

# Homework 3

ECON 5332 Government, Taxes, and Business Strategy  
Spring 2008

Due Tuesday, February 5, 7:00 pm

- Two firms are ordered by the federal government to reduce their pollution levels. Firm A's marginal cost of pollution reduction is given by  $MC^A = 20 + 4Q^A$ . Firm B's marginal cost of pollution reduction is given by  $MC^B = 10 + 8Q^B$ . The marginal benefit of total pollution reduction is  $MB = 400 - 4Q^T$ , where  $Q^T = Q^A + Q^B$ .
  - What is the socially optimal level of pollution reduction in total? How much pollution reduction does each firm contribute?
  - Compare the total surplus generated by each of three possible public policies designed to generate the socially optimal quantity of pollution reduction: (1) require both firms to reduce pollution by the same amount, (2) charge a common tax per unit of pollution, or (3) require both firms to reduce pollution above levels for which they do not have a permit, and issue an equal number of tradeable pollution permits to each firm.
- Nordhaus (2007) talks about the "Westphalian dilemma." What is this dilemma and why does it make addressing global warming more difficult than addressing, say, acid rain?
- Nordhaus (2007) identifies two types of efficiency that contribute to determining the efficient distribution of emissions reductions. Define these two types of efficiency and explain why they are important.
- According to Nordhaus (2007), are price-type approaches to addressing global warming more or less susceptible to corruption than quantity-type approaches? Why?
- In Becker and Murphy's "rational addicts" model, smokers are perfectly aware of the potential for smoking to cause addiction, and they take this into account when deciding whether or not to smoke. Suppose a new technology – such as a nicotine patch – is invented that makes quitting smoking much easier (less costly) for an addict. If Becker and Murphy's model is correct, what effects would you expect this invention to have on people's smoking behavior? Would your answer be different for young people than for older people?
- According to Gruber and Koszegi (2001), what two conditions are required for a good to be addictive? Why are cigarettes addictive?

7. Caffeine is a highly addictive drug found in coffee, tea, and some sodas. Unlike cigarettes, however, there have been very few calls to tax it, to regulate its consumption, or limit its use in public places. Why the difference? Can you think of any economic arguments for regulating (or taxing) its use?

## References

Jonathan Gruber and Botond Koszegi. Is addiction rational? theory and evidence. *Quarterly Journal of Economics*, 116(4):1261–1303, November 2001. Available on EconLit.

William D. Nordhaus. To tax or not to tax: Alternative approaches to slowing global warming. *Review of Environmental Economics and Policy*, 1(1):26–44, Winter 2007. Available at [http://nordhaus.econ.yale.edu/nordhaus\\_carbontax\\_reep.pdf](http://nordhaus.econ.yale.edu/nordhaus_carbontax_reep.pdf).