CONTROLLING THE COST OF TRANSATLANTIC CLIMATE CHANGE POLICIES *

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– Executive Summary

By minimizing the cost of transatlantic climate policies the United States and Europe can protect their economies and secure the domestic political support necessary to take strong action against global warming. In short, climate policy costs must be (I) modest overall (II) predictable and (III) distributed justly among countries and industrial sectors. Differences between the United States and Europe over the Kyoto Protocol stem partly from different perceptions about how well the treaty achieves these objectives. Any future transatlantic climate change cooperation must do a better job of satisfying the cost concerns of both parties.

– Uncertainty

Our understanding of climate change and the costs or benefits of various policy responses is imperfect. Today's models provide only crude estimates about the economic consequences of alternative global warming scenarios. Judgments about the benefits of climate policies rest on uncertain predictions about the adverse regional effects of global warming. Likewise, estimates about their costs rely on potentially shaky assumptions about the rate of technology change, innovation and social adaptation. With such uncertainty it is no wonder that differences of opinion exist.

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The question for policy makers is how to deal with this uncertainty. Some maintain that uncertainty argues for delaying costly action to spare the economy until more is known. Others argue that the risk of irreversible and possibly catastrophic climate change more than justifies decisive action as an insurance against the unknown. The reasonable middle ground on which most Americans and Europeans agree is that the risk of dangerous climate change is real enough to warrant genuine action now that can be pursued without unduly harming the economy.

Controlling the cost of fighting climate change, therefore, is of critical political, economic and environmental importance. Keeping the cost low is key to securing the broadest possible political acceptance, both at home and abroad. A high cost approach, in addition, would detract from the pursuit of other important priorities, such as health care, job creation, education and national security. Cost-effective climate strategies, moreover, are needed to ensure that any resources devoted to climate policy actually achieve the maximum environmental benefits.

The timeframe required for climate solutions also creates uncertainty. Greenhouse gases stay in the atmosphere for decades (methane), centuries (carbon dioxide), and even millennia (perfluorocarbons). Reducing emissions today imposes an immediate cost on society that would be off set slowly over time by the benefit of less climate change. Because nations and individuals discount future benefits, they are only prepared to pay a modest amount today to avoid a larger cost from climate change tomorrow. Uncertainty how to value benefits over very long periods only amplifies uncertainty about the benefits themselves. This mountain of uncertainty inhibits not only rational decision-making but also political action because convincing voters today to sacrifice for the benefit of future generations can be politically challenging.

– The Cost Framework

Nations tend to concentrate on three important dimensions of the cost problem. These are (I) expected total cost, (II) predictability of cost, and (III) relative cost or 'competitiveness'.

Each is discussed below.

I. Expected Total Cost

The expected costs of climate policies hinge largely on the stringency of the goals established and the cost-effectiveness of the measures chosen to meet them.

A. *Stringency*

Stringency is a function of the magnitude of the change in national emissions sought and the timeframe in which that change is to be achieved. Ambitious targets may become very much more expensive to achieve than those that are slightly less so because the marginal cost of emissions abatement rises (meaning that achieving the last emissions reduction costs many times more than the first).

Timing too is critical to determining stringency. It should be self-evident that moving ahead too fast would be unduly costly because that would require rapid, unanticipated and expensive changes in capital stock, business practices and personal behavior. Yet, climate policies that focus primarily on very long-term goals (such as creating a carbon-neutral society by 2050) may leave investors guessing whether distant goals would really be pursued or enforced in the future. Giving emitters too much time to reduce emissions without intermediate goals, therefore, can result in under investment in new climate-friendly technologies and practices. This can result in a costly last minute scramble to achieve the original policy objective, making an ambitious very long term objective more costly than a more reasonable medium term plan. Economists agree that to achieve any fixed objective the most cost-conscious climate policies would re-

quire modest action in the short term while establishing clear and credible benchmarks or market signals for medium- and long-term performance. Sound policies would also induce near-term investments in technologies that would inevitably require decades to develop and deploy. Good policies, in short, begin slowly and then escalate to give players time to adjust but not enough time to sit on their hands.

B. *Cost Effectiveness*

The second major factor in determining the expected cost of climate policy is cost effectiveness. Cost-effective climate policies achieve a given stringency objective at the lowest possible cost. Policy makers can promote cost-effective strategies by allowing emitters flexibility on the where, when, what and how of emissions abatement.

1) *Where?* Greenhouse gases mix in the atmosphere, so emissions avoided in Boston yield the same benefit to the climate as identical action in Berlin or Beijing. To minimize costs, abatement should occur where it can be done cheapest. Policy mechanisms, such as emissions trading, that harness the power of the free market to identify low cost solutions also contribute to cost effectiveness. Technology investment programs in developing countries, where many emission reductions can be secured most cheaply, may also be cost-effective.
2) *When?* Climate change happens over many decades. Modest flexibility in the timing of when nations reduce their emissions can reduce costs without harming the environment. The atmosphere is not sensitive to annual variations in greenhouse gas emissions. Climate policies, therefore, should allow higher emission in times of robust economic growth than during recessions. Nations should average their emission performance over a number of years or use a performance indicator that takes into account changes in economic growth, such as the carbon intensity of the economy (emissions per unit of GDP).

3) *What?* Several gases contribute to atmospheric warming. Policies should encourage reductions in atmospheric concentrations that can be achieved most easily, taking into account that each gas contributes to global warming differently.
4) *How?* Nations have different energy needs. Some nations may find it cheaper to reduce carbon emissions from the transportation sector while others might find easier progress by focusing on industrial emissions or housing. Some nations may be able to sequester (store) carbon in the land or sea cheaply using plants, algae or other methods. The right mix of policies will vary from country to country based on their unique national circumstances. Accordingly, to be cost effective any international approach must allow nations the flexibility to decide how best to meet any agreed upon objective.

II. Cost Predictability

Another critical factor is the predictability of economic costs. In statistical terms, this is a question of 'variance' or the extent to which actual outcomes are likely to differ from expected cost. Cost unpredictability can be as important an obstacle to progress as expected cost. Companies and consumers tend to be risk averse. Accordingly, a climate policy that is reasonably certain to cost one billion euro or dollars annually may be more socially acceptable than another policy that is expected to cost twenty percent less but that also has a substantial risk of ending up at twice the price. So, while predictability does not reduce expected costs, certainty about costs may facilitate the adoption of strong climate policies and help ensure compliance with those policies.

There are a number of ways to increase the cost predictability of climate policies. First, less ambitious policies are more likely to be predictable for the same reason one can more accurately throw a ball five meters than fifty. Second, climate policy costs are more predictable for some approaches than others. Climate policies tend to have either (I)

predictable environmental outcomes but uncertain costs, or (II) predictable costs but uncertain environmental outcomes. The Kyoto Protocol's binding national emissions targets are examples of the former, while energy taxes and technology research programs are forms of the latter. One can, of course, retain the appearance of Kyoto-style targets while providing cost predictability by adding a so-called 'safety valve' to a national target. This mechanism would excuse a nation from reaching a pre-agreed target if the cost of climate action rose more than expected. Another way to increase the predictability of a target might be to index it to economic growth, such as an emissions intensity ratio (emissions per unit of GNP) rather than an absolute emissions goal (such as returning to 2000 emission levels by 2010). Here too predictability about costs would come at the expense of some predictability about environmental benefit.

III. Relative Cost

In political terms, expected cost may prove less important for some parties or industries than the competitiveness consequences of climate policies. Relative cost refers to the distribution of costs both among and within countries, as well as among and within specific industrial sectors. Competitiveness concerns arise when companies from one nation face different climate burdens than their competitors in other nations. Those with lower burdens in effect have a leg up on their competitors. For goods that are traded internationally, relative cost comparisons matter not only among traditional economic competitors, such as the United States and Europe, but also with respect to emerging economic powers, such as China, Mexico, Brazil and India.

Relative cost discrepancies are hard to eliminate because even when a nation as a whole would not suffer a loss in competitiveness, certain of its industries, particularly those that are carbon intensive, may be harmed. Energy-intensive industries producing goods that are traded internationally would seek to avoid the climate policies of one nation by relocating plants or shifting production to countries with less costly regulation. Aluminum, for example, would be particu-

larly vulnerable because it is both energy intensive and a highly competitive industry. The possibility of job loss and industrial migration creates domestic political challenges for nations seeking to address climate change. Relative cost differences among trading partners also produce environmental effects. 'Emissions leakage' occurs when emissions reductions in one place are partly offset by emission increases elsewhere, such as when a plant moves from Europe to China to avoid European carbon regulation. Some economists believe that unless relative costs are equalized across major trading partners emissions leakage could be substantial.

Perhaps the only way to minimize the political, economic and environmental problems surrounding competitiveness shifts would be to ensure that major emitters and economic competitors are undertaking similar efforts to address the climate problem. Coordinated international emissions trading, for example, would act to equalize the marginal cost of carbon emissions and thereby reduce incentives to shift production from one country to the next. Programs designed to engage developing nations to upgrade their technologies may also achieve a similar effect.

Yet, while keeping an eye on relative costs might help minimize competitiveness shifts among trading partners, climate policy will inevitably create winners and losers within particular economies. Even if all nations were pulling together in harmony, carbon-intensive industries and sectors would suffer relative to other areas of the economy. People would use less aluminum and gasoline, for example, if the cost of those products increases relative to low carbon goods. This substitution from high-carbon to low-carbon goods is precisely what the environment requires but the transition would be painful for at least some economic players even if it proved beneficial for society as a whole. Therefore, it will fall to policy makers to redistribute burdens equitably.

– Kyoto's Cost Features

The Kyoto Protocol would have some but not all of the cost control features outlined above. The overall Kyoto target (approximately 5% below 1990 levels by 2008-2012 for industrialized nations) is seen as too modest by many in Europe and as too stringent by many in the United States. In other words, there is a real question as to whether the stringency of Kyoto was set correctly. Kyoto would have many cost-effective features, including international emissions trading, inclusion of all six major greenhouse gases, a multi-year period to control for the boom and bust of the economy, (limited) inclusion of carbon sequestration and the flexibility for countries to secure emission reductions from a variety of sectors. Yet, the Kyoto targets would demand a particular environmental outcome (compliance with the treaty's national targets) but they would leave the cost of compliance uncertain, so Kyoto's true cost would remain unpredictable. Early estimates for the United States, for example, varied by a factor of ten. Kyoto's competitiveness consequences, moreover, were not analyzed systematically during the negotiations and remain unclear even today. As developing nations do not have targets, Kyoto would result in some (perhaps modest) competitiveness benefits for these countries relative to countries with targets. In short, the Kyoto Protocol would make some effort to control the many dimensions of the cost problem but determining the adequacy of that effort remains a highly subjective judgment. Given where nations stand on Kyoto, t is perhaps fair to say that Europeans have been optimists and Americans pessimists on the likely cost of the treaty.

– Controlling Costs Beyond Kyoto

Future transatlantic climate policies should control economic costs and thereby pave the way for strong but affordable action against global warming. By adjusting the magnitude and timing of action the United States and Europe can balance competing economic and environmental concerns. By incorporating flexibility and market mechanisms

needed to make policies cost-effective, strong climate policies can be pursued at the lowest possible cost. By linking up European and American emission trading systems and coordinating other activity, they can reduce the competitiveness concerns of climate policy. The parties' willingness to link their systems may depend on whether the United States and Europe each believe the other is behaving fairly. Both parties would benefit from expanding any linked system to include as many other nations as possible in order to take advantage of other low cost emission reduction opportunities. In addition, by setting realistic goals and targets, or by incorporating mechanisms to enhance cost predictability, such as a safety valve or indexing, the transatlantic parties can reduce economic uncertainty and secure the strongest possible action that would not undermine economic growth.