

LECTURE 17: NATURAL RESOURCE ECONOMICS II

14.42/14.420

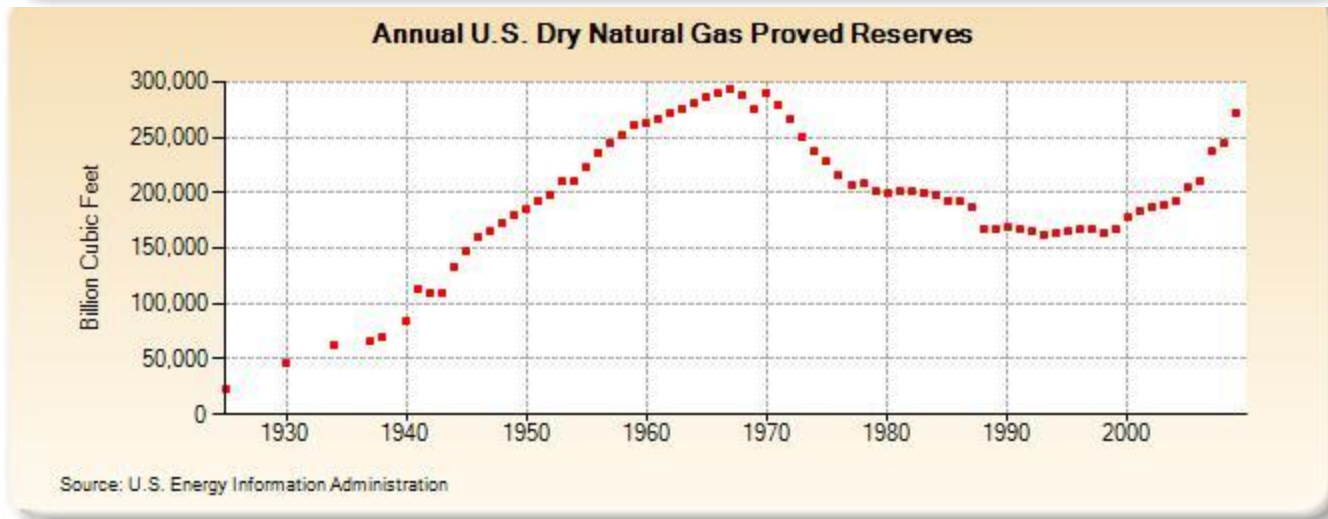
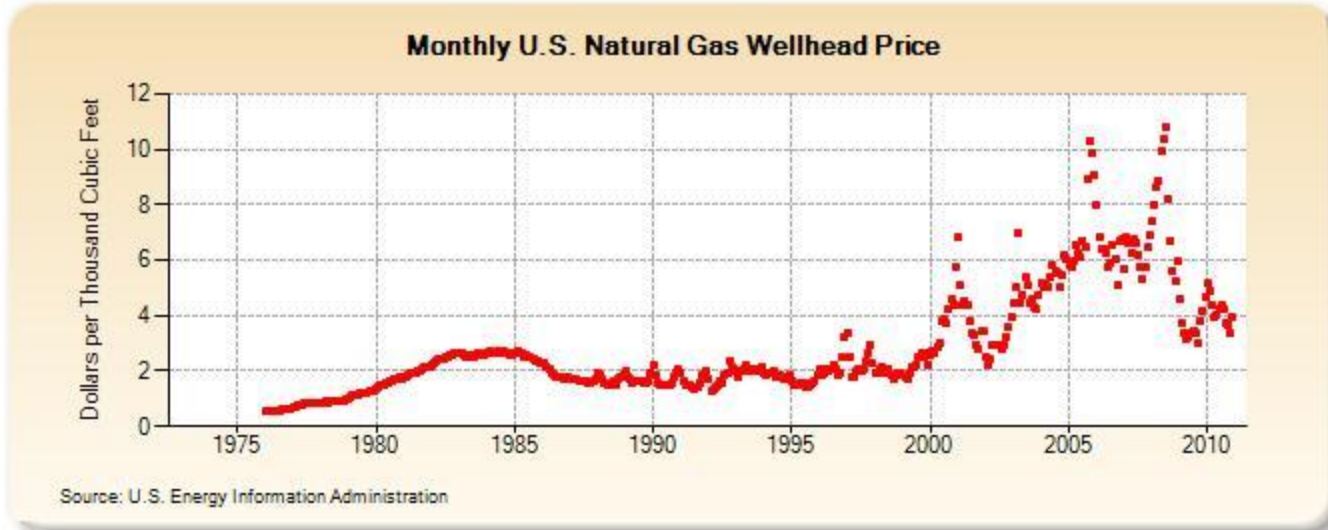
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Today's Class

- Natural Resource Economics II
- Agenda
 1. Depletable Resources (continued): Market equilibrium
 2. Renewable Resources

Are We Running Out of Natural Gas in the United States?



Betting the Planet

- 1980: Ecologist Paul Erlich and economist Julian Simon bet about increased resource scarcity.
- Erlich picks 5 commodities of his choice: copper, chrome, nickel, tin, and tungsten.
- Essentially buys \$200 of futures from Simon: if prices go up, Simon pays Erlich. If prices go down, Erlich pays Simon.
- 1990: Erlich sends Simon a check for \$576.07
 - Real prices for each commodity was lower.
- How should prices change over time?

Recap: Non-Renewable Resources

- **Popular arguments:**

- We are running out of oil (and other resources)
- We will reach a point of shortages
- Or perhaps a sudden point of high prices

- **Models from Natural Resource Economics**

- (Generally more sanguine)
- It is trivially true that we are running out of oil
 - But cost reductions and new discoveries have made past predictions premature
- Shortages only happen with price caps
- In theory, the market prices scarcity, prices rise at the interest rate.
- Allows smooth substitution to alternative resources
- Without market failures, the market path is “dynamically efficient”
 - i.e. intertemporally Pareto Optimal
- Market failures: OPEC, imperfect information, property rights.
- Climate change is more likely to be the end of oil than scarcity.

Renewable, Common Property Resources

- We are now changing TWO THINGS about the resource model:
 - Renewable resources: Naturally replenished over time
 - Common property: No naturally occurring property rights
 - Could also do non-renewable common property resources, but the fishery example is notable
- Examples: fisheries, large game (elephants, tigers), open forests.
- In contrast to private property natural resources, we should be very concerned about market outcomes for common property resources.
- Many examples of inefficient exploitation of these resources that have really harmed people (and the environment).

Welfare Losses from Inefficient Fishing

- Port Maitland and Miminegash, Canada. Lobster fishermen
 - Lost 62 percent of potential incomes from overfishing relative to optimum (Henderson and Tugwell (1979))
- Elephants in Southeast Asia and Africa
- Crab fisheries in the Aleutian Islands
 - 140 processing boats
 - Optimal number: 9 (Huppert 1990)



Takeaways: Resource Economics

- Economists are relatively sanguine about non-renewable resource exhaustion
- Why? Not major market failures related to optimal extraction!
 - Good information about availability
 - Clear price signals
 - Clearly defined property rights over the resource
 - There are usage market failures (climate damages) that are more problematic
- Much less sanguine about common-property resources like fisheries.
 - Lack of property rights => policy intervention generates large welfare gains.

Readings

- Readings for Resource Economics: Tietenberg, Tom. Environmental and Natural Resource Economics, Sixth Edition. Chapters 5, 7, 8, and 13.
 - These plus my lecture notes will be helpful for the problem set.
- **Next Time: Policy Application on Climate Change**
- Stern, Nicholas: “The Economics of Climate Change.”
- At least skim the responses by Nordhaus and Weitzman.

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