

Essay 1:

The 1997 Kyoto agreement established a global target for reductions in greenhouse gas emissions (approximately 7% from 1990 levels). Consider the problem of negotiators who had to allocate permissible emissions among the various countries. Should permits be distributed on the basis of population? GDP? The present level of emissions? Discuss the pros and cons of those three options. Who (or what countries) would tend to support or oppose each? What is “fair”? What is “efficient”? Can the two objectives be reconciled? How would your answers differ if the permits were transferable? You can include in your answer actual knowledge of what transpired in Kyoto the reaction afterwards, although that is not necessary.

The 1997 Kyoto Protocol is an agreement between the parties (countries) of the United Nations Framework Convention on Climate Change, which was signed in Rio in 1992. A good place to learn about global climate change and the Convention in particular is the official web site (www.unfccc.de). For this question, however, you were expected to discuss in more general terms various permit allocation schemes. You could imagine that if 100 units of greenhouse gases (GHG) had been emitted in 1990 (the base year), a global reduction of 7 percent meant that 93 permits had to be allocated, one way or another. Those permits could (theoretically) be allocated on the basis of countries' share of global population, GDP, or historical level of emissions. Note that using population share does not necessarily favor large countries: the United States population, for example, is one of the largest in the world, but its *share* of global GDP is larger than its *share* of world population. A good answer to the essay question would feature some of the following points. A great one would touch on most of them:

1. **POPULATION:** developing countries (with much smaller GDP share than population share) favor this allocation. In fact, the fundamental divergence of views between developed and developing countries is the crux of this question. Roughly speaking, developed countries support measures that assign some reduction (from 1990 base levels) to emissions of *all* countries. In developing countries, however, the accumulation of GHG in the atmosphere is seen as the result of ongoing emissions from industrialized countries, and that consequently, “fairness” implies that developing countries attain the same level of industrialization before stabilizing emissions. Assigning emission permits on this basis would leave ample room for countries such as India, China or Brazil to grow (both in GDP and emissions), but would mean drastic reductions in emissions in U.S., Canada, Japan, or Europe.
2. **GDP:** here, the argument of the preceding paragraph is reversed. Such a system is vigorously opposed by developing countries. Since the link between growth in GDP and emissions is pronounced (if not perfect), limiting emissions implies limits on economic growth, which

obviously goes against development efforts. You can also see this as a question of priorities: people with no running water or access to adequate food supplies tend to care less about global warming.

3. EMISSIONS: although the cleanliness of various production technologies can vary (often higher in developed countries), the basic logic of the two preceding paragraphs still apply. You could make the argument, however, that allocating permits on the basis of historical levels of emissions favors heavy polluters, to the detriment of those countries who have already reduced emissions, perhaps by adopting cleaner technologies.
4. PARTICIPATION TO THE PROTOCOL IS VOLUNTARY: That means that no country is obliged to sign, ratify or abide by the treaty and reduce emissions of GHG. Since there is no world government to allocate and enforce property rights, any agreement (specifying *both* property rights and mechanisms for trade) must be the result of negotiations. In other words, each country must feel that the Agreement serves its own interests (is “fair”) to consider signing and ratifying the agreement. You may or may not find this strategy appealing, but it is the reality of international diplomacy. In that sense, the Coase theorem is not particularly helpful here.
5. MAKING PERMITS TRANSFERABLE: many of you implied that trading could solve the allocation dilemma mentioned above. That is not the case, however. Although trading generally, as we have seen during the first part of the semester, improves efficiency *given initial allocation*, its effects are predictable and therefore taken into account during negotiations. If permits were given on the basis of population share and were transferable, then countries like the U.S. or those of Europe would have to pay significant amounts to permit sellers such as India or Brazil. By some accounts, this transfer of wealth could be on the order of ten times the entire U.S. annual Foreign Aid budget. There is not exactly a groundswell of support for this idea in developed countries. If, on the other hand, permits were given on the basis of GDP share, developing countries such as Malaysia and countless others would have to pay Europe, Japan, and the U.S. for the rights to increase emissions (and pursue development). Needless to say, this scheme is a political non-starter.
6. KYOTO PROTOCOL: The general goal of the Protocol is to reduce emissions of green house gases by roughly 7 percent (from 1990 levels) by the period 2008-2012. It actually gave reduction targets only to developed countries (OECD countries minus Mexico), as well as targets at or above 1990 levels for economies in transition such as those in Eastern Europe. But the difference of views persists. Important developing nations refused to join, even on a voluntary basis (i.e., without binding targets). On the other hand, confirmation in the U.S. Senate looks unlikely. The prevalent opinion of senators is the desire to see countries like China

to do “their fair share”. There are mechanisms that credit the export of cleaner technologies to ratifying countries.

7. MISCELLANEOUS: Impacts have no relations to emissions. Even if Bangladesh emitted nothing, it could still get flooded if global warming melted the snow cap and raised ocean’s levels. You can see the benefits of avoiding global warming as a public good, and the reluctance of countries to ratify the protocol as a form of free-riding.

REFERENCES: for more information, the already-mentioned official site (www.unfccc.de) is a great place to start. Another very good source of information is the February 2000 Economic Report of the President (w3.access.gpo.gov/eop) which devotes a good part of its chapter on the environment to the Kyoto Protocol, supplying clear explanations of all the major concepts. Two articles in the *Foreign Affairs* journal give more opinionated perspectives: *Toward a Real Global Warming Treaty (Implications of the 1997 Kyoto Conference)* by Richard N. Cooper in the March/April 1998 issue, and *Kyoto’s Unfinished Business (Kyoto Protocol on Climate Change Incomplete)* in the July/August issue of the same year.

Essay 2:

On March 7, Californians voted on Proposition 12. This measure proposed issuing \$2.1 billion in bonds to raise funds to a) protect waterways and coasts to improve water quality and ensure clean drinking water, b) protect forests and planting trees to improve air quality, c) protect wildlife habitat, and d) improve state and neighborhood parks.

Opponents (R. Haynes, CA State Senator, et al) to this measure argue that since only a small portion of the funds will be used for neighborhood parks and soccer fields, while most funds will be used to protect inaccessible lands, this bond will not benefit the majority of taxpayers. They claim that:

“The government will use the vast majority of the money to buy more land for insects, rats, and weeds. In short, this bond will not benefit your family. Your children will never get to set foot on the land.” (CA Voter Information Guide, 2000)

Comment specifically on this argument. Discuss the benefits of these so-called “inaccessible resources” that the opponents may be ignoring. What methods do economists use to estimate these types of benefits and what are the pitfalls of each of these techniques?

In claiming that there are no benefits to taxpayers in maintaining inaccessible areas, opponents of Proposition 12 are ignoring non-use benefits as well as the fact that there are public good aspects to the benefits that these areas provide.

Non-use benefits are benefits that are derived without even stepping foot on the lands. Several types of non-use benefits exist including

OPTION VALUE BENEFITS: Benefits derived from having the option to use the resource at some future date. Example: By preserving a particular area, one derives utility from the possibility that it may be possible to extract resources from that area or to use it at some future date

BEQUEST BENEFITS: Utility derived from knowing that in preserving these inaccessible areas, these areas are left for future generations.

EXISTENCE VALUE: Utility derived in simply knowing that these inaccessible areas exist. Example, if these areas are primary habitat for endangered species, the fact that these habitats exist for endangered species to thrive makes us happy, even if we never come into contact with the lands or the species.

Ways to measure inaccessible resources

CONTINGENT VALUATION (INTERVIEW METHOD): This is probably the most relevant way to measure the benefits associated with inaccessible areas. This method calls for asking respondents how much they are willing to pay for the environmental resource in question or how much they are willing to accept to forego the resource. A few problems: 1) How can one decide on a price to pay for a good for which no real market exists. If you aren't used to paying for an environmental resource, it's difficult to decide on a price. Faced with hypothetical costs and benefits, respondents don't have the incentive to carefully consider their response and answer truthfully. 2) Similarly, if a respondent is not familiar with the environmental amenity, the respondent may not have well-formed preferences for the good. 3) Asking a respondent's willingness to pay for an environmental resource will yield a lower estimate of the environmental amenity's value rather than asking for the willingness to accept to forego the resource. This is because willingness to pay is bounded by income whereas willingness to accept is not. 4) Respondents may answer strategically (strategic bias) to advance their own agenda, especially if they realize that they are not actually expected to pay what they report. 5) The framing of the question affects the response. For example, studies have shown that directly asking respondents to simply state what they are willing to pay will yield a different value than giving respondents a choice from among a given set of values.

HEDONIC PRICING: This involves imputing the value of the environmental amenity by considering it as an attribute of a market good and comparing the value of the market good lacking the environmental amenity. For example, suppose there are homes with a great view of these inaccessible areas. Comparing the prices of these homes with identical homes far away from these areas should reflect the utility derived from the environmental resource. However, a major problem is that homeowners like to be near man-made amenities such as grocery stores, schools, and work (think of SF home prices compared with home prices in rural areas). Then using this method would actually lead one to infer that the price of environmental amenities is negative.

VOTING: If this vote passed (which it did), it reveals that Californians (who voted) value these resources at greater than the cost to them of providing it. This isn't really intended as a way to estimate valuation, but does reveal a lower bound estimated value of those who voted.

DONATIONS: Considering how much money has been donated to environmental groups to preserve inaccessible areas. This is subject to problems of free-riding and other biases.

Travel cost does not apply as a way to estimate non-use values