

The Skeptical Economist

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The Problem of Expertise: Why Be Numerate?

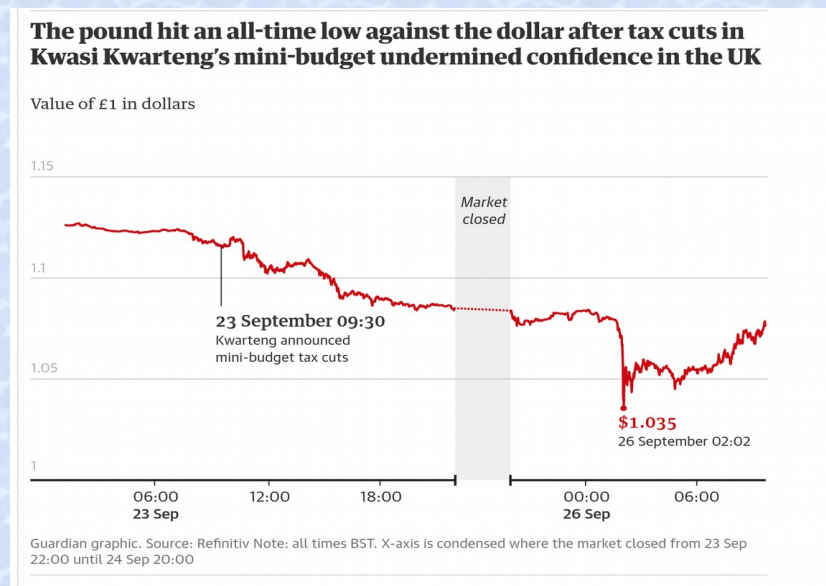


The daughter of the engineer Bob Ebeling on driving with her father before the launch: “He said, 'The Challenger's going to blow up. Everyone's going to die,' “ Serna recalls. “And he was beating his fist on the dashboard. He was frantic.”

An Economic Example

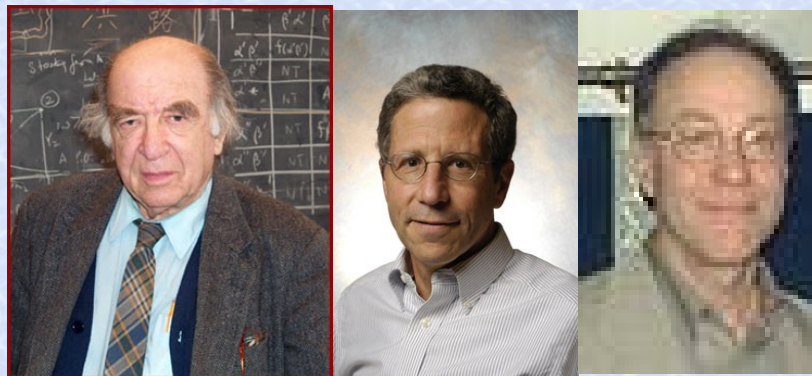
24 September 2022 in the Daily Telegraph: “This was the best budget I have ever heard a chancellor deliver, by a massive margin” Allister Heath (studied economics at the LSE and Oxford)

26 September 2022 in the Guardian



The Goal of This Class

- don't be that guy
- teach you economic science as it exists today not 50 years ago
- be numerate and able to sort out the economic experts from the economic charlatans
- learn that economics is not about a static world full of certainties, but is about a dynamic world full of uncertainties



Theory That Works

Economics is an experimental science: we test our theories with real people paid real money in the laboratory and in the field

Case Study: a two party election

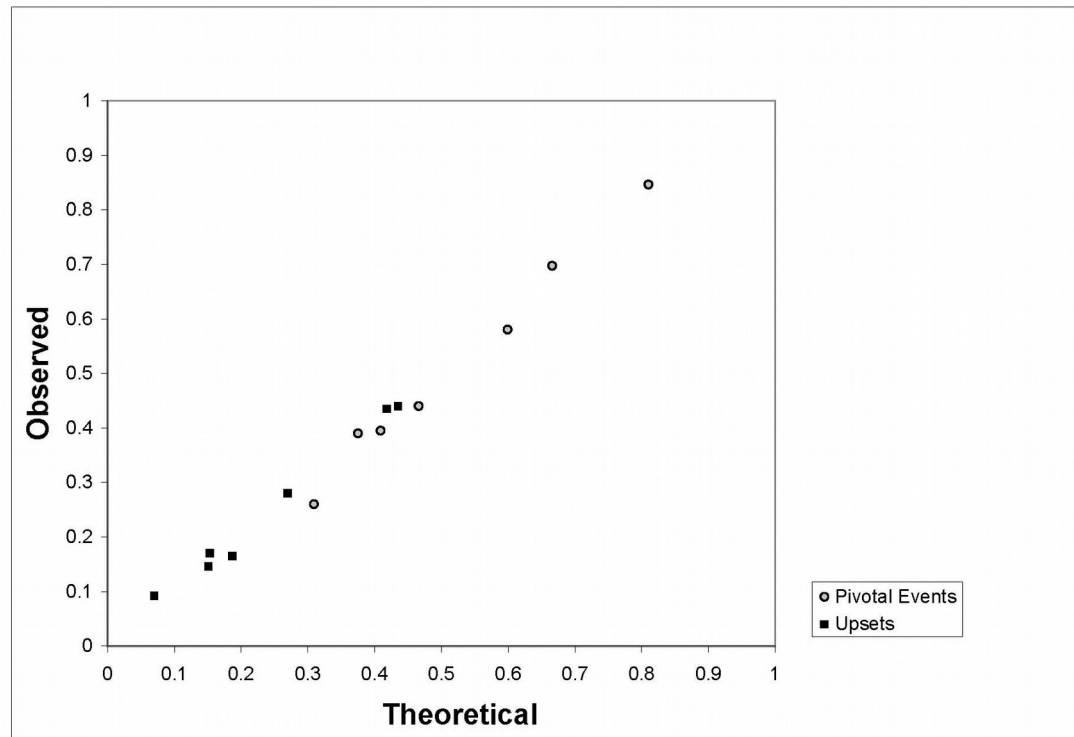
voters had a choice between casting a vote for their own party or abstaining

members of each winning party received a prize of \$0.37, split between the two parties in case of a tie

voting was costly - each voter was randomly assigned a cost of voting ranging from \$0.00 to \$0.185: known only to the voter to whom it was assigned

whether it is worth voting depends upon whether the election is close or not

Close Elections: Theory vs Reality



Mathematicians?

- Do not confuse the mathematics we use to analyze human behavior with how people behave: people do not solve calculus problems to determine how to vote. Photons do not know quantum mechanics, yet they obey its laws
- Computing the theoretical quantities in the voting experiment required a lot of computer time. The participants learned by doing: our theory tells us what they will happen when they do that
- People are pretty smart. There is a book *Predictably Irrational* by Dan Ariely which claims the opposite and purports to give experimental evidence to that effect. Since the data is made up we may take it that people probably aren't predictably irrational
- I will teach you the theory in the third lecture

Next up: **Competition and Monopoly**

The Representative Consumer

Purchases Q pizzas pays p for each pizza

Gets utility

$$aQ - (1/2)bQ^2 - pQ$$

Many such consumers so can have little effect on the price: act as *price takers*

Each acts in their own self-interest so tries to maximize their utility

Demand for pizzas: find the maximum by differentiating with respect to Q , setting equal to zero and solving for Q

$$a - bQ - p = 0$$

Solution

$$Q = \frac{a-p}{b}$$

Competitive Production

Each pizza costs c to produce and distribute
(constant marginal cost of c)

Firms compete to produce pizzas so act as price takers

Receive profits $\pi = pQ - cQ$, maximum when $p = c$



Competitive Equilibrium (Perfect Competition)

Equilibrium conditions: $p = c$, $Q = \frac{a-p}{b}$

Solution:

$$Q = \frac{a-c}{b}$$



The Problem of Monopoly

The catering company Big Eats has the exclusive right to sell pizza on the campus of Big U, continues to produce a pizza for cost c

How does price depend on the number of pizzas it sells?

Inverse demand: solve for p

$$Q = \frac{a-p}{b}$$

solution

$$p = a - bQ$$

profit of the monopolist

$$\pi = pQ - cQ = (a - bQ)Q - cQ$$

Solution of the Profit Maximization Problem

Profit is

$$\pi = (a - bQ)Q - cQ = aQ - bQ^2 - cQ$$

differentiate with respect to Q and set equal to zero

$$\partial\pi/\partial Q = a - 2bQ - c = 0$$

solve for the monopoly output

$$Q = \frac{a-c}{2b}$$

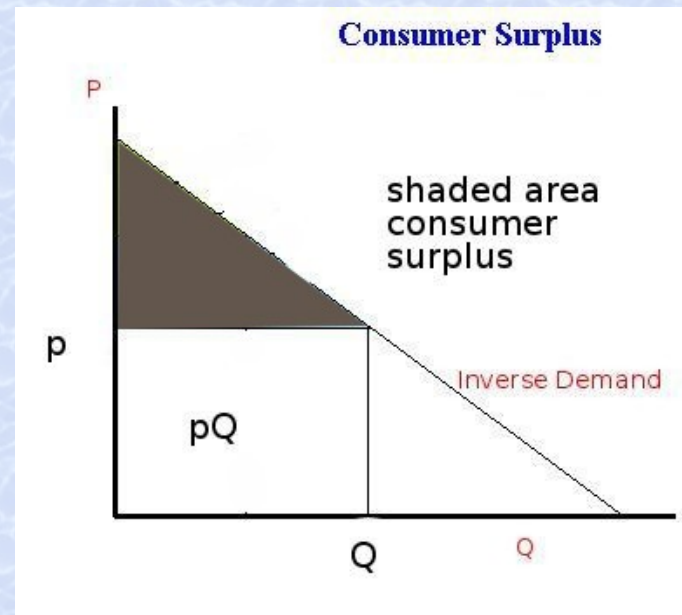
half the competitive level

Consumer Surplus

Better known as utility

$$aQ - (1/2)bQ^2 - pQ = \int_0^Q (a - bq) dq - pQ$$

difference between marginal utility (= inverse demand) and price



Producer Surplus

Better known as profits

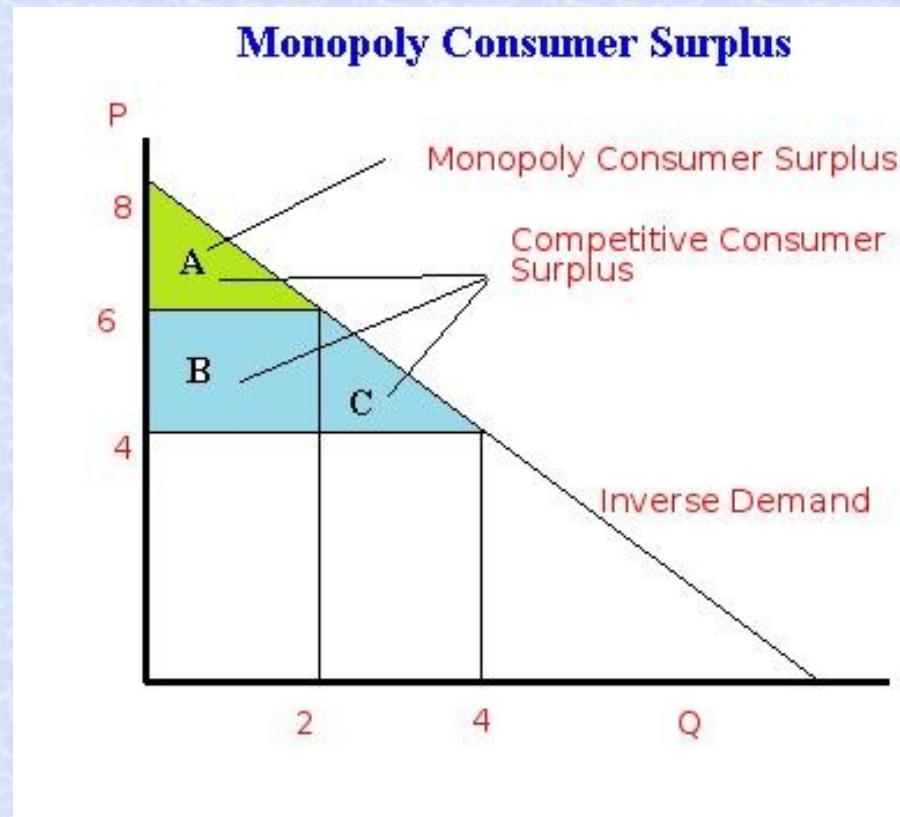
Constant marginal cost

$$(p - c)Q$$

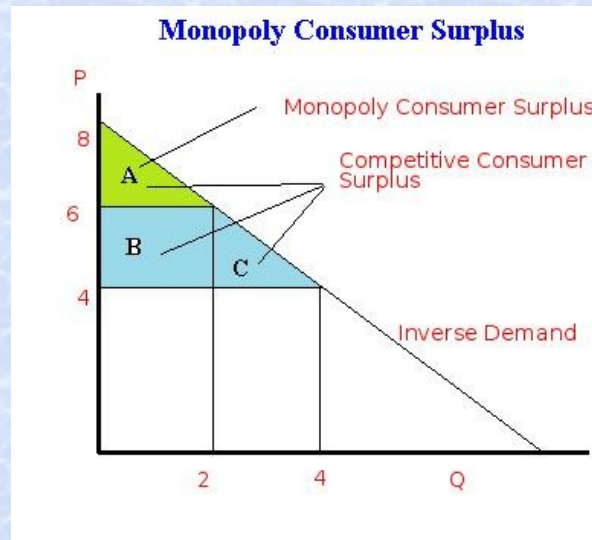


Graphical Analysis of Monopoly

take $a = 8, b = 1, c = 4$



What Are We Fighting Over?

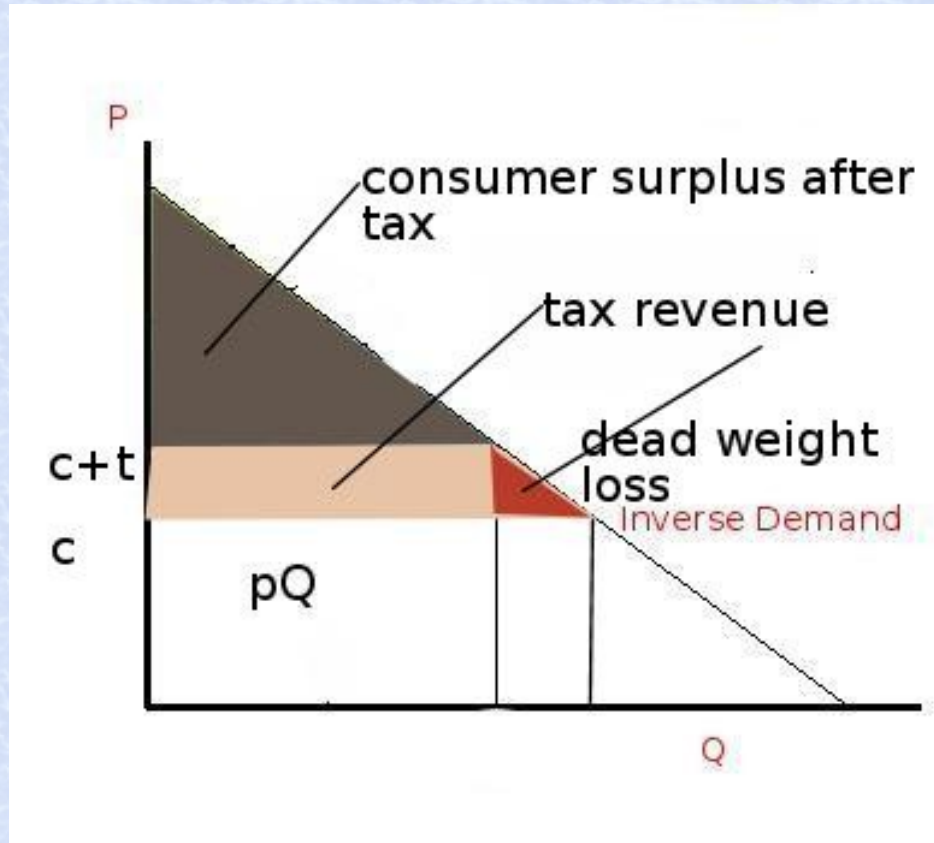


A: consumer surplus under monopoly

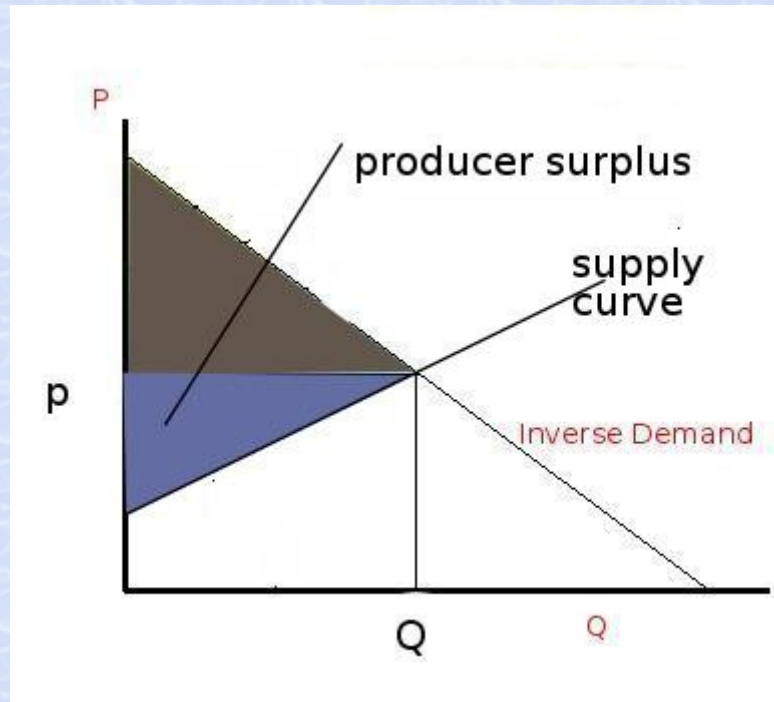
B: *producer surplus* (profit) under monopoly – *transfer* from consumer to producer

C: *deadweight loss* – surplus under competition lost under monopoly

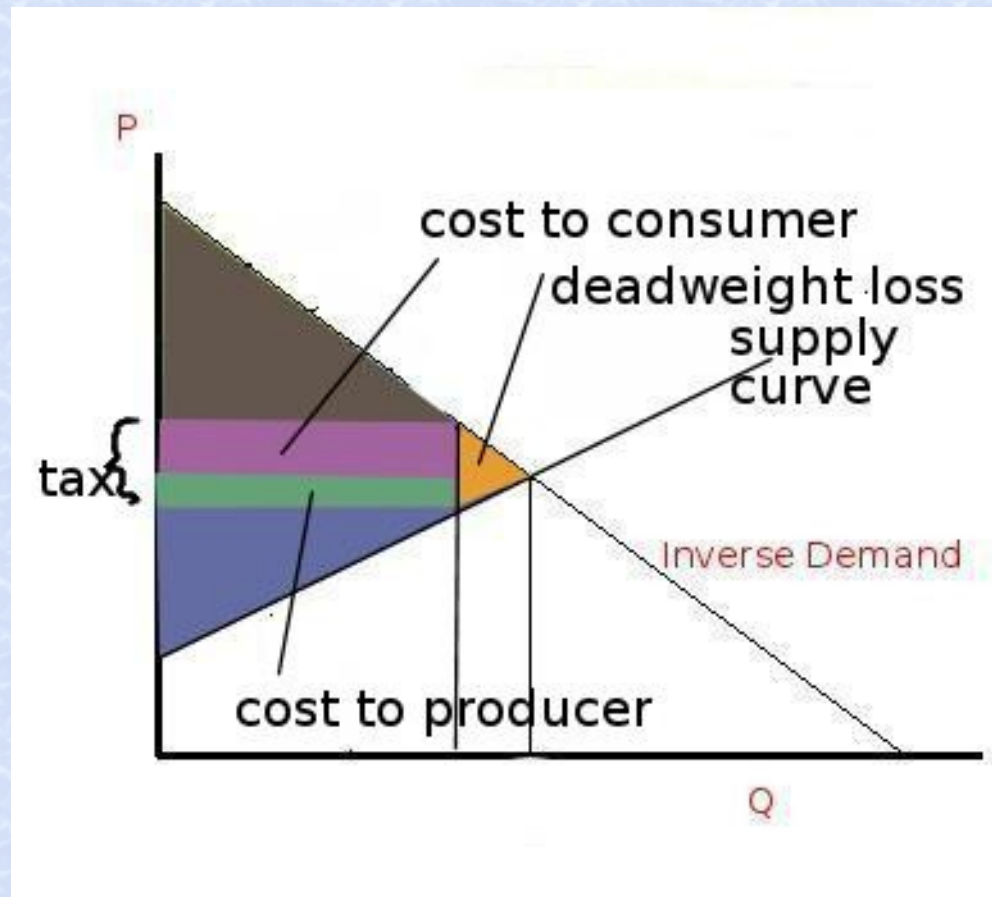
Taxes



Producer Surplus with Increasing Marginal Cost



Tax with Increasing Marginal Cost



Patents

It isn't easy to keep a monopoly: what keeps other firms from competing with you?

1. government action, patents, regulation, etc. (long-term)
2. regulation and regulatory capture – the book talks of the benefits of price regulation :-)
3. first mover advantage (short-term)

How Not To Get Rich

- Watch someone else innovate
- See if they are successful in making a popular product
- Then imitate them
- It's a little late at that point
- example: the iPhone

their imitators didn't exactly put them out of business, why?

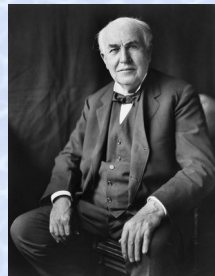
Patents:

- used by failing firms to extract rents from successful firms
- used by successful firms to keep failing firms from extracting rents

Devil in the Details

In fiction

- Lone inventor works for years on their brilliant idea resulting in a formula anyone can use
- Nasty thieves grab the formula before the poor lone inventor can patent it



In reality

- Ideas are cheap
- Building a product and finding a market are hard

Case Study: the Covid Vaccine

AstraZeneca vaccine invented by a handful of people over roughly two weeks

how important is the recipe?

it is not easy to make vaccines:

“If you’re point one of a pH unit out, that can be enough to massively disrupt your productivity. Other factors can be cell culture medium, process timing, pH, carbon dioxide concentration, oxygen control and mixing time to name a few. [...] I worked with one process – if there was a slight overshoot on temperature because the PID loops [proportional–integral–derivative – a feedback control mechanism] weren’t correctly tuned, the cells would stop producing.”

Producing Vaccines

“A production problem at a contract manufacturing facility used by AstraZeneca in Belgium has left the EU [European Union] facing a shortfall of 60% fewer doses than it was expecting this quarter”

“a plant providing key ingredients for the Johnson & Johnson vaccine had to be shut down because of contamination and other problems. This same plant had to destroy several million doses of AstraZeneca. There is also evidence that Russia has had problems in producing the Sputnik vaccine. And the Novavax vaccine has been held up because of production problems, especially shortages of raw materials.”

- very few countries and people have the ability to mass produce vaccines and it takes time to get it right
- it took about a year to get vaccines into mass production compared to a few weeks to find the recipe – substantial first mover advantage

Bottom Line

- lots of competition to produce vaccines and most of them made good money out of it
- patents weren't needed or especially used

Concepts

- price taker
- **competitive equilibrium**, perfect competition
- **monopoly**
- **consumer surplus, producer surplus, deadweight loss**
- patent, regulation, first mover advantage

Skill

given information about utility and cost

find demand, inverse demand, the competitive equilibrium, the monopoly solution, the transfer from consumer to producer and the deadweight loss