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Political Institutions and Greenhouse Gas Controls

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Related Publication 08-09

November 2008

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Executive Summary

Ideas drawn from the works of Douglass North and those of other political economists suggest that institutions limit the extent to which efficient policies to reduce greenhouse gas (GHG) emissions are likely to be adopted. Most analyses of the costs of making steep GHG emission cuts conflict with these realities. Problems arise at both the international level and within nations.

Internationally, no third party institutions exist to enforce agreements, and nations differ widely in their interest in restricting GHG emissions. Therefore, high transaction costs will attend efforts to reach and maintain broad GHG controls. So far, those transaction costs have blocked agreement, and there seems little reason to expect that these constraints will soon vanish.

Institutional constraints also exist within key nations. In the United States, widespread voter xenophobia and distrust of markets contribute to adoption of cost-ineffective policy tools, and legislators' incentives to serve constituency interests further supports adoption of regulatory and subsidy programs that greatly increase costs of mitigation. China's legal and economic institutions could not currently apply an effective GHG cap-and-trade or carbon tax. These kinds of GHG controls require the full rule of law, market prices for energy, and market discipline for major industries. In China, the prospects for such a transformation remain highly uncertain.

The most likely course for future climate policy is drift and fragmentation. Some countries, including the US, may adopt GHG limits. One key question is whether this country will be able to make policy changes to limit the economic harm from adopting poorly designed policies. A second is whether it will be able to develop options for adapting to climate change or finding means that prevent warming despite continuing GHG emissions.

Exploring these options will require a new, broader focus for climate policy analysis. To achieve this wider view, the lessons of political economy must become central to the study of climate policy. An initial step toward this goal would be to encourage a systematic exchange of views between the climate modeling community and leading scholars in the traditions of political economy and institutional economics

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1. Introduction: Need for broader view of climate policy

“What passes for optimism is most often the effect of an intellectual error.”

(Raymond Aron)

“Progress is not an illusion; it happens, but it is slow and invariably disappointing.”

(George Orwell 1954)

The goal of this paper is to apply ideas from the study of political economy to the subject of climate policy. Work by Douglass North and other economists active in what is sometimes called the ‘new institutional economics’ (NIE) is especially helpful in understanding the forces that are shaping climate policy.

The need for new insights is, we believe, manifest. Climate policy is in disarray. After twenty years of effort, greenhouse gas (GHG) emissions are rising, not falling, and there is no realistic prospect for a near-term reversal of that trend. At the same time, some countries are proposing to impose emission limits that are likely to be costly compared to the benefits that they will achieve.

Yet much mainstream climate policy analysis has slighted questions about the causes of these failures, or the prospects for improving on them. Instead, it has concentrated on building large integrated models of the climate system and the economy. While the model-based analyses are very useful in many respects, they often fail to ask some of the most important and pressing questions for which policy-makers need answers. These unasked questions mostly center on how political institutions and ideologies can affect climate policy outcomes. Work by NIE scholars and other political economists may open new windows through which to view these neglected factors.

1.1. Climate policy: Accomplishments versus aspirations

1.1.1. Current status of climate policy

The year 2008 marks the 20th anniversary of the first meeting of the IPCC, the international body established by the UN to solve the problem of warming. The ‘progress’ to date has been almost purely rhetorical. Currently, according to the U.S. Energy Information Agency, global emissions of CO₂, the most important greenhouse gas, were over a third higher than they had been in 1988. The IPCC reports that the rise in atmospheric concentrations has accelerated through the last several decades.

After twenty years of laborious efforts, the plain truth is that greenhouse gas control proposals have so far failed to move the needle on global emissions. Even in Europe, where the social consensus for GHG reduction is supposedly strongest, emissions continue to grow. (Abboud A8) Where greenhouse gas emissions have fallen, underlying changes in economic structure may have played a bigger role than climate policy.

This record should call to mind the adage, “What cannot happen, will not happen.” Given the results to date, it seems reasonable to ask if the conditions required for making steep cuts in global GHG discharges are, in fact, present. There is very little sign that this question is receiving the amount of attention that it deserves. Instead, proposals for hasty frontal attacks on near-term emission levels continue to dominate the public discourse on global warming.¹ As a result, much of the policy discussion focuses on arguments about the details of an ‘option’ that may be illusory.

1.1.2. The standard of success

To accurately judge the status of climate policy, one must first know that stopping global warming would demand that mankind achieve zero net GHG discharges. This goal implies that global emissions must fall to roughly 20 percent of business-as-usual projections by mid to late century, if the goal is stabilization at 550 ppm CO₂, and lower if a more ambitious goal is chosen. (Clarke et al.) The speed with which this emission rate is achieved will determine the GHG

¹ Aspirations to even more ambitious long-term goals are found in the EU’s commitment to limiting long-term concentrations to 450 ppm or less, and discussion in the U.S. Congress of emission caps for 2050 requiring 80% reductions in emissions from current levels.

concentration at which the atmosphere stabilizes, but this emission level must be reached to halt the rise in concentrations. Recent economic trends foresee global energy consumption doubling, or even tripling, by 2050. Existing GHG-free energy technologies, and incremental improvements to them, cannot accommodate this growth at realistic costs. (Hoffert et al.)

While ultimate success would require reducing emissions to far below current rates, the Kyoto Protocol would have barely made a dent in the task of restraining their current quite rapid *growth*. Nevertheless, some proponents of stringent GHG controls often cite resistance by the United States as the cause of the lack of progress to date. The claim is hard to credit. Even if the U.S. had ratified the Kyoto Protocol, and even if all the other signatories had lived up to their commitments, the agreement's impact on global temperature would have been trivial. (Nordhaus and Boyer 152) Thus, had U.S. policy been different, the results would have been much the same. Larger forces are at work.

1.2. Need for greater political focus in current climate policy analysis

The central fact of climate policy is that political institutions are a filter through which climate policy proposals must pass before they can take effect. The filter turns out to be highly selective.

1.2.1. Current analysis

Unfortunately, most of the effort being directed toward climate policy analysis is largely ignoring questions about the capacity and limits imposed by political institutions and political ideology. Rather, it often clings to a fascination with ideal policies and fails to analyze the measures actually being adopted. Hence, a salient feature of most economic studies of climate issues is how little they explain about the causes and possible cures of the typical modes of failure exhibited by real world climate policy.

Climate modelers have tirelessly analyzed hypothetical GHG reduction scenarios. As part of this effort, they have developed an array of Integrated Assessment Models (IAMs). IAMs are designed to explore some of the costs and benefits of emission cuts. The models have estimated the probable range of carbon prices and policy designs likely to be optimal or near to it. In a few cases, they have been used to estimate the costs of straying outside the bounds of well-designed policies.

Much of this work throws valuable light on many policy choices. It explains a great deal about which policies are likely to be cost-beneficial, which are not, and what features distinguish the former from the latter. Its explanations, though, of why actual policies might yield net costs rather than net benefits remain entirely on the surface of events. It does not explain why no international agreement has emerged.

IAM-based analysis points to the dangers of GHG controls that cover too few countries, employ inefficient policy tools, and aim at cuts that are too hasty. Nonetheless, almost every country that is taking some kind of action seems headed toward a control regime with just these features. The roots of this trend grow out of the workings of ‘political markets’ and constraints imposed by economic markets that governments have distorted for political purposes. IAMs cannot explain political markets at all, and they often do a poor job of describing the implications of distorted economic ones. For these tasks, new analytic approaches are needed.

1.2.2. Political economy and climate policy

The venerable, once out of fashion, but now revived, sub-discipline of political economy may help to correct the tendency to slight the role of politics and political institutions. In this paper, we pay a good deal of attention to the work of Nobel laureate economist Douglass North and to the field of NIE literature. Not all of the work of NIE scholars falls within the scope of political economy, and many political economists feel no particular kinship with the NIE.

North, however, has studied many other political economists from the public choice tradition including Breton, Buchanan, Downs, Niskanen, Olson, and Tullock. (North 20, 1991) He has also drawn from history, economic theory, anthropology, and cognitive psychology. This eclecticism helps to make his work an especially useful starting point for applying the lens of political economy to the subject of climate policy.

A few of the themes that North has stressed seem particularly relevant to climate policy. He has not, as far as we know, ever written directly about climate policy. Rather, much of his work has been designed to answer the question of why many societies do not adopt the institutions that are known to promote economic development. However, we suggest in this paper that there are suggestive analogies between the sources of bad outcomes in development and the roots of the current frustrations in climate policy.

For example, because North has sought to explain a policy failure, *i.e.* the rejection of the institutions² required for high economic output, his ideas may offer a good framework within which to ask why climate policy seems to be headed for a series of bad institutional choices. This focus on the origins of policy mistakes is quite different from much economic analysis which assumes that optimal arrangements will necessarily prevail. North explicitly asks why non-optimal policies prevail and persist, the very question that most IAM-based analysis has ignored.

In his view, transaction costs can often be high enough to render uneconomic activities that would otherwise be attractive. Institutions can either raise or lower the costs of specific kinds of transactions or of other activities. Governments have at least some capacity to shape institutions. However, policy path dependency, the tendency for steps taken down a given policy path to become self-reinforcing, usually restricts institutional change. Many factors contribute to policy path dependency, among them ideology.

North has argued that governments possess a limited ability to shape institutions. Following Olson and others he observes that those in government can use their control to confer economic benefits on favored groups. They do so in the expectation that the recipients will support incumbents' grip on power. At best, this process causes those in power to generate valuable public goods. At worst, it leads them to curtail competition and distort markets in other costly ways. (McGuire and Olson) Governments vary greatly in the balance between the benign and the predatory effects of their policies. (North 20-32, 1981)

North has also emphasized the concept of “adaptive efficiency”, a society’s capacity to correct mistakes. In his view, adaptive efficiency is a key to long-term economic performance because mistakes are common and, *ceteris paribus*, path dependency will often cause their impacts to worsen with time. Societies differ greatly in the adaptive efficiency of their structures. (North 1990) In an area like climate policy, where initial policy choices are likely to be far from ideal, adaptive efficiency may be crucial to reaching a tolerable long-term outcome.

² “Institutions,” as North employs the term, and as it is employed here, denote the rules, laws, norms or conventions that encourage or discourage various actions. Institutions interact with perceptions, beliefs, and ideologies to shape society’s reaction to problems and opportunities. “Organizations” in North’s terminology, are groups of individuals acting purposively. In North’s analogy, institutions are the rules of the game, organizations are the teams that play it.

2. Difficulty of international cooperation on GHG controls

The ideas of Ronald Coase and Douglass North point to important root causes of climate diplomacy's current travails. Coase, for example, famously observed that transaction costs often preclude options that would have been possible if transactions had been free or less costly. North, too, recognizes the importance of transaction costs. He goes on to note that institutions can heavily influence the level of measurement and enforcement costs associated with making various transactions, and, in this way, they can often determine which transactions occur and which do not. (North 27-35, 1990) International agreement on GHG controls may be an example of a deal that is killed or drastically postponed because of its transaction costs.

2.1. *The economics of international GHG abatement*

GHG mitigation policies require coordinated international action. Emissions have the same effect on warming wherever they originate, and fifteen to twenty nations around the world are major sources of GHG discharges. As economic growth proceeds, the number of major sources will certainly climb.

That the kind of international cooperation required for GHG controls is especially difficult adds to the challenge. The task of forging an international agreement to curtail GHG emissions requires costly affirmative efforts by many nations, an especially difficult challenge for the international system. (Barrett 2007) In GHG control, all nations have an incentive to try to free ride on the efforts of others. More importantly, nations differ in their interests in curtailing warming and in the costs that they would have to incur in meeting a given level of GHG controls. They also differ in their power to influence the behavior of other states. No third party exists to enforce participation in GHG limitation agreements, to compel performance of agreed actions, or to set standards.

Under these conditions, the transaction costs of making an accord will be high, and those high costs will affect the prospects for reaching and keeping an agreement. Remedies, moreover, may be hard to come by, because the structure of the international state system is a main source of the high transaction costs, and that structure seems unlikely to change in ways big enough to affect the outlook for global warming.

That the estimated net benefits of even optimal GHG reductions are small clearly lengthens those odds. Indeed, the Kyoto Protocol is probably generating net costs for the participants if one considers the cost-ineffective means by which it is achieving its paltry emission cuts. (Nordhaus 176, 2007) The purpose of cutting greenhouse gas emissions is to reduce the potential harm from climate change. As emission cuts grow steeper, each additional tonne of reduction will cost more, and the present value of the damage that it avoids will fall. The optimal point is one at which the damage avoided by reducing emissions a bit more just equals the cost of that incremental change. Positive net benefits, of course, are achieved only as long as abatement costs remain no larger than avoided damages.

The preponderance of the economic evidence is that rapid and steep emission cuts are not optimal. (Kelly and Kolstad 19) Later studies have repeatedly updated and confirmed that judgment. (Nordhaus 138-139, 2007) Although the British government's *Stern Report* sought to make a case for more aggressive controls, it relied, in doing so, on biased use of sources and unrealistic assumptions about discount rates. (Nordhaus 140-143, 2007) The report also cherry-picked the available literature on the expected damages from climate change, selecting the most pessimistic sources. (Tol 4, 2006)

For GHG cuts to achieve the greatest net benefits, they must be limited and gradual. But limits on the total volume of emission reductions will also constrain the size of the possible net gains. For example, GHG controls are expected to produce much smaller net gains than did the control of ozone-depleting chemicals. (Barrett 379, 2003)

In principle, a GHG agreement can still be collectively rational, *i.e.* it could make the group as a whole better off than it would be without an accord, but the gains, at best, may not be very large. This conclusion does not contradict the view that climate change could lead to serious, and costly, impacts relative to current conditions. Rather, it is the result of estimates that both damages from climate change and costs of mitigation are likely to be large. Thus, the damages that can be avoided by means of feasible actions may not be very much larger than the costs of taking the actions.

A viable international GHG accord must also be individually rational. In other words, each nation must realize net benefits by joining the agreement and abiding by it. Individual rationality poses a severe challenge for GHG proposals. The level of emission reduction that

would maximize national welfare differs widely from country to country. Any proposed allocation of effort, for example the Kyoto Protocol's set of emission targets, may create net winners. Small island states, China, and India were potential winners under Kyoto in large measure because the Protocol did not require them to curb their GHG discharges.

A GHG agreement will, however, also create net losers. For America, Kyoto's high abatement costs and imposition of large international income transfers to achieve targets very likely would have made compliance a net loss. A multi-model exercise found that, in 2010, Kyoto would have cost the U.S. between 0.24 percent and 1.03 percent of GDP. (Hourcade and Shukla 537, Table 8-8) Mean estimates of climate benefits to the U.S. from Kyoto do not come even close to that magnitude.³ Russia, too, given its climate and its economy, is likely to wish to place a rather low ceiling on mitigation costs. The fact that Russia is again refusing to accept even a nominal GHG cap points to that country's deep lack of enthusiasm for the entire venture of international controls. Because an agreement to make deep cuts does not appear to be individually rational for these states, they are tempted to reject it or, as many countries including Russia did with Kyoto, accept it formally while evading its intent.

2.2. *Transaction costs and international agreement on GHG controls*

International politics is a self-help world; there is no 911 to call. (Mearsheimer 32) Thus, nations that are determined to raise the stringency of other countries' GHG limits must take direct action to change those nations' perceived economic interests. They have no other recourse. They may try to bribe the other states to adopt higher standards, in effect, offering to pay for emission reductions that occur outside their own borders, say in America or in Russia. Alternatively, states might try to use coercion, assuming the role of what one might call a "climate vigilante."⁴

³ The most current survey of the social cost of carbon emissions, (Tol, 2007) finds that the mean global value taken from studies that employed assumptions appropriate for predicting what choices would be cost-effective for individual countries is less than \$24 per ton CO₂. The U.S. share of this total is unlikely to exceed the U.S. share of global GDP, and is likely much less than that because of the widely accepted conclusion that advanced countries in northern latitudes like the U.S. are the least susceptible to climate damage. (IPCC) Applying a damage figure adjusted for the U.S. share of global GDP to the emission reductions to be achieved by the Kyoto Protocol gives an estimate of benefits far less than the loss in U.S. GDP to meet the Kyoto targets.

⁴ In practice, the countries that are most vulnerable to harm from climate change are generally poor and lack the economic resources either to pay for GHG abatement in the global North or to compel it. Also, many poorer nations prefer to protect themselves through economic development rather than by inducing other countries to restrict GHGs. (Schelling 581-593)

The trouble is that the costs of enforcing GHG reductions on reluctant nations will also fall heavily on the would-be vigilantes. Trade sanctions and other measures designed to punish other states also exact costs from the countries that impose them. (Barrett 327, 2003) The greater the desired increase in other nations' abatement costs, the higher the costs of the sanctions or bribes for the countries demanding tougher limits.

For either sanctions or bribes, the problem that North has stressed, that of measuring compliance, is likely to occasion major additional costs. In this regard, efforts to influence China and India are especially problematic. Today, the U.S. government struggles to measure the safety of toys and food imported from China. Can it, or can any other foreign government, really determine how much coal China is burning or whether a carbon tax has been enforced on state-owned enterprises in Qinghai (and not, to compound the difficulty, offset by other hidden subsidies)?

The temporal disconnect between costs and benefits, with costs being incurred far in advance of benefits being achieved, further complicates the difficulties of credibly enforcing compliance with an agreement. If some parties, *i.e.* China and India, can argue to have their mitigation actions delayed, the incentives for them to free ride on the benefits of earlier action by others become even stronger.

In sum, the limited scale of the net benefits expected from a GHG accord implies that such an agreement cannot absorb high transaction costs and still remain collectively rational. The lack of a third party enforcer requires that only bribery or sanctions could be used to meet the tests that individual rationality poses to an agreement on quantitative emission limits—further reducing its likelihood of passing either collective or individual rationality tests. It seems likely that the costs of these measures would indeed swamp the economic *raison d'être* of the entire proposal. Absent some, as yet unknown, way out of this conundrum, the current debates about global paths toward stabilization of GHG concentrations seem to float in thin air.

This is not to say that some form of concerted international action is impossible. It does say that such action is highly unlikely to take the form assumed in IAMs. A global agreement on comprehensive emission caps with full and unrestricted trading of emission allowances across all countries at a single global price is a highly unlikely outcome. Transaction costs are much smaller if negotiations center on either parallel policies and measures (with due attention to

institutional change such as improvements in legal systems and financial markets) or on technology cooperation.

Agreeing on observable, current measures would pose far smaller problems of enforcement and vigilantism than would attempts to negotiate future outcomes. Therefore, its transaction costs are likely to be lower. This gain will occur whether the measures being negotiated pertain to actions intended to reduce emissions or to agreements on R&D investments. Compared to a “targets and timetables” approach, this “pledge and review” framework will make monitoring compliance much easier, and make penalties of failing to perform agreed actions more credible. (Schelling; Barrett 2003) However, emission reductions under this type of agreement are likely to be more modest and uncertain than idealized agreements on targets and timetables would achieve—if the latter were possible.

2.3. *Trade sanctions against China and India*

Contrary to this reasoning, the U.S. Congress is considering provisions that would impose trade sanctions on China and India as part of domestic GHG cap-and-trade bills. These provisions are a unilateral version of the idea of using trade sanctions to compel China and India to adopt GHG restrictions. Initially advocates of unilateral controls argued that, if the U.S. adopted GHG limits, China and India would promptly follow suit. However, during the Clinton Administration, the U.S. offered to adopt GHG limits if China and India did likewise, and China and India spurned the offer. (Aldy 107-108) That result should not have been a surprise because unilateral U.S. GHG limits would actually raise the rewards that China and India can reap by resisting controls. (Jacoby, Prinn, and Schmalensee)

With the prospect of legislation gradually drawing nearer, cap-and-trade proponents have responded to fears on this issue by adding provisos that would clap limited trade sanctions on China and India, should those countries not adopt GHG curbs in response to America’s action. Sanctions, they maintain, would protect some of American’s most energy-intensive industries from import leakage. Also, proponents claim, they will prod China and India to adopt their own controls.

As a means of coercing China, this strategy would face long odds. First, why would China and India, by adopting domestic GHG controls, handicap all of their global trade merely to

avoid sanctions on a quite small part of their economies? Less than 1 percent of Chinese steel production is sold to America in a form that would make it liable to sanctions. For aluminum, the number is only 3 percent. It is 2 percent for paper and less than 1 percent for both basic chemicals and cement. Second, one country adopting trade sanctions, or a few countries doing so, will merely change the geographic pattern of trade flows without having much impact on the total demand for Chinese energy-intensive goods. U.S. sanctions on China would cause countries with low-carbon steel, aluminum, or other industries to increase their exports to the U.S. and increase their own imports from China. It is implausible to suggest that this threat would compel China to adopt GHG controls that would remotely resemble the severity of those being proposed in America. (Houser et al. 76)

While sanctions would not put much pressure on China, they might endanger important U.S. interests. The precedent that they will cause may well undermine the already fragile international trade regime. The threat is especially real given the tendency of the American political process to expand and escalate the effects of legislation that creates opportunities for restricting imports. The history of anti-dumping laws illustrates the grounds for concern. (Houser et al. 41) At the moment, one can only say that remarkably little thought seems to have been given to the larger implications of such proposals.

2.4. *Can Green ideology produce international cooperation?*

At the 1992 “Earth Summit” at Rio de Janeiro, developed countries pledged to stabilize their GHG emissions at 1990 levels. Little action ensued. The reason was that within these countries domestic public support was relatively narrow and the issue was of low salience. Accepting an international agreement avoided complaints from Green non-governmental organizations (NGOs), but the political support that would have been required to implement the agreements was absent. (Cass 231)

2.4.1. The power of Green ideology

So far, only Europe, with its strong Green movements, seems likely to attempt significant GHG cuts. It is less certain, but still quite possible, that the U.S., which also has a strong Green movement, might follow suit. One might speculate that the spread of Green ideology could become a vehicle for spreading a new norm of international behavior. Domestic political

constraints might, in principle, drastically lower the transaction costs of making and enforcing an international agreement, by, in effect, substituting the power of domestic ideology for the high costs of international vigilantism.

History is rife with examples of large masses of people making great sacrifices in the service of ideology.⁵ (North 90, 1990) In the West, environmentalism has become a broad worldview. (Inglehart 241-248) At least one sociological theory predicts its global spread, albeit a gradual one. In this view, as more and more societies modernize, they will achieve the much higher levels of economic security that modernization brings. With greater economic security and wealth, values like environmental quality gain importance relative to economic growth. (Inglehart 31-36)

The process is slow. For its full implications to be felt, generations that grew up in economically secure and wealthy conditions must become socially dominant. (Inglehart 46) Still, a world of polities peopled by Greens would seem to greatly smooth the road to international GHG control.

2.4.2. History and the limits of ideology

The question arises, then, as to whether the spread of Green ideology can transcend the limitations imposed by the absence of international third party enforcement. However, for that process to work with GHG control, the same or equivalent Green worldview must take root in the populations of all major emitting nations. In fact, moral norms about climate change differ even between the U.S. and Europe. (Cass 222) There is no evidence that, as of yet, such norms exist in China and India or that Chinese political institutions would allow such norms to influence government actions if they were widespread. Based on Inglehart's work, a very long process of social transformation would be required before the hoped for culture shift could possibly become widespread enough to make a difference.

Increased acceptance of a belief system that requires doing the right thing regardless of actual consequences or effectiveness is unlikely to escape the basic dilemma of climate. True, if accepted widely enough, such rule-based or moral/sacred imperatives would solve the collective

⁵ "By ideology I mean the subjective perceptions (models, theories) all people possess to explain the world around them. Whether at the microlevel of individual relationships or the macrolevel of organized ideologies providing integrated explanations of the past and present, such as communism or religions, the *theories* individuals construct are *colored* by normative views of how the world should be organized." (North 23, note 7, 1990)

action problem, but only if these values gain wide acceptance in poorer countries. The EU and U.S. appear to differ even now in the extent to which they accept this rule-based morality. Current EU insistence that domestic action occur despite the absence of a pathway to success seems inconsistent with any kind of logical reasoning other than this non-instrumental belief system.

Yet, even a society that has adopted a “post-modernist” culture may spurn proposals that entail major economic sacrifices:

“History is deeply discouraging on this front. There are very few examples anywhere of societies (as opposed to hermits and monks) that voluntarily renounced the fruits of high-energy society, or embraced a lower standard of living, as lower energy use, absent gains in efficiency, implies. One might claim that the early Christians embraced poverty, but they were a small minority within Roman society, and the great majority of them were poor to begin with.” (McNeill 42)

The abolition of slavery is sometimes cited as a counter-example. It does illustrate that altruism can effect social change. Even though its course was hastened by economic trends that weakened the economic rationale for servitude, abolition required a major war in the United States, “and its global success required the moral and military dominance of nineteenth-century Britain and the self-confidence within Britain to force abolition on unwilling societies and cultures—a constellation of circumstances not easily reproduced.” (McNeill 43) Far from encouraging optimism, the example shows that “We could wait a long time for the stars to align themselves just right so as to permit a social movement that could lead to reduced energy use.” (McNeill 43)

The current Green movement, moreover, may not replicate the hard-headed instrumental rationality of the nineteenth-century British abolitionists.⁶ It clearly would not support the idea of empire as a way of creating an international order that enforced emission limits. Some sociologists argue that, in affluent strata of rich, technologically advanced societies, self-expression has gained priority at the expense of instrumental rationality. (Inglehart 23) The

⁶ Instrumental rationality focuses on the most efficient or cost-effective means to achieve a specific end, while setting aside the question of the value of that end.

problem is that climate policy poses challenges that seem likely to demand application of a quite steely kind of instrumental rationality.

2.4.3. Ideology and international agreements

In order to predict its effect on international action, it is important to distinguish two kinds of Green ideology. One, which is clearly associated with increasing income, is putting a high value on non-market effects of climate change and potential catastrophic changes in natural systems and a low value on forms of consumption with high greenhouse gas emissions. This change in preferences would have different implications for global action than the rule-based set of moral imperatives for individual (both for one's self and for one's country) action and behavior discussed above.

Rising incomes appear likely to change the point of collective rationality for a global agreement. They do so by increasing the valuation of non-market effects of global warming or shifting economic structure and preferences toward lower emissions per unit of output. Schmalensee et al. have estimated these changes as the observed "Environmental Kuznets Curve". The result is to boost the benefits of mitigation relative to its costs. One result is to raise the amount of mitigation that a country would choose, without regard to the benefits of cooperation.⁷ This change in tastes and economic structure will not eliminate the free rider problem, but it could narrow the distance that must be moved from a choice that is individually rational in the absence of an agreement to the collectively optimal choice. In this way it may reduce transaction costs of reaching an agreement.

In practical terms, this transformation of values will make a material difference in the current standoff on global action only if it occurs in the "holdout" nations. If Green ideology succeeded in eliminating GHG emissions in the EU and the U.S., the self-sacrifice might be morally satisfying. It would not, however, stabilize temperatures. For that outcome, developing countries must also adopt tight limits.

⁷ If climate negotiations are thought of in terms of game theory, the equilibrium outcome with no binding agreement is one in which each party chooses the level of abatement at which its own marginal costs equal the marginal benefits it receives, assuming that each other country does the same "Nash equilibrium". For a small country that can have little effect on global emissions, this entails essentially zero action as the rational choice. For a large country, some action may be justified, but it will be less than the "collectively rational" outcome achievable with a binding, enforceable agreement. The emission level that a country will choose unilaterally is sometimes called its "threat point" because it is the rational choice in the absence of cooperation from other parties and therefore a credible "threat" of consequences if negotiations fail.

Inglehart's work suggests that China's continued economic growth may eventually effect changes in its people's ideology and tastes. This process, though, is likely to take several generations. That time frame makes aspirations to stabilize concentrations at 550 ppm or less highly unrealistic. Waiting until growth moves China's economy toward lower energy intensity will also take time, though more rapid institutional reform could hasten the result. (Montgomery and Tuladhar)

The alternative, rule-based form of Green ideology would make specific kinds of action, in private and/or public choices, a moral imperative. The imperatives apply whether or not the action leads to the desired outcomes. A moral stand of this kind amounts to tossing instrumental rationality over the side. In that case, the test of individual rationality becomes irrelevant to the task of reaching global agreement. Again, though, for this outcome to occur, the crucial issue is that all major emitting nations must go through the same transformation of values.

If the developed world accepts the imperative of steep GHG cuts while unilaterally jettisoning instrumental rationality, there seems no escape from an attempt to drive its own net emissions to zero while also paying the full costs of developing world emission reductions. That policy is likely to be made more costly still if embedded in a larger framework of anti-nuclear, anti-globalization, small-scale, and anti-consumption imperatives.

Although such a policy might be consistent with positions taken by some church leaders as well as many Green groups, it would contrast sharply with the fundamentally selfish stance that prevails on much smaller issues such as farm subsidies, debt relief, and intellectual property. It would also require somehow compelling the developing countries to use the proffered income transfers to reduce their GHG emissions, when they would much prefer to employ them to enrich themselves in other ways. Even in post-modern Europe, achieving agreement on GHG cuts requires much hard bargaining.⁸ And there, unlike the situation in the poor and developing world, consensus on the goal supposedly already exists.

Thus, we find ourselves right back facing the enforceability of an international agreement on emission limits. If the aim is to stabilize GHG concentrations rather than to achieve moral perfection, the need for instrumental rationality reappears. Save for the distant hope of a moral

⁸ The changed position of the German government on emission standards for vehicles once their impact on German manufacturers of large, luxury cars was understood is a case in point. (Taylor)

transformation throughout the world, stabilizing GHG concentrations will require sharp distinctions between symbolic and real actions as well as a willingness to choose the lesser among evils. At some point, the threat of abstention from domestic GHG cuts without strict reciprocity is likely to become essential. The Greens' penchant for unilateral cuts appears to clash with this stern logic.

3. Inefficient domestic policies

Whereas the absence of institutions for third party enforcement creates grave problems for a global GHG pact, within nations, government makes and enforces rules. This fact allows governments to surmount the free rider problems that have frustrated international climate policy. However, within polities, other factors can cause the use of policies that are needlessly costly. There is good evidence that this will occur in the case of domestic GHG limits.

3.1. Using inefficient policy tools to limit GHG output

In a recent analysis, the International Monetary Fund (IMF) described the features of a cost-effective GHG control program. It noted that the program should impose a price on GHG emissions. This price should be distributed uniformly across all economic sectors and all nations. (International Monetary Fund 2) The price on emissions should be stable. Carbon taxes, the report observed, were the best means of achieving that goal. (International Monetary Fund 23)

How well (or poorly) designed the eventual cap-and-trade will be remains an open question. However, actual policies and most proposals now under consideration bear little resemblance to this vision. The list of differences is long.

3.1.1. Command-and-control regulation returns

During the Bush Administration, the U.S. adopted a series of command-and-control regulations aimed in part at lowering GHG output. These cover lighting and other uses of electricity and natural gas, biofuels, and corporate average fuel economy. To cite a notorious example of the consequences, at worst, mandates for biofuels may actually add to climate change, and, at best, they are an extremely costly means of curtailing GHG emissions. (International Monetary Fund 1)

While not all command-and-control regulations are likely to be as counter-productive as today's biofuels mandates, by their nature, such measures yield widely differing abatement costs across economic sectors.⁹ Therefore, they do not concentrate abatement efforts where they are most cost-effective. For that reason, most economists regard them as inefficient.

3.1.2. Overlapping, duplicative controls

Second, a well-structured cap-and-trade program, or better still a carbon tax, would have avoided the worst of these problems. Cap-and-trade seems to be coming, but there is no reason for believing that, when it does, it will replace the existing regulations. Instead, the current proposals seem likely to add new layers of controls atop existing command-and-control mandates.

Indeed, federal cap-and-trade may be super-imposed on state controls leading to a farrago of sector specific controls at both levels of government. This course would be similar to that taken in Europe and California. There, relatively narrow cap-and-trade programs stand side by side with a plethora of regulatory initiatives.

3.1.3. Designed-in allowance price volatility

Most of the current congressional bills are designed so as to guarantee that the prices for GHG emission allowances will be very volatile. It is possible to design a GHG cap-and-trade system with either stable allowance prices or volatile prices. For the economy as a whole, stable prices for GHG emissions would be much less costly than volatile ones will be.

Technically, price stability could be achieved easily, through either a carbon tax or establishment of ceiling and floor prices at which the regulator would, respectively, sell and buy unlimited amounts of allowances. By selling unlimited allowances at the ceiling price, government would ensure that market prices did not rise above this level. By buying allowances at the floor price, government would limit downward volatility. Specific proposals to create price stabilization authorities, such as the CMEB in the Lieberman-Warner bill, seem unwilling to provide this amount of authority to introduce and retire allowances, and therefore may have less

⁹ Indeed, the Chairman of the Council on Environmental Quality proudly announced that this was the purpose and major accomplishment of the Bush Administration's climate policy at a U.S. Chamber of Commerce meeting on April 25, 2008.

success in stabilizing prices. The history of attempts to create commodity price stabilization authorities suggests that agencies with limited resources cannot control volatility and may indeed make it worse. (Newbery and Stiglitz) Again, the preference for complex schemes over simple and effective policies seems to appear.

3.1.4. Numerous gaps and exemptions in cap-and-trade

Numerous exemptions are likely to further decrease the cost-effectiveness of cap-and-trade. Current proposals have included exemptions for favored sectors (farmers, small business, New England households, the poor, and so forth). If a quantity-based target remains in place, carving out exemptions increases the severity of the cuts exacted from those sectors that are still covered. Control costs for these sectors will rise steeply. Thus, according to Nordhaus, exempting half of the economy while trying to meet the same cap with concentrated action in the remainder does not just double the marginal costs of reaching a specific emission cap; it imposes a cost penalty of 250 percent. (Nordhaus 175, 2007)

3.1.5. Using allowance auction revenues to fund dubious subsidies

The use of emission allowances under cap-and-trade is likely to create a new set of highly inefficient subsidies. The cost-effectiveness of cap-and-trade depends in part on whether they raise revenue for the government and on how that revenue will be spent.

A cap-and-trade program can raise revenue by auctioning off some or all of the allowances. ... The enthusiasm for using auctions and taxes, however, has not been accompanied by sober assessments of whether and how the revenues would actually be used. Most of the evidence suggests that at least some of the revenues would not be spent wisely, at least from an economic perspective. (Hahn 1)

In theory, a cap-and-trade program could use revenues from the auction of emission allowances to supplant other taxes, lessening the deadweight loss that those levies impose on society. (Hahn 1-2) In actuality, though, governments rarely use additional revenues to reduce taxes. (Hahn 15) Government could also distribute auction revenues as lump sum payments, *i.e.* the size of the allocation could be fixed and the recipient could do nothing to increase or decrease it. Under the EU plan, however, governments have tied continued allowance allocations to continued

operation of facilities in their original locations. If the allocation is designed in this way, firms are encouraged to preserve older facilities even when closing them down would be more efficient. (Convery et al.)

Worse, draft legislation indicates that Congress is inclined to use emission allowances to fund some technologies at the expense of others. A great deal of experience shows that Congress is an extremely poor institution for picking future technological winners. (Cohen and Noll) Much of the large amount of money that seems destined for this exercise is likely to be wasted.

In order to account for the welfare effects of GHG cap-and-trade, these losses should be subtracted from gains, if any, attributable to the emission reductions. S. 2159, a cap-and-trade bill offered in the 110th Congress, would have created and granted to myriad interests new property rights worth more than \$60 billion per year. As an opportunity for politically advantageous rent seeking, this bill may exceed in scale any measure since the nineteenth century land grants. Although, alas, unlike the latter policy, it promises no vast boon to national output and wealth.

3.2. *A pattern of costly haste*

Cass Sunstein has recently opined that the U.S. may accept controls too stringent to maximize its own material interests. (18) Sunstein, in making that judgment, did not consider that the controls might also be badly designed in other regards. In fact, many state and congressional plans entail hasty emission cuts that are guaranteed to needlessly raise costs not because of the extent of the absolute emission reductions, but because of the haste with which GHG output is required to fall. (Smith EPW) Given the extent of the nation's capital stock that is tied to fossil fuels, legislation that attempts to make large reductions over the next fifty years or so must be considered very ambitious.

Policies of this kind could be costly. Globally, proposals by former vice president Gore and British government economist Nicholas Stern have been calculated to entail net costs of \$17 trillion and \$22 trillion, respectively. That is, these proposals are far more expensive than doing nothing at all would be. Even these estimates, though, assume that governments would meet their targets through optimal policies. (Nordhaus 177, 2007) In other words, the use of non-optimal policy tools will raise costs still higher.

The adoption of goals based on very steep GHG cuts is likely also to create a different source of unnecessary costs. Legislation that, if fully implemented, would lead to very high future costs may be greeted with skepticism. Investors might speculate that, when the economic crunch arrives, future office holders may choose to relax the goals rather than impose high costs on influential constituents.

If so, real options analysis suggests that regulatory uncertainty about future GHG policy can discourage near-term investment. In some circumstances, uncertainty about future climate policies could lower electricity supply and boost utility rates. (Blyth et al. 5770; Bernstein, Earle, and Montgomery) Blyth finds that the critical issues arise when more definitive information is expected, and that announcing dates in the relatively near future at which significant policy choices will be made has the most chilling effect on investment. IAM analysis has ignored this possibility, but its costs could be substantial.

3.3. *Is congressional decision-making becoming more efficient?*

Diagnosing the sources of the political appeal of inefficient policies can suggest directions in which that policy might develop. For example, recently one political scientist has argued that congressional learning by doing was enhancing the cost-effectiveness of its pollution control measures. Cap-and-trade, he averred, is an example of such progress. (Esterling) This kind of legislative model assumes that misunderstanding and excessive intellectual conservatism had led to the choice of earlier command-and-control policies.

As noted above, though, when confronted with demands for action on GHG emissions, Congress has first opted for old-fashioned command-and-control. The California state legislature is similarly inclined. Moreover, the recent travails of the EU's program point out that the cost-effectiveness of cap-and-trade depends heavily on selecting many seemingly unimportant, but actually crucial, small design features.

Thus, the preference for cap-and-trade is a lot weaker than the assumption of learning by doing would suggest. Further, even were it stronger, it would not provide much defense against the many devils lurking in such a plan's countless details. Of course, it remains unclear how inefficient future policies will be, but, to date, the signs are hardly encouraging.

4. Factors making GHG controls needlessly costly

Aspirants to political power must win enough support to gain and hold power. To do so, governments often back measures that impose net costs on society. These costs are the inevitable consequence of government, not an aberration. (North 48-50, 1990) One obvious example of how such outcomes can occur is the choice of policies that favor more powerful interests over those with less power. Political observers since Thucydides have been remarking on the prevalence of such policies.

Climate policy may be especially prone to result in the adoption of welfare-decreasing measures. Three factors may be at work: a) the information-processing capabilities of the American electorate, b) the nature of climate change, and c) the structure of U.S. government.

4.1. *Voters prefer non-market control instruments*

Understanding the consequences of political decisions requires an investment of time and effort. Policies, though, differ greatly in how easily their consequences can be understood. Most people are attention misers in general. (Jones) They are even less inclined to attend to politics than to other spheres of life. (Bianco)

The more logical steps it takes to connect a policy with a desired or undesired outcome, the smaller the number of voters who will invest the cognitive effort needed to make the connection. All else being equal, as the number of voters connecting a policy with a perceived cost or benefit falls, the outcome will have a smaller and smaller impact on voters' policy preferences. Thus, early order causal implications are likely to have more political salience than later order ones. (Arnold 20-23) If the early order effects of policies contradict their later order effects, voters, acting as cognitive misers, will be prone to mistaken evaluations of costs and benefits.

4.1.1. Political visibility of costs and benefits

Legislators have strong incentives to highlight the environmental benefits and conceal the costs of GHG controls. These tactics may reconcile to controls even many of the interests to which controls may actually bring net losses. In some cases, they discern the benefits, but not the costs. And in others, the over-allocation of allowances may turn a loss into a gain.

Political scientists have long pointed out that command-and-control mandates draw attention to the benefits of controls (lower emissions) while revealing nothing of their costs. In contrast, the benefits of a carbon tax, or cap-and-trade designed to function like a carbon tax, are nearly invisible to the general public. Voters often fail to grasp the power of market incentives to change economic behavior. The package of visible benefits and tacit costs helps to explain why command-and-control remains popular with legislators. (Arnold 24)

Also, the explanation of how a mandate works involves fewer logical steps than are required to understand the operation of a pollution tax or cap-and-trade. Unlike the latter, it demands no knowledge of economics. The more reasoning and the more analytic knowledge that are needed to understand a policy, the fewer the people who will pay the cognitive costs to do so. (Arnold 19-22)

Survey data confirm that voters do not readily grasp the power of market incentives to affect environmental behavior. Instead, the electorate tends to focus on the self-interested motives of the for-profit sector instead of the power of incentives to harness those motives to an environmental purpose. (Caplan 30-31) Because of this anti-market bias, holding cost constant, more people support mandates than either a tax or cap-and-trade as tools for curbing GHG emissions. (Burchfiel)

4.1.2. Political visibility of sacred versus secular trade-offs

Part of the reason for this preference is that many voters, on moral grounds, strongly reject *explicit* trade-offs of ‘sacred’ values against secular ones. Especially for voters who invest pollution control with ‘sacred’ significance, because of Green ideology or a presumed connection between pollution and risks to human life, trading off pollution control benefits against abatement costs falls afoul of this “taboo”. (Tetlock 323) The public is likely to morally condemn those who even *contemplate* such trade-offs. (Tetlock 321) Of course, the entire rationale for market-based environmental policies is to facilitate just such trade-offs.

By inference, the elected sponsors of such policies stand in some risk of triggering moral opprobrium as punishment for their intended good deeds. Cap-and-trade may be seen as the less immoral choice, because mandatory emission caps can be set without regard to cost (as mandated by the Clean Air Act for primary air quality standards), so that the cost trade-offs

occur only in deciding how to achieve the 'sacred' goal. Carbon taxes make the choice between environmental values and costs explicit and force each member of society to make it. This tendency is likely to run afoul of the distaste for sacred versus secular trade-offs.

4.1.3. Voters' anti-market and xenophobic biases

A legislator seeking re-election must consider these and other factors likely to shape voters' choices. An astute legislator may suspect that many people who vote may not do so as a means of enhancing their individual economic well-being. After all, individual votes cannot have a noticeable impact on an election's outcome, so voting would be a poor investment if the goal were to enhance the voter's individual interests.

Rather, many people use the voting booth as an opportunity to indulge moral feelings and other emotions. Voting becomes an exercise in self-expression. Perceptions of the interest of the community often determine voting choices. (Caplan 195)

Unfortunately, the public's perceptions of community interest are often based on economically erroneous notions. Comparing opinion survey results of the American electorate with those of a sample of trained economists shows that the two differ sharply on major points about economic performance and policy. Compared with the views of economists, those of the general public exhibit several biases.

At least two of these biases are directly relevant to the design of GHG controls. First, the general public displays "*a tendency to underestimate the performance of the market mechanism.*" (Caplan 20) This tendency is clearly relevant to the choices of GHG control tools discussed above. Second, the public shows "*a tendency to underestimate the economic benefits of interaction with foreigners.*" (Caplan 36) Such a bias will almost certainly make coercive trade sanctions against nations that resist GHG controls seem less costly to the public than is, in fact, the case. Rent-seeking corporations and labor unions have often found it in their interest to mobilize the electorate's economic xenophobia. This case seems likely to offer another example.

Holders of elective office have incentives to learn the electorate's wishes and to deliver policies that conform to those wishes. To the extent that they seek re-election, such office-holders have little reason to prefer policies that might enhance the public's welfare while offending the sentiments of its members. Thus, the tendency to adopt bad climate policy may

stem not from the failure of elected representatives to fulfill their constituents' wishes. Rather, it seems more likely to arise from their desire to give their constituents what they want.

4.2. *The nature of the issue leads to inefficient solutions*

The long-term nature of the risk of global warming implies still other complications for the task of crafting welfare-enhancing responses. Climate change poses mostly long-term risks, but political systems are notoriously slow to address problems of this type. Think of the examples of Social Security and Medicare funding, both of which are far more immediate than the worst risks of global warming. The tendency of the public and the government to defer action creates incentives for advocates of GHG controls to adopt strategies that have the effect of raising the costs of GHG controls.

4.2.1. GHG limits must include special interest favors

In the case of GHG limits, in order to gain the number of votes needed for enactment, legislators probably must include an unusually large stock of special interest favors.

The deferred nature of the benefits of GHG reduction means that few current voters will accurately perceive themselves as receiving direct benefit from GHG cuts. On the contrary, most will suffer a net decline in their living standard. The benefits of climate stabilization, by definition, will accrue only to future generations and largely to foreigners.

For a legislator, this distribution of costs and benefits seems a poor base on which to build a re-election strategy. One way for office-holders to improve the balance would be to pursue policies that confer windfall gains on well-organized special interests. Often these interests will be narrow, which allows them to act cohesively. The problem is that the process of delivering these windfalls to the intended recipients is likely to increase the measure's total costs to society. (Olson) For a legislator seeking re-election, though, the prospect of support from grateful special interests is likely to be essential to offset the political risks of imposing higher energy costs on current generations of voters.

Examples of the inefficient policy choices that come out of granting favors to special interests are discussed above in Section 3.1. As noted, one such special interest favor would be choosing a cap-and-trade policy without a safety valve because traders want to make money establishing exchanges and managing price volatility.

McChesney has suggested that rent extraction by public office-holders can cause inefficiency. He points out that office-holders can use regulation to impose private sector costs. The threat to do so can induce those that would be economically harmed to “buy” complete or partial exemptions with campaign contributions or other emoluments to the office-holders. The risk of such rent extraction, and the constant threat of opportunistic behavior on the part of the public office-holders, depresses investment in the threatened sectors. (McChesney) Viewed in this light, the enormous expansion of regulation implied by the arrival of the GHG controls clearly implies a large potential increase in political rent extraction. The shortfall between actual and optimal investment would presumably be proportionate.

4.2.2. Competition for media coverage leads to bad policy choices

As noted, the most serious risks of climate change most likely lie far in the future. This is especially true of the United States. A threat many decades or a century into the future, though, has difficulty in winning media coverage. In a classic 1972 article, Anthony Downs observed that to compete for media attention, issues must be dramatic:

“[N]ews is “consumed” by much of the American public (and by publics everywhere) largely as a form of entertainment. As such, it competes with other types of entertainment for a share of each person's time. Every day, there is a fierce struggle for space in the highly limited universe of newsprint and television viewing time. Each issue vies not only with all other social problems and public events, but also with a multitude of “non-news” items that are often far more pleasant to contemplate. These include sporting news, weather reports, crossword puzzles, fashion accounts, comics, and daily horoscopes. In fact, the amount of television time and newspaper space devoted to sports coverage, as compared to international events, is a striking commentary on the relative value that the public places on knowing about these two subjects.
(Downs)

The for-profit American media are likely to be especially responsive to audience restiveness.
(Downs)

To win this competition, issue advocates must make their cause seem more pressing than the other candidates for public attention. The threat of something bad happening around the year 2200 may not be that compelling for most audiences. Advocates need to do something to enhance their competitive position.

A report titled “An Abrupt Climate Change Scenario and its Implications for United States National Security” is an example of a climate change story that did get media attention. It painted an apocalyptic view of climate change based on a hypothetical scenario in which warming disrupted Atlantic Ocean currents supposedly with various catastrophic results. The report placed this possibility only a few decades in the future. This claim generated extensive media attention. A new book has now recycled this scenario. (Gulledge 79-80) Other “nightmare scenarios” have also been devised.

News organizations have at least some profit motive for abetting this sensationalism. They also often report later corrections and qualifications. Nevertheless, the later reports are far less sensational stories, and they generate far less coverage.

Thus, a leading scientific expert published a stinging critique of the report described above. In it, he noted that the report had greatly exaggerated both the risk of near-term disruption of the Atlantic currents and the extent of the harm likely to result. (Broecker 388) Later an IPCC report basically confirmed his critique. (IPCC Fourth Assessment Report, Working Group II 563.) Yet, neither of these efforts received the media attention of the initial claims of close-looming disaster.¹⁰

In this example and others, the advocates of GHG cuts have largely succeeded in using the news media to persuade much of the public that many of the possible threats of global warming are much more imminent and more damaging than they probably are. One effect of this success, though, is to raise the political pressure on Congress to make very sharp emission reductions. This effect is doubtless just fine with Green NGOs, but it might worry legislators wishing, for various reasons, to craft a politically popular GHG control bill.

¹⁰ An interesting counter-example is found on the front page of the Washington Post Opinion section on Sunday, August 3, 2008 in an editorial that highlighted a series of these exaggerations and misattributions of current calamities to climate change and argued for more accurate advocacy.

Thus, without an effort to sensationalize the risks of climate change, advocates of steep GHG cuts are disadvantaged in the competition for media coverage. With it, they are even more constrained than they otherwise might be to demand emission cuts that are far more expensive than those which are justified by more realistic assessments of the threat.

4.3. *Congressional organization favors duplicative policies*

Institutions also play a role in motivating the choice of needlessly costly GHG controls. Rent seeking often interacts with organizational structures. For example, Congress' decentralized committee system urges it to adopt multiple 'solutions' to any problem. When an issue becomes ripe for action, many committees will seek to exploit the chance presented by this moment of mobilization as a pretext for actions that will benefit interests or causes favored by the committee members. (Baumgartner and Jones)

Many of the resulting policies may enjoy only tenuous claims as solutions to the problem of the hour, but Congress is not organized to integrate the various policies into a coherent whole, and the logic of log-rolling is powerful. (Baumgartner and Jones) This tendency has clearly revealed itself in the sequence of "comprehensive" energy bills passed since 1974.

GHG cap-and-trade programs are especially appealing sources of political favors. As already noted, their cumulative cash value is high. To an office-holder, the distribution of allowances is, in effect, a free off-budget disbursement of money to potential supporters. If a legislator is not a member of one of the appropriations committees, allowance allocation may be the best available source of such resources. The fact that the transfer of allowances is less politically transparent to the wider world adds to the appeal.

4.4. *Institutionalized environmentalism and GHG targets*

Private sector institutions and ideologies are also deeply involved in climate policy and may play a role in pushing it toward costly choices. In America, a variety of Green advocacy groups have institutionalized various aspects of environmentalism. Most Green groups in the U.S. draw on voluntary contributions by wealthy individuals, environmentally-oriented foundations, and small grassroots contributors. (Bosso 96) In recent years, Green groups have raised over \$2 billion per year in the United States, (Bosso 96) and it is possible that the climate issue might boost this sum.

Most of the Green groups operate in one or more advocacy niches. (Bosso 48-83) Quite a few of these organizations are actively pushing for GHG controls. Having adopted an advocacy role, and having made that role key to their financial survival, these NGOs are, in a sense, now special interest groups. The groups' own marketing strategies indicate that their fund-raising success rests on their being seen as successful advocates of environmental causes. It is, of course, not based on maintaining a fine balance between environmental values and other social goals. (Bosso 48-83)

Environmentalism exhibits a strong Manichean strain. This tendency is well-suited to tapping the energy that moral outrage can sometimes unleash. Historically, moral zeal has often prompted actions that are at odds with the goal of allocative efficiency. (North 49, 1981) It may, in this case, complicate the task of implementing gradual GHG reductions.

Climate exemplifies the difficulties that Green NGOs have in willingly accommodating other social interests. Almost all Green NGOs insist, for example, that GHG controls must take the form of hard quantitative targets rather than that of setting a price that emitters must pay. The latter, they object, would leave the level of emissions uncertain. Their demand is wedded to the goal of achieving by mid-century very steep GHG cuts. If adopted as national policy, this stance would require the nation to meet what is an entirely arbitrary emission reduction target regardless of how expensive that goal proves to be. These goals clearly entail a high risk of forcing society to pay more for deep GHG cuts than the benefits that the cuts will deliver.

This seeming rigidity may someday be revealed as only a bargaining position. However, a Green NGO that wished to compromise on such issues would risk being outflanked to the left in the competition for funding. The NGOs' funding prospects are likely to be much more strongly and more positively correlated with potential donors' commitment to environmental purity than they are to donors' support of economic efficiency. If that is the case, and it seems very likely to be, then financial competition is likely to anchor most Green NGOs rather firmly to their present demands. Of course, ideology may also simply preclude the option of flexibility on this issue.

To be sure, the United States is rare in enjoying a streak of economic individualism that, compared to Europe, is relatively strong. This tradition can sometimes limit the Greens' influence and curb regulatory excess. (Micklethwait and Wooldridge) However, the presence of

a countervailing ideology may not ensure that GHG controls will be designed cost-effectively. For example, the anti-tax attitudes fostered by conservative ideology add to the resistance against what is probably the most cost-effective approach to GHG control. Thus, the notion that countervailing power will lead to socially optimal outcomes may be, in this case, largely groundless.

The Green organizations' zealotry has spurred a reaction on the right. Rather than simply arguing that drastic GHG cuts are excessive and that the negative effects of warming will largely occur in the long-run, some on the right have gone on to assert that human-induced climate change is a hoax. They maintain that even small expenditures on GHG reductions are unjustified. The clash of two extreme ideological positions does little to focus the political process on the selection of welfare-enhancing policies.

5. China's institutional future

As some of the previous discussion suggests, China is key to hopes for reducing global GHG emissions, and India, while not quite as central, is also crucial. This reality reflects the smashing economic success of development in the two Asian giants, an event of world historical proportions. Today, as a result of both the extent of its economic growth and of its nature, China is the leading global GHG emitter (or number two), and its output is growing rapidly. Consequently, countless schemes have been offered for moving its economy toward less GHG-intensive technologies. Some of these plans hope to reduce emissions without imposing GHG controls; some require controls. Neither is likely to face an easy road.

In countries like China and India, government may be unwilling to reform economic markets that have been distorted by prior interventions. For instance, government may subsidize energy production or regulate prices. By doing so, it may generate rents with which it buys the support of favored industries or curries favor with consumers. These policies, though, often have the effect of boosting GHG emissions (Montgomery and Tuladhar) or making it impossible to implement effective market-based GHG controls.

5.1. *Institutions and China's high GHG intensity*

It is impossible to separate the issue of China's high GHG technological base from the nature of China's economic institutions. In fact, simply replacing existing Chinese technology

with designs from the West and Japan would greatly lower China's GHG intensiveness. That shift would also raise the value of China's total economic output. Nevertheless, the GHG efficiency of China's new investment continues to lag behind that of the West, let alone that of Japan. (Montgomery and Tuladhar 3-4)

It is a fundamental insight of the NIE that technology and institutional forms are tightly linked. (North 172, 1981) China's current institutions seem to be pushing that economy toward reliance on high-GHG technologies. Several examples can help to explain.

First, the growth of heavy industry is the main force behind China's rising energy use. (Rosen and Houser 4) Regional and local governments strongly promote "their" heavy industries. They use subsidies, captive courts, taxes, capital allocation, price controls, and land price manipulation to feed capital into favored firms and protect them from non-local rivals. At the national level, powerful ministries watch over favored sectors.

Second, energy prices are distorted by regulation and by hidden subsidies. Prices drive neither consumer behavior nor investment decisions. (Cooper 11) The coal, rail, and electric power sectors, as well as others, have been cartelized. Budget constraints within these sectors remain soft, and government distorts prices in these sectors in order to buy political support. (Pei 96-121) The Chinese government recently announced that "Prices of oil products, natural gas, and electricity will be frozen in the near term." (Yardley) This policy, of course, neutralizes the effect of rising world oil prices on China's soaring gasoline demand.

Thus, at the Bali international conference, the Chinese government demanded and won acceptance of the idea of technology transfer from the West as a major theme of international climate policy. Yet less than a month after the close of that event, it announced new energy price controls that, by their very nature, subvert the incentives for investing in energy-saving technologies. It would be hard to imagine a more blatantly contradictory policy stance or one that more starkly underlined the critical importance of the interaction between technology and institutions.

More recently, the Chinese government has begun to allow increases of energy prices. Interestingly, it was reported that the motivation for these policy changes was the advocacy of refiners and electricity generators, who were suffering large losses between what they paid to buy oil, gas, and coal at prices driven up by global market forces and what they could sell

refined products and electricity at in China. This may reveal more of the interesting balance of forces among political constituencies in China than any underlying trend in market reform.

Third, China's governance problems have checked the inflow of energy-efficient technologies owned by Western or Japanese firms. Many experts argue that China's judicial system cannot yet deliver impartial, predictable, rule-based justice. Its chronic abuse of intellectual property rights is well-known. Such problems inevitably act as a brake on Western and Japanese foreign direct investment. (Montgomery and Tuladhar 1, 3) Other scholars argue that this effect is of declining importance and point to improvements.

What seems clear is that China's prospects for lowering its GHG output rest heavily on its ability to continue to reform its institutions. It is true that, during the last twenty years, China has made great strides toward modernizing its firms, markets, and property rights. (Steinfeld B03) It is equally true that many markets remain distorted and the rule of law remains imperfect.

5.2. *Institutional reform and future growth*

Although still achieving what are by global standards only middling scores for the rule of law and related institutional development, China has logged huge economic gains. Some might object that this growth refutes the claimed tie between reformed institutions and economic growth. The record, though, indicates that many countries achieve rapid growth without having first built rule-of-law-based societies. The real test comes when a country has closed much of the technological gap with the industrialized world. At that point, further institutional reform becomes critically important. (Dam 2-3, 41)

For China, the test may still lie in the future. The continuing trend to integrate the labor market between the west and the east and between rural and urban areas provides a reservoir of yet to be fully tapped productivity growth. (Naughton 189-202) As this pool is drained, the issue of further institutional reform is likely to become more pressing. (Dam 41) Chinese financial markets are also seen as remaining far behind the West in regulation, openness, and protection of investor rights, leaving China's economic growth at risk to any event that stresses those markets (Dam). Despite these concerns, other experts, including some within the NIE tradition, remain sanguine that China can and will solve the institutional challenges. (Fogel)

5.3. *Institutional reform and political power*

Yet history shows that governments do not always stay on the path to such reforms. (North and Thomas 1; North et al. 15, 2006) North has suggested that, in order to sustain its economic development, China may have to adapt its property rights and judicial systems to more closely resemble those of the West. (North 159, 2005) Another recent NIE paper notes that the deep economic reforms may lead inexorably to the creation of a more open and competitive political system. (North et al. 6, 2006) By inference, if the CCP wishes to complete the process of economic reform, it must be willing to abdicate its monopoly on political power. Minxin Pei has bolstered this argument by suggesting a number of concrete ways in which economic reform threatens the economic and career interests of individual nomenklatura, as well as the position of the CCP as a whole. (29-33)

Some observers see the pace of reform as flagging. If so, a growing awareness of the link between economics and politics by the CCP might help to explain this slowdown, especially since North's work is well-known in China. (Dam 40-41) The point is not to predict one way or the other—it is to recognize that the intractably uncertain future course of China's institutional development will be a key driver of global GHG policy.

5.4. *Institutions and GHG limits*

China's institutions not only raise its GHG intensity, they also greatly decrease the odds that the country will adopt controls. Existing institutions sap the appeal of controls while also undermining the government's ability to enforce them in the unlikely event that it should wish to do so.

To be sure, China has valid grounds for concern about potential harm from climate change. Water supply is already a problem and much of the economic activity is concentrated on the coast. (Anthoff and Tol 12) Even so, economic development can reduce this vulnerability, and, for China, development may be a better shield than GHG controls would be. (Schelling 593)

The stronger grounds for shunning controls are political. The CCP has good reason to fear the popular backlash that higher energy prices might unleash. (Shirk 53) That is why it already incurs significant costs to hold many energy prices below optimal levels. Certainly climate change cannot match the urgency of concern about adding to already troubling popular

unrest. The economy's high GHG intensity would amplify the costs of controls, which would presumably further crimp the government's appetite for such innovations.

Recalling North's strictures about enforcement and agency problems (North 27-35, 1990) prompts the question: If the central government were to proclaim controls, would enforcement be more than nominal? The myriad means by which regional and local governments now protect their favored industries give a vivid idea of how difficult enforcement would be.

6. Looking toward future policy

More attention to political economy could lead to more chastened expectations about the likely future course of climate policy. Through a lens of political economy, climate policy is likely to record only halting progress for as long as it continues to focus on the single-minded pursuit of GHG limits. A few thoughts about the possible course of future policy might draw out some possible implications of the foregoing analysis.

6.1. *Possible patterns of future mitigation efforts*

The effort to control greenhouse gases will continue, but probably not very effectively. Internationally, a patchwork with many gaps seems unavoidable. Domestically, costly control measures and poor policy tools seem likely to prevail. The key challenge for climate policy will be to adjust in ways that mitigate the economic harm otherwise likely to ensue from the likely policy choices. A more diversified mix of strategies may be superior to today's single-minded focus on GHG controls.

6.1.1. Internationally, a patchwork outcome

Internationally, no comprehensive system appears to be on the horizon. The inability to make an agreement individually rational at acceptable transaction costs lies at the heart of the problem, and nothing seems likely to change this basic reality.

If international policy continues to be driven by the sum of domestic developments in relatively few countries, the international system seems destined to evolve, but it will do so incrementally and without a centrally driven concept. Some nations, especially the United States, will probably adopt more stringent controls than they now have in place. Some blocs of states, notably the EU, may well continue to coordinate internationally.

Other industrialized countries differ in their institutional frameworks, their cultural traditions, and their economic interests. How far their efforts will be harmonized with the EU remains an open question. For example, Japan has advocated a sectoral approach. It is hard to imagine how their concept could be directly linked to a United States or EU emission trading system.

One possible outcome could be a more or less parallel development of independent approaches. In such a system, nations and blocs would be constantly watching over their shoulders to see how well others are keeping up. The predictable outcome of such a system is likely to be a race in which the slowest competitor, the one with the least to gain from abatement, sets the pace. Since many nations have weak motives for speeding up GHG cuts, such a dynamic may be long on symbolic gestures and short on action.

The United States-China relationship is the fulcrum of global climate policy. So far, climate specialists have considered U.S-China relations as if climate policy were the dominant issue. In fact, the relationship is multi-faceted. Measures to lessen GHG output are likely to impinge upon many other American policy objectives. Thus, the U.S. government, in dealing with China, is implicitly trading-off GHG abatement against Taiwanese security, Chinese relations with rogue states, trade, human rights, and countless other objectives.

Attempting to persuade China to make GHG cuts implies opportunity costs on these other margins. Domestic politics makes such cross issue trade-offs difficult because disparate domestic interests hold great influence over specific policy domains. (Lake 8-11) *Ex ante*, perhaps all that can be said is that many factors will affect the tenor of the U.S.-China relationship and that its tenor could, in turn, profoundly change the course of global climate policy.

If progress is defined only as movement toward global cap-and-trade with universal adherence to strict targets and timetables, prospects are bleak. A more optimistic outlook comes out of suggestions by very seasoned observers and scholars in international relations. They have argued that some form of muddling through has much better prospects. In this incrementalist approach, negotiations do not start with the objective of revolutionary change. Rather, they work gradually through a process of eliminating factual disagreements, developing proposals for domestic policies and measures and cooperative activities, and then reaching agreement on a set

of specific actions that each country will take contingent on others doing the same – and on the consequences to be imposed if review reveals that a country has not kept to its pledge.

This pledge and review process is unlikely to produce large and immediate reductions in greenhouse gas emissions, but it is likely to produce progress on many fronts necessary to global action over the long term. Much of this progress, for example in the areas of reaching agreement on facts and getting around “spoiler” issues, has probably been impeded by the presence of “targets and timetables” on the agenda. In this regard, the course of international negotiations since the Berlin Mandate in 1993 seems like an immense detour.

6.1.2. Domestic institutions and GHG abatement costs

The debate about future abatement costs is usually waged in terms of conflicting predictions about future technology. It has largely ignored the likely role of political institutions. In fact, American political institutions have so far produced climate policies that are far less cost-effective than those that most economists would embrace. In this regard, climate policy is evolving in ways that suggest that it will resemble most other areas of energy and environmental law.

However, the smallish net benefits projected for ideal GHG controls suggest a narrow margin for error. If GHG controls can do no better than to match the cost-effectiveness of other pollution limits, then GHG curbs are likely to produce net costs. After all, for the next two decades, warming is widely predicted to yield net benefits for America, although results will later probably turn negative. (Fingar) If any of the many possible forms of inefficient implementation occur, costs will rise and the benefit-cost ratios of even the optimal level of GHG output abatement could easily decline below 1. (Nordhaus 85, 2007) Unfortunately, the U.S. could be headed toward adopting just such welfare-reducing policies.

6.2. *The critical goal of flexibility*

The seemingly inexorable slide toward policies that are likely to yield net costs puts a premium on creating options to make later policy course corrections. If mistakes are likely, adaptive efficiency should be the Pole Star by which policy is guided. Vigilance against possibly baleful path dependency should be a standard operating procedure. Frequent policy reviews,

ideally reviews backed with sunset provisions, would offer major advantages. Alas, the reasons that make this flexibility needful will also make it hard to implement.

6.2.1. Adaptive efficiency versus path dependency

At this point, the future course remains somewhat speculative, but institutions and ideology, operating in tandem, seem more likely to push the policy process toward expensive but ineffectual gestures than toward producing global change. An obvious question becomes how durable the impending policy changes are likely to be. The concepts of “policy path dependency” and “adaptive efficiency” provide a good start for considering this question.

Path dependency “... encourages and enables the analytical historian and the economist alike to entertain the possibility that, in place of a unique equilibrium-seeking dynamic, one should envisage a process that is seeking an evolving and historically contingent equilibrium. This provides a rationale for the methodology of *historical* social science, by indicating why it is that in order to uncover the logic (or illogic) of the world around us, we sometimes must first understand the details of how it got that way.” (David 2) North states:

“Path dependency is a fact of history and one of the most enduring lessons to be derived from studying the past. The difficulty of fundamentally altering paths is evident and suggests that the learning process by which we arrive at today’s institutions constrains future choices. It is more than simply that the organizations brought into existence by the existing organizational matrix owe their survival and well-being to that matrix and therefore will attempt to prevent changes that would adversely affect their well-being. It is also that the belief system underlying the existing matrix will deter radical change.” (North 77, 2005)

Many mechanisms contribute to path dependence. One simple factor is that events change the relative strength of social interests. Thus, GHG controls, for example, will aggrandize some interests and enfeeble others:

“Policies aimed at mitigating global warming will depress returns in the oil and gas industries and raise costs in sectors that use

energy intensively (e.g., transportation), but benefit alternative energy industries and less energy-intensive producers. Within each country there will be winners and losers from climate change and from every possible policy to slow or reverse it. In redistributive politics, the concept of a national interest shared equally by everyone evaporates.” (Lake 5)

The industries that suffer as a result of GHG controls will shrink and perhaps simply seek refuge abroad. Their political voice against the extension of the new policy will, therefore, gradually fade in strength or be stilled altogether. The longer the process runs, the less likely a policy course correction becomes.

As discussed in a previous section, exactly the opposite process will occur in countries, like China, that initially decline to limit emissions. Increasingly these nations will become the havens for energy-intensive industries. As investment in such industries shifts to countries like China, the political voice there against limiting emissions will be strengthened and the less likely a policy correction will become.

Institutions may further amplify the momentum. Cap-and-trade plans, for instance, as noted above, can easily be used to create large government-controlled transfers of unearned income. Politically speaking, these transfers will be less transparent than if they had been made in cash. The interests that capture these economic rents will surely become loyal and well-financed promoters of the manna-producing GHG controls and the office-seekers who support those controls.

It is here that the difference between allocating allowances and distributing tax revenues becomes most pronounced. Under a cap-and-trade system, those interests granted allowances will benefit from higher carbon prices. Their rights to allowances would push them to support future tightening of the cap on everyone else. Recipients of benefits derived from the general fund of government revenues have no such direct interest in raising carbon prices.

If path dependence is a source of momentum for continuing current trends, adaptive efficiency could be thought of as a feature of institutions that keeps other options open. North uses the term “adaptive efficiency” to describe institutions’ capacity to innovate and to correct

mistakes. Knowledge is imperfect, so errors are common. Adaptive efficiency is, therefore, likely to be important for minimizing the costs of the many inevitable mistakes.

Decentralized decision-making promotes adaptive efficiency. Institutions that reward learning and experimentation do so. Wining out failures is a key marker of high adaptive efficiency, and North believes that political structures as well as economic ones can be better or worse at this task. (North 80-81, 1990) Representative democracies, for example, tend to produce governments that are open to a wide range of influences. This characteristic may not prevent erroneous policies, but is likely to boost a society's ability to correct them.

The concept of adaptive efficiency raises a new question: how durable and effective will a wealth-decreasing climate policy be? Alternatively, turning the question around, what factors raise or lower societies' capacity to correct policy mistakes? Based on the current direction of climate policy, these two questions about the implications of erroneous policies are of considerable importance.

6.2.2. Adaptive efficiency versus regulatory uncertainty

The powerful sway of path dependency puts a premium on institutional flexibility. Some GHG control bills propose to build "off-ramps" and review provisions into initial legislation. The ability of these provisions to enhance adaptive efficiency might be a key question in determining the future costs of such GHG limits.

North is quite clear that adaptive efficiency is different from allocative efficiency. Indeed, he suggests that the concepts may sometimes conflict. (North 81-82, 1990) Interestingly, the idea of off-ramps for GHG control policy may offer an instance in which adaptive efficiency must be traded-off against the benefits of regulatory certainty.

This observation suggests that no policy design can overcome the inherent uncertainty of future decisions. Off-ramps, which provide for relief on carbon prices or adjustment of targets based on future events, could substantially reduce long-run costs if technology or participation by other countries does not materialize. Off-ramps, therefore, would be a significant source of policy uncertainty by setting certain dates at which investors could expect to receive better information. On this basis, off-ramps could dampen incentives for near-term investment and, thereby, increase generating costs. The resulting costs would have to be weighed against the odds

that the policy course correction would diminish the harmful effects of an overly stringent GHG policy. This is a climate policy dilemma which has so far largely escaped the attention of economic climate policy analysis.

6.3. *Back-up strategies*

In the longer term, the nature of the climate problem may shift. The inability to actually halt the rise in global temperatures could, over time, become more threatening than are ill-advised and ineffectual government emission controls. One consequence is that government should begin considering back-ups to GHG limits. Adaptation measures, steps that allow societies to adjust to rising temperatures at lower costs, are an obvious example. Adaptation is able to promise a large potential to reduce costs. (Mendelsohn and Neumann 321) It is also true, though, that government policy is likely to heavily influence the effectiveness of adaptation. Policies that misallocate water protect too much land from rising sea levels, and can increase the costs of climate change and impede market-driven steps that would otherwise lower those costs. (Mendelsohn and Neumann 6, 327)

Another family of technologies, known collectively as ‘geoengineering’, might provide an added margin of safety during the transition. The idea behind them is simple. When sunlight strikes the Earth’s surface, greenhouse gases in the atmosphere trap some of the heat that is generated. A slight decrease in the amount of sunlight reaching the Earth’s surface could, in principle, offset the warming. Scientists estimate that deflecting into space only 2 percent of the total sunlight that strikes the Earth would be enough to cancel out the warming effect of doubling the pre-industrial levels of greenhouse gases. (Lane et al.)

Scattering this amount of sunlight may be relatively easy. Past volcanic eruptions have shown that injecting relatively small volumes of matter into the upper atmosphere can scatter enough sunlight back into space to cause discernable cooling. The 1991 eruption of Mt. Pinatubo reduced global mean temperature by about .5 degrees Celsius. These temperature reductions were apparent in just a few months and persisted for about three years. (Lane et al.)

Some scientists propose, therefore, to use modern technology to create a carefully engineered analogue to this effect. Proposals to seriously study geoengineering are gaining adherents among climate policy experts. In late 2006, NASA and the Carnegie Institution jointly

sponsored a high-level expert workshop on the subject. The workshop report observed that such distinguished scientists as Ralph Cicerone, Paul Crutzen, and Tom Wigley have suggested further study, and it noted, “Prominent economists such as William Nordhaus and Thomas Schelling have long argued that the concept warranted further exploration as well.” (Lane et al.)

Of course, neither adaptation nor geoengineering will be exempt from institutional and ideological influences. On the contrary, those influences are likely to be strong. How they will play out is an empirical question. The poor prospects for mitigation underscore the need to investigate this question.

7. A proposal for future analysis

A useful first step toward enhancing political economy’s contribution to climate policy might involve a session, or sessions, designed to foster the exchange of ideas between political economists and modelers.

Political institutions will shape climate policy outcomes. Current IAMs do not reflect the complexities implied by this fact. Moreover, because modeling optimal policies is much easier than modeling expected non-optimal policies, the analysis has been biased toward large understatement of the costs of controlling greenhouse gases and large overstatement of the net benefits. This tendency has almost certainly reinforced the current single-minded focus on rapid emission cuts.

Combining the methods of the climate modelers with those of political economists may offer an antidote to this optimistic bias. Expertise borrowed from the NIE, and from other areas of political economy, may point to opportunities for modeling more realistic policies. At least, it would provide a useful warning against overly optimistic assessment of the realism of today’s model results.

Cooperation offers advantages to both groups of scholars. The approaches complement each other. IAM-based analysis can explain what policies would be optimal and the costs of deviating from them. This ability could provide a metric by which to compare the efficiency of existing political and economic institutions. A joint workshop attended by scholars from both camps might be a useful first step toward exploring the possibilities for fruitful collaboration.

Potentially such collaboration could have important implications for climate policy. IPCC assessments have tremendous influence, but the IPCC process strongly resists consideration of institutional realities. For example, it took a considerable effort on the part of a small set of analysts to convince the authors of the IPCC Fourth Assessment Report to qualify a statement that the results of economic models assuming perfect implementation of policies in all countries and internationally provided a “lower bound” on costs of stabilizing emissions. Clearly, the climate policy debate would benefit from greater familiarity with the political economy and NIE literature.

Acknowledgements

The authors wish to thank Chris Green, Bob Hahn, Douglass North, and Tom Schelling for their reviews and many thoughtful comments during the preparation of this paper. We also wish to gratefully acknowledge the financial support for this research by the American Council for Capital Formation, the American Enterprise Institute, the Climate Policy Center, and Exxon-Mobil Corporation.

References

- Abboud, Leila. "EU Greenhouse-Gas Emissions Rose 1.1% Last Year." *Wall Street Journal*, 3 April, 2008; Page A8.
- Achenbach, Joel. "Global Warming Did It! Well, Maybe Not." *The Washington Post*, 3 August, 2008; Page B01.
- Aldy, Joseph A. "Saving the Planet Cost-Effectively: The Role of Economic Analysis in Climate Change Mitigation Policy" in *Painting the White House Green: Rationalizing Environmental Policy Inside the Executive Office of the President*, R. Lutter and J. F. Shogren (eds). Washington, D.C.: Resources for the Future, 2004.
- Anthoff, David and Richard S. J. Tol. "On International Equity Weights and National Decision Making on Climate Change." Working Paper FNU-127, February 2007.
- Arnold, R. Douglas. *The Logic of Congressional Action*. New Haven: Yale University Press, 1990.
- Barrett, Scott. *Why Cooperate?: The Incentive to Supply Global Public Goods*. New York: Oxford University Press, 2007.
- Barrett, Scott. *Environment & Statecraft: The Strategy of Environmental Treaty-Making*. New York: Oxford University Press, 2003.
- Baumgartner, Frank R. and Bryan D. Jones. *Agendas and Instability in American Politics*. Chicago: The University of Chicago Press, 1993.
- Bernstein, Paul M., Robert B. Earle, and W. David Montgomery. "The Role of Expectations in Modeling Costs of Climate Change Policies" in *Human-Induced Climate Change: An Interdisciplinary Assessment*, M. Schlesinger, H. Kheshgi, J. Smith, F. de la Chesnaye, J. M. Reilly, T. Wilson, and C. Kolstad (eds). New York: Cambridge University Press, 2007.
- Bianco, William T. *Trust: Representatives and Constituents*. Ann Arbor: University of Michigan Press, 1990.
- Blair, Peter D. "Exploring Pasteur's Quadrant: International Comparisons for Setting Research Priorities in the 21st Century." The National Academies, 2004.
- Blyth, William, Richard Bradley, Derek Bunn, Charlie Clarke, Tom Wilson, and Ming Yang. "Investment Risks Under Uncertain Climate Change Policy." *Energy Policy*, 35(11): 5766-5773, 2007.
- Bosso, Christopher J. *Environment, Inc*. Lawrence: University Press of Kansas, 2005.
- Broecker, Wallace S. "Future Global Warming Scenarios." *Science*, 304(5669): 388, 2004.
- Burchfiel, Nathan. "Americans Would Prefer Gov't Regulation to CO₂ Tax or Trading, Poll Finds." *The Nation*, 21 June, 2007.
- California Climate Action Team. "Draft State Agency Work Plans." 8 December, 2005.
- Caplan, Bryan. *The Myth of the Rational Voter*. Princeton: Princeton University Press, 2007.

- Carlin, Alan. "Global Climate Change Control: Is There a Better Strategy than Reducing Greenhouse Gas Emissions?" *University of Pennsylvania Law Review*, 155(6): 1401-1497, 2007.
- Cass, Loren R. *The Failures of American and European Climate Policy: International Norms, Domestic Politics, and Unachievable Commitments*. Albany: State University of New York Press, 2007.
- Center for Clean Air Policy. "Activities and Policies to Enhance Forest and Agricultural Carbon Sinks in California." 14 October, 2005.
- Clarke, Leon E., James A. Edmonds, Henry D. Jacoby, Hugh M. Pitcher, John M. Reilly, and Richard G. Richels. "Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations: Synthesis and Assessment Product 2.1A." Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research, July 2007.
- Coase, Ronald H. *The Firm, the Market, and the Law*. Chicago: The University of Chicago Press, 1988.
- Cohen, Linda R., and Roger G. Noll (with Jeffrey S. Banks, Susan A. Edelman, and William M. Pegram). *The Technology Pork Barrel*. Washington, D.C.: The Brookings Institution, 1991.
- Convery, Frank, Christian de Perthuis, and Denny Ellerman. "The European Carbon Market in Action: Lessons from the First Trading Period – Interim Report." Center for Energy and Environmental Policy Research: 08-002, March 2008.
- Cooper, Richard. "A Carbon Tax in China." Climate Policy Center White Paper, August 2004.
- Creys, Jon, Anton Derkach, Scott Nyquist, Ken Ostrowski, and Jack Stephenson. "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" U.S. Greenhouse Gas Abatement Mapping Initiative, Executive Report. McKinsey & Company, December 2007.
- Dam, Kenneth W. "China as a Test Case: Is the Rule of Law Essential for Economic Growth?" University of Chicago Law School, Olin Working Paper 275, 2006.
- David, Paul A. "Path Dependence: A Foundational Concept for Historical Social Science." *Cliometrica Journal of Historical Economics and Econometric History*, 1(2): 91-114, 2006.
- Downs, Anthony, "Up and Down With Ecology: The "Issue-Attention Cycle" *The Public Interest*, 28: 38-50, 1972.
- Esterling, Kevin M. *The Political Economy of Expertise: Information and Efficiency in American National Politics*. Ann Arbor: University of Michigan Press, 2004.
- Fingar, Thomas. "National Intelligence Assessment on the National Security Implications of Global Climate Change to 2030." Statement before the Permanent Select Committee on Intelligence and the Select Committee on Energy Independence and Global Warming, 25 June, 2008.
- Fogel, Robert, W. "Why China is Likely to Achieve its Growth Objectives." National Bureau of Economic Research, Working Paper 12122, March 2006.

- Gulledge, Jay. "Three Plausible Scenarios of Future Climate Change" in *Climatic Cataclysm*, K.M. Campbell (ed). Washington, D.C.: The Brookings Institution, 2008.
- Hahn, Robert W. "Greenhouse Gas Auctions and Taxes: Some Practical Considerations." Working Paper 08-12, AEI Center for Regulatory and Market Studies, April 2008.
- Hoffert, Martin I., Ken Caldeira, Gregory Benford, David R. Criswell, Christopher Green, Howard Herzog, Atul K. Jain, Haroon S. Kheshgi, Klaus S. Lackner, John S. Lewis, H. Douglas Lightfoot, Wallace Manheimer, John C. Mankins, Michael E. Mauel, L. John Perkins, Michael E. Schlesinger, Tyler Volk, and Tom M. L. Wigley. "Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet." *Science*, 298(5595): 981-987, 2002.
- Hourcade, Jean-Charles and Priyadarshi Shukla. "Global, Regional, and National Costs and Ancillary Benefits of Mitigation" in *Climate Change 2001: Mitigation*. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, B. Metz, O. Davidson, R. Swart and J. Pan (eds). New York: Cambridge University Press, 2001.
- Houser, Trevor, Rob Bradley, Britt Childs, Jacob Werksman, and Robert Heilmayr. *Leveling the Carbon Playing Field: International Competition and U.S. Climate Policy Design*. Washington, D.C.: Peterson Institute for International Economics, World Resources Institute, 2008.
- Inglehart, Ronald. *Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies*. Princeton: Princeton University Press, 1997.
- Intergovernmental Panel on Climate Change. "Fourth Assessment Report," Working Group II Report: *Impacts, Adaptation, and Vulnerability*, 2007.
- International Monetary Fund. "Climate and the Global Economy" in *World Economic Outlook*, Spring 2008.
- Jacoby, Henry D. "The Uses and Misuses of Technology Development as a Component of Climate Policy" in *Climate Change Policy: Practical Strategies to Promote Economic Growth and Environmental Quality*. American Council for Capital Formation, Center for Policy Research, May 1999.
- Jacoby, Henry D., Ronald G. Prinn, and Richard Schmalensee. "Kyoto's Unfinished Business." *Foreign Affairs*, 77(4): 54-66, 1998.
- Jones, Bryan D. *Politics and the Architecture of Choice: Bounded Rationality and Governance*. Chicago: The University of Chicago Press, 2001.
- Kelly, James L. and Charles D. Kolstad. "Integrated Assessment Models for Climate Change Control" in *International Yearbook of Environmental and Resource Economics 1999/2000: A Survey of Current Issues*, H. Folmer and T. Tietenberg (eds). Cheltenham: Edward Elgar, 1999.
- Lake, David A. "The State and International Relations." July 2007.

- Lane, Lee, Ken Caldeira, Robert Chatfield, and Stephanie Langhoff. "Workshop Report on Managing Solar Radiation." NASA Ames Research Center, Carnegie Institute of Washington Department of Global Ecology: NASA/CP-2007-214558, 18-19 November, 2006. Report published by NASA in 2007.
- McChesney, Fred S. *Money for Nothing: Politicians, Rent Extraction, and Political Extortion*. Cambridge: Harvard University Press, 1997.
- McGuire, Martin C. and Mancur Olson, Jr. "The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force." *Journal of Economic Literature*, 34(1): 72-96, 1996.
- McNeill, J.R. "Can History Help with Global Warming?" in *Climate Cataclysm: The Foreign Policy and National Security Implications of Climate Change*. Washington, D.C.: The Brookings Institution Press, 2008.
- Mearsheimer, John J. *The Tragedy of Great Power Politics*. New York: W.W. Norton & Company, 2001.
- Mendelsohn, Robert, "The Impacts of Climate Change on Asian Pacific Countries" in *Global Warming and the Asian Pacific*, C. C. Chang, R. Mendelsohn, and D. Shaw (eds). Northampton: Edward Elgar Publishing, Inc., 2003.
- Mendelsohn, Robert and James E. Neumann (eds). *The Impact of Climate Change on the United States Economy*. Electric Power Research Institute, 2001.
- Michaels, Patrick. "Global Warming: The State of the Debate." CATO Institute Forum: 12 December, 2003.
- Micklethwait, John and Adrian Wooldridge. *The Right Nation: Conservative Power in America*. New York: The Penguin Press, 2004.
- Milgrom, Paul R., Douglass C. North, and Barry R. Weingast. "The Role of Institutions in the Revival of Trade: The Medieval Law Merchant, Private Judges, and the Champagne Fairs." *Economics and Politics*, 2: 1-23, 1990.
- Montgomery, David W. and Sugandha D. Tuladhar. "Making Economic Freedom Central to the Asia-Pacific Partnership." Charles River Associates, International, April 2006.
- Naughton, Barry. *The Chinese Economy: Transitions and Growth*. Cambridge: The Massachusetts Institute of Technology Press, 2007.
- Newbery, David M.G. and Joseph E. Stiglitz. *The Theory of Commodity Price Stabilization*. Oxford University Press, 1981.
- Nordhaus, William D. *The Challenge of Global Warming: Economic Models and Environmental Policy*. Yale University, 2007.
- Nordhaus, William D. and Joseph Boyer. *Warming the World: Economic Models of Global Warming*. Cambridge: The Massachusetts Institute of Technology Press, 2000.
- North, Douglass C., John Joseph Wallis, and Barry R. Weingast. "A Conceptual Framework for Interpreting Recorded History." National Bureau of Economic Research, Working Paper 12795, December 2006.

- North, Douglass C. *Understanding the Process of Economic Change*. Princeton: Princeton University Press, 2005.
- North, Douglass C., *Institutions, Institutional Change, and Economic Performance*. New York: Cambridge University Press, 1990.
- North, Douglass C. *Structure and Change in Economic History*. New York: W.W. Norton & Company, Inc., 1981.
- North, Douglass C. and Robert Paul Thomas. *The Rise of the Western World: A New Economic History*. New York: Cambridge University Press, 1973.
- Olson, Mancur. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge: Harvard University Press, Revised Edition, 1971.
- Orwell, George. "Charles Dickens" in *A Collection of Essays*. Garden City: Doubleday and Co., 1954.
- Pei, Minxin. *China's Trapped Transition: The Limits of Developmental Autocracy*. Cambridge: Harvard University Press, 2006.
- Pielke, Jr., Roger, Tom M. L. Wigley, and Christopher Green. "Dangerous Assumptions." *Nature*, 452: 531-532, 2008.
- Repetto, Robert (ed). *Punctuated Equilibrium and the Dynamics of U.S. Environmental Policy*. New Haven: Yale University Press, 2006.
- Roland-Holst, David. "Economic Assessment of Some California Greenhouse Gas Control Policies: Applications of the BEAR Model" in *Managing Greenhouse Gas Emissions in California*, M. Hanemann and A. Farrell (eds). University of California at Berkeley, The California Climate Change Center, January 2006.
- Rosen, Daniel H. and Trevor Houser. "China Energy: A Guide for the Perplexed." Center for Strategic and International Studies, Peterson Institute for International Economics, May 2007.
- Rosenberg, Nathan. "Uncertainty and Technology" in *The Mosaic of Economic Growth*, R. Landau, T. Taylor, and G. Wright (eds). Stanford: Stanford University Press, 1996.
- Schelling, Thomas C. "What Makes Greenhouse Sense?" *Indiana Law Review*, 38: 581-593, 2005.
- Schmalensee, Richard, Thomas M. Stoker, and Ruth A. Judson. "World Carbon Dioxide Emissions: 1950-2050." *The Review of Economics and Statistics*, 80(1): 15-27, 1998.
- Shirk, Susan L. *China: Fragile Superpower*. New York: Oxford University Press, 2007.
- Smith, Anne E. "Prepared Statement at the Legislative Hearing on America's Climate Security Act of 2007, S.2191 of the Senate Committee on Environment and Public Works," 8 November, 2007.
- Smith Anne E. "Climate Change: Lessons Learned From Existing Cap and Trade Programs." Statement before the House Subcommittee on Energy and Air Quality, 29 March, 2007.

- Stavins, Robert N., Judson Jaffe, and Todd Schatzki. "Too Good to be True? An Examination of Three Economic Assessments of California Climate Change Policy." AEI-Brookings Joint Center for Regulatory Studies, January 2007.
- Steinfeld, Edward S. "The Rogue that Plays by the Rules." *Washington Post*, 2 September, 2007; Page B03.
- Sunstein, Cass R. "The Complex Climate Change Incentives of China and the United States." Working Paper 07-14, AEI-Brookings Joint Center for Regulatory Studies, Revised: August 2007.
- Taylor, Paul. "Germany Torn on EU Climate Plan as Car Lobby Bites." *Reuters*, 23 April, 2008.
- Tetlock, Phillip E. "Thinking the Unthinkable: Sacred Values and Taboo Cognitions." *Trends in Cognitive Sciences*, 7(7): 320-324, 2003.
- Tol, Richard S.J. "The Social Cost of Carbon: Trends, Outliers and Catastrophes." Discussion Paper 2007-44, 19 September, 2007.
- Tol, Richard S.J., "The Stern Review of the Economics of Climate Change: A Comment." 30 October, 2006.
- Weingast, Barry R. "The Political Foundations of Limited Government: Parliament and Sovereign Debt in 17th-and 18th-Century England" in *The Frontiers of the New Institutional Economics*, J. N. Drobak and J. V. C. Nye (eds). New York: Academic Press, 1997.
- Wyerman, James K. and John L. Kirkwood. "Comments on Draft Guidelines and Draft Report." Submitted to OMB 5 May, 2003 by 20/20 Vision, American Lung Association, American Rivers, Breakthrough Technologies Institute, Clean Air Task Force, Clear the Air, Coalition on the Environment and Jewish Life of Southern California, Defenders of Wildlife, Environmental Integrity Project, Friends of the Earth, Los Angeles Interfaith Environmental Council, Mineral Policy Center, National Audubon Society, National Environmental Trust, Natural Resources Defense Council, Oceana, Physicians for Social Responsibility, Sierra Club, The Ocean Conservancy, U.S. Public Interest Research Group, and World Wildlife Fund.
- Yardley, Jim. "Fighting Inflation, China Freezes Energy Prices." *New York Times*, 9 January, 2008.