Lecture 01

Introduction to Environmental Economics

Ivan Rudik
AEM 4510

Roadmap

- What is environmental economics?
- What are the goals for this class?
- Microeconomics recap

What is environmental economics?

What's enviro econ?

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These ideas can be applied to the environment

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The value of mitigating pollution

How agents will response to climate change policies

Whether investment tax credits for wind power are cost-effective

Air pollution is bad

How do people respond to info?

Sequoia Kings Air
@SequoiaKingsAir

ADVISORY: #ozone is expected to be Unhealthy for All today in and around the foothills area of @SequoiaKingsNPS (Ash Mountain entrance)

Ozone Air Quality Guide

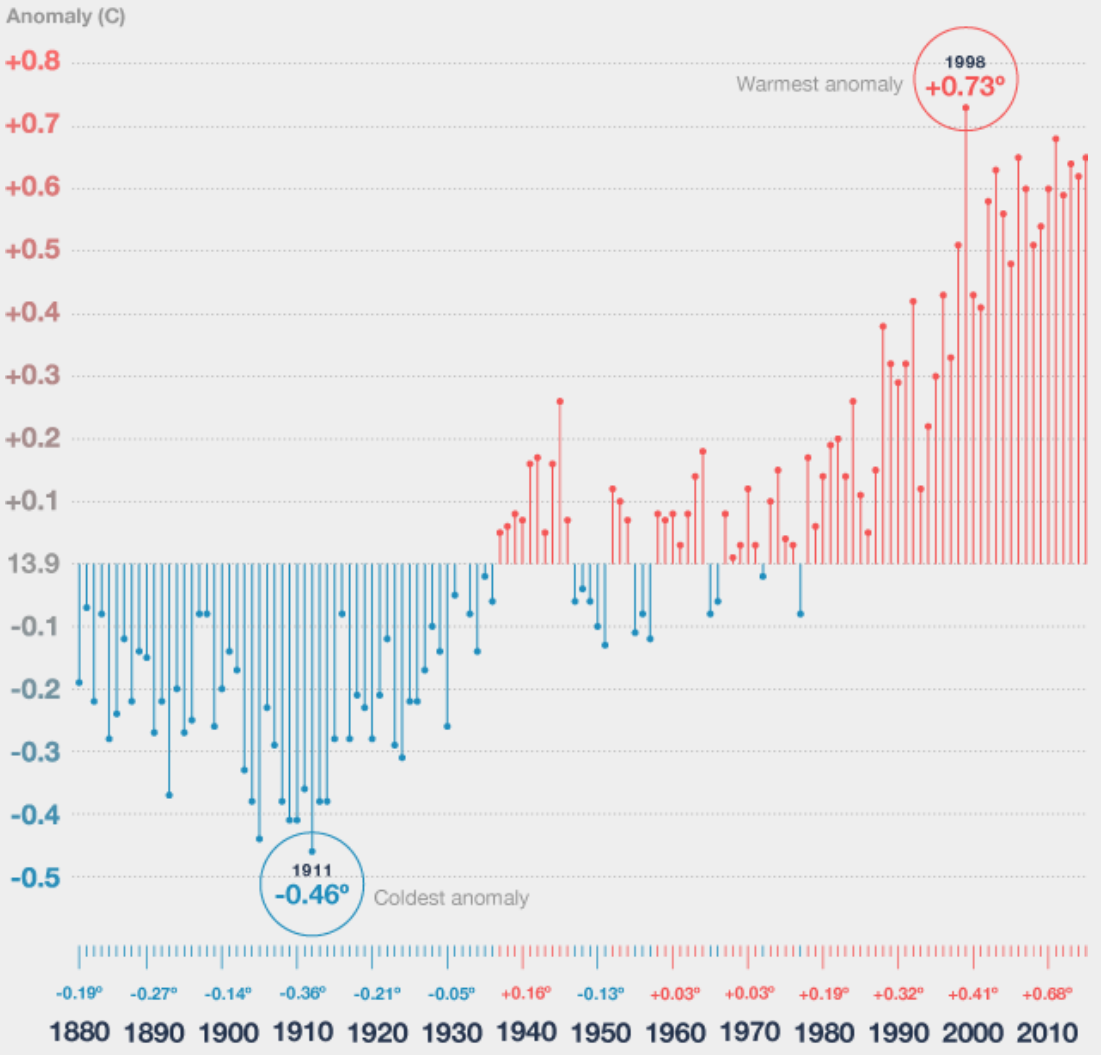
Advisory Level	Health Concern
Unhealthy (86 ppb – 105 ppb)	The following groups should avoid prolonged outdoor exertion: • People with lung disease,

Places provide info to help people avoid air pollution

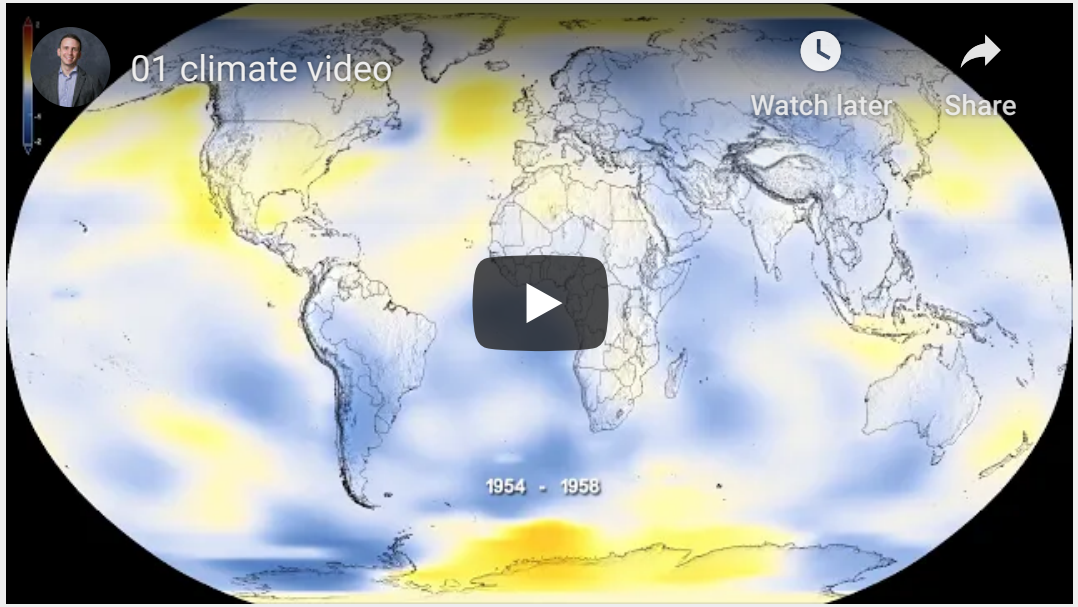
Does it work?

How well?

Climate change



Climate change



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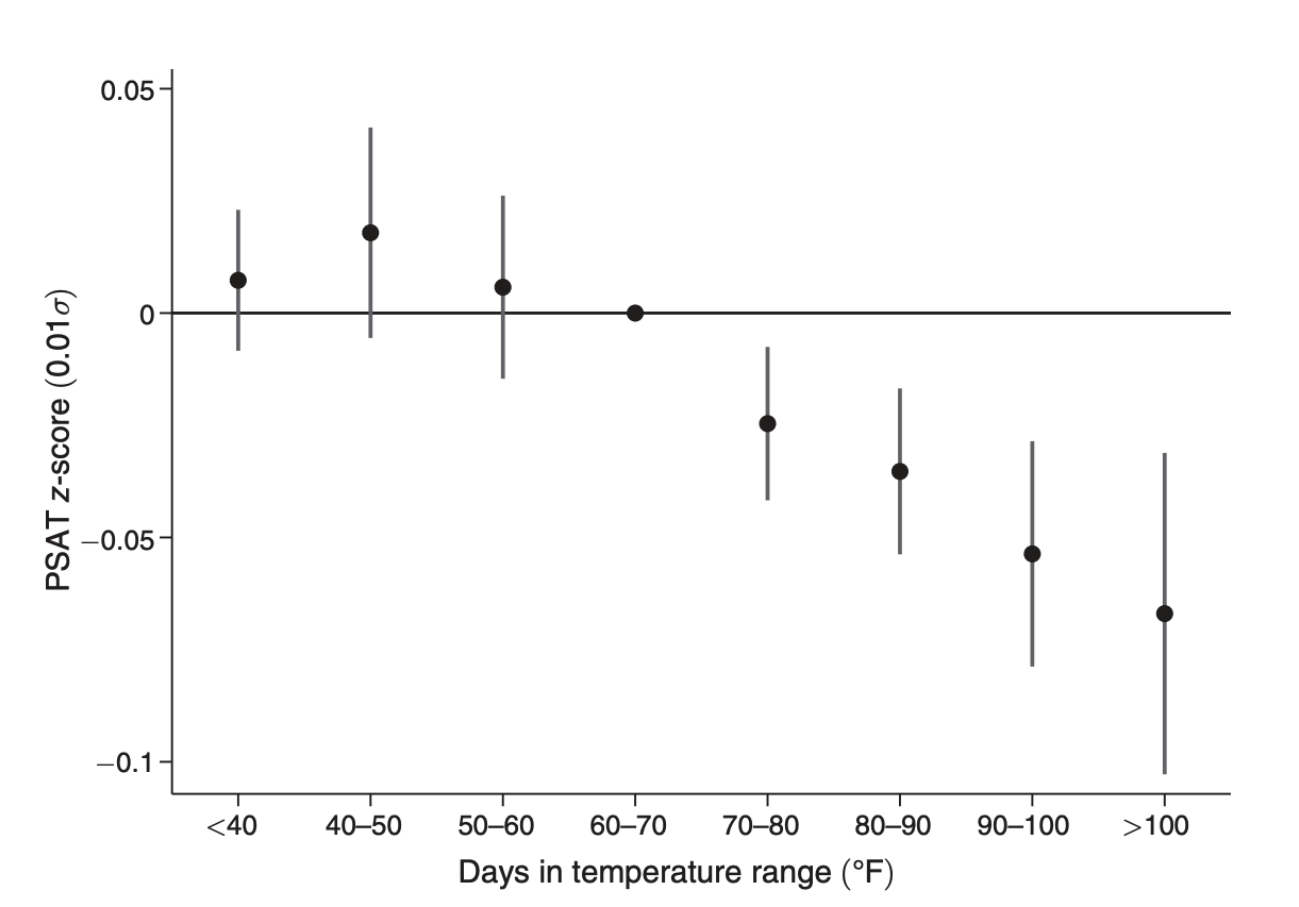
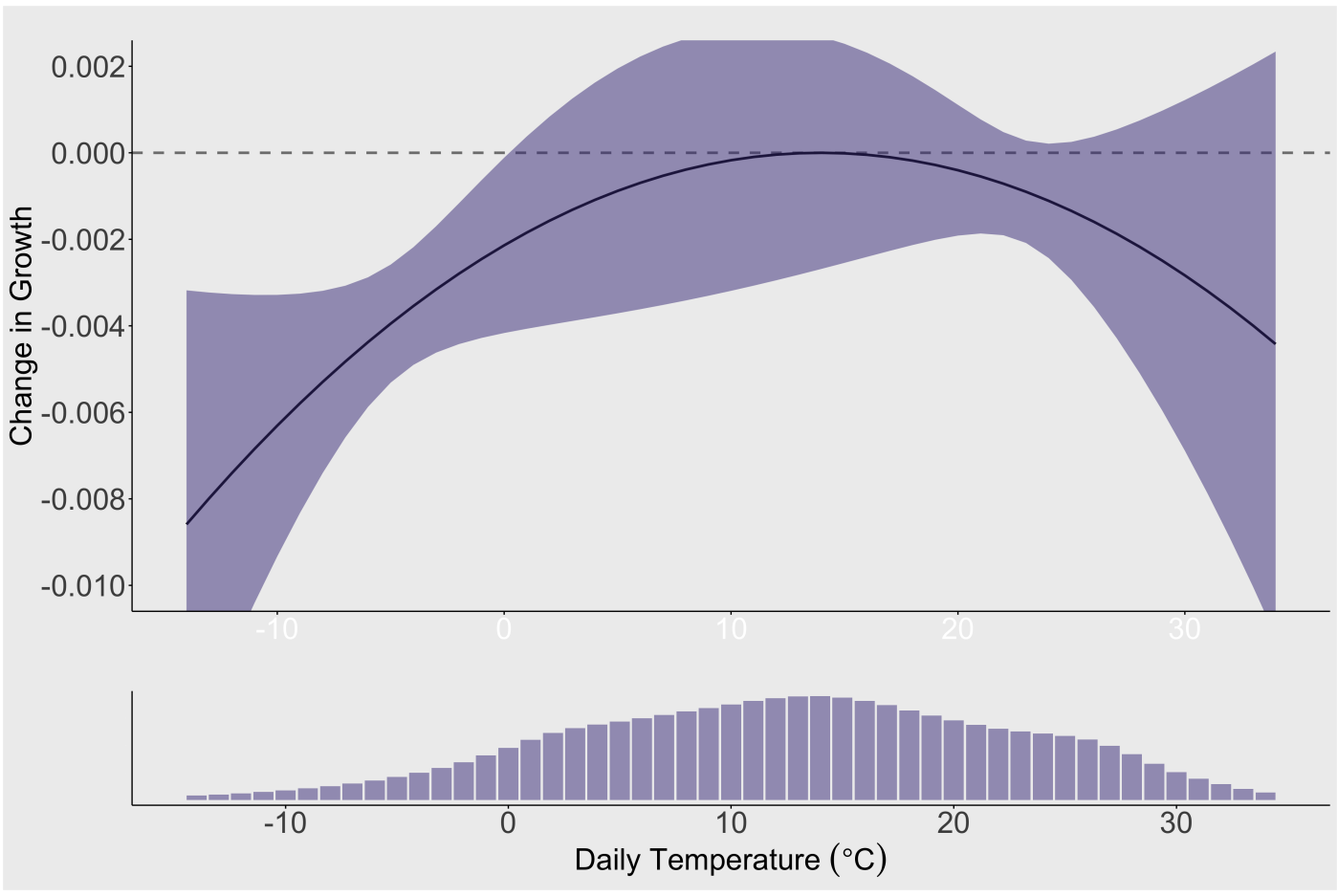
- etc, etc

Climate change: heat hurts learning



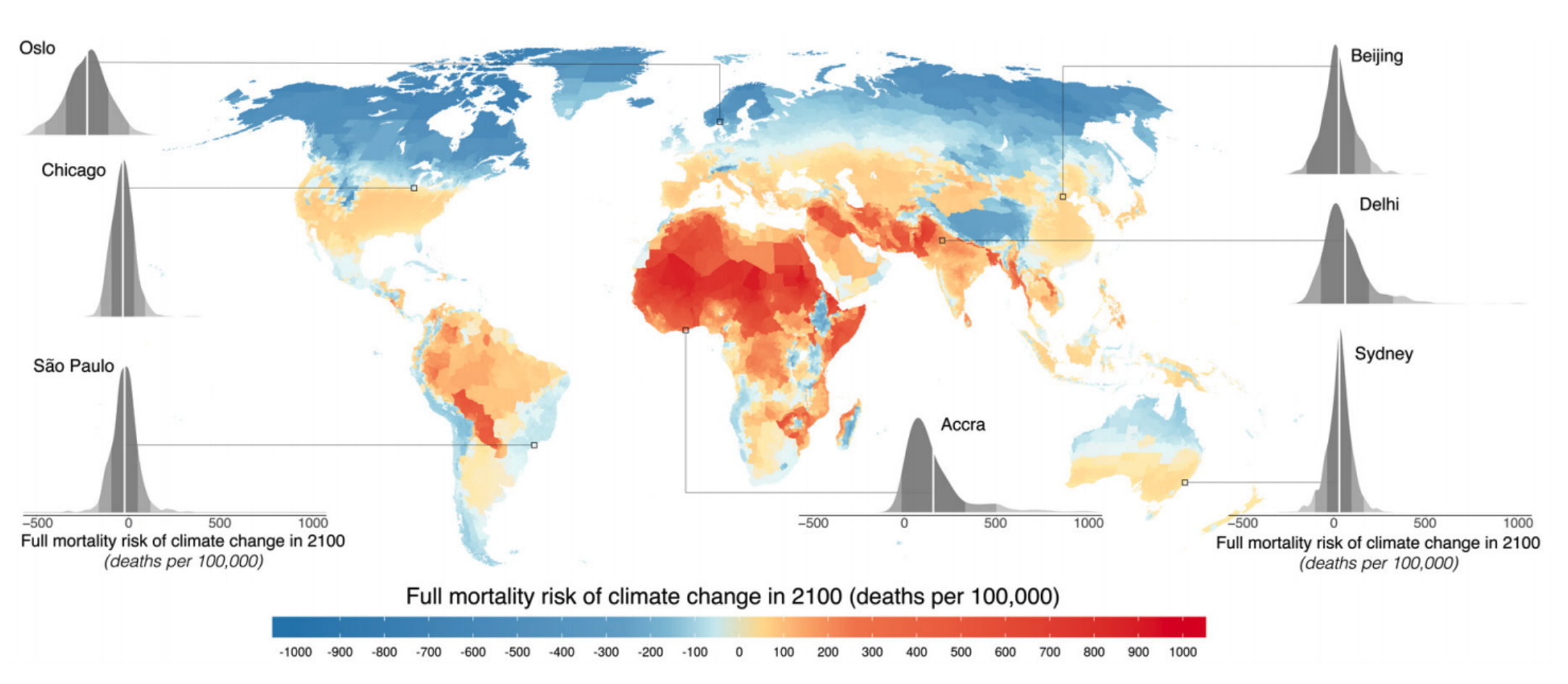
Park et al. (2020)

Climate change: heat hurts economic growth



Lyn et al. (2020)

Climate change: extreme heat/cold increases mortality



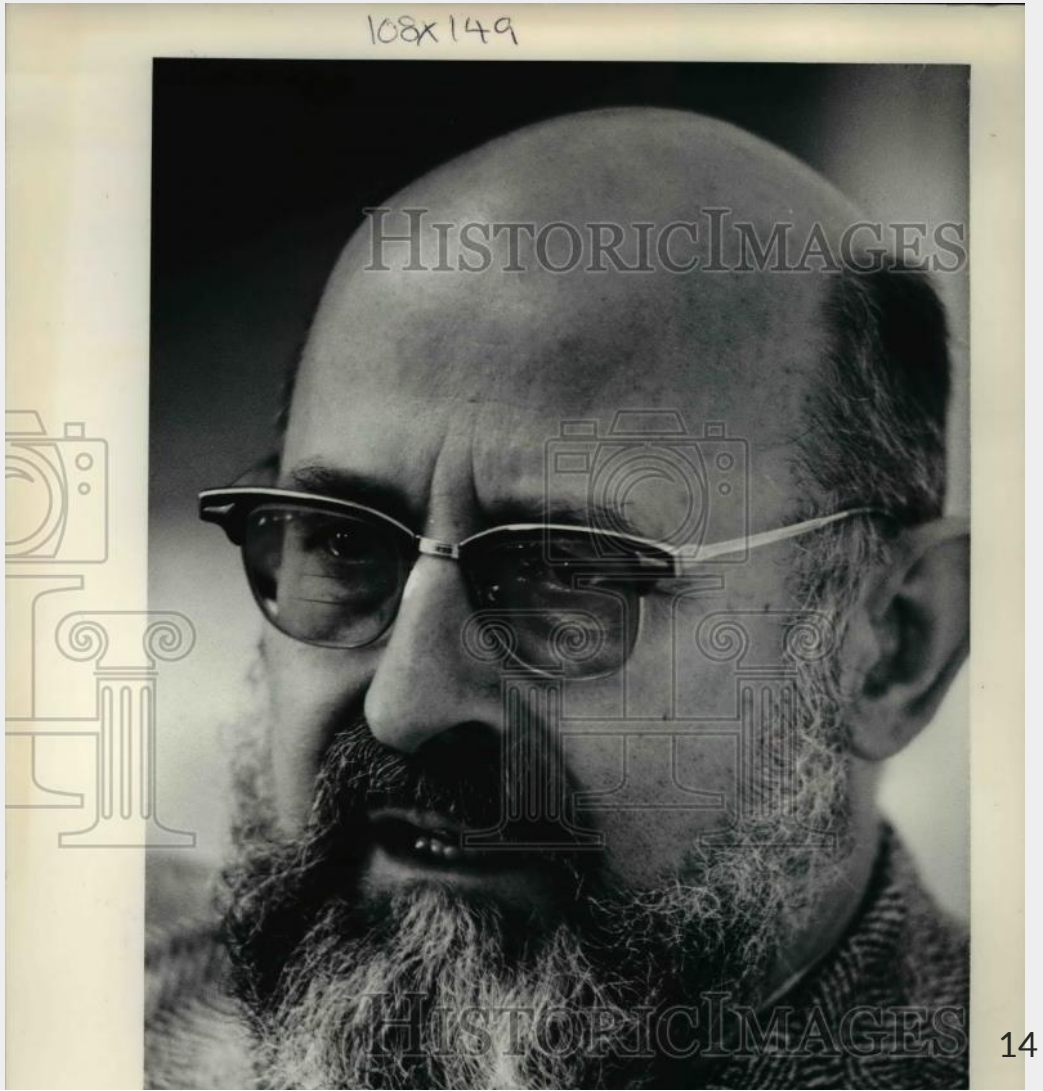
Carleton et al. (2020)

What is enviro econ?

Environmental economics is actually pretty new

Spurred by John Krutilla in the 1950s

His paper Conservation Reconsidered is the landmark paper in the field (sort of like Wealth of Nations and economics as a whole)



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- Industry jobs (energy, transportation, finance)
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Learn both the theory and applications of environmental economics

Microeconomics recap

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Is Intro to Micro applicable everywhere?

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Creating markets to solve problems

How do we solve some problems in practice?

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Micro recap: terminology

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Demand curve: A schedule or graph showing the quantity of a good that buyers wish to buy at each price; it gives us the marginal willingness to pay or the marginal benefit

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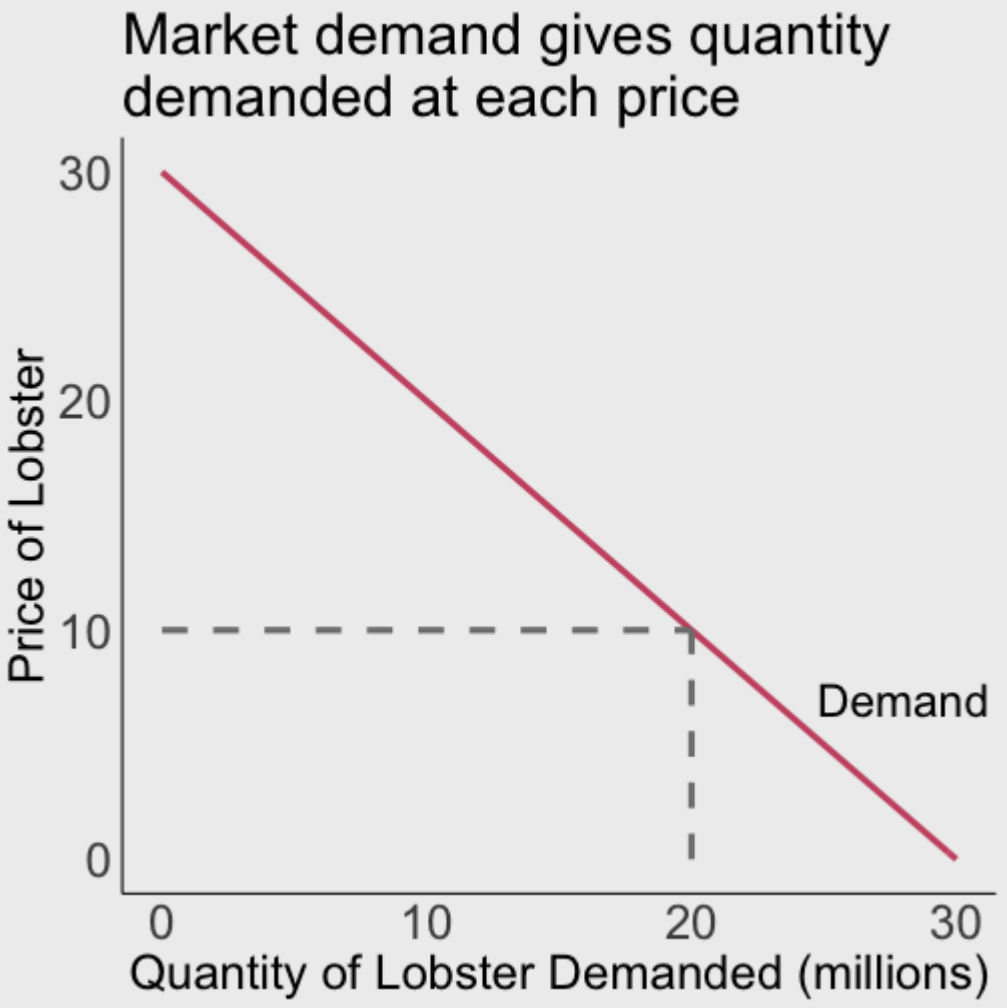
Supply curve: A schedule or graph showing the quantity of a good that sellers wish to sell at each price; it gives us the marginal willingness to accept or the marginal cost

Market demand



Market demand is aggregated from all individual demand curves

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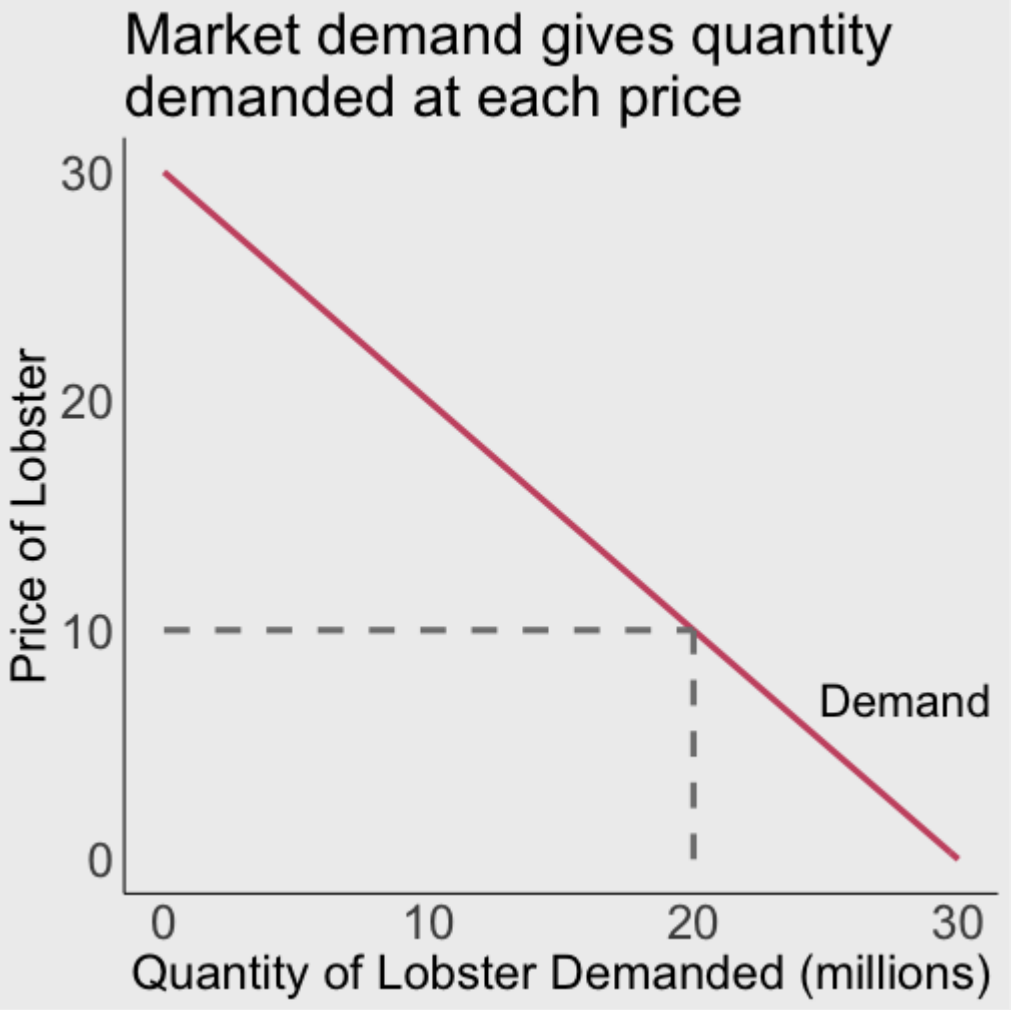

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Horizontal interpretation: if buyers face a price of $10/lobster they will want to purchase 20 million

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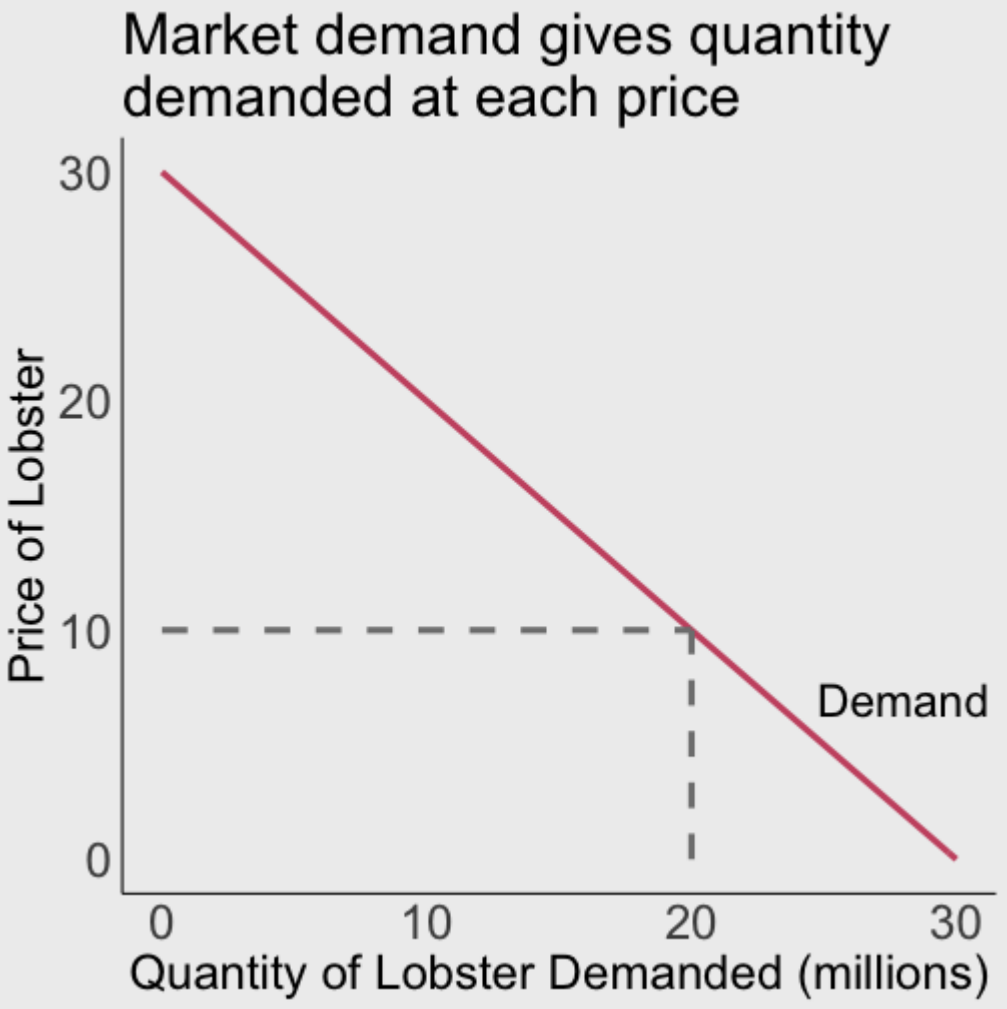

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Vertical interpretation: if buyers are buying 20 million lobsters, the marginal buyer is willing to pay at most $10

Market demand slopes down

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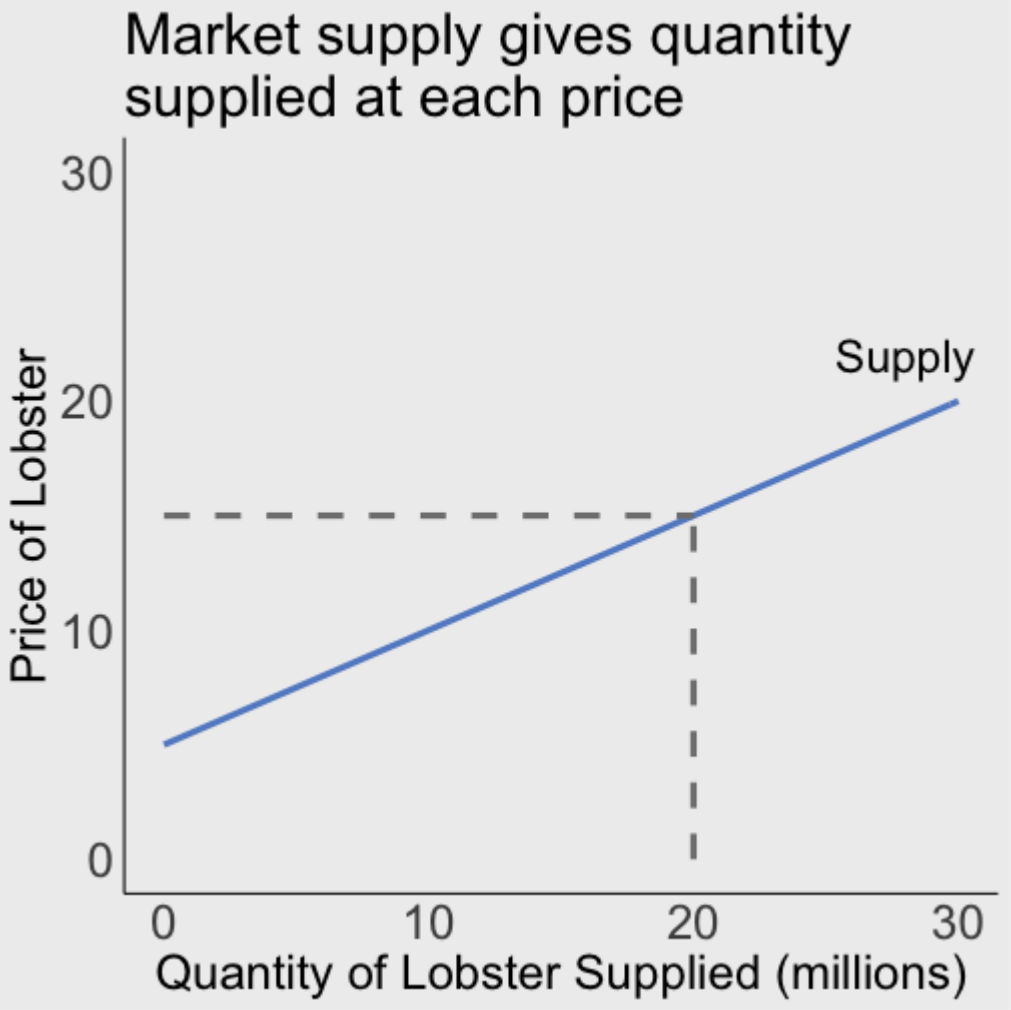
This is the **income effect**: if the price of pizza goes up, we have a lower real budget

Market supply



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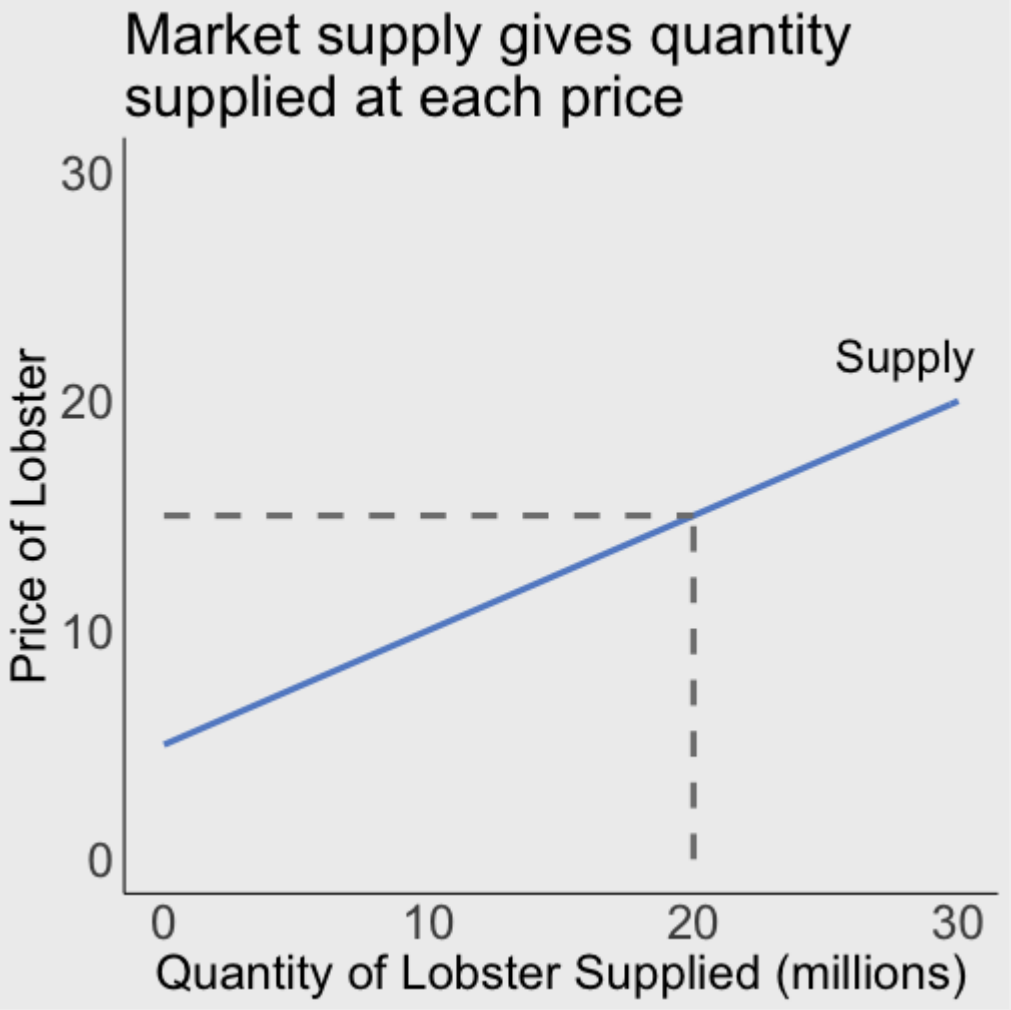

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Horizontal interpretation: if sellers face a price of $15/lobster they will want to sell 20 million

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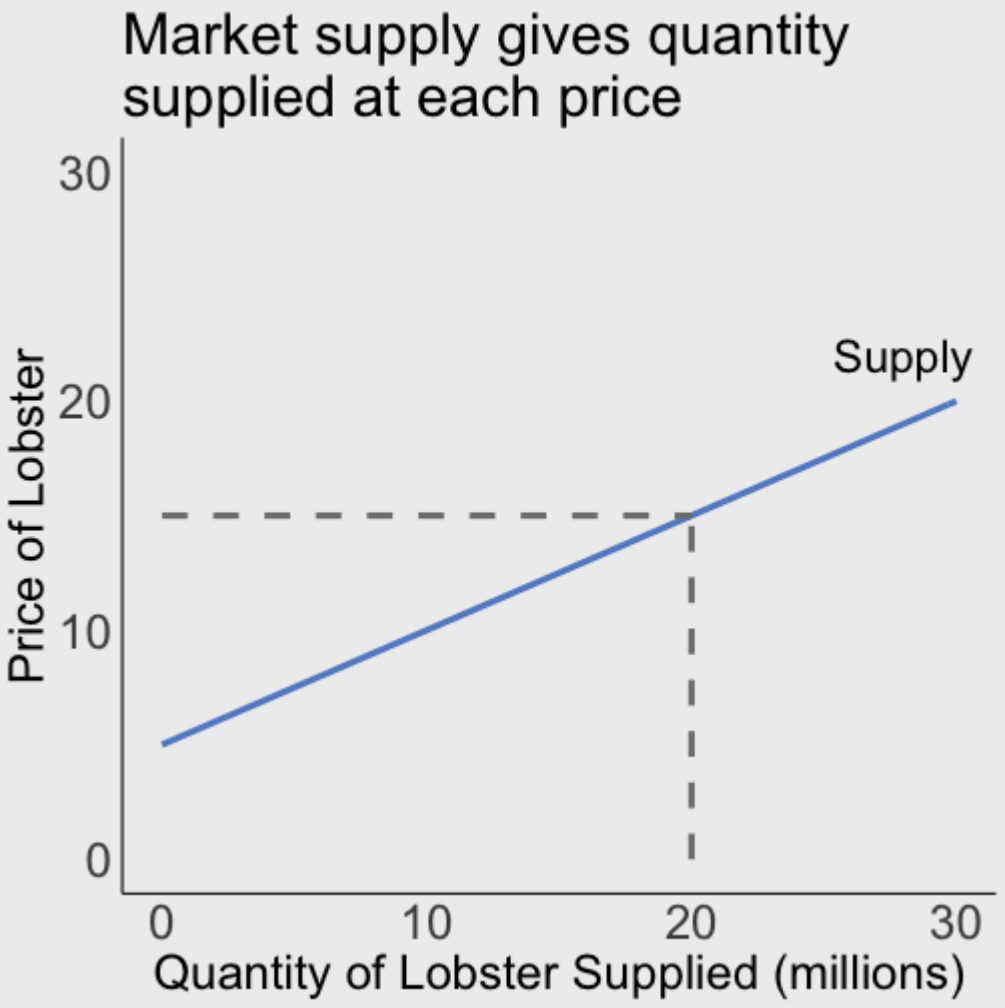

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Horizontal interpretation: if sellers face a price of $15/lobster they will want to sell 20 million

Vertical interpretation: if sellers are selling 20 million lobsters, the marginal cost of the last lobster is $15

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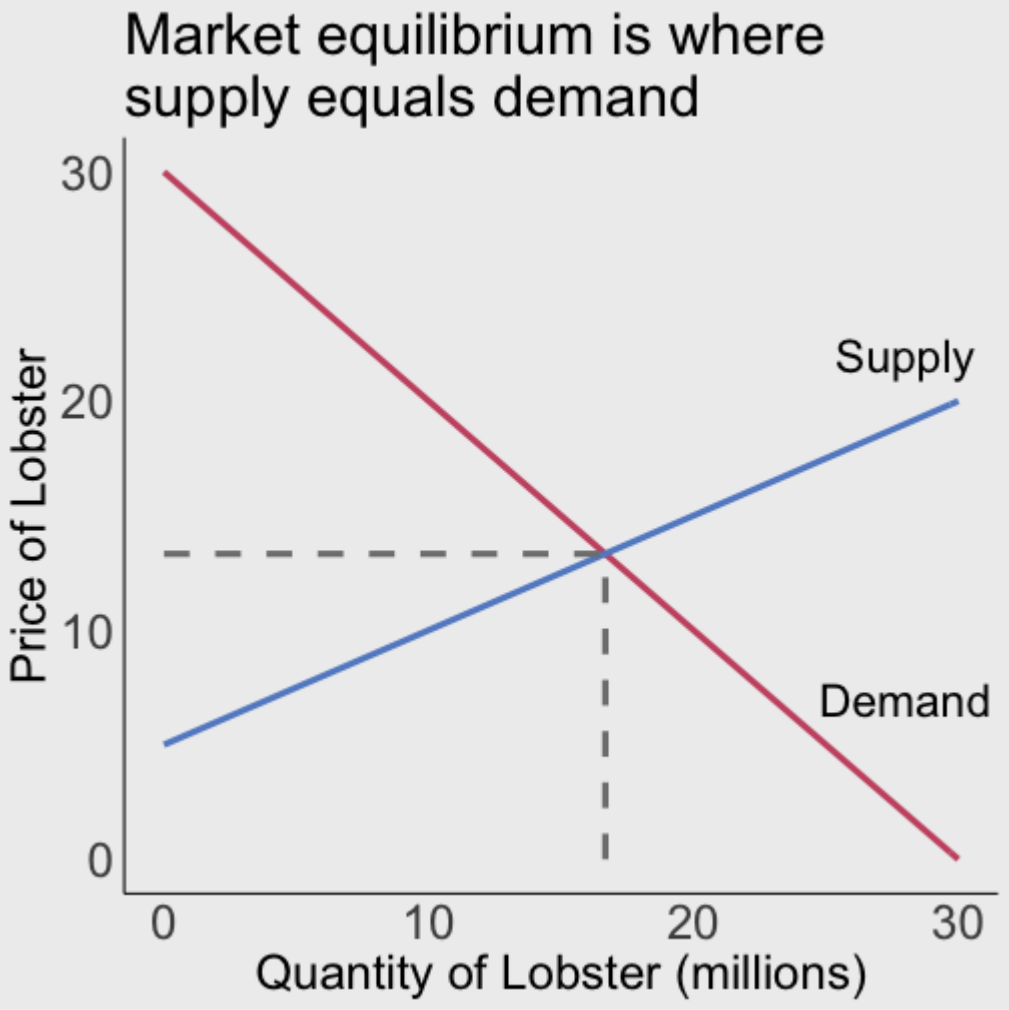
Marginal costs go up as production goes up $\rightarrow$ producers need higher prices in order to produce more goods

Market equilibrium



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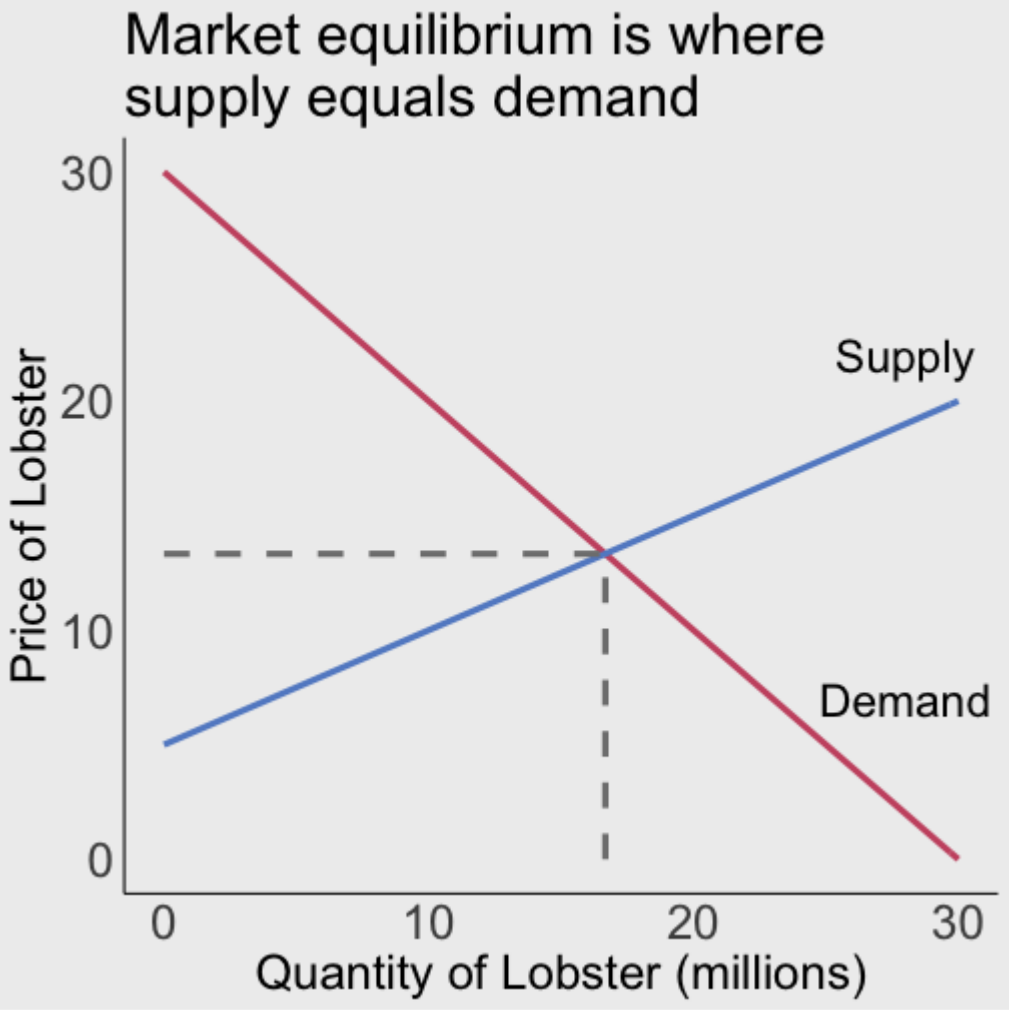

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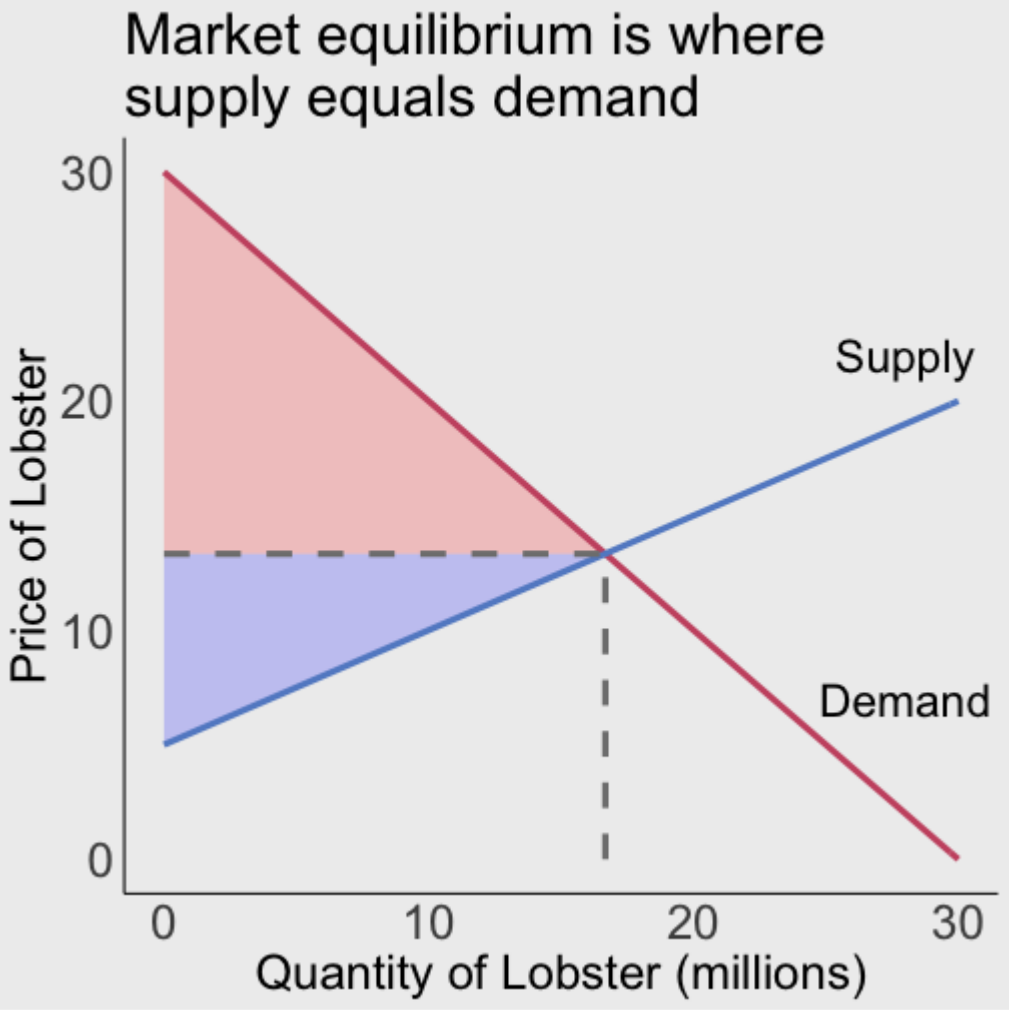
This gives us the price where the quantity demanded exactly equals the quantity supplied: no shortages, no surpluses

Market equilibrium



Consumer surplus is the difference between willingness to pay (demand) and price

Producer surplus is the difference between price and marginal cost (supply)

Total surplus is the sum of CS and PS

Efficiency

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1. A socially optimal quantity is the quantity of the good the maximizes total surplus

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If you can make one person better off without making anyone else worse off its called a **Pareto improvement**

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Main takeaway: markets are often a nice way to allocate scarce resources

Under what assumptions are markets efficient?

What are the underlying assumptions for market efficiency?

1. Perfect competition
2. Perfect information
3. Complete markets (minimal transactions costs)
4. **No externalities**

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They drive a wedge between private and social marginal cost, or private and social marginal benefit

The key departures in environmental economics

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	Excludable	**Non-Excludable**
Rival	Private goods (food)	Common-pool resources (fish, timber)
Non-rival	Club goods (parks, netflix)	Public goods (air, national defense)

Imperfect information

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Why?

Without the adequate information, buyers or sellers cannot make the choices in their best interest

Efficiency and equity

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- If Elon Musk held **all** the wealth in the world, that would be a Pareto efficient outcome even though it goes against basically all people's notions of equity
- Perfect price discrimination is also Pareto efficient: producers capture all the surplus but it is maximized

Ecological wealth