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Globalization and the environment

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References for this lecture

- Antweiler W, Copeland BR, Taylor MS (2001) Is Free Trade Good for the Environment? American Economic Review, 91(4):877-908
  - Introduction (pp 877-880)

- Copeland BR, Taylor MS (2004) Trade, Growth and the Environment. Journal of Economic Literature, 42:7-71
  - Section I (pp 7-10)

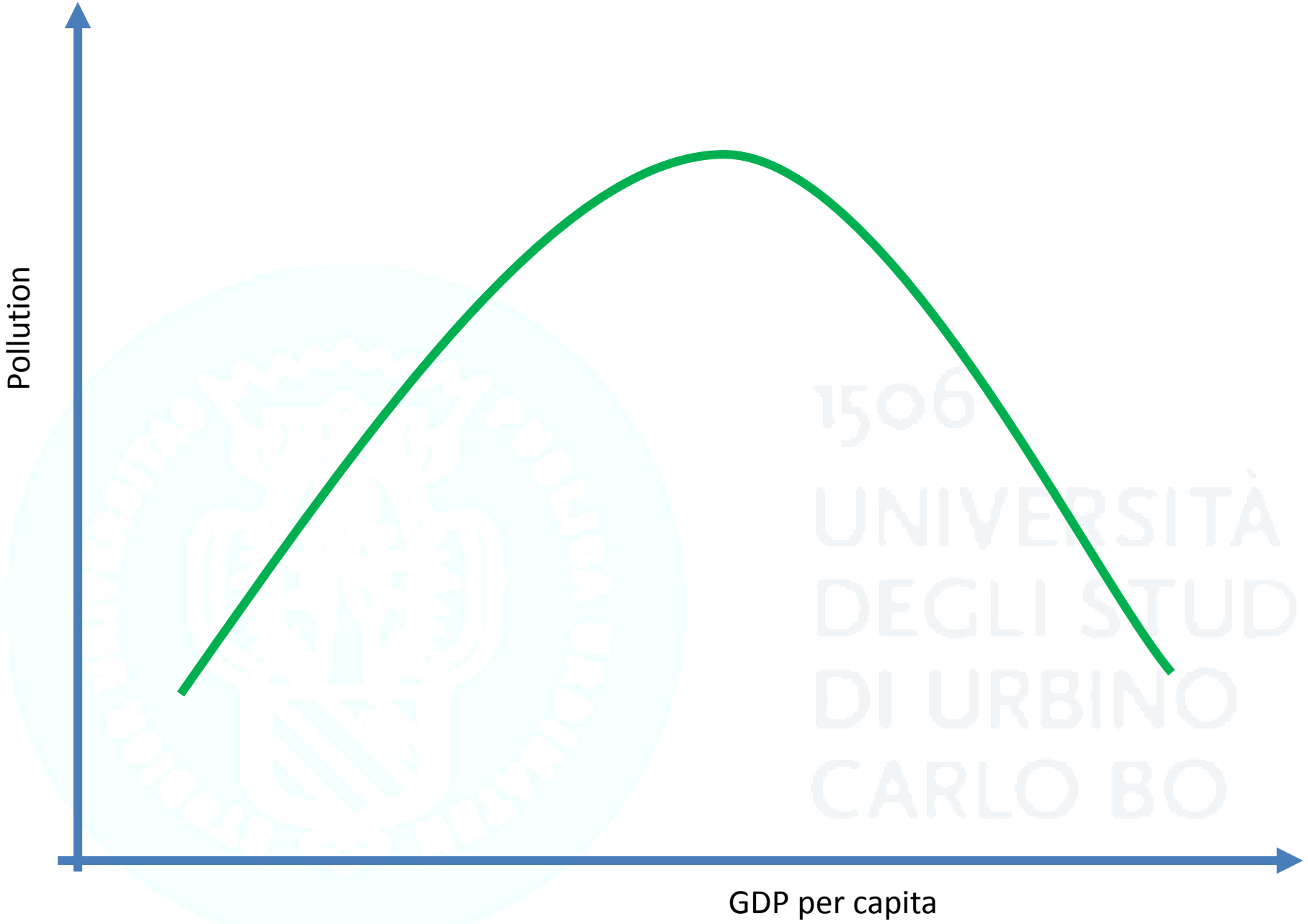
- Cherniwchan J, Copeland BR, Taylor MS (2016) Trade and the Environment: New Methods, Measurements, and Results. NBER Working Paper No. 22636
  - Section 1 (pp 2-4)

Globalization and the environment: links

- The **endowment** of natural **resources** is **not uniformely spread** all over the world
- **Damages** linked to environmental **pollution** are **localized**
- **Countries differ** in the **stringency** of environmental **regulation**
- **Sectors** (and firms) are **heterogeneous** in their '**environmental intensity**' (resource use or pollution generation)
- **MNE** consider, among other things, the **cost** of **complying** with **environmental regulation** when choosing **where to locate** production

The Environmental Kuznets Curve (EKC)

- **Grossman and Krueger (1993)** evaluated the **impact** of the **NAFTA** on the **environment**
- They identified an **inverse-U relationship** between **GDP** per capita and the **environment** (**Environmental Kuznets Curve**), with **trade** being among the most important **drivers** of **delinking**



Why ‘Kuznets’?

- Simon **Kuznets** (1901-1985, **Nobel Price**, 1971)
  - He was the ‘inventor’ of **national accounting** (including GDP) in the 1930s
  - He was awarded the Nobel price for identifying a **inverted-U shaped** relationship between **GDP per capita** and **income inequality**

The Environmental Kuznets Curve

- **Scale** effect (+)
  - As **income and consumption increase**, also **pollution** (needed to produce goods and provide services) **increases linearly**
- **Composition** effect (first +, then -)
  - In the **first stages** of economic **development** the economy moves **from** the (low pollution) **agriculture** to the (high pollution) **manufacturing** sector
  - In **later stages**, the economy moves **from** the (high pollution) **manufacturing** sector to the (low pollution) service **sector**
- **Technique** effect (-)
  - As **income increases**, also the **technology** of production becomes **less pollution-intensive**

The Environmental Kuznets Curve (EKC)

- **Environmental quality** is a **'normal' good** → its **demand increases** with **income**

- As income increases, **people** increases its **valuation** of **environmental quality** and will vote **politicians** that enforce **environmental regulations**

- Sometimes the **environment** is seen as a **'luxury good'** → its demand increase more than proportionally (elasticity >1) than income

EKC and the Solow model

- In the **Solow model** there are **two sources** of **growth**
  - Improvements in **total factor productivity** (TFP)
  - **Investments** in fixed capital

- Imagine an **economy** in which **two goods** are produced
  - **One good** is **capital intensive** and, consequently, **pollution intensive**, the other is less capital and pollution intensive
  - **Increases** in **TFP** result in a **decrease** the **pollution** required to produce an unit of the two goods (both the pollution intensive and the less pollution intensive)

EKC and the Solow model

- As we have seen few weeks ago, according to the Solow model, in the **first stages** of **development** (with below-equilibrium capital intensity) **countries grow fast** thanks to **capital** accumulation

- In **later stages**, once the **equilibrium** level of **capital intensity** is reached, **economic growth** is driven **only** by **TFP growth**

- Also the **Solow model** predicts an **Environmental Kuznets Curve**

EKC and globalization

- So far we looked at a **closed economy**
- Moving to an **open economy** is expected to **influence** the **drivers** of the **EKC**
  - **Scale** effect
  - **Composition** effect
  - **Technique** effect

EKC and globalization: scale effect

- Opening a country to trade and FDI has an **impact (positive)** on its economic **growth**
- Faster economic growth means, other things equal, **faster use** of natural **resurcers** and rapid increase in **pollution**

EKC and globalization: composition effect

- Trade openness has important implications for the **composition effect**
- The theoretical framework, here, is the **HOS model**
- With trade, countries relatively well **endowed** with **capital** will specialize in the production of p**ollution-intensive** products (and thus **increase their pollution** 'ceteris paribus')
- Countries with **relatively stringent** environmental **regulations** (and thus with **high cost of pollution**) will specialize in **low-polluting products** → **<u>pollution haven effect</u>**

EKC and globalization: composition effect

- **High-income** countries are at the same time **capital intensive** and characterized by **stringent environmental regulation** (as wealthier citizens demand for more stringent regulations)
- The **two effects** go in **opposite directions**

EKC and globalization: technique effect

- **Opening** to trade and FDI is likely to influence the **within-sector environmental intensity** of production
- **Technology diffusion** (embodied in trade or through FDI-related spillovers) improves the environmental performance of all countries

Environmental policy and globalization: example

- **Country A**
  - Sets a **maximum level of pollution** to be released by its domestic production facilities
  - **Capital intensive**
- **Country B**
  - **No environmental regulation**
  - **Labour intensive**

- Once **trade** is allowed, the **demand** for **capital-intensive** goods produced in **country A** increases (HOS)
- As there is a **cap** on **total pollution** in country A, firms that produce the capital-intensive product need to **improve** their **environmental efficiency** to meet the environmental target ➔ **technique effect**
- An **alternative way of 'abating' pollution** is to **purchase pollution-intensive** products from **country B** (offshoring)

Different types of pollution

- With the **pollution haven effect**, **pollution** is **displaced** from high-regulated countries to low-regulated countries
- The impact on **welfare** is **different** depending on wheter **pollution** has a **local** or **global** effect

Different types of pollution

- Pollution with **local effects**
  - Examples: **PM10**, **ozone** precursors
  - If **pollution-intensive** production is **offshored** to low-regulation (poor) countries, **environmental quality increases** in the **high-regulation** (rich) countries and worsens in the low-regulation (poor) countries
  - **Direct impact** on **ecosystems**, **health**, etc

- Pollution with **global effects**
  - Example: **greenhouse gases** (climate change)
  - **What matters** for environmental damages is the **global level** of **pollution** (no matter where it is generated)
  - With **homogeneous technologies** worldwide, **offshoring** would have **no impact** on environmental quality

Carbon leakage

- **Unilateral** environmental **regulation** is **not effective** in dealing with the environmental problem (and **just displaces jobs** and reduces the competitiveness of domestic companies)

- Production **technology** is **not homogeneus** across countries
  - **Unregulated countries** have **less environmental efficient** production **technologies** than regulated countries
  - **Unilateral environmental policy** may ultimately **worsen** the **global environmental problem** (i.e. increase global emissions)

Carbon leakage: the EU Emission Trading Scheme

- The **EU Emission Trading Scheme (EU-ETS)** is the largest **carbon market** in the world
- An EU-wide **cap** is set for **CO2 emissions**
- EU firms can **buy and sell pollution permits** on the market
- The scheme was put in place in year **2005**
- In year **2009** (effective from 2013), the system was revised
  - The **rule** is that firms need to **purchase pollution permits** in **auctions**
  - The **exception** is that the European Commission **allocates** a certain amount of pollution permits **for free** to firms in **sectors** that are at risk of **carbon leakage**