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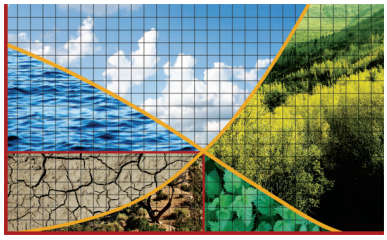

Harvard Project on Climate Agreements

Summary of Discussion Paper 54

SEPTEMBER 2015

THE ROLE OF BORDER CARBON ADJUSTMENT IN UNILATERAL CLIMATE POLICY: INSIGHTS FROM A MODEL-COMPARISON STUDY

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Overview

In the absence of an effective global agreement to reduce carbon emissions, some industrialized countries have taken unilateral action to reduce emissions. However, unilateral carbon policy can lead to leakage of carbon emissions and precludes abating emissions where such abatement would be least expensive (possibly in other countries). Border carbon adjustment (BCA) is one policy option to mitigate these two disadvantages of unilateral action, but the effectiveness of these measures remains unclear. Comparing the results of simulated carbon policy and BCA in multiple computable general equilibrium (CGE) models of the global economy offers several estimates of the effectiveness of BCA.

Background

BCA includes a tariff on imported goods, the magnitude of which is approximately proportional to the carbon emissions associated with their production (for example, from electricity use). On the export side, emission charges paid by domestically-regulated firms are rebated for exports to countries with no domestic regulations. In this way the price of imports and exports should remain unaffected by unilateral carbon policies.

Without BCA, unilateral carbon policy can generate leakage through two channels. The first is by changing the competiveness of energy-intensive, trade exposed industries (EITE). Competitors not subject to domestic carbon policy can sell at a lower price, which either induces EITE firms to relocate or decrease production, while unregulated firms increase production. In both cases, carbon emissions "leak" from the regulated to the unregulated country. The second leakage channel is depression of fossil fuel prices caused by decreased demand in the abating region. Lower prices lead to increased demand—and emissions—in non-abating regions. By adjusting prices, BCA can mitigate the competitiveness impacts on EITE industries. BCA can also encourage abatement to occur in least-cost areas by incentivizing carbon reduction among firms in non-abating regions that export to the abating region.

Assessing the effectiveness of BCA as a policy option requires answering four key questions: (1) How effective is BCA in reducing leakage? (2) Is BCA effective in protecting EITE industries? (3) How large are global cost savings from BCA? (4) What is the incidence of BCA across regions? To answer these questions, the results of a series of CGE models of the global economy are calibrated with the same base data for a business as usual (BAU) case in which a coalition of developed countries implements unilateral carbon policy to generate a 10% reduction in global emissions. A simulation is then run in which the same policy is implemented but BCA is used by the abating coalition.

Key Findings

1. **BCA reduces leakage.** Leakage rates in the BAU case are between 5% and 19%, with a mean value of 12%. In the simulations with BCA in place, leakage rates range between 2% and 12%, with a mean value of 8%. This implies that with BCA, unilateral emissions caps can be relaxed (that is, allowed to be higher), relative to the BAU case, to achieve a given level of global carbon reduction, and that BCA helps move some carbon reduction to the areas with lower abatement costs.

2. **Global abatement costs are only slightly lower with BCA.** Because BCA allows for a higher cap in the abating countries, the BCA scenario has slightly lower marginal abatement costs. BCA is only a weak instrument for correcting the global inefficiency of unilateral action.

3. **BCA maintains the competitiveness of energy exposed industries.** EITE production in abating countries falls by 2.8% on average in the base case and increases in non-abating countries. Implementation of BCA reduces the decline in abating countries to a 1% fall in production and reduces the growth in non-abating countries.

4. **BCA does little to offset impacts of carbon reduction on global GDP.** A 10% reduction in global carbon emissions through unilateral action without BCA results in losses of between 0.13% and 0.63% of global GDP. Cost savings from implementing BCA range from 0% to 18%, with a mean of 7.7%.

5. **BCA increases the burden of GDP loss born by non-abating countries.** The ratio of GDP losses resulting from unilateral carbon caps in abating countries to those in non-abating countries without BCA is 3:1. When the BCA is implemented this falls to 1:1.

Conclusions

Without an international agreement to reduce carbon emissions, countries have turned to unilateral policies. Using BCA in concert with these policies can be effective in reducing emissions leakage to non-abating countries, and BCA can lower overall abatement costs. Further, EITE industries in abating countries retain their competitiveness when BCA is in place. However, BCA does little to offset the overall cost of carbon emissions reduction, and the burden of these costs falls more heavily on non-abating countries, relative to abating countries, when BCA is utilized. Finally, while the burden shifting potential of BCA may accommodate strategic leverage to trigger cooperation by non-abating countries, the coercive nature can also backfire and lead to detrimental trade conflicts.

Full paper available at: http://belfercenter.ksg.harvard.edu/publication/22361

About the Project

Established in 2007, the goal of the Harvard Project on Climate Agreements is to help identify and advance scientifically sound, economically rational, and politically pragmatic public policy options for addressing global climate change. Drawing upon leading thinkers in Argentina, Australia, China, Europe, India, Japan, and the United States, the Project conducts research on policy architecture, key design elements, and institutional dimensions of international and domestic climate policy.

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