

LECTURE 13: REGULATION IN DEVELOPING ECONOMIES

14.42/14.420

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Quick Response to Ahuja et al. (2010)

- Write one thing you thought was interesting about Ahuja et al. (2010).
 - Or if nothing was interesting, just write one thing you learned. 😊
- I will collect at 2:39.

Agenda for Today

- Today concludes our discussion of environmental issues in trade, growth, and development.
 - Race to the Bottom/Trade
 - Environmental Kuznets Curves
 - Porter Hypothesis
 - Challenges in Environmental Regulation in Developing Economies

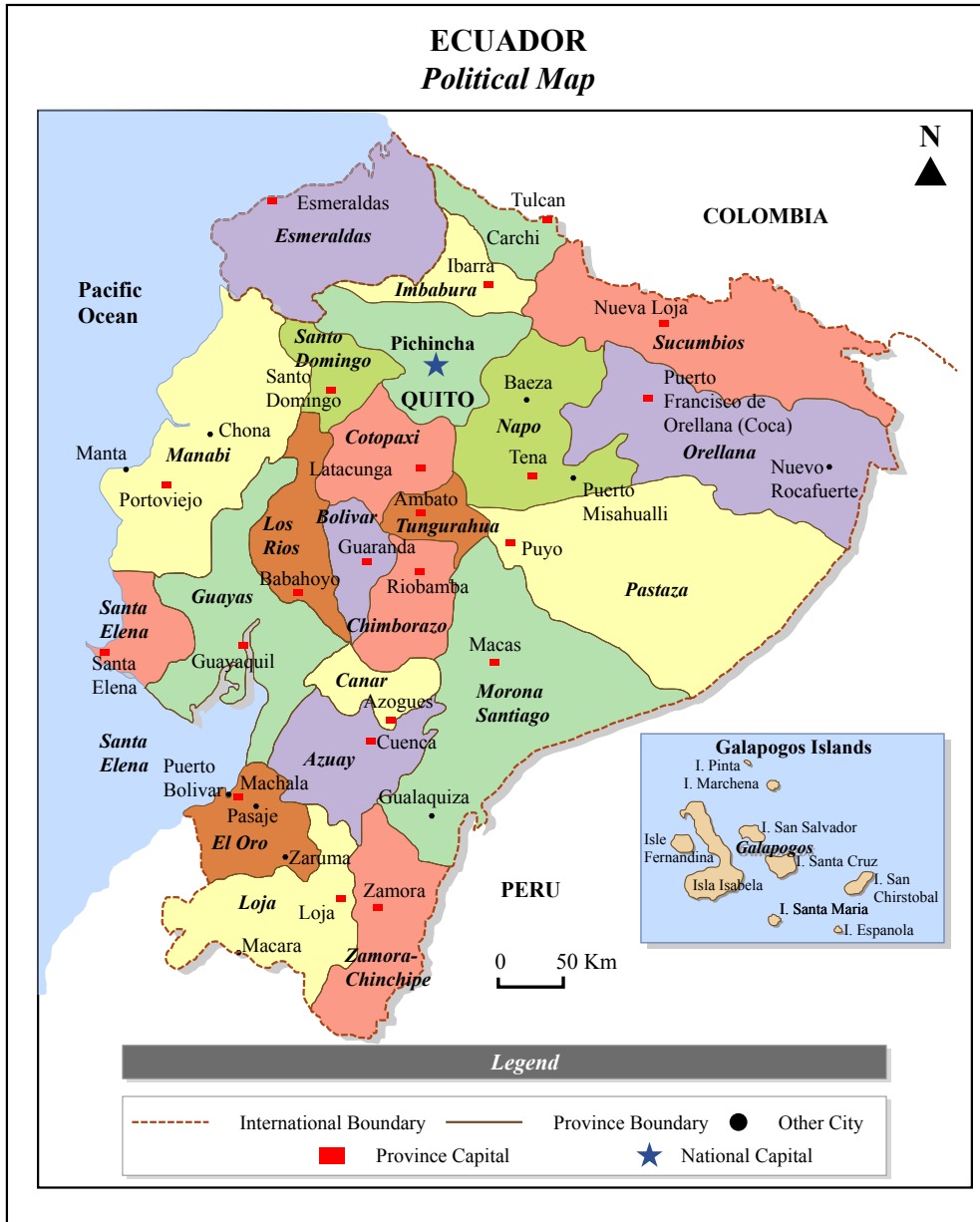
Environmental Regulation in Developing Economies

- Several factors distinguish environmental regulation in developing countries from environmental regulation in developed countries
 - Limited resources for monitoring
 - Limited credibility in setting long-term regulations
 - Corruption by regulators
 - Inability to enforce regulations in courts
- *Today we'll discuss the first two issues in the context of PetroEcuador/Chevron and some formal models*
- Lack of availability of basic public goods
- *Today we'll discuss in the context of Ahuja et al. (2010), "Providing Safe Water."*

Oil Drilling in the Amazon



Sucumbios State in Ecuador



History

- As early as 1940s: Oil exploration in the Amazon region of Ecuador.
- 1964: Texaco begins exploration in Sucumbios
- 1972: Production begins at Lago Agrio
 - Formation water released into rainforest instead of reinjected
 - Polycyclic Aromatic Hydrocarbons (PAH)
- 1990: Texaco leaves Lago Agrio
 - \$25 billion in profits from Lago Agrio in 1972-1990
- 1992: Environmental agreement
 - Audit of damages
 - Texaco carried out \$40 million in remediation
 - Ecuadorian government released Texaco from all further liability
- 1990-Present: Field operated by Petro Ecuador
 - 1,400 spills since 2000.
- 1993: Indigenous residents file lawsuit against Texaco
- February 2011: Ecuadorian court fines Chevron \$8.6 billion

Natural Gas Flare



Me with Margarita Lopez



Waste Pools



Waste Pools (Continued)



Waste Pools (Continued)



Audit Model Setup

- The government cannot perfectly observe all of the oil company's actions in all locations.
 - Unlike large power plants, where emissions monitored via CEMS
- But the government can occasionally audit firms and fine them if in violation of standards
- Questions: How will firms respond? What should the audit probability and fine be?

Commitment

- Return to a world where the regulator can enforce a regulation, but cannot commit to whether the regulation will be in place in the future
 - Happens in developed countries, but also frequently in developing countries where new policies may or may not be enforced, or new governments may change rules.
- Two period game
- Two levels of regulation: Tight and Weak
- Two ways of complying: Short-Run and Long-Run.
- The regulator imposes Tight regulation in P1
 - In P2, Tight with probability φ .
- The Short-Run compliance strategy is better if P2 Regulation is Weak, but worse if Regulation is Tight.
 - SR: \$30 if Weak, \$60 if Tight
 - LR: \$50 regardless of stringency

Water Provision

- Diarrheal diseases account for 1/5 of deaths of children under five years old: 1.6 million children per year.
 - 1/5 of children in rural Kenya have diarrhea each week.
- Some programs to provide clean water are startlingly cost effective at reducing disease and saving lives.

Takeaways: Environmental Regulation in Developing Economies

- Occasional audits and fines are a useful substitute for constant monitoring.
 - Need to think carefully about setting audit probability and fine amount.
- When a country wants strict regulations but cannot commit for the long run, this drives up total compliance costs.
- Clean Water:
 - Takeup of some health technologies in developing (and developed!) countries is puzzlingly low.
 - This and other market failures justify government or NGO intervention to increase takeup, by the public interest theory of environmental regulation.

Reading

- Kolstad Chapter 16 covers some things from today
- Next Week: Measurement of Benefits
 - Tuesday: Kolstad Chapter 6 and 7
 - Thursday: Kolstad Chapter 8
- There are some interesting papers on the syllabus, but I do not want to make them “required” for the exams. I may discuss examples from papers on the syllabus, but you are not responsible for them on the exam.

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