THE ROLE OF TRADE AND COMPETITIVENESS MEASURES IN U.S. CLIMATE POLICY

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ABSTRACT

We review the proposed measures for addressing competitiveness and carbon leakage concerns in recent U.S. climate policy legislation. For eligible energy-intensive, trade-exposed sectors, output-based rebates would initially dampen cost increases; later, border adjustments would ensure that imports face comparable cost burdens. Both measures can in theory enhance the economic efficiency of carbon reduction efforts, but both pose some interesting economic and practical tradeoffs. This paper discusses our recent research into the welfare and carbon leakage effects of using output-based allocation and trade measures in conjunction with climate policies.

The Role of Trade and Competitiveness Measures in U.S. Climate Policy

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Efforts of the 111th U.S. Congress to pass comprehensive climate change legislation, although ultimately unsuccessful, provide important insights into the challenges that must be addressed to reach political agreement on a package for reducing greenhouse gas (GHG) emissions. Chief among the concerns for legislators is the economic burden on their constituents, their household energy bills, and particularly their jobs. Among the many interests in the climate debate, perhaps the most vocal are the energy-intensive manufacturing sectors. They argue not only that the increased costs of carbon pricing will harm their ability to compete on international markets, but also that the lack of comparable regulation among trading partners risks eroding the environmental benefits if emissions shift abroad.

The political importance of these arguments is underscored by correspondence and statements by Senators from industrial states. In 2008, 10 of these Democratic Senators wrote a letter laying out the principles they would need to see final legislation address, including cost containment, relief for working families, technology investment, equitable treatment of states,

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and, prominently, "enhanced safeguards to ensure a truly equitable and effective global effort that minimizes harm to the U.S. economy and protects American jobs."[2]

The Waxman/Markey bill (H.R. 2454 "The American Clean Energy and Security Act," henceforth "ACES Act") passed by the House on June 26, 2009 incorporates many of these features. Cost containment measures include generous use of offsets,[3] banking and borrowing provisions, and safety valve mechanisms to avoid price spikes. Allowance revenues are earmarked in part to technology investments, relief for low income households, and to mitigate electricity price increases. In addition, a section titled "Ensuring Real Reductions in Industrial Emissions" offers two targeted programs that deal specifically with competitiveness and leakage concerns: an "Emission Allowance Rebate Program" and an "International Reserve Allowance Program" (IRAP). These latter features were also retained with only minor variations in the companion Kerry/Lieberman bill ("American Power Act") that failed to pass in the Senate.

The section identifies sectors most vulnerable to competitiveness and carbon leakage problems by defining eligibility as *manufacturing* sectors (excluding refining) that are at least 5% energy (or CO2) intensive *and* 15% trade intensive, or 20% energy intensive, although other sectors may petition for inclusion. These criteria, applied at the 6-digit level of the North American Industry Classification System (NAICS), imply that 44 (out of nearly 500) industries would likely be presumptively eligible, with most of those concentrated in the manufacture of

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[2] Letter to the Honorable Harry Reid and the Honorable Barbara Boxer, from Senators Deborah Stabenow, John D. Rockefeller IV, Carl Levin, Blanche Lincoln, Mark Pryor, Jim Webb, Evan Bayh, Claire McCaskill, Sherrod Brown, and Ben Nelson, June 6, 2008.

[3] Some issues with offsets are discussed by Sigman and Chang in this issue.

primary goods like chemicals, metals (e.g., steel and aluminum), nonmetallic minerals (e.g., cement and glass), and some minerals processing (Interagency Report 2009).

Firms in eligible sectors would get rebates in the form of allowance allocations, based on their production levels, multiplied by a sector-specific carbon benchmark equal initially to 100% of sector average emissions (both direct and uncompensated indirect emissions costs are included). These allocations would be updated annually, based on recent (two-year) average production. Unlike traditional grandfathered allowances, which offer windfall compensation, output-based allocation creates a production incentive that mitigates the increases in marginal costs and product prices that result from emissions pricing. These allocations would begin to phase out over 10 years in 2026, unless they are deemed by the President to still be necessary.

Beginning in 2020,[4] the legislation foresees a transition from the rebate program to the IRAP, which would require importers of goods from the same eligible energy-intensive trade-exposed (EITE) sectors to purchase allowances to cover the embodied carbon emissions. The intent is to base the allowance requirement on the national (foreign) carbon intensity of production in that sector (covering both direct and indirect emissions), with reductions for the share of emissions for which the domestic U.S. sector receives free allocation of allowances; the details of the carbon metrics, however, would be left to the administration. Some countries would be exempt from these border adjustments: the least developed countries; those representing less than 0.5% or global emissions and 5% of U.S. imports in that sector; and, importantly, those meeting standards of adequate effort. The legislation defines these standards

[4] The ACES Act states that the IRAP should go forward unless Congress recognizes a finding by the President that the program is unnecessary. This discretion, as well as the delay in implementation, was a point of contention in the Senate debate.

in Section 767(c) as either 1) being party to an international agreement with reduction targets "at least as stringent" as in the U.S.; 2) being party to multi- or bilateral agreements with U.S. for that sector; or 3) having lower energy or GHG intensity than the comparable U.S. sector. The IRAP is deemed no longer necessary once 85% of imports are produced in countries meeting these standards. Thus, the border adjustments are intended not only as a means to avoid carbon leakage and competitiveness effects, but also as a lever to encourage trade partners to adopt their own reduction strategies.

Both of these programs are controversial. Both policies, but particularly border adjustments, risk being disputed as inconsistent with World Trade Organization (WTO) law. Both can in theory enhance the economic efficiency of carbon reduction efforts, but both are practically challenging to implement in a fashion that maintains their efficiency-enhancing properties. Given some of the likely practical constraints, they each pose some interesting economic tradeoffs. This paper discusses our recent research into the welfare and carbon leakage effects of using output-based allocation and trade measures in conjunction with climate policies.

I. Output-Based Rebating

Output-Based Rebating (OBR) gives a financial reward to eligible firms for each unit of their production, in this case in the form of a per-unit allocation of emissions allowances. The ACES Act formula for the allocation would be industry average emissions intensity (e.g., average CO2 per ton of product), while a less generous form might offer the best practice emissions intensity for the industry as the benchmark. A key factor is that the allocation is in

proportion to actual, recent measures of production, rather than being fixed by historical measures; that is, the allocation is updated on some regular basis.[5]

Competitive firms need to recover the additional costs of the allowances that must be purchased (or foregone) for the emissions associated with additional production. OBR reduces this cost burden, since additional production garners additional rebates, offsetting the additional emissions liability. Thus, the cost increase that must be passed on to consumers or absorbed by firms is smaller with OBR than with allocation mechanisms not conditional on output.

By basing the allocation on a sectorwide measure, individual firm incentives to reduce emissions are maintained. In essence, the emissions price signals the value to reducing emissions intensity, while the rebate signals that production levels should be maintained.

Still, from a first-principles point of view, OBR is generally a bad idea. The point of emissions pricing is to send markets a signal that greenhouse gas emissions are costly. One way to avoid emissions is to use production processes that are less emissions-intensive; another is to consume fewer products from energy-intensive sectors. OBR dampens the price signal that would be sent to consumers to signal the value of conservation or of investments in end-use efficiency. Correspondingly, without conservation in demand for emissions-intensive products,

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[5] Allocations in the next phase of the EU Emissions Trading System (ETS) can be thought of as a hybrid of this scheme and grandfathering. Although allowance allocations are fixed for some years, they are determined through a benchmarking process that computes industry best practices and takes production capacity into account. Thus, there is some degree of updating over time across the phases. The EU is also imposing trade and energy intensity criteria, but by allowing sectors that are either highly trade or energy exposed, they capture a larger range of industries eligible for free allocations.

to reach the same level of emissions reduction, firms must engage in greater efforts to reduce the emissions intensity of production, which means permit prices and overall costs must rise.

However, climate policy is not implemented in a first-principles world, but rather in a second-best context in which there can be efficiency arguments for OBR. Two categories of market imperfections are especially important for policies addressing CO2, a pollutant that is both global in its effects and pervasive in its use throughout the economy. One is incomplete coverage of the carbon regulation, and another is the presence of pre-existing distortions in the greater economy.

Incomplete regulatory coverage can arise both internationally, if trading partners lack comparable regulation, and domestically, if the environmental policy is unevenly applied, due to technical, administrative, or other concerns. Bernard et al. (2007) show that when the emissions of other sectors cannot be regulated, the second best policy is to tax those goods according to their embodied emissions. If the other emitting sectors can be neither regulated nor taxed, the next best policy is to subsidize the output of the regulated sectors. The optimal subsidy then reflects the value of the emissions crowded out by additional output in that regulated sector.

Labor taxes distort the consumption-leisure tradeoff, and environmental regulation that further raises consumer prices exacerbates those costs (a collection of the literature is available in Goulder 2002). Taking this distortion into account, grandfathering allowances results in higher policy costs than auctioning with revenue recycling to lower labor taxes, which helps maintain the real wage. However, output-based rebating, by limiting those consumer price increases, can also reduce the tax interaction effect, as well as the leakage effect. Fischer and Fox (2009b) solve for optimal rebates when a carbon tax is implemented in a context with both carbon leakage and tax interactions. They show that optimal rebates are higher for goods that are stronger substitutes

for unregulated carbon-intensive goods, such as in EITE manufacturing sectors, and for goods that are stronger complements with employment.

Of course, the ACES Act not only offers OBR to EITE sectors, but also, in effect, to electricity, through the allocations to the local distribution companies (LDCs), which have a mandate to pass on the cost savings to consumers. Electricity generation faces little competition from foreign trade, though some of its consuming sectors are trade-sensitive, so there is limited leakage justification, especially considering the inclusion of indirect emissions in EITE eligibility. Rebating to generators would keep electricity prices low, which may respond to some constituent concerns, but the consequence is to limit incentives for consumers and companies to adopt energy-saving technologies. The resulting upward pressure on carbon prices only serves to increase the cost burden on other sectors, including those for which competitiveness and leakage are real concerns (Burtraw 2009). It can also drive up demand for natural gas, changing the relative prices of fossil fuels and decisions about energy use in the rest of the economy. However, the widespread consumption of electricity throughout the economy means that OBR to electricity can limit changes to the real wage, mitigating some tax interaction effect, though not as effectively as a broad-based tax cut.

Fischer and Fox (2010) simulate stylized versions of the ACES Act provisions in a computable general equilibrium (CGE) model of global trade that incorporates labor-leisure tradeoffs, to represent both carbon leakage and tax interaction issues. They consider the effects of these kinds of OBR (to EITE sectors and to electricity), depending on whether the remaining revenues are used to lower distorting taxes or grandfathered (in the form of lump-sum transfers) to constituents in the economy. They find that when remaining allowances are auctioned with revenue recycling, OBR to EITE sectors improves U.S. welfare and reduces carbon leakage, with

little effect on the carbon price; however, extending OBR to electricity is welfare reducing, driving up carbon prices by a third, foregoing substantial revenue recycling, and making little incremental impact on carbon leakage. On the other hand, when remaining allowances would be grandfathered, offering OBR to both the EITE and electricity sectors improves welfare over grandfathering alone, despite the higher carbon prices, due to the smaller decreases in the real wage; still, it does not necessarily dominate OBR to EITE alone.

II. Border Carbon Adjustments

Border carbon adjustments (BCAs) are in theory an effective way to ensure that consumers face consistent carbon pricing signals, thus avoiding a main disadvantage of OBR. Ideally, they can distinguish among the reduction efforts of trading partners, which OBR cannot. Import adjustments would require importers to purchase allowances based on actual or estimated embodied emissions, leveling the playing field at home between imported and domestic consumer goods. Full border adjustment would also level the playing field abroad between domestic exports and foreign goods by adding relief for exports, in the form of a rebate based on average emissions payments in the sector.

However, few proposals would in practice implement true destination-based carbon pricing. The ACES Act only addresses imports, and despite aspirations to adjust for actual embodied emissions, legal and practical reasons may prohibit that. Even for primary goods, the information required to calculate actual embodied emissions for foreign firms may be onerous or simply unavailable. Less direct measures like country averages mean exporters have little incentive to reduce their emissions to influence the adjustment; BCAs then, like rebates, only affect the relative prices of goods. Using country averages may also require an option for firms with below-average emissions to appeal the adjustment. Opinions vary as to whether BCAs that

differentiate across countries can be compatible with WTO obligations to treat imported goods no less favorably than "like" domestic products, and to accord Most Favored Nation Treatment to all WTO members. Exceptions might be made for policies deemed necessary to preserve the environment, as long as they are the least trade restrictive option. Nondiscriminatory measures like best available technology benchmarks would likely avoid these problems, but they mean weaker signals for consumers and less effective action against leakage.

Fischer and Fox (2009a) compare the different economic tradeoffs associated with BCAs as compared to OBR. While all the options promote domestic production to some extent, none of them would necessarily be effective at reducing global emissions in a given sector—while they reduce emissions abroad, they expand domestic firms' emissions. The net effect depends on the relative responses of domestic and foreign producers to price changes and their relative emissions intensities. Using plausible values for these parameters, it seems likely that for most U.S. sectors, a full border adjustment, combining an import adjustment based on actual embodied carbon emissions with an export rebate, is most effective at reducing global emissions. But when import adjustments are limited for reasons of WTO compatibility to a weaker nondiscriminatory standard, OBR can be more effective at limiting emissions leakage and encouraging domestic production.

III. Conclusions

As long as we remain in a world of asymmetric, unilateral efforts to regulate greenhouse gas emissions, addressing competitiveness and leakage concerns will be a necessary component for Congress to reach a comprehensive legislative solution to climate policy. The key anti-leakage measures of the proposals in the 111th Congress—output-based rebates and border carbon adjustments for energy-intensive, trade-exposed manufacturing sectors—have (in theory)

the potential to improve the efficiency of domestic carbon regulation during the global transition, but they are not uncontroversial. Consequently, some caution is reasonable.

Border adjustments provide better price signals for consumers, but they also risk providing political cover for unwarranted and costly protectionism and may provoke trade disputes with other nations. Output-based rebating is less overtly a trade measure, but if not used judiciously, it can undermine the efficiency of the cap. Even a circumscribed program can run into challenges of defining appropriate metrics for eligibility and consistent units of production and allocation benchmarks that do not mute the environmental effectiveness of the carbon price signal (Fischer and Morgenstern 2009). Finally, the U.S. must remember that many large trade partners are themselves implementing emissions regulation, and any anti-leakage scheme must consider how preferential treatment will be phased out.

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