

AAE / ECON / Env. St. 343
Environmental Economics

Homework #8
Due in class on Tuesday, December 9, 2008

Provide short answers to the 7 questions below. Required Reading is from your outside reading list available on your myUW page:

[16] Stavins, R.N. 2004. "Forging a More Effective Climate Change Treaty." *Environment*, 46(10): 22-30.

Suppose there is a pollutant which affects two countries, A & B. The benefits of reducing this pollutant are equal to 120 if both countries reduce, 60 if one country reduces, and 0 if neither country reduces. The costs of reducing the pollutant are equal to 115. These numbers apply to both countries.

1. The president of country A proposes to cooperate with country B by reducing pollution for 4 years. However, in year 5, the president wants to deviate and not reduce pollution. As an advisor to the president, you must give your recommendation as to whether this is a strategy which will yield a net gain for country A. What is your recommendation if the discount rate equals 5%? What if the discount rate equals 10%?
2. Explain why repeated games are more apt to lead to cooperation than a one-turn game or a game with only a few turns. Is this relevant for international environmental agreements? Explain.

Now, suppose we have 3 countries (A, B, C) who are interested in reducing a trans-boundary pollutant. The following table presents the value of various coalitions of the three countries.

Coalition of Countries	Value of Coalitions
A	50
B	80
C	40
A,B	200
A,C	250
C,B	300
A,B,C	500

Adopting the notation from the book, let $V()$ indicate the value of the game to a coalition and $\pi()$ represent the individual payoff from a coalition.

3. Suppose an international agreement is proposed between the three countries ($V(A, B, C)=500$) with the following individual payoffs: $\pi(A)=120$; $\pi(B)=310$; $\pi(C)=70$. Is this a stable agreement? Explain.
4. Propose an alternative international agreement that includes all three countries and satisfies the conditions for a stable solution.

The next 3 questions refer to the Stavins article:

5. Is the author of this article an advocate of the “broad-then-deep” strategy of reducing climate change? Explain.
6. In the section on expanding participation, the author refers to “emissions leakage”. Explain this concept and its relevance to expanding participation of developing countries.
7. Explain how market-based policies can make participation in international agreements more likely.