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Conclusion

The adoption of federal climate legislation in the United States would be one of the most significant economic and environmental policy developments on record. While considerable work remains to be done to quantify the impact of climate policy on various sectors of the economy, carbon-intensive manufacturing would face meaningful increases in production costs under most proposals being discussed. The effect of such a cost increase on the international competitiveness of these industries has become a key concern for policymakers, not just in the United States but also in most countries. While these concerns are best addressed through a harmonized international climate policy, the differences between countries in the level of economic development, political conditions, obligations stemming from historic emissions, and responsibilities arising from future emissions mean harmonization is still a long way off. The question then, in the design of domestic US climate policy today, is how to level the playing field for carbon-intensive industries during a period of uncertainty about policy movement internationally.

Broadly defined, options for addressing competitiveness and emissions leakage in US climate policy fall into three categories: (1) reducing the cost of compliance for domestic producers, (2) imposing similar costs on foreign producers indirectly through an adjustment at the border, and (3) encouraging other countries to impose similar costs on their industries directly. Each of these approaches can be found in the leading legislative proposals being considered in the US Congress at present. Based on analysis of energy requirements, the international trade flows, and trends in supply and demand of key carbon-intensive industries, we arrive at the following conclusions for each approach.

Cost Containment Mechanisms

Reducing emissions at the lowest possible cost to the economy as a whole is an overarching priority in climate policy design. As such, a market-based regulatory system like a carbon tax or a cap-and-trade system will likely be at the core of any US climate policy. The most economically efficient system from a *nationwide* standpoint, however, could reduce the international competitiveness of key carbon-intensive industries, and thus output and employment, if major trading partners do not follow suit. Several options are available to lower the compliance costs for these industries, though doing so may weaken the policy's environmental effectiveness. In considering the use of cost containment mechanisms to level the playing field for US industry, policymakers should consider a number of factors.

Effectiveness Varies Greatly Across Industries and Firms. The ability of cost containment mechanisms to reduce compliance costs for carbon-intensive manufacturing depends on the type of energy consumed and whether associated CO_2 is emitted directly by the manufacturing facility or indirectly in the generation of electricity. Significant differences in both exist across industries and firms.

Measures that Increase Flexibility Are Broadly Helpful. Granting firms the option to "bank and borrow" emissions allowances and use offsets reduces compliance costs for all carbon-intensive industries, though to varying degrees. If properly enforced, such measures help level the playing field without compromising the environmental integrity of the system as a whole.

Allocation of Allowances May Do Little to Guard Against Declines in Output and Employment Levels in Vulnerable Industries. Providing emissions allowances free to carbon-intensive industries under a cap-and-trade system has been discussed as a way to prevent firms from closing shop in the face of international competition that does not face similar carbon costs. While such measures would help compensate investors, they may not protect output or employment levels if firms opt for profit over market share by pricing products based on the cost of purchased allowances rather than those received for free. Allocating free allowances to nontraded sectors, like electric power, does little to help the competitiveness of carbon-intensive US manufacturing.

Price Caps Are a Blunt Tool for Dealing with Industry Competitiveness. The uncertainty in the price of carbon under a cap-and-trade system has led some policymakers to support the inclusion of a defined limit on the

cost of emissions allowances. While price caps would limit costs for carbon-intensive industries, they would weaken incentives to reduce emissions for other sectors of the economy as well and thus undermine the policy's environmental objectives.

A Carbon Tax Offers a More Targeted Approach, but with Environmental Costs. If price certainty is a priority, policymakers should consider making a carbon tax part of the domestic regime. As opposed to a cap-and-trade system with a price cap, a carbon tax offers greater flexibility in targeting relief specifically to industries competing internationally. Such relief comes at an environmental cost, however, as carbon tax credits remove incentives to reduce emissions.

Reducing Noncarbon Costs Guards Against Job Loss while Meeting Environmental Goals. As opposed to free allocation of emissions, which may protect profits more than employment levels, and carbon tax credits, which increase emissions, using allowance auction or carbon tax revenue to reduce labor-related costs for carbon-intensive manufacturing creates incentives for firms to both maintain employment levels and reduce emissions. The cost of such relief is a fraction of the amount of forgone revenue that would result from the free allocation of emissions allowances considered under most proposals. And while free allocation is often justified on competitiveness grounds, reducing noncarbon costs for affected industries may be more effective in maintaining output levels.

Trade Measures

After the United States withdrew from the Kyoto Protocol, some in Europe considered addressing what they considered to be an unfair trade advantage for American industry exempt from carbon costs by imposing tariffs on US goods at the border. Now that the United States is returning to the fold, policymakers in Washington are considering similar steps aimed primarily at developing-world producers. Trade measures, whether under a cap-and-trade or a carbon tax system, seek to impose indirectly at the border the same costs borne by domestic firms on foreign producers. The mechanics of implementing such measures, the range of products that would be covered, and their impact on US industry and the international trading system are a key focus of this report.

Assessing Carbon at the Border Is Complicated. To subject foreign producers to the same costs faced by US firms under a cap-and-trade or carbon tax regime through trade measures requires an accurate assessment of the amount of CO_2 emitted during the production of a specific good.

For most carbon-intensive intermediate products like steel, aluminum, chemicals, and cement, this is a daunting task, given the enormous variety of production processes employed and fuels used. The amount of carbon "embedded" in a ton of steel varies greatly both by country and by individual firm. For final goods like electronics, appliances, and vehicles, accurately assessing embedded carbon at the border is next to impossible.

A Level Playing Field Does Not Benefit All US Industry. In an effort to treat domestic and imported goods equitably in terms of embedded carbon (required to withstand a WTO challenge), trade measures would provide protection for some US producers but not for others. In terms of average carbon intensity, the US steel, paper, and chemical industries score better than cement and aluminum, though important differences exist between individual firms in all industries. And while US policymakers may have more carbon-intensive China and India in mind when considering the use of trade measures, most imports of the goods in question come from countries with less carbon-intensive production than the United States. In addition, if the United States imposes trade measures alone, China (for instance) could redirect its products to Japan, freeing up carbon-light Japanese production for export to the United States.

Focusing on Carbon-Intensive Imports Misses Important Industries Downstream. Given the challenges in assessing embedded carbon in fairly standardized intermediate products like steel, aluminum, and basic chemicals, it would be nearly impossible to do the same for the millions of downstream products that rely on these goods for final assembly. Yet using trade measures for imported steel but not for imported automobiles, for example, would increase the steel acquisition costs for the US auto industry vis-à-vis foreign competition, putting it at a competitive disadvantage.

Trade Measures Provide Little Leverage Internationally. Many policymakers see the threat of trade measures as a way both to win domestic support for US climate legislation and to encourage other countries to take similar steps to reduce emissions. Yet the risk of losing access to the US market for carbon-intensive goods alone provides little leverage in inducing a change in policy in most countries. While China accounts for 32 percent of global steel production (figure 3.9), only 8 percent of the 353 million tons produced in 2005 was exported (figure 3.10). Less than 1 percent was sold to the United States (figure 3.10). The US market accounts for 3 percent of Chinese aluminum production, 2 percent of paper production, and less than 1 percent of both basic chemicals and cement. Most of the demand for carbon-intensive products comes from developing countries, China in particular. The United States accounts for only 10

percent of global demand in the five carbon-intensive industries, the imported share of which accounts for less than 3 percent.

Border Calculations May Fail to Create Firm-Level Incentives. Under most proposals, the carbon embedded in imported goods would be assessed using a national average for the country of origin. As exporting firms from countries such as China are often the best in class, such calculations create little incentive for exporters to get cleaner. That said, trade measures could, if assessed at the firm level, create positive incentives for foreign companies to reduce carbon emissions individually even if they do not provide enough leverage to convince their governments to do so through policy. This would, however, require the voluntary participation of the exporting company or its home government in tracking and monitoring emissions. Fortunately, the prospects for eliciting such international participation are more promising than many believe.

Coordinated International Action

Given the challenges in using unilateral trade measures to address competitiveness concerns, working with major trading partners to impose costs directly on their industries at home, rather than indirectly at the border, is a more promising way to level the playing field both for producers of carbon-intensive goods and the industries that consume them. In addition, a trade approach alone would fail to address the majority of industrial emissions. US imports of carbon-intensive goods account for less than 4 percent of emissions from those industries worldwide (table 4.1). Even if other countries acted alongside the United States, only 18 percent of the steel, aluminum, cement, paper, and basic chemicals produced worldwide is internationally traded. While developing countries produce a growing majority of carbon-intensive goods, the vast bulk is consumed domestically, feeding the rapid urbanization taking place. Getting at that production requires international engagement.

International Engagement Offers More Than One Way to Address Competitiveness Concerns. The need to raise living standards through economic growth likely means that absolute caps on emissions during the next round of climate negotiations will be unacceptable to most in the developing world, including India and China. Indeed, many policymakers are attracted to trade measures partly because they provide a concrete alternative should international climate negotiations fail to alleviate competitiveness concerns. Many commitments short of absolute caps, however, could be even more effective in leveling the carbon playing field for US industry. An agreement to discipline industrial emissions from key sectors, whether through emissions-intensity targets, product standards,

or a direct tax, would do far more than would trade measures alone, both for the competitiveness of US industry and overall reduction of emissions.

Engagement with the Developing World Has More Potential than Most Observers Think. The reluctance of developing countries to adopt absolute caps on emissions does not signal unwillingness to discipline industrial emissions. China, the source of much of the concern in the US climate policy debate, is working aggressively to curb the growth and improve the efficiency of its carbon-intensive industries out of local environmental and energy security concerns. Actions taken already include changes in tax policy equal to the imposition of a $50 per ton carbon tariff applied to exports of Chinese steel. During the last round of climate negotiations in Bali, industry-level agreements garnered support from developed and developing countries alike. There is considerable room to work together with large emerging economies like China and India to level the carbon playing field.

Looking Forward

The rules and institutions of the international trading system may well have a role to play in leveling the carbon playing field in the years ahead. If approached multilaterally and in conjunction with a broader international climate framework, trade policy could create additional incentives to reduce greenhouse gas emissions. To be successful, a trade regime that included climate considerations would require the willing participation of both developed and developing countries. Such multilateral involvement would promote an accurate assessment of embedded carbon both by product and by producer, so that low-carbon goods and production processes were adequately rewarded. Absent broad multilateral action, the use of trade measures to address competitiveness concerns and emissions leakage will have only limited success and could put considerable strain on the international trading system we rely on to boost economic growth in developing countries and deliver the technology required to make that growth green.