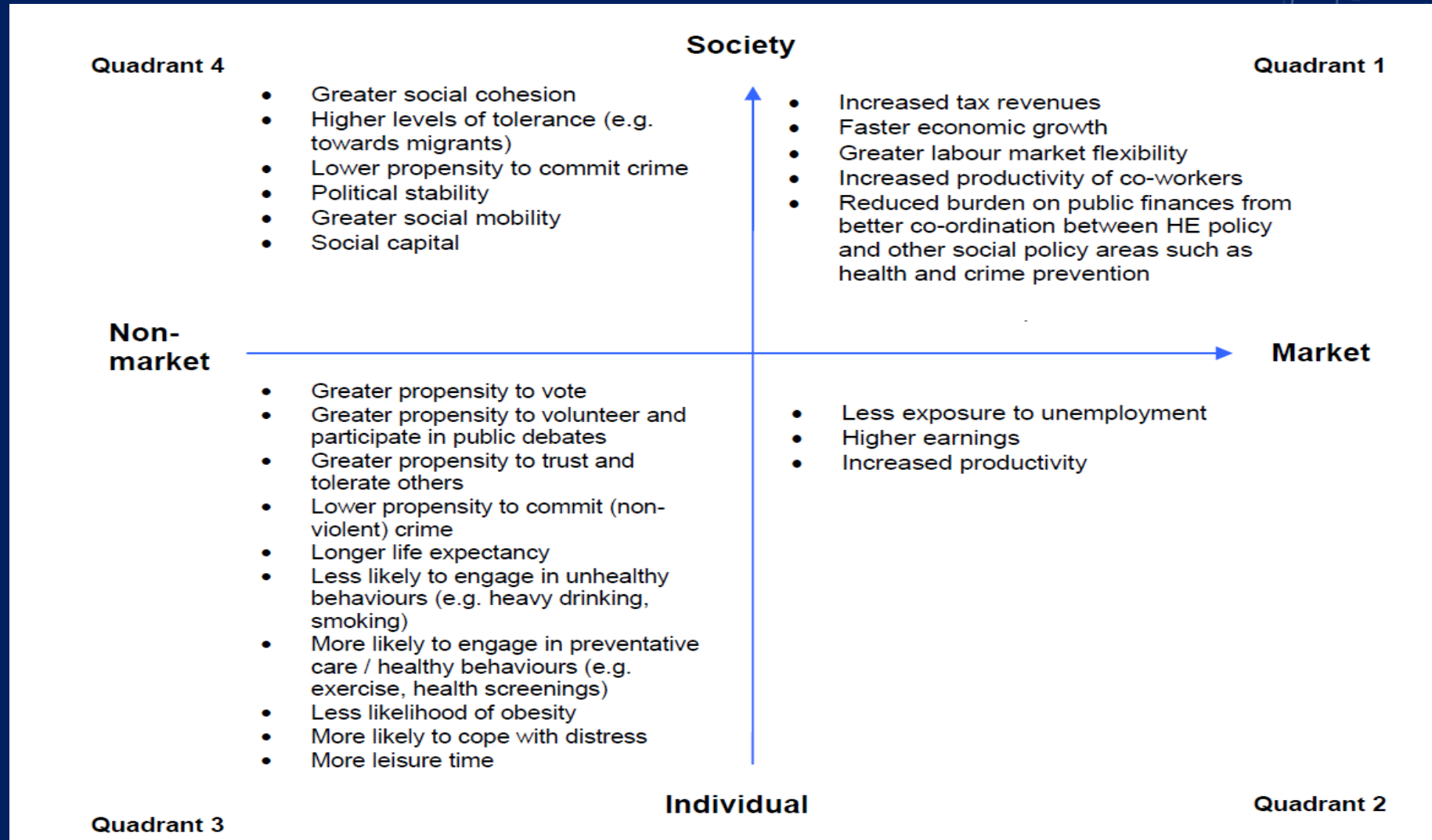
Estermann, T & Kulik Anna (2017)

Average tuition fees

*Average tuition fees charged
by public institutions in USD*



Wider Benefits of Higher Education

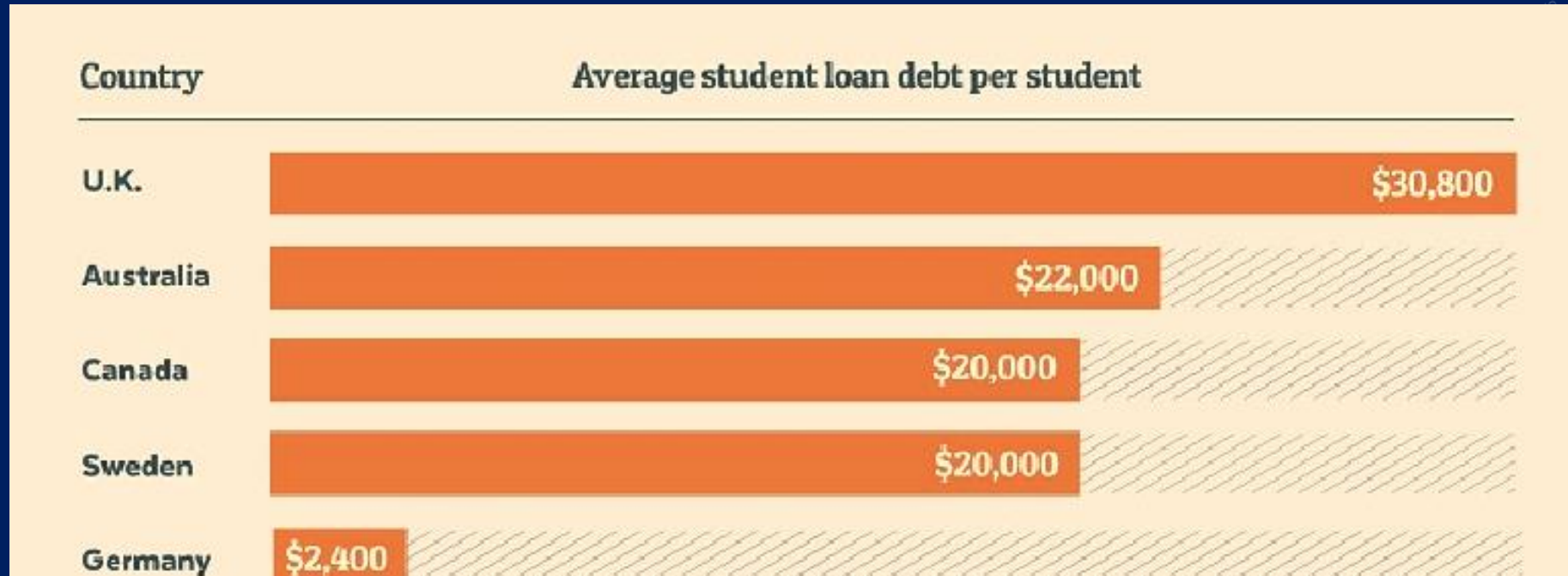


Source: Brennan et al, 2013

The background is a dark blue field. In the center, there is a rectangular area with a light blue and white grid pattern. Overlaid on this grid is the text. To the right of the grid, there are several circular graphic elements: a large circle with a scale from 0 to 210 and an arrow, and a smaller circle with a dashed arrow. In the bottom left corner, there are more circular dashed lines and arrows.

Student debt exceeds **\$1 trillion** in the US
yet 29% of all students who take out loans drop out
of school, with 9% of loans currently in default

Average Student Loan Debt

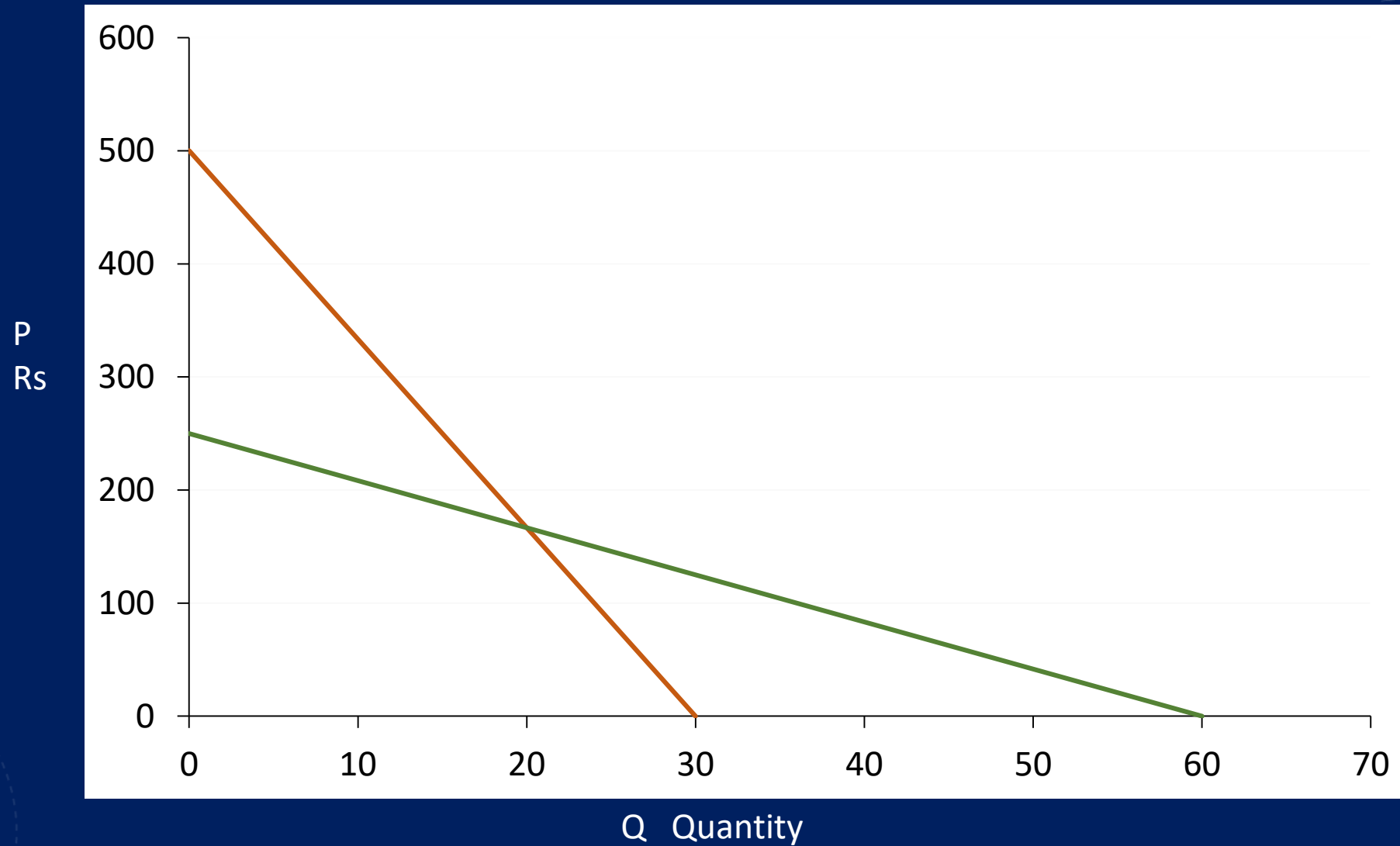


<https://www.cnbc.com/2017/10/13/cost-of-college-tuition-around-the-world.html>

Aggregation of Demand Curves

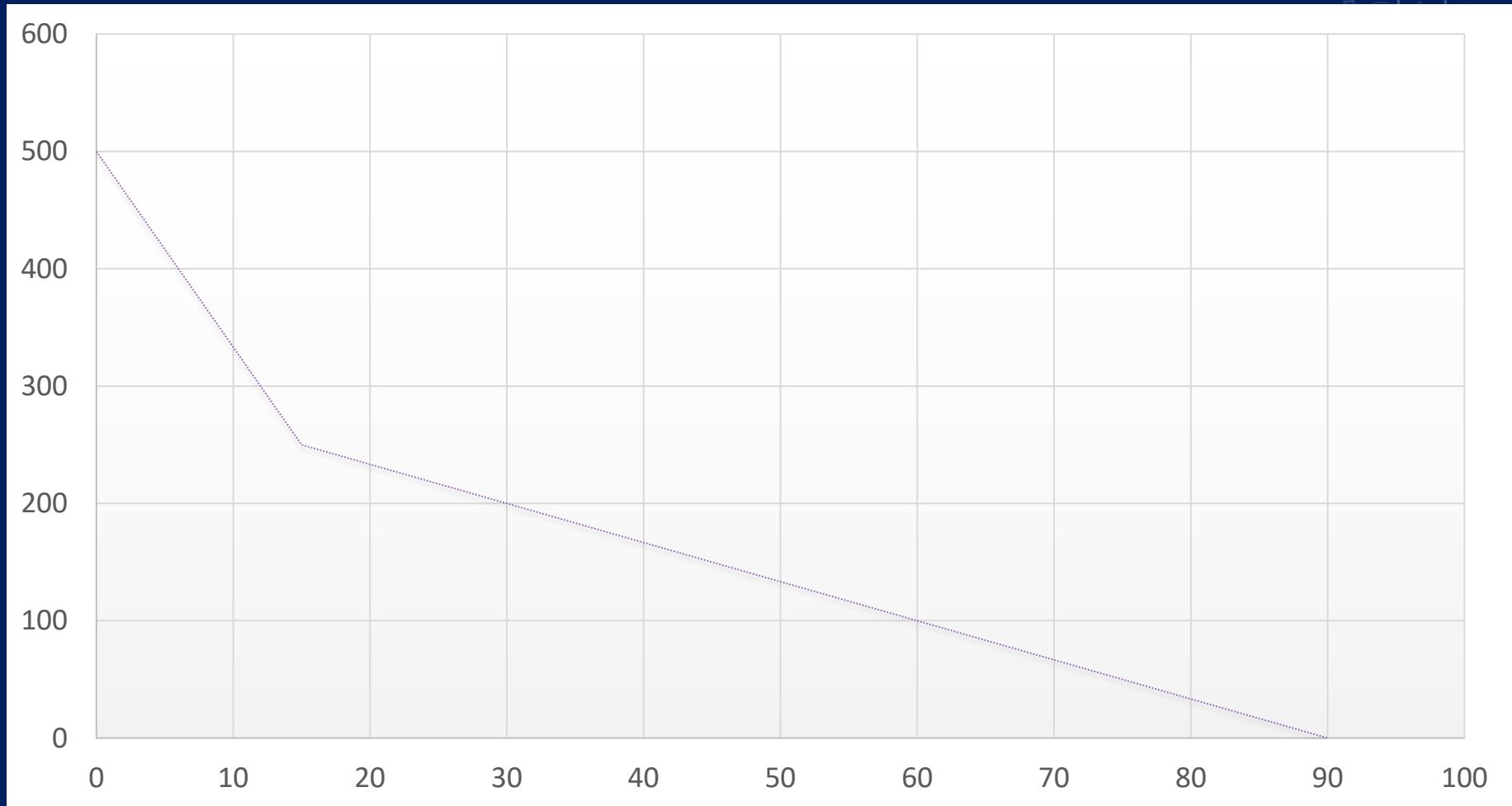
- Price or Marginal Willingness to Pay (MWTP) on Y axis (vertical axis)
- Quantity – Demand (X-axis)
- If goods are rival – for any price sum the total amount of goods that the consumers are willing to consume

Example of Demand Curves



Aggregate Demand Curve

P
Rs

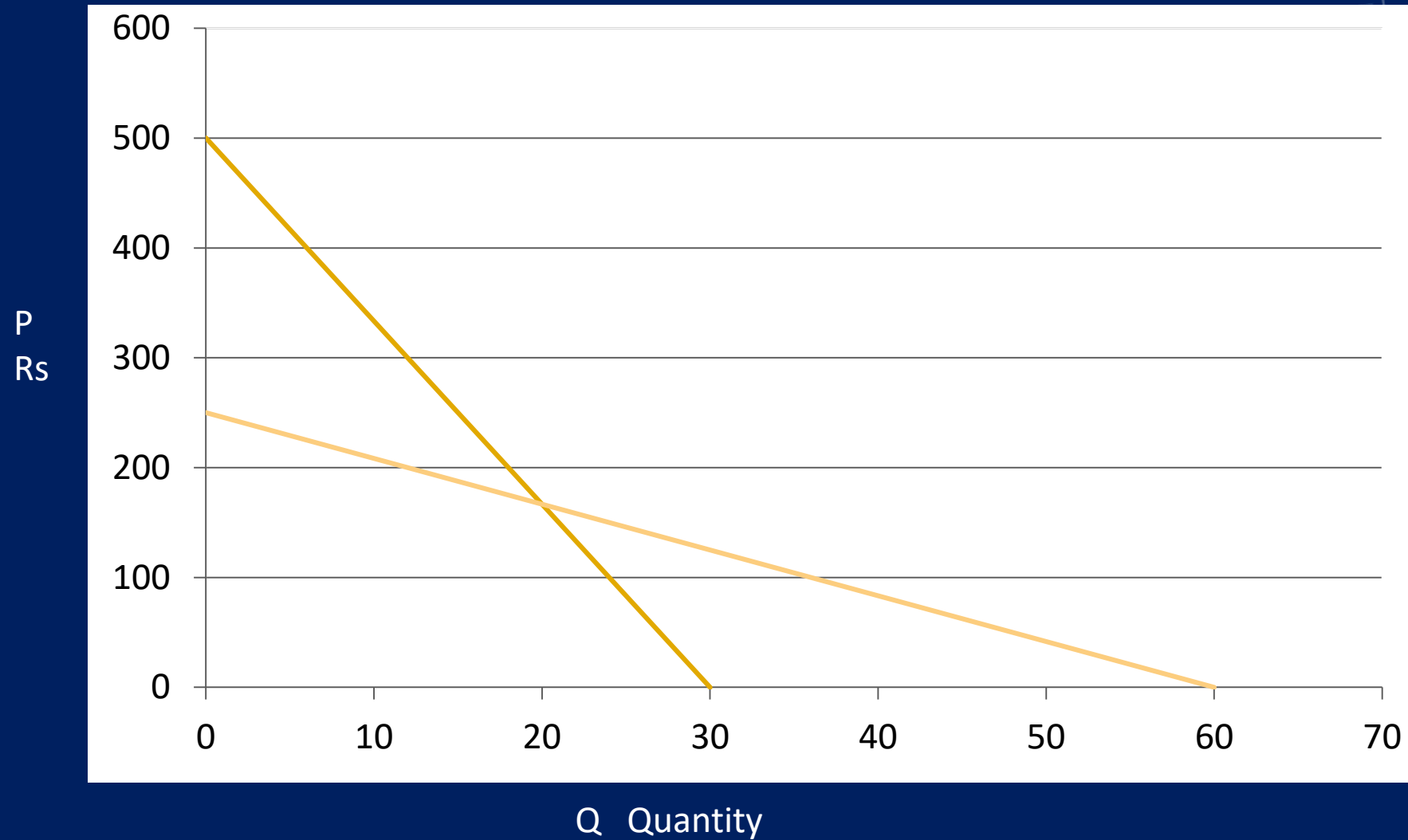


Q Quantity

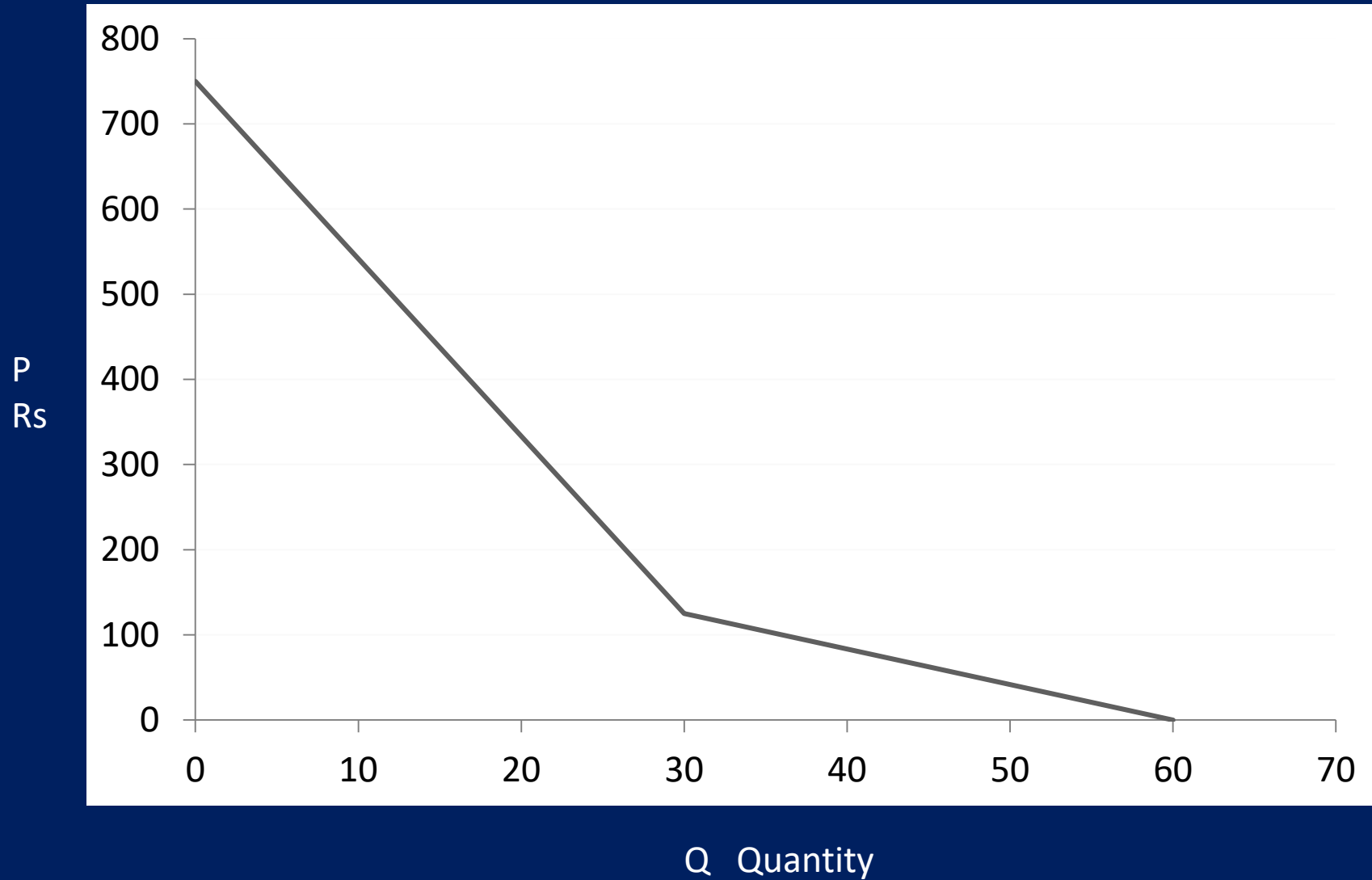
Aggregate Demand Curve – Non Rival goods

- All consumers consume same amount of good
- Sum up the prices for same q

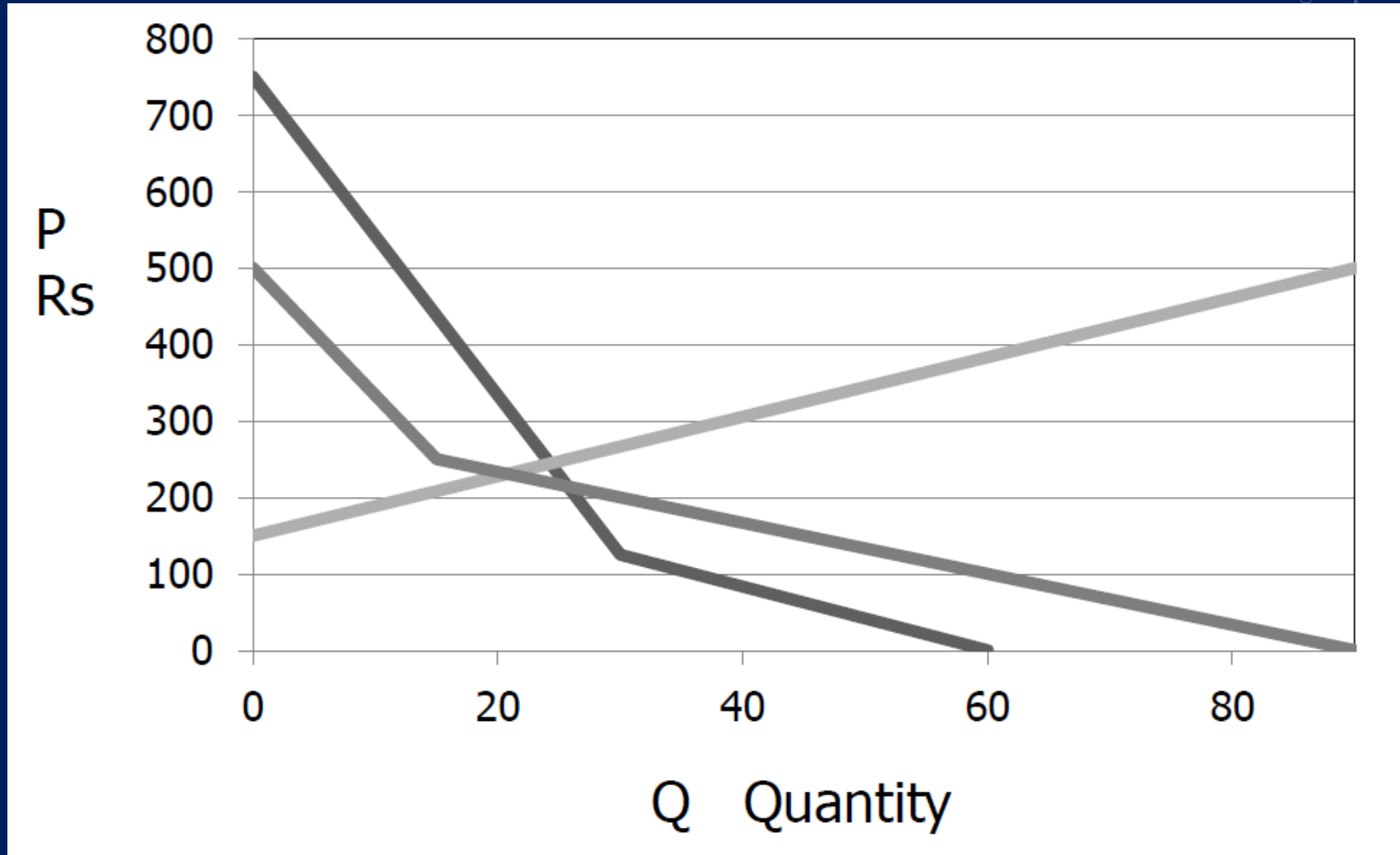
Example of Demand Curves



Aggregate Demand Curve – Non Rival



Supply-Demand Curves



Optimal Provision of Public Goods/ Bads

- Private Goods – Supply and Demand Curves intersect, Marginal cost of production = Price

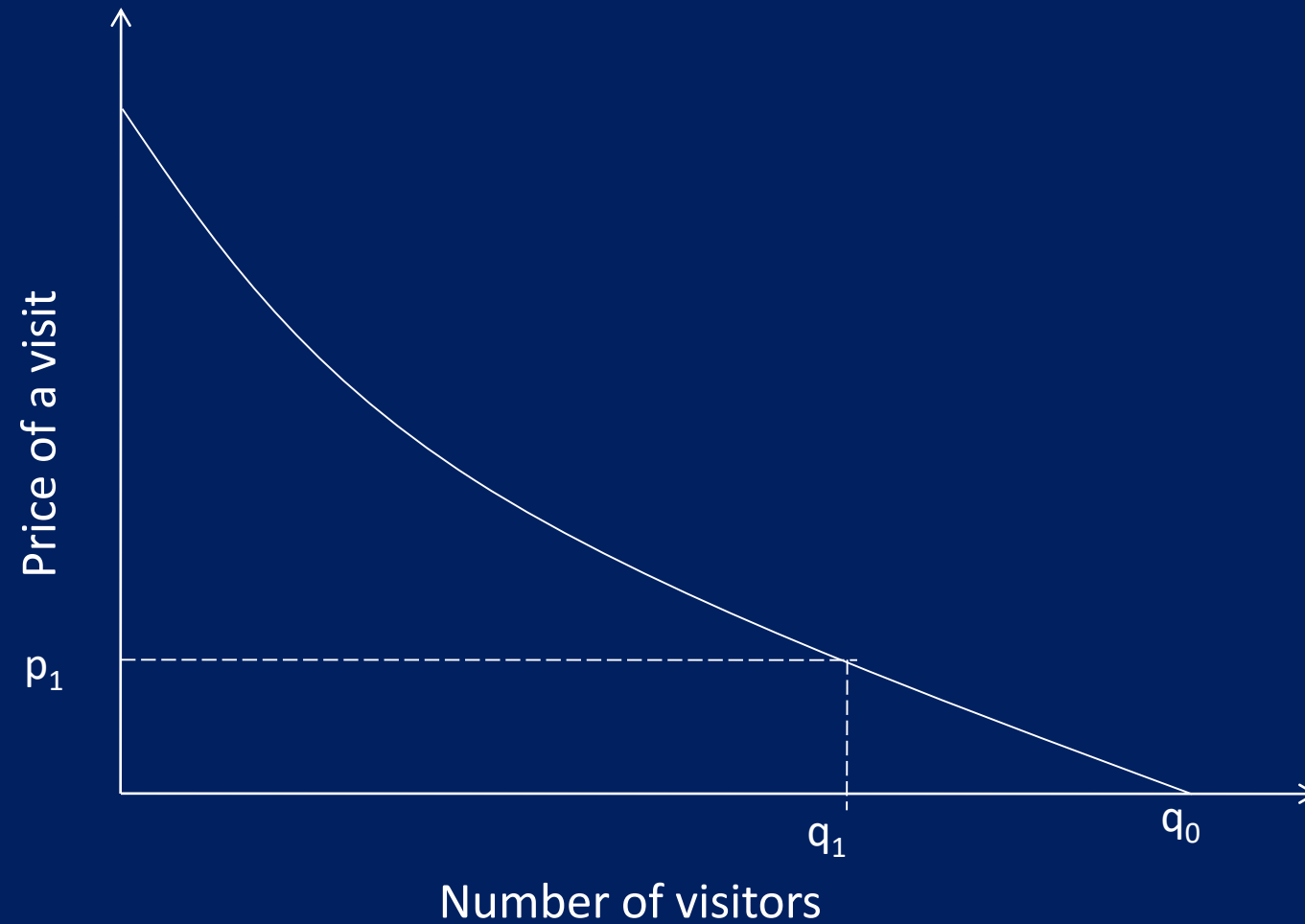
Market price?

- Can we infer a market price from the intersection of supply / demand curves for a non-rival good?
- Why?

Efficient Public Good Pricing

- Consider non rival good
- Park with a fence around it – entrance can be controlled
- Large park – no congestion
- Operating cost – only fixed cost – not dependent on number of visitors
- What is the efficient operating price?

Price-Demand for a Park



Source: Kolstad

Optimal producer price

- Efficient consumer price zero
- Producer must have sufficient revenue to meet costs
- If producer raises price, demand reduced – too little of public good produced

Example from Kolstad

- Assume society of N identical individuals
- Each individual – two goods:
 - x Rival, excludable private good
 - G Non Rival, non excludable private good
 - Each individual income w (Assume quantity units adjusted so that prices of goods set to unity)

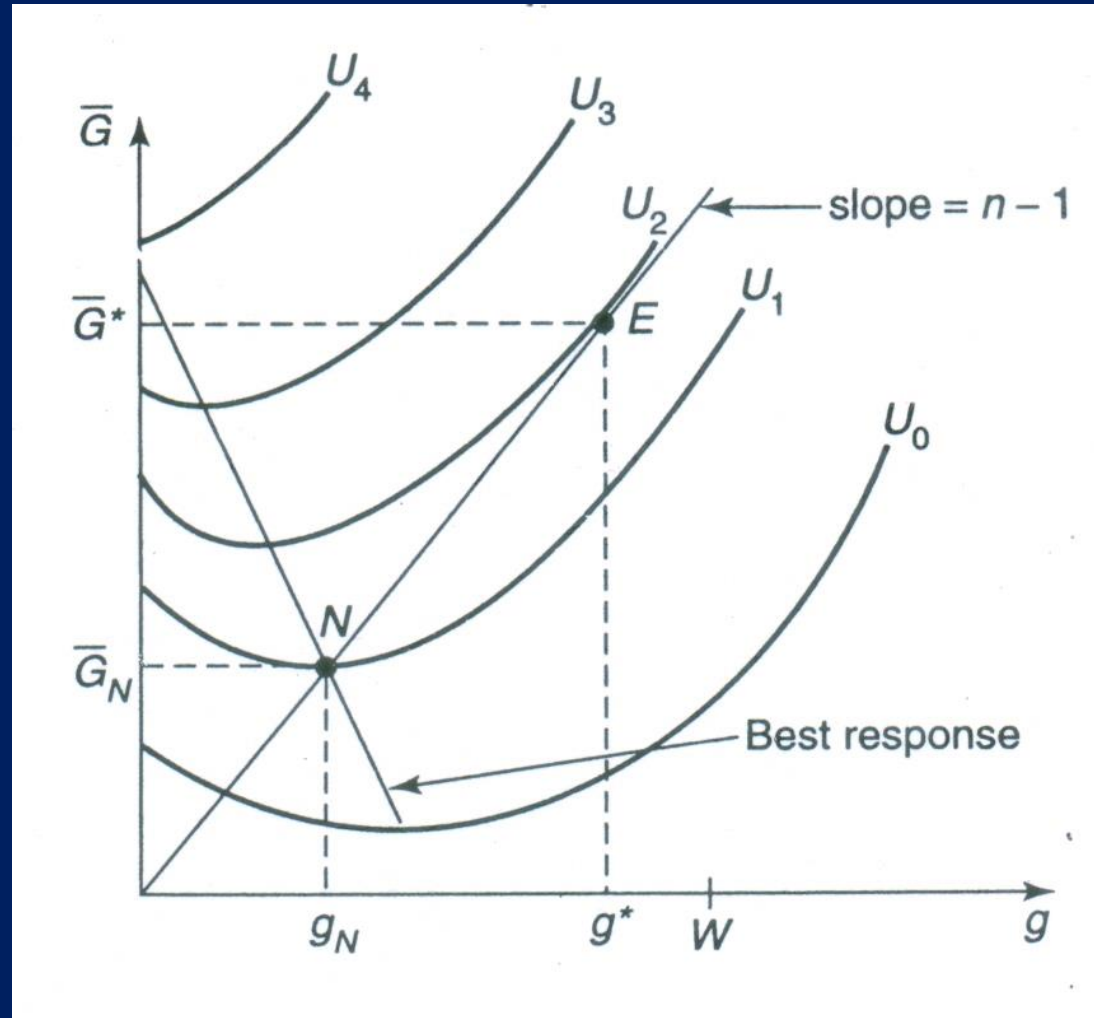
Market provision of public goods

- Utility = $u(x, G)$
- Public good – produced and can be bought privately
- $G = G^- + g$
 - Where g individual purchase
 - G^- provided by everyone else
- Utility = $u(w - g, G^- + g)$

Market provision of public goods

- $G^* = (n-1)g$ since everyone is identical and makes identical choices
- Co-operative action implies

Indifference Curves for Public-Pvt Good



Market provision of public goods

- $g_N < g^*$
- Reason?
- Number of polluters- injured somewhat by polluting but most of the damage accrues to someone else

Market Provision of Public Goods

- Market typically under-provides public goods
- Market typically over-provides public bads

Lindahl price

- Decide demand and supply
- Charge each consumer based on Marginal willingness to pay
- Lindahl equilibrium, Lindahl price (Norwegian economist – Erik Lindahl)
- Do you think this equilibrium will occur?

References

- Charles Kolstad, Environmental Economics, Vol. 1, Oxford University Press (1999).
- Public Goods for Economic Development, UNIDO, 2008.
- Estermann, T & Kulik Anna (2017). Define Thematic Report: Performance-based funding of Universities in Europe. 91, 399–404.
- Brennan, John, Durazzi, Niccolò and Séné, Tanguy (2013) Things we know and don't know about the wider benefits of higher education: a review of the recent literature. BIS Research Paper, URN BIS/13/1244. Department for Business, Innovation and Skills, London, UK.
- <https://www.cnbc.com/2017/10/13/cost-of-college-tuition-around-the-world.html>