The Kyoto Treaty: Economic and Environmental Consequences

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I believe I was invited here by ACCF in part to represent the Adminstration position. Needless to say, that position is in favor of the Climate Change agreeements that we are negotiating internationally. We heard at breakfast that Congressman Knollenberg's bill would forbid this sort of advocacy from an Adminstration official. Thus I am glad that his legislation is not currently in effect, so that I am free to speak.

I will make some general comments about the Administration position on the Kyoto Agreement, before commenting on the excellent paper of Alan Manne and Rich Richels.

The Administration Economic Analysis

The key bottom line of the economic analysis that we released in July was as follows, in qualitative terms: *Given key elements of the Agreement and of Administration policy (including tradeable permits and other flexibility features), the U.S. economic impacts are likely to be modest.*

Those key features are of several sorts. The Administration insisted that the design of the agreement be market-based, flexible, and global. The flexibility comes in three categories:

"When" flexibility	• 1st-period reductions less drastic than some countries wanted
	• targets phrased as multi-year averages
	• banking
"What" flexibility	• 6 gases included, not just carbon dioxide
	• sinks
"Where" flexibility	• international trading in emission permits
	• CDM

Finally, we require a global solution, to address a global problem.

- Without meaningful LDC participation, the President will not submit the Treaty for Senate ratification

Economic analysis of climate change policy is difficult for many reasons, which again fall into three categories.

- It is impossible to put a single monetary number on the benefits of averting Global Climate Change. It is difficult enough to put numbers on the economic costs of a 2-to-6 degree F increase in temperature or a 6-inch to 3-foot rise in sea level, which is what the IPCC scientists are forecasting for the next 100 years. But that difficulty pales next to the uncertainties surrounding the appropriate discount rate, danger of catastrophic climate events, and appropriate risk aversion.
- Some terms of the international agreement are still uncertain.
- Econometric models are subject to inevitable limitations. Some models are good at some things, other at others. No one model does it all. The estimates of each are subject to wide bands of uncertainty,

Despite these difficulties, we used some estimates based on Battelle Labs' SGM (directed by Jae Edmonds), a model that is well-designed to handle international trading. The most important quantitative findings, supporting the qualitative finding that I led with, were as follows.

- Full and successful implementation of Annex I trading would reduce costs by one-half, relative to a situation where each country had to satisfy its commitment domestically.

- Full and successful implementation of global trading (including developing countries) would reduce costs by 80-87%.

- Global trading would reduce resource costs by an estimated $7-$12 b/yr in 2010, which is 0.1 % GDP in 2010. This is a cost that I would describe as, if anything, less than modest.

- The effect on the price of carbon is estimated at $14-$23/ton.

    - Δ price of natural gas = 3-5 %
    - Δ price of fuel oil = 5-9 %
    - Δ price of gasoline = 4-6¢ / gal.
    - Δ price of electricity = 3-4 %

- Effect on the energy bill of the average household is estimated at $70-$110

The SGM model, along with the MERGE model of Manne and Richels and many other leading econometric models, participates in the Stanford-based Energy-Modeling Forum. The most recent compilation by the EMF of the results of ten of these models shows the SGM, the model that we used, in the middle of the pack of estimates of the costs of Kyoto, when standardizing on the policy

experiment under consideration. The SGM's estimates of costs in 2010 near the median in the experiment with no international trading or in the case with Annex I trading. With full global trading, SGM cost estimates are a bit below the median, but far from the lowest of the models.

In one respect, our estimates are optimistic: we cannot be sure of getting full developing-country participation in the near future. But in other respects they are conservative. They omit some factors that would reduce the net costs of the agreement:

- The Administration proposal for Federal electricity restructuring, which we consider part of our energy-and-environment policy, would save approximately $20 billion in costs -- potentially enough to offset the increase in the household energy bill.

- Allowance for sinks, such as land forestation, would potentially reduce the need for emission reductions substantially.

- The President's proposal to allocate $6.3 billion over the next five years in Research and Development and tax breaks to develop and disseminate carbon-saving technologies could further reduce costs if it were enacted and if some of the technological payoff were to come in the next ten years. To be conservative, we assumed that it did not.

- Ancillary non-climate benefits, such as the health benefits of reduced air pollution could reduce net costs by an estimated one-quarter.

- Of course, the most important factor that has been left out of the above assessment is the benefit of mitigating climate change itself. (A full cost-benefit analysis would include mitigation in the benefits column. The only reason we have not done so, explained repeatedly above, is the difficulty in coming up with a number to capture the monetary benefits.) But nobody should lose sight of our ultimate objective -- keeping our planet the hospitable home that we enjoy today.

The Manne-Richels paper

Alan Manne and Rich Richels have done some of the most important and pioneering work in the economic modeling of climate change policy. They have been at the frontier, being the first, for example, to address the theoretically optimal time-path of GHG emissions over the coming century to get to a given environmental goal in terms of concentrations in the atmosphere. In their latest paper they have updated their model, and included analysis of some of the policy questions that are most topical in the ongoing negotiations.

In particular, of the various questions still to be settled in international negotiations, the two most important both receive useful analysis here. The first is what would be the likely effect of the caps on trading that have been proposed by European countries; the second is the importance of participation by developing countries. That first question, regarding trading caps, has shaped up to be probably the

most contentious at the upcoming Buenos Aires negotiations. The second issue may be the most contentious thereafter.

I already have explained that the ability to buy and sell emission permits is critical to our view of the Kyoto Protocol. It allows us to achieve the same environmental goal at lower economic costs. The Manne-Richels estimates using their MERGE model are in this regard very similar to ours: trading among the "Annex I" countries reduces costs by more than half.

Unfortunately, not all countries share the American enthusiasm for trading. Some countries, particularly the EU, are not completely convinced of the case in favor of trading. They insist that trading should be only supplemental, by which I fear they mean that the United States must accomplish most of its reductions (relative to the Business as Usual path) through domestic reductions, rather than purchases. Some Europeans may be driven by a primitive distrust of trading in general, analogous to those who believe that everybody should grow his or her own food. Others are in effect protesting the allocation of emission rights at Kyoto, believing the US and FSU allocations to be too generous. This is what it must mean to complain that the US needs to make more of a domestic sacrifice, or that Russia shouldn't be allowed to sell hot air. (It is not always easy to distinguish that belief from a -- logically quite distinct -- failure to understand that for any given allocation of emission rights, trading lowers the cost of the same environmental outcome. One of the great feats of Kyoto is that the Annex I countries were able to agree on the allocation of property rights, in a context where many of us had thought the political obstacles might be insuperable.)

In any case, some Europeans want to place quantitative limits on how much countries can buy. Such limits would operate as import quotas do for trade in agricultural commodities and other goods. They have the same drawbacks: they would artificially raise the price of emissions in the buying country, they would introduce an extra degree of complication, government bureaucracy, and rent-seeking into the marketplace, and they would generally impede efficiency. The US has said that it will not agree to trading limitations at Buenos Aires.

We have estimated that such limits could raise the cost of compliance substantially for the United States, and even more so for Europeans and others. A 50% limit rule could raise the price of carbon by an estimated 157 %. These estimates are based on an application of the SGM model of Battelle Labs [and they assume the regime we aspire to: participation and trading among key developing countries in addition to Annex I].

Manne and Richels consider a related experiment, what would happen if a limit were imposed on purchases equal to 1/3 of countries' commitments. Estimated costs are 2 ½ to 3 times higher than under full and unconstrained trading.

Even if we succeed in overcoming European objections to trading at Buenos Aires, a second -- even more daunting -- hurdle awaits us: convincing the developing countries to participate in the effort in a more meaningful way than they have in the past.

US Senators say we need developing country participation because otherwise we will lose competitiveness. I agree that we need the developing countries, but I would phrase the reasons differently. Any major structural change in the economy (like an increase in the price of energy) is likely to result in the expansion of some sectors and the contraction of others. The Manne-Richels paper reports likely negative effects -- "loss in competitiveness" -- in energy-intensive manufactures. But, as the paper mentions, other sectors will gain competitiveness. It is not clear that the overall effect will be negative. I am not aware of a study that has been able to address that question.[1]

The reasons we need the LDCs are, rather:

- they are the fastest-growing emitters (so "fairness" demands their inclusion),
- without participation by the developing countries problems of free-riding and leakage would render an agreement ineffective at its environmental goals,
- their participation is needed to reduce economic costs to US compliance [by as much as 80% in our estimates, somewhat less in Manne-Richels], and
- the Senate will not ratify a treaty without them.

Manne and Richels offer estimates of the magnitude of leakage -- that is, the possibility that reductions in emissions in the industrialized countries under the agreement would be partly offset by increases in emissions in non-participating developing countries. They look at two sources of leakage: first the effect that lower demand for petroleum products in the industrialized countries would have, via a decline in world prices, on demand in non-participating countries; and second the effect of a contraction in output of energy-intensive sectors in industrialized countries and an expansion in non-participating countries. Conclusion: "...[N]either of the two trade alternatives leads to a dramatic increase in carbon emissions outside Annex I. Apparently there is an international leakage problem, but it appears to be of manageable dimensions." This is a useful result (though I think that we need to refine and extend estimates of leakage).

Conclusion

I conclude simply by noting that the threat of global climate change is real, that prudence demands we respond, and that the Kyoto Protocol and the President's policies to address the threat entail only modest economic costs.

[1] It is even less clear that the US trade deficit will get larger, which is what some people apparently have in mind by "competitiveness." Indeed, if we are buying emissions from abroad, elementary application of the transfer problem framework says that our trade balance in goods and services should improve.