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# How Trade Cooperation by the United States, the European Union, and China Can Fight Climate Change

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Together, the United States, the European Union (EU), and China account for 60 percent of world GDP and nearly half of the world's greenhouse gas (GHG) emissions.<sup>1</sup> Their climate policies are heterogeneous—understandably, given the large differences in their forms of government, their paths of economic development, the role of government in their economies, and their patterns of production and consumption.

Climate policy choices have important spillover effects across jurisdictions. For example, Chinese subsidization of solar panels has lowered the global costs of solar energy adoption, spurring energy transitions elsewhere. European Union emissions reductions have benefitted the rest of the world while demonstrating the feasibility of tackling climate change through policy innovation. The United States hopes to help drive global technolog-

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1. All data are from the World Bank. In 2019, these jurisdictions account for 46 percent of the world's greenhouse gas emissions and 52 percent of the world's carbon emissions. GDP data and population data are from 2021, when these jurisdictions accounted for 28 percent of the world's population. All series are for the latest year available at the time of writing.

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ical innovation through a portfolio of tax incentives that aim to spur the clean energy transition.

Heterogeneous policy choices can generate downsides as well as benefits, however. The United States' clean energy tax subsidies under the Inflation Reduction Act (IRA) demonstrate important commitments to addressing climate change, but they raise competitiveness concerns for trading partners. Many countries view the European Union's proposed carbon border adjustment mechanism (CBAM) as hidden protectionism. Chinese subsidies have led to geographically concentrated production of key clean energy supply chain components, stoking fears that such market power could be weaponized through export restrictions. These frictions result from worries that one country's policies will ultimately harm firms and workers outside its borders.

This chapter explores recent climate policy development in these three economies, describing potential policy spillovers. It discusses how trade tensions can result from divergent climate policy, examining the policy response to the IRA (both unilaterally and bilaterally) as well as how the United States, Europe, and China differ in their approach to managing these vexing trade and climate issues.

The chapter then turns to the role of the world trading system in tackling these challenges, considering WTO rules on subsidies, border measures, and export restrictions. It shows that the WTO response to these challenging policy spillovers is likely to be inadequate because of difficulties in the current dispute settlement system and the need for broader reforms.

The last section of the chapter discusses possible paths forward. The first big challenge is to manage cooperation on trade and climate between the United States, the European Union, and China. The urgency of the global climate crisis has the potential to galvanize productive negotiations by these three important jurisdictions, allowing them to overcome impasses based on commercial considerations. A key output of such negotiations would be agreement on a set of guardrails that would shape the use of (and response to) subsidies, carbon border adjustments, and export restrictions. Policy cooperation by the United States, the European Union, and China might serve as a steppingstone toward better global policy cooperation.

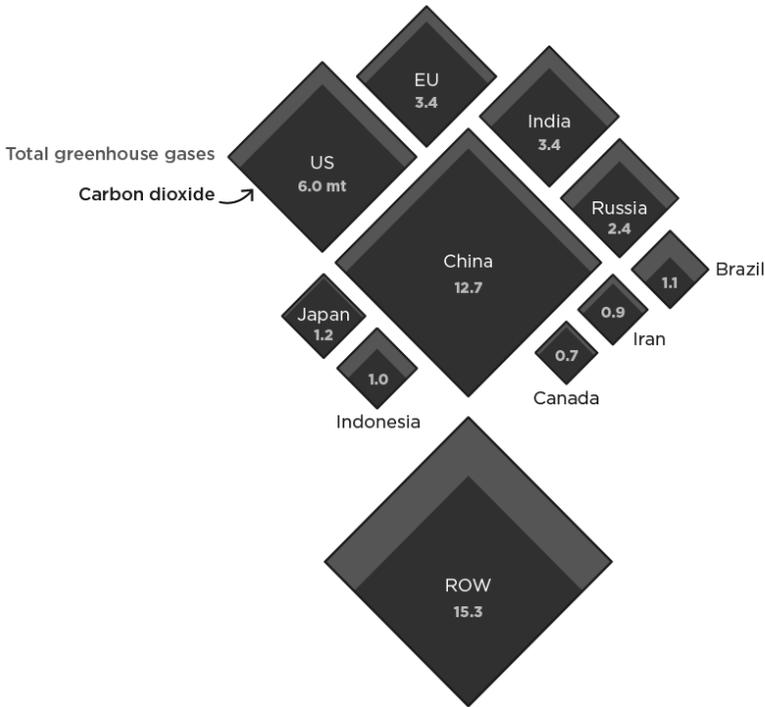
## **Approaches to Climate Change in China, the United States, and the European Union**

China is the world's largest emitter of GHG emissions, accounting for 26 percent of global emissions in 2019 (figure 8.1). Its high level of emissions stems from both its enormous economy and its role as a net exporter of manufacturing goods, including many important energy-intensive industrial products.

Figure 8.1

**China, the United States, and the European Union are major emitters of greenhouse gases, including carbon dioxide**

Emissions of greenhouse gases and carbon dioxide in 2019, top ten emitting countries, megatons



mt = megaton; US = United States; EU = European Union; ROW = rest of world

Note: Values are greenhouse gas emissions.

Source: World Bank, *World Development Indicators*.

China’s policy choices and its industrial prowess have made it the largest global supplier of a number of green energy industries. It also dominates important upstream segments of several important cross-border supply chains, including those for solar panels, critical minerals, and batteries. Finally, it has become the largest exporter of finished electric vehicles (EVs).

In addition to subsidizing clean energy industries, China has a national cap-and-trade system, which it launched in 2021. The system covers more than 2,000 power plants that together account for about 40 percent of China’s emissions and 15 percent of world emissions. Unlike the EU emissions trading system (ETS, described below), China’s ETS is based on emissions intensities, so that the overall cap (as well as company allowances)

adjusts upward with production. The carbon price for trades was less than \$10/ton at the end of 2022—well below current estimates of the social cost of carbon of \$185–\$200 per ton (Rennert et al. 2022; EPA 2022). China’s ETS is thus only one step in its commitment to reduce emissions intensity by over 65 percent from 2005 levels by 2030.

From the perspective of the United States and, to a lesser extent, the European Union, China’s economic approach presents a number of challenges independent of its climate policies. For instance, China is a long-standing user of industrial policy, and its nonmarket economy lacks transparency. The opacity of China’s economic (and climate) policies makes it hard to map policies to outcomes, creating additional uncertainty for those outside of China. An added concern is China’s unwillingness to publish transparent data, especially when they create political difficulties, as recently experienced during the pandemic and after a spike in youth unemployment.<sup>2</sup> Yet, China’s size implies its policy choices can have effects on industries and their workforces outside of China.

China has also shown a willingness to use export restrictions to exercise market power and punish countries whose nontrade policies it disagrees with, as an act of economic coercion. Despite an already significant and persistent trade surplus, China’s President Xi Jinping has a stated policy goal of further reducing China’s reliance on the rest of the world for its imports and making the rest of the world more dependent on China’s exports.<sup>3</sup> This explicit objective of acquiring leverage has created policy impetus for governments elsewhere to undertake their own policies to reduce Chinese leverage, as described below.

US climate policy is equally complex, for different reasons. At the federal level, the United States does not price carbon, although California and some northeastern states have modest cap-and-trade systems.<sup>4</sup> Until recently, US federal climate policy was modest. The Obama administration’s Clean Power Plan faced successful court challenges, and the Trump administration withdrew the United States from the Paris Agreement. In contrast, on his first day in office, President Joseph R. Biden, Jr. signed

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2. Robbie Griffiths, “China Has Stopped Publishing Daily COVID Data amid Reports of a Huge Spike in Cases,” National Public Radio, December 25, 2022; Meaghan Tobin, “China’s Solution to Record Youth Unemployment Is to Stop Reporting It,” *Washington Post*, August 15, 2023.

3. Tetsushi Takahashi, “A Future in Which China No Longer Needs the World but the World Cannot Spin without It,” *Financial Times*, December 15, 2020.

4. California imposes a carbon price of about \$30 per ton that covers 74 percent of emissions. The more modest Regional Greenhouse Gas Initiative (RGGI) covers the power sector in 11 US states in the Northeast, with coverage of 11 percent of emissions and a price of \$14 per ton. These states do not typically host trade-exposed energy-intensive industries.

an executive order to rejoin the Paris Agreement, which the United States officially rejoined in February 2021.<sup>5</sup> Beyond such symbolic statements of policy intent, the United States enacted major climate legislation, including the Infrastructure Investment and Jobs Act of 2022, which funded important investments in power and transmission infrastructure as well as EV charging stations.

In terms of scale and scope, the most important legislation is the Inflation Reduction Act (IRA) of 2022, which includes more than \$100 billion in spending (on conservation, sequestration, energy efficiency, industrial decarbonization, and green lending). The legislation also includes about \$270 billion in clean energy tax credits (figure 8.2).<sup>6</sup> Since enactment, the Joint Committee on Taxation (JCT) has revised its score of these energy tax credits upward (to \$527 billion), roughly doubling the estimated fiscal cost of these tax subsidies.

Many outside estimates find that the fiscal costs associated with these credits are likely to be far greater than even the revised estimates from official scorekeepers (see Credit Suisse 2022; the Penn-Wharton Budget Model 2023; and Bistline, Mehrotra, and Wolfram 2023). The high budgetary uncertainty around these credits comes in part from the fact that some are new policy tools and many have novel structural features, including transferability and “direct pay”, that make them akin to refundable tax credits. In addition, taxpayers await detailed regulatory guidance, which has taken time to materialize, because of the vast task of implementing the many new tax provisions in the IRA.

Many questions about the IRA’s tax provisions remain open. Some of its credits include “adders”—provisions that make tax credits more generous when certain labor standards (prevailing wage standards and the use of registered apprentice programs) are met; several credits (for clean energy production and EVs) include domestic content requirements. How binding such restrictions are in practice will determine both the underlying cost and the effectiveness of these credits. Leased cars, for example, do not need to meet these restrictions to qualify for the full credit, providing an important work-around for EV production (Bown, forthcoming).

The US subsidies are similar in size and scope to the subsidies provided by the European Union (Kleimann et al. 2023). There are also important differences between them, including the structure of the US tax credits, which

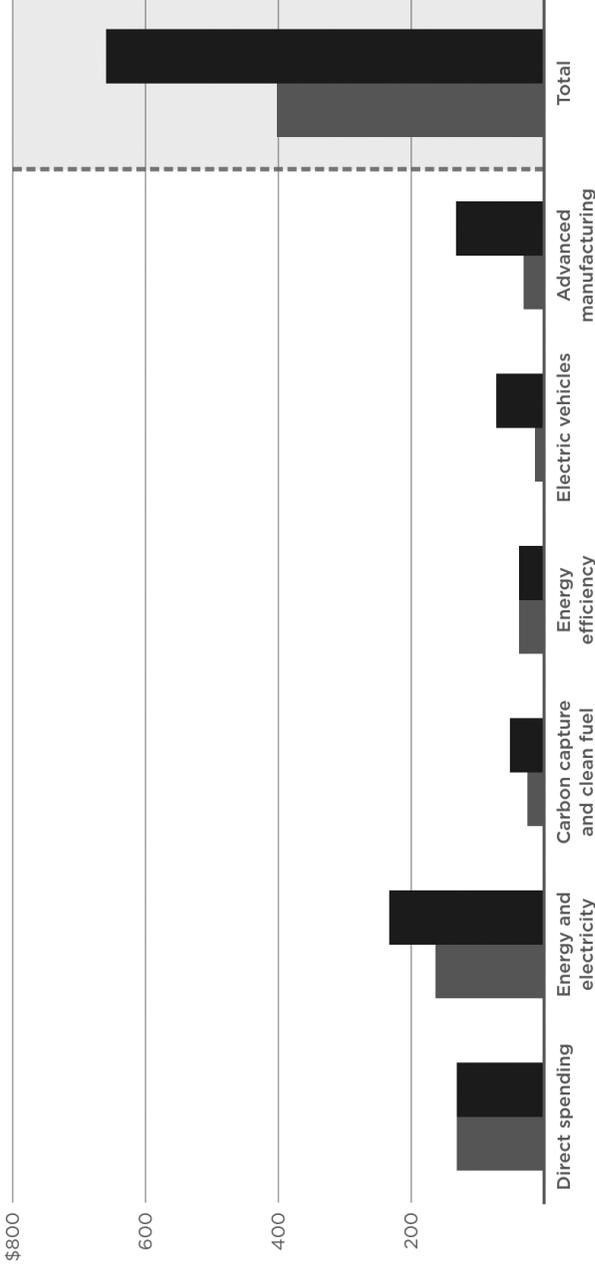
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5. Antony J. Blinken, “The United States Officially Rejoins the Paris Agreement,” US Department of State Press Statement, February 19, 2021.

6. Bistline, Mehrotra, and Wolfram (2023) summarize the legislation.

Figure 8.2  
**Since the Inflation Reduction Act was passed, official estimates of the cost of clean energy subsidies have soared**

Estimated cost of IRA energy spending and tax credits, billions, **2022** and **2023**



IRA = Inflation Reduction Act

Source: Committee for a Responsible Federal Budget, Congressional Budget Office, and Joint Committee on Taxation.

makes them a more flexible and streamlined policy tool, and the inclusion of national content provisions, which set a troubling precedent (discussed below).

Several political-economic factors motivated the IRA. Domestic political constraints made carbon pricing or cap-and-trade systems infeasible, especially given the close balance of political power (with a 50–50 split in the US Senate), making subsidization relatively attractive. Sustained political support for the clean energy transition would require ensuring that stakeholders—both firms and workers—benefit from the transition. Given the possibility of a climate-skeptic president in 2024, creating green jobs and industries in key battleground voting areas could help prevent a major climate policy reversal.

The IRA was also shaped by growing geopolitical tensions with China. China has a head start in a number of clean energy technologies, some the result of legitimate policy, others arguably resulting from explicit violations of international trade rules. This head start was a source of concern, given that Chinese market power could allow it to weaponize clean energy through export restrictions, as it has done in the past for rare earths, raw materials, and a variety of other products.<sup>7</sup> The United States was motivated to consider some forms of discriminatory policy for these and national security reasons. Of course, building supply chain diversity beyond jurisdictions of concern is not the same thing as requiring US (or free trade agreement partner) production, as some IRA domestic content provisions do. Much of the world is neither a jurisdiction of concern nor a US free trade agreement partner.

The European Union has a longstanding and ambitious set of climate policies. In addition to significant subsidies (described in Kleimann et al. 2023), it employs a cap-and-trade system, the European Union Emissions Trading System (EU ETS), which covers 40 percent of greenhouse gas emissions at prices that averaged more than €80/ton over the past year.<sup>8</sup> A

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7. In an April 2023 speech, Biden administration National Security Advisor Jake Sullivan noted that “more than 80 percent of critical minerals are processed by one country, China. Clean-energy supply chains are at risk of being weaponized in the same way as oil in the 1970s, or natural gas in Europe in 2022” (White House, “Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution,” April 27, 2023).

8. See the World Bank’s Carbon Pricing Dashboard for data on coverage and Ember’s Carbon Price Tracker for recent price trends. In addition to EU-wide policies, many EU member states have their own carbon pricing regimes.

system of free permits meant that many producers did not need to pay for their emissions (while still facing a marginal incentive to reduce emissions), although the share of free permits has declined over time.<sup>9</sup>

Alongside this decline in free permits, the European Union has proposed a Carbon Border Adjustment Mechanism (CBAM), which is currently in a process of phased implementation.<sup>10</sup> The motivation for the CBAM is to help level the playing field by requiring EU imports of energy-intensive products to face similar carbon prices as goods produced in the European Union.

In terms of economic efficiency for climate policy, the European approach has many advantages. Brussels just needs to overcome important implementation challenges, including interactions with other countries' policy approaches, described below.

## Effects of Climate Policies on Other Countries

Both cost-imposing policies (such as carbon pricing or the purchase of permits under the ETS) and cost-reducing policies (such as subsidies and tax credits) have important environmental and economic effects in other jurisdictions.<sup>11</sup> This section describes five such channels as well as the issue of domestic content requirements.

1. **Emissions externalities.** Emissions anywhere create negative external effects that are felt throughout the world, and emissions reductions everywhere have global benefits. The global nature of this externality makes emissions reduction a particularly vexing policy problem because governments have a strong incentive to free-ride on others' efforts, and voluntary mechanisms (such as the Paris Accord) may fall short. Indeed, many countries have failed to take adequate climate policy action even after the Paris Accord.<sup>12</sup>

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9. If a producer needs to buy permits to meet desired production levels, it pays the marginal cost of emissions associated with the permit price. If a producer does not need to purchase permits to hit its desired production level, it forgoes the ability to sell permits at the going price, internalizing the marginal cost of emissions given by the permit price.

10. European Commission, "Commission Adopts Detailed Reporting Rules for the Carbon Border Adjustment Mechanism's Transitional Phase," News, August 17, 2023.

11. For a discussion of the general economic approach to the WTO and its rules as well as the implications of policy spillovers for those rules, see Bagwell and Staiger (1999, 2001, 2002).

12. See Climate Action Tracker, 2030 Emissions Gap: CAT Projections and Resulting Emissions Gap in Meeting the 1.5°C Paris Agreement Goal, November 2022.

2. **Learning and scale spillovers.** When governments subsidize clean energy innovation or expansion, other jurisdictions may benefit due to learning or scale effects. Cross-border learning effects can materialize if new innovations are allowed to spread. For example, innovation in green hydrogen or carbon sequestration could increase the economic feasibility of new clean energy technologies or reduce the amount of emissions from existing technologies, benefiting other countries' energy transitions, provided intellectual property rights protections do not impose undue limits on technology transfer. An increase in scale can also lead to large benefits as industries move down cost curves. Economists often distinguish between “internal” and “external” economies of scale. In the case of external economies of scale, industry-wide costs fall as the industry expands in size, not solely because of the spreading of fixed costs over more and more units of output but also because industry expansion enables innovation and learning, greater specialization, more developed input suppliers (perhaps with their own economies of scale), and so on.
3. **Impacts on the location of tradeable industries.** Policies that either raise or lower industry costs in a jurisdiction may affect the location choice of certain firms. A neutral consumption subsidy for EVs, for example, would not affect the location of production, whereas a subsidy to production or investment might.<sup>13</sup> As EVs are a traded good, where manufacturers locate production may affect trade flows. Because of high fixed costs, scale economies, and the co-location of auto parts supply chains, governments may be tempted by subsidies that have the potential to affect early leadership in such an imperfectly competitive industry, and companies may hope to garner rents. In contrast, in a largely nontradable industry, like local power generation, location-specific subsidies are unlikely to have direct international spillover effects. Any international spillovers would come from competitiveness impacts on upstream and downstream markets, as described next.

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13. In Section 30D of the IRA, the United States turned an otherwise neutral consumption subsidy into a local production subsidy by making the tax credit contingent on both assembly in North America and the location of the supply chain for key battery inputs (critical minerals and battery components), with preferences for North American or free trade agreement partner content. Section 30D is not a pure production subsidy, however, because exported EVs are not eligible for the US tax credit. Section 30D should be distinguished from the commercial vehicle tax subsidy provision (Section 45W), which applies to leased cars and does not include incentives for local (or free trade area partner) production.

4. **Impacts on downstream industries.** Climate policies that either raise or lower industry costs in one jurisdiction affect the relative competitiveness of downstream industries across jurisdictions (figure 8.3). Consider, for example, an energy-intensive, tradable, downstream industry like chemicals (other examples include steel, fertilizer, aluminum, and cement). Carbon pricing in Europe could disadvantage the European chemicals sector, particularly as free permits are phased out and energy costs increase, because foreign chemical manufacturers that do not face carbon pricing (or face a lower carbon price) will benefit from improved competitiveness relative to their European counterparts. Furthermore, the US chemicals sector may benefit from IRA subsidies to wind, solar, green hydrogen, and carbon capture, which reduce energy costs.
5. **Impacts on upstream industries.** For upstream industries (such as critical minerals, used in clean energy products like batteries), the distinction between cost-raising and cost-reducing approaches matters less, as each tends to increase demand for clean energy (e.g., batteries) thereby raising demand for key inputs. The first-order impact abroad is mainly positive for countries that are net suppliers of key energy transition inputs (e.g., those with large stores of lithium, cobalt, nickel or other critical minerals), which may benefit from increased prices and demand.<sup>14</sup> (If the same countries also produce downstream products like batteries, those local industries will face higher input costs, which may generate domestic policy pressure to limit exports of the key inputs.)

The deployment of downstream clean energy outputs could also be slowed if input providers fail to receive price signals (or face other regulatory bottlenecks, such as permitting) that prevent their expansion of production capacity. In these cases, there may be an enhanced role for policy coordination between downstream (e.g., EV-producing) countries and upstream (critical mineral-producing) countries. Cross-border contracting difficulties could generate a role for upstream subsidies and policy coordination between input- and output-providing countries along the supply chain (Antràs and Staiger 2012).<sup>15</sup>

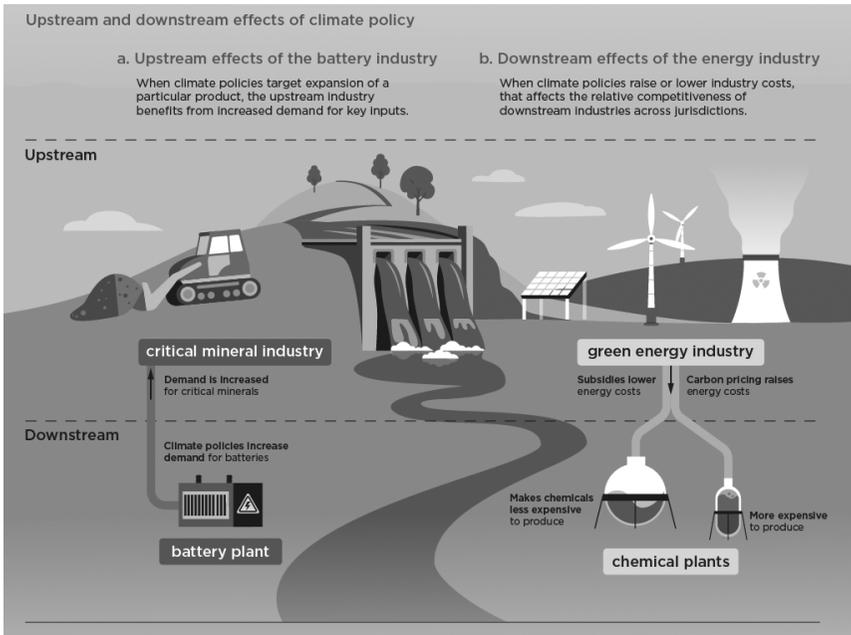
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14. Other industrial users of those scarce inputs—e.g., critical minerals used in batteries for mobile phones, laptops, tablets, or consumer electronics—will also face higher input costs.

15. Antràs and Staiger (2012) provide one setting in which cross-border supply chains create a role for globally efficient subsidies in input-producing countries. Bown, Snyder, and Staiger (2022) explore related issues in the context of cross-border vaccine supply chains, where time is an additional important factor for policy.

Figure 8.3

**In a supply chain, climate policy targeting one industry can affect other companies both upstream and downstream**



Source: Created by the authors.

Lastly, consider the issue of national content provisions. Several IRA subsidies included “adders” (more generous tax credits) for goods that meet threshold levels of domestic content or, in some cases, content from free trade agreement partners. For purchased EVs, for example, there are separate thresholds for critical minerals and components used in batteries.<sup>16</sup> For wind and solar production, there are enhanced tax credits for production

16. See Bown (2023, forthcoming). Half of the tax credit eligibility (\$3,750) is available for vehicles that include a battery recycled in North America or a battery that meets a critical minerals sourcing requirement. Certain minimum thresholds have to be sourced from (extracted or processed in) the United States or a country with which the United States has a free trade agreement. The minimal critical mineral threshold was 40 percent in 2023; it increases by 10 percentage points a year until reaching 80 percent in 2027–32. The other half of the tax credit eligibility is for vehicles meeting the battery components requirement. These requirements are much more restrictive than they are for critical minerals: The threshold amount of material has to be manufactured or assembled in North America. The minimal battery components threshold was 50 percent in 2023. It will increase by 10 percentage points a year until reaching 100 percent in 2029–32.

that uses sufficient US steel (and manufactured inputs). As steel is a tradable, this provision benefits US steel producers at the expense of foreign steelmakers and trading partners upstream.

Domestic content provisions may also have perverse effects on the competitiveness of domestic industries, encouraging sourcing that may be inefficient and reducing the international competitiveness of subsidized companies.

Potentially more problematic are the effects of local content requirements on the world trading system. Before the IRA, outside of government procurement, the US government had not generally relied on domestic content provisions as a policy tool and had strongly opposed their use abroad. The United States helped design international rules under the General Agreement on Tariffs and Trade (GATT) and WTO to restrict the use of such provisions, and it challenged other WTO members when they implemented national climate policies containing such provisions.<sup>17</sup> In the IRA, the US government simply ignored these WTO obligations, implementing the domestic content policy tool largely without even acknowledging any inconsistencies.

If other countries follow the US example, their clean energy transitions will be costlier, making them less likely to be sufficiently ambitious or politically sustainable, especially since many countries face important fiscal constraints.<sup>18</sup> Depending on the product, trading partners' decisions to impose their own domestic content requirements could also hurt US exporters. These frictions could spill over to areas unrelated to climate policy, unraveling beneficial global collective action and reducing the huge economic gains from trade and globalization.

## **Policy Evolution Following Passage of the Inflation Reduction Act**

### **EU Responses to the Inflation Reduction Act**

EU political leaders reacted to the IRA with both enthusiasm and dismay. Although they appreciated the policy action on climate change mitigation, the scale and format of the subsidies raised fears about the effects on

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17. In 2014, the United States challenged India's use of local content provisions in the Jawaharlal Nehru National Solar Mission (NSM) regarding the rules for solar power developers selling electricity to the government (*India-Solar Cells*). The WTO largely sided with the United States in the case.

18. In response to the IRA, in 2023 Korea changed consumer tax credit eligibility in opaque ways that may have the effect of discriminating in favor of local producers, much like Section 30D of the IRA does (Bown, forthcoming).

European industrial competitiveness and world trading system norms.<sup>19</sup> Many leaders voiced concerns during White House visits, including French President Emmanuel Macron (in late 2022) and European Commission President Ursula von der Leyen (in early 2023).

Some in Europe have suggested following the US lead and implementing larger and more flexible clean energy subsidies.<sup>20</sup> In December 2022, French and German leaders put forward a statement arguing that the US IRA implies that Europe needs to adopt a more aggressive industrial policy.<sup>21</sup> They suggested modifying existing state aid rules by allowing tax credits and subsidies in targeted strategic sectors, aligning EU funding priorities accordingly, and using EU trade instruments to create a level playing field. Such policy shifts have the potential to hurt smaller EU countries, which may fear that such a posture will allow larger countries like France and Germany to subsidize national champions.

These sorts of impulses run counter to the intention of EU rules on state aid, which aim to level the competitive playing field in Europe by prohibiting member states from taking policy actions that provide companies with an advantage over their competitors. Examples of prohibited policies include grants, tax credits, and government guarantees that provide companies with a competitive edge, distorting competition and intra-European trade. The French and German proposal argues that an exception is warranted for targeted strategic sectors, raising questions about how such sectors would be defined and whether the exceptions are worth granting. The proposal refers to “transformation technologies” and lists as examples wind, heat pumps, hydrogen, and photovoltaic technologies.

In February 2023, the European Commission put forward a “Green Deal Industrial Plan” that aims to enhance the competitiveness of European industry. It emphasizes simplifying regulation for the production of goods that are important for meeting climate goals, such as batteries, wind-mills, solar, as well as carbon capture and storage. The plan also suggests

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19. Jiyeong Go, “EU and Japan Lash Out at ‘Discriminatory’ US Green Subsidies.” *FDI Intelligence (Financial Times)*, November 15, 2022; George Parker, Andy Bounds, and Aime Williams, “Britain Joins EU in Criticising Biden’s Green Subsidies Package,” *Financial Times*, December 22, 2022.

20. The Biden administration has encouraged them to do so. See Andy Bounds and Aime Williams, “Top US Trade Official Urges EU to Join Forces on Subsidies amid Green Deal Tensions,” *Financial Times*, November 2, 2022.

21. Bruno Le Maire and Robert Habeck, “For a European Green Industrial Policy,” French Economy Ministry Press Room, December 20, 2022.

extending and accelerating public funding for energy transition industries and temporarily modifying state aid rules along multiple dimensions “subject to conditions necessary to limit distortions to the Single Market.”<sup>22</sup>

In March 2023, the European Commission proposed the Net Zero Industry Act (NZIA) and the Critical Raw Materials Act (CRM).<sup>23</sup> The NZIA lists industries that are deemed to be strategic; sets benchmarks for EU production in these industries at 40 percent of EU needs; outlines a system that would target net-zero strategic products (NZSPs); and suggests policy tools for supporting such projects, which include accelerated permitting, mobilization of private funding, public subsidies (that would operate mostly at the national level), and other measures (Tagliapietra, Veugelers, and Zettelmeyer 2023). The NZIA is intended to work together with recent provisions that relax state aid rules.<sup>24</sup>

Under political pressure from businesses complaining about high energy prices, the German Economy Ministry initially put forward a proposal to subsidize 80 percent of the electricity cost for energy-intensive companies. The May 2023 plan was reportedly partly in response to level playing field concerns generated by China and the US IRA.<sup>25</sup> It would have entailed a remarkable switch from cost-imposing to cost-reducing policies affecting energy-intensive companies. The proposal drew concerns from other EU member states that claimed the inability to afford similar subsi-

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22. See page 8 of European Commission, “Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions”, COM(2023) 62 final, February 1, 2023. At the time of writing, the plan was awaiting action by the European Parliament. At the time of the plan’s release, European policymakers noted the impetus of the IRA. European Commission President Ursula von der Leyen reportedly said the package was needed to level the playing field and to ensure EU leadership in the “clean tech revolution” (Hanna Ziady, “Europe Unveils \$270 Billion Response to US Green Subsidies,” CNN, February 1, 2023). Valdis Dombrovskis, the EU commissioner for trade, commended the IRA but expressed concerns about the negative effects of discriminatory content requirements on global supply chains.

23. In July 2023, member states finally provided the European Commission with a mandate to negotiate a critical minerals agreement with the United States (Council of the European Union, “Trade with the United States: Council Authorises Negotiations on EU-US Critical Minerals Agreement,” Press release, July 20, 2023).

24. The Critical Raw Materials Act identifies a list of strategic raw materials; sets benchmarks for domestic production and single-source import dependence; and proposes policy steps to meet these benchmarks, which include administrative steps, monitoring measures, and measures to improve the use and sourcing of critical raw materials, in both the European Union and abroad. See Le Mouel and Poitiers (2023).

25. Laura Pitel, Guy Chazan, and Patricia Nilsson, “Germany Plans to Subsidise Power-Hungry Industries,” *Financial Times*, May 5, 2023.

dies and feared the implications for state aid rules. In August, the German government rejected the proposal.<sup>26</sup>

The evolution of this policy debate will be important on many fronts. Will Europe be able to rely on effective yet cost-imposing policies in the face of large subsidies abroad? Will European state aid rules be weakened, affecting the competitive environment in the common market? On the other hand, if important countries match US subsidies, take-up of tax credits in the United States may decline, lowering the fiscal cost of the IRA tax subsidies but stifling aspirations for a US competitive edge in these industries.

### The Evolution of US Policy

US policy has not been static. Trading partners' concerns have led to bilateral actions (described below) and some unilateral actions. For example, regulations for the tax credit eligibility of EVs interpreted leased cars as qualifying for a different commercial vehicle tax subsidy provision (Section 45W instead of Section 30D), which does not contain local content requirements or other restrictions (Bown 2023, forthcoming). As leased cars have become an increasingly important part of the new car market, Europe and other trading partners have become less concerned about the reach of the EV content restrictions.

Treasury has also defined a free trade agreement country—which determines eligibility for half (\$3,750) of the Section 30D EV credit associated with the critical minerals sourcing requirements—more broadly than simply the 20 countries with which the United States has a Congressionally authorized free trade agreement.<sup>27,28</sup> There has been some prominent political

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26. Guy Chazan, “Germany Accused of ‘Ignoring Emergency’ by Rejecting Energy Subsidies for Industry,” *Financial Times*, August 30, 2023.

27. For example, Article XXIV of the GATT considers a free trade area to be consistent with most-favored nation rules only when duties are eliminated on substantially all trade between partner countries. There are few instances in which the United States has engaged in only a partially liberalizing trade agreement. The most notable example is the 2019 US–Japan Trade Agreement.

28. There are also restrictions on sourcing from a “foreign entity of concern.” At the time of writing, the Department of Energy had not released the criteria for defining a foreign entity of concern for critical minerals and battery components and thus eligibility for the EV tax credits under Section 30D. The provision is directed at China, but it is unclear whether it also applies to Chinese firms (or joint ventures that include Chinese firms) involved in mining or processing critical minerals, or building battery components, either in the United States (e.g., CATL for batteries) or in third countries (e.g., lithium mining in Australia).

pushback, however, as Sen. Joe Manchin (D-WV), whose support was essential to getting the IRA passed in a 50-50 Senate, subsequently complained about Treasury's implementing regulations.<sup>29</sup>

There is also the possibility that new, and evolving, estimates of the fiscal cost of the IRA tax subsidies (by both official and outside sources) will cause Congress to scale back the subsidies in the years ahead, especially in the context of persistent concerns about high levels of US budget deficits and national debt. Brinkmanship surrounding the debt ceiling has been alarming, and there will be multiple sources of budgetary stress down the road, including rising interest rates; the continued aging of the population (and the associated increase in health care costs, which typically rise faster than inflation);<sup>30</sup> national security concerns, which could increase defense spending (including support for Ukraine and in response to China's military provocations); and the looming expiration of the 2017 Tax Cuts and Jobs Act provisions (which would cost at least \$3.5 trillion to extend over 10 years).<sup>31</sup>

Budget pressures may also provide an opportunity for the United States to pivot toward more cost-imposing (and tax revenue raising) climate policies, such as carbon pricing or an ETS. These policies can be effective complements to the subsidies in the IRA, as Timilsina (2022) and Roy, Burtraw, and Rennert (2021) show. Cost-imposing policies may be more feasible to adopt once clean energy infrastructure and supplies are buttressed, as any negative impacts on household energy costs will be far smaller (if they exist at all), given that the IRA will substantially lower energy costs. Clausing and Sarin (2023) put forward one such proposal.<sup>32</sup>

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29. See Joe Manchin, "Biden's Inflation Reduction Act Betrayal," *Wall Street Journal*, March 29, 2023. Manchin has been somewhat inconsistent in this regard. In an interview with Bloomberg in January, he expressed surprise that EU firms would not qualify for free trade agreement content thresholds, suggesting that he believed the United States already had a free trade agreement with the European Union (Ari Natter, "Manchin Says He Didn't Know US, EU Lacked Free Trade Agreement," Bloomberg, January 19, 2023). For more on the controversy surrounding Manchin's role in the last-minute IRA negotiations in July 2022, see Emma Dumain and Hannah Northey, "Manchin Says Biden Broke Climate Deal. Others Say 'There Was No Such Agreement,'" *Politico*, June 25, 2023.

30. Shameek Rakshit, Emma Wager, Paul Hughes-Cromwick, Cynthia Cox, and Krutika Amin, "How Does Medical Inflation Compare to Inflation in the Rest of the Economy?" Peterson-KFF Health System Tracker, July 26, 2023.

31. Tax Notes, "CBO Rescores Cost of TCJA Extensions at \$3.5 Trillion," May 17, 2023. When Congress addresses expiration (likely in 2025), these costs will be closer to \$4 trillion over the 2026–35 budget window (Clausing and Sarin 2023).

32. For discussion of the effects of the IRA on energy prices, see Bistline, Mehrotra, and Wolfram (2023).

Public support for the IRA subsidies may evolve in either positive or negative directions. Progress in tackling the clean energy transition could be celebrated in the years ahead. Subsidized investments in new clean energy projects to date have disproportionately benefited Republican-dominated states, which may improve political support for these tax subsidies.<sup>33</sup>

At the same time, there will be (nearly inevitable) setbacks. The structure of many of these provisions (including transferability and refundability) makes them particularly flexible and useful, but it also means that they must be implemented with care to avoid fraud or waste. There have also been important debates about reform of permitting in the United States, in response to concerns that building things has become excessively difficult, potentially thwarting both the speed and the cost-effectiveness of the energy transition. The greatest uncertainty, of course, is the outcome of the 2024 presidential election and the potential return of a climate change skeptic to the White House.

## US-EU Solutions for Resolving Conflict

The United States has been in active conversations with trading partners regarding these sources of friction. While early administration statements seemed to breezily exhort trading partners to simply provide their own subsidies, officials all the way up to the president have expressed a willingness to work with partners on solutions to challenges provoked by the terms of the IRA.<sup>34</sup>

Some concerns could be addressed through implementation. The United States has begun to negotiate limited “trade agreements” that allow partner countries to access benefits to some of the credits with content

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33. Amanda Chu, Oliver Roeder, and Myles McCormick, “Republican Districts Dominate US Clean Technology Investment Boom,” *Financial Times*, August 13, 2023.

34. The strongest statement came from President Biden himself, when he indicated that “when you write a massive piece of legislation. . . there’s obviously going to be glitches in it and [the] need to reconcile changes in it. . . There’s tweaks that we can make that can fundamentally make it easier for European countries to participate and/or be on their own. . . I never intended to exclude folks who were cooperating with us” (White House, “Remarks by President Biden and President Macron of France in Joint Press Conference,” December 1, 2022). Yet, as Jake Sullivan later indicated, “We will unapologetically pursue our industrial strategy at home—but we are unambiguously committed to not leaving our friends behind. We want them to join us. In fact, we need them to join us” (White House, “Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution,” April 27, 2023). An earlier opinion piece by Sullivan, Brian Deese, and John Podesta painted a similarly unapologetic picture, noting the many gains abroad come from innovation and development in the United States (“Brian Deese, John Podesta, and Jake Sullivan on the Inflation Reduction Act,” *The Economist*, January 24, 2023).

provisions. The first of these agreements was between the United States and Japan in March 2023. A similar agreement is being negotiated with the European Union, efforts are underway with the United Kingdom, and Indonesia and the Philippines have requested such agreements. Such deals could provide benefits to firms in these countries by expanding demand for critical minerals from companies assembling EVs in North America that are utilizing Section 30D consumer tax credits. However, because these agreements are not as broad as traditional trade agreements and do not contain enforceable, binding provisions that would require approval from Congress, a new administration could reverse them. This sort of policy uncertainty may deter some investment in these upstream sectors.

Independent of the IRA, the United States and European Union have made efforts to negotiate a Green Steel Deal (formally, the Global Arrangement on Sustainable Steel and Aluminum). Details of the negotiations have long been scarce, but the idea seems to be to limit steel protection between the United States and Europe while (perhaps) imposing tariffs on other countries that do not meet benchmark carbon emissions standards. In late 2022, the US Trade Representative described the approach as follows: “The concept would be for the United States and the European Union to join our markets, and to use access to our markets to leverage fair trade and clean trade in these industries.”<sup>35</sup>

One difficulty with the premise of the agreement is the different starting points. The European Union requires its industries to pay for their emissions (as free allowances are phased out), whereas the United States subsidizes energy. As a consequence, the estimated cost of manufacturing green steel would be far lower in the United States (Boston Consulting Group 2022).<sup>36</sup>

The steel industry may also not be a good model for other sectors, given that the agreement may rely on preconditions unique to the industry. For instance, the US steel industry has long been protected by an evolving set of trade restrictions—the latest are the Section 232 (national security) tariffs and quotas, but many other instruments, including voluntary export restraints, trigger price mechanisms, antidumping and countervailing duties, and safeguard tariffs, have protected the industry on and off since the 1960s. Details

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35. See Simon Lester, “Katherine Tai on the Global Arrangement on Sustainable Steel and Aluminum,” *International Economic Law and Policy Blog*, December 14, 2022.

36. They calculate that costs for manufacturing steel with lower carbon emissions per ton could be 42-43 percent less in the United States than in Germany in 2030, although there are possible confounding factors.

of any agreement remain to be seen, but European officials are reportedly not keen on US proposals so far.<sup>37</sup>

Other areas that are ripe for policy alignment between the European Union and the United States might serve as a stepping stone to wider cooperation. For example, as part of the IRA, the US government instituted a fine on methane emissions, as a backstop to tougher methane regulations in the oil and gas sector. The European Union is also in the process of toughening its methane regulations. A recent proposal (Clausing, Garicano, and Wolfram 2023) would build on these parallel policies and use a border import charge (at the level of the US methane emissions fee) as a lever for seeking similarly ambitious regulatory reforms abroad. Ideally, cooperation by the United States and the European Union would expand to include a wide group of oil and gas importers, including China and India.<sup>38</sup> As methane is a potent greenhouse gas with low abatement costs, a mechanism that incentivizes worldwide policy action could yield enormous benefits.

### The Role of China

Many US (and some EU) approaches to climate policy seem to be direct responses to China's policies. The United States has framed many of its policy choices—in the IRA and elsewhere—as necessary to address both the challenge of climate change and the challenge of Chinese market dominance in key energy transition sectors when China is not a trusted trading partner. The European Union sometimes appears less troubled about relying on China during the energy transition. (For example, both the United States and the European Union imposed antidumping and countervailing duties on imports of subsidized Chinese solar panels beginning in the early 2010s. But the European Union later removed its duties, causing solar panel imports from China to once again boom.) Though EU policymakers seem keen to address supply chain resilience, they are currently emphasizing a more pragmatic approach. In May 2023, for example, the Dutch trade min-

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37. See Andy Bounds, "EU Rejects US Offer to End Steel Tariff Dispute," *Financial Times*, June 28, 2023; Alan Beattie, "Transatlantic Impasse over Turning Steel Green," *Financial Times*, July 3, 2023.

38. One might be concerned that trade diversion would otherwise render such a border adjustment ineffective, but the implied fees are lower than incremental transportation costs in most cases. As methane abatement costs are also quite low (and often negative by many estimates, such as the estimates by the International Energy Agency's, "Methane Tracker," accessed August 31, 2023), this policy could nonetheless be effective at stimulating reductions in methane emissions.

ister indicated that the European Union and China share mutually beneficial gains from international trade and technological sharing on climate.<sup>39</sup>

In general, whereas the United States has emphasized competition and confrontation with China, both the tone and the substance of EU trade policy appear more focused on cooperation with China. Though the EU position has evolved, some of this stance is practical and unlikely to change. Relative to the United States, the European Union faces a more imminent challenge of high energy prices as a result of the Russian invasion of Ukraine, Russia's weaponization of natural gas flows through Nord Stream 1, and its dependence on Russian energy. But its pragmatism is also driven by the concerns of certain large member states—such as Germany—about whether conflict with China would result in lost export market access for its manufacturing industry, at a time when German heavy industries, such as energy-intensive chemicals, are already struggling.<sup>40</sup> At the same time, the EU has expressed concern about Chinese subsidies, and they recently launched an anti-subsidy investigation into Chinese production of electric vehicles.<sup>41</sup> Still, with the earlier visits to China by German Chancellor Olaf Scholz and French President Emmanuel Macron, accompanied by significant German and French business interests, and Macron's subsequent remarks about Taiwan, European leaders are sending mixed signals.<sup>42</sup>

Both Brussels and Washington have seemed to settle on the common narrative that they are “de-risking” their economies in ways that would reduce China's potential economic leverage.<sup>43</sup> The European approach awaits concrete policy action. However, in response to the tariffs imposed

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39. Minister Liesje Schreinemacher stated that “it would really be a shame if we decoupled fully from China. . . we need each other when it comes to making our economies more sustainable and the green transition” (Alice Hancock and Andy Bounds, “Europe's Green Transition Impossible without China, Says Dutch Minister,” *Financial Times*, May 28, 2023).

40. In February 2023, BASF announced plans to relocate production to China (Patricia Nilsson, “BASF Outlines Further Cost-Cutting and 2,600 Job Losses as It Downsizes in Germany,” *Financial Times*, February 24, 2023).

41. In mid-September, the European Commission President Ursula von der Leyen announced the probe in an address to EU lawmakers. See Alice Hancock and Henry Foy, “EU to Launch Anti-Subsidy Probe into Chinese Electric Vehicles,” *Financial Times*, September 13, 2023.

42. See Sha Hua, “Germany's Olaf Scholz Puts Business First in Beijing Visit,” *Wall Street Journal*, November 4, 2022; Stacy Meichtry and Daniel Michaels, “France's Emmanuel Macron Draws Criticism over Taiwan Remarks,” *Wall Street Journal*, April 10, 2023.

43. On the EU side, see European Commission, “Speech by President von der Leyen on EU–China Relations to the Mercator Institute for China Studies and the European Policy Centre, March 30, 2023. On the US side, see US Department of the Treasury, “Remarks by Secretary of the Treasury Janet L. Yellen on the US–China Economic Relationship at Johns Hopkins School of Advanced International Studies,” April 20, 2023, and White House,

in 2018 under the Trump administration and continued under the Biden administration, the United States has already shifted some US import sourcing (or at least final assembly) away from China and toward economies like Vietnam, Taiwan, and Mexico (Bown 2022a). A legitimate question is whether these tariffs best target the sources of supply chain risk. In terms of US exporter dependence, China never resumed purchasing US goods and services after the trade war, so it has little leverage there. Except for a few US agricultural products, such as soybeans, where American farmers have become more reliant on the Chinese market, China never resumed purchasing US goods and services after the trade war (Bown and Wang 2023).

China has voiced concerns about both the US and EU approaches to climate policy. In July 2021, China's Ministry of Ecology and Environment said the EU CBAM "violates WTO principles."<sup>44</sup> In March 2023, China again signaled that it might file a WTO dispute against the CBAM if the European Union pushed ahead and implemented it as scheduled in October.<sup>45</sup>

On US policy, China's Ministry of Commerce stated that the IRA's Section 30D tax credit for EVs "discriminates against similar imported goods and is a suspected breach of World Trade Organization principles" in September 2022.<sup>46</sup> China has not yet filed a trade dispute over the issue.<sup>47</sup> In contrast, it did launch a formal WTO dispute against the US export control policy regarding semiconductor equipment and advanced node chips, announced October 7, 2022.<sup>48</sup>

It is unclear whether international rules can shape China's economic and climate policy choices, even if China is often an engaged participant in WTO meetings. Despite the expectations of many observers upon its entry into the WTO, China failed to become more market oriented (Wu 2016), and its policies have become more state-centric under Xi Jinping (Lardy 2019). China has also continued to use export restrictions as a tool of industrial

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"Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution," April 27, 2023.

44. Muyu Xu and David Stanway, "China Says EU's Planned Carbon Border Tax Violates Trade Principles," Reuters, July 26, 2021.

45. Finbarr Bermingham, "China Asks EU to Justify Upcoming Carbon Tax at World Trade Organization," *South China Morning Post*, March 16, 2023.

46. Bloomberg, "China Threatens Action against 'Discriminatory' US EV Tax Breaks," September 22, 2022.

47. Beyond any constraints imposed by the IRA, China's EV exports to the United States face an additional trade barrier in the form of the 25 percent Section 301 tariffs in effect since summer 2018 (Bown 2021).

48. WTO, "China Initiates WTO Dispute Complaint Targeting US Semiconductor Chip Measures," December 15, 2022.

policy (OECD 2019a, 2019b), including for critical minerals needed for the green transition (OECD 2023), and it often uses trade policy as a political weapon. China overtly uses its trade policy to undertake acts of economic coercion to punish countries with foreign policies it dislikes. Examples include its policies toward Australia (over COVID origins), Canada (over a Huawei executive), Japan (over territorial waters), Lithuania (over Taiwan), South Korea (over the Terminal High Altitude Area Defense), Norway (over human rights activist Liu Xiaobo), and the Philippines (over territorial waters).

## **Lessons from the World Trade Organization**

This section reviews the most salient WTO rules and identifies some of their shortfalls, including the limits to compliance stemming from the lack of a functioning dispute settlement system.

### **WTO Rules on Subsidies**

The WTO's Agreement on Subsidies and Countervailing Measures contains the multilateral trading system's rulebook on disciplining the national use of subsidies. The rulemaking began with the 1947 GATT; it was more fully expanded as part of the Uruguay Round negotiations that established the WTO in 1995.

Initially, subsidy rules were intended to prevent governments from taking away the new market access implied by reciprocal tariff reductions (made by bargaining in GATT negotiating rounds) by introducing a new domestic policy.<sup>49</sup> There is now concern that the limits on subsidies go too far. Subsidies can be a first-best economic policy to address a market failure, such as a positive externality in consumption or production. They are often more efficient than tariffs because they can help domestic producers without hurting consumers through market distortion and increased prices.

WTO rules prohibit two types of subsidies: export subsidies and subsidies that are contingent on the use of domestic over imported inputs. (The latter prohibition is why legal scholars view the local content provisions in the IRA as inconsistent with WTO rules.) If the WTO finds that a particular subsidy was prohibited, trading partners can respond with a remedy—

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49. There is a debate in the legal-economic literature as to whether such a role for subsidy disciplines is needed given that the 1947 GATT contained other provisions—in particular, the possibility of bringing nonviolation nullification and impairment complaints—that could also be used to secure market access without overly constraining the use of subsidies when they might be a first-best policy instrument. For a discussion, see Sykes (2005) and Bagwell and Staiger (2006).

typically tariffs—without needing to show that the subsidy had a negative impact on their own domestic industry or resulted in a loss of market access implied through tariff concession negotiations.

Other types of subsidies are not strictly prohibited, but they can be “actionable” (and thus face a trading partner tariff response) if there is evidence that they hurt competitors in foreign countries or cause losses in market access.

In principle, when deciding whether and how to subsidize, forward-looking governments consider the future costs their industries might face in the form of WTO-authorized remedies. The remedy that trading partners might seek to adopt in response to prohibited or actionable subsidies is determined not only by the evidence but by the underlying trading relationship. There are four main types of situations:<sup>50</sup>

- The trading partner is an importer but does not have its own industry that competes with the good being subsidized abroad. In this case, the partner faces only the benefit of lower-priced goods subsidized by foreign taxpayers and would have no reason to object to the subsidy.
- The trading partner has an import-competing industry. In this case, even if the immediate gains to its consumers (through lower prices) are larger than the losses to its own industry, the partner is permitted to launch a countervailing duty investigation under its own domestic laws. If the foreign subsidy has injured its import-competing industry, the government can impose a tariff (countervailing duty) equivalent in size to the subsidy as a remedy to limit the foreign country’s exports into its market.
- The trading partner does not directly import the good benefiting from the foreign subsidy (i.e., a countervailing duty is not an option), but it might have been an exporter to the subsidizing country market but for the subsidy. In this case, the trading partner can file a formal WTO dispute. If the partner can show that the actionable subsidy reduced its expected market access implied by the subsidizing countries’ tariff bindings or otherwise caused injury (“serious prejudice”) to its industry, the WTO can authorize a remedy of tariff retaliation (limited to the size of the subsidy) over some other good the subsidizing country exports to the partner. The remedy is

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50. For a discussion, see Sykes (2005). For an analysis of the formal disputes that have resulted in remedies in the form of authorized retaliation by trading partners for WTO-inconsistent subsidies, as well as calculations of the size of that retaliation, see Bown and Ruta (2010).

not retrospective and can be imposed only if the country refuses to remove the WTO-inconsistent part of the subsidy.

- The partner and the foreign subsidizing country have exporters that compete in third markets. In this case, the trading partner can file a formal WTO dispute. If it can show that the actionable subsidy caused injury (“serious prejudice”) to its exporting industry in third markets, then the WTO can authorize a limited tariff retaliation over some other good the subsidizing country exports to the partner.

The WTO does not currently have any carve-outs for subsidies that promote climate mitigation. When it was established, in 1995, three types of subsidies were permissible (deemed “non-actionable”) under WTO rules: subsidies for research and development, subsidies for disadvantaged regions, and subsidies for adaptation of existing facilities to meet new environmental regulations. The carve-outs were limited to five years; as WTO members chose not to extend them, the carve-outs expired in 2000.<sup>51</sup>

There have been proposals to define new criteria that would make certain green subsidies nonactionable, but no international agreement has yet been reached.<sup>52</sup> Therefore, it is likely that, if they were subjected to formal legal challenges, the WTO would find the domestic content provisions in the IRA to be a form of prohibited subsidies. Other subsidies in the IRA could also be actionable and thus subject to remedy.

From a political-economy and institutional perspective, there are at least two problems with applying green subsidies before engaging with other WTO members on developing rules for such potential carve-outs. First, the United States may be underestimating future challenges to exporting industries in its own manufacturing sector. Historically, trading partners have not imposed many countervailing duties (or other trade remedies) on US exporting firms, in part because the United States has not imposed many subsidies. In addition, the United States has historically been an active user of countervailing duties against other countries’ subsidies; it accounts for more than half of all countervailing duties that G20 member economies imposed over 1995–2019 (Bown 2022b). The historical US policy position has been to resist efforts by other countries to discipline CVD use—i.e., to constrain the remedy. US-based firms now enjoying the benefit of the green subsidies and expecting to be able to export to the rest of the world could be in for a rude awakening if trading partners start invoking countervailing duties more frequently.

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51. See WTO SCM Agreement Article 8.2 and Article 31.

52. See, for example, Lee (2016) and Hillman and Manak (2023).

Second, seeking ad hoc carve-outs from trading partner retaliation via countervailing duties ex post may prove difficult. In some countries, including the United States, the countervailing duty investigation operates as a bureaucratic process, independent of the trade ministry.<sup>53</sup> For countries with similar systems, even if the US government had the political leverage to convince a foreign trade ministry to stop imposing countervailing duties on American exporters, that trade ministry might be relatively powerless to do so.

Thus, if countries do not precommit to rules allowing certain types of subsidies, one potential result may be an unstoppable wave of foreign industries claiming to be injured by such US subsidies. These industries will request (and likely receive, under current rules) approval for countervailing duties even if the government's trade ministry would prefer ex post that the protection not be granted.

Negotiating carve-outs for green subsidies would not be easy. At the same time that the United States may seek to loosen rules on climate mitigation subsidies, it has been seeking ways to tighten WTO rules on subsidies that would apply to China and its nonmarket economy model.<sup>54</sup> China is a state-led economy with five-year plans and explicit industrial policy (including for clean energy technology targets) through Made in China 2025. Its state-owned enterprises and other institutional features affect the pricing of economy-wide inputs like banking and land, which create competitiveness concerns with other countries. The role of state-owned enterprises in China's economy has grown during the presidency of Xi Jinping (Lardy 2019), potentially exacerbating some of these distortions over time.

At the moment, China and other WTO members have not even agreed on the definition of a subsidy.<sup>55</sup> It is unlikely that tweaks to WTO subsidy rules for the climate transition would be made without a broader rethink of subsidy rules to deal with concerns raised by the Chinese economic model.

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53. In the United States, the Commerce Department makes the subsidization determination but the independent, quasi-judicial US International Trade Commission makes the injury determination.

54. For a review of some of the underlying subsidy issues involving China, see Bown and Hillman (2019). The Trump administration pursued a trilateral approach (with the European Union and Japan) of developing new subsidy disciplines that might then be negotiated and applied to China. To date, the Biden administration has not continued that approach, but it has continued to complain publicly about China's economic system (USTR 2023).

55. Multiple examples abound. One prominent one is the disagreement as to whether Chinese state-owned enterprises (SOEs) provide a subsidy (if they are a "public body"), through inputs priced below market rates provided to downstream manufacturers,

## WTO Rules on Border Measures

A multitude of other WTO rules is likely to affect the form of cost-raising policies such as the European Union's proposed CBAM, which would levy tariffs on carbon-intensive products. The EU CBAM is designed to prevent carbon leakage by making imports bear a similar cost of carbon emissions as European firms in the EU market. Although the European Union has attempted to design the CBAM policy in a manner that is consistent with WTO rules, trading partners may raise several possible legal concerns.

First, even if the CBAM is applied in a nondiscriminatory fashion, it raises the European Union's effective tariff rate above its legally binding tariff commitment for any given product (scheduled under GATT Article II). Exceeding the bound tariff rate is normally a violation of WTO rules, unless the border tax is simply applying an internal tax facing domestic goods to imports. In this case, as long as the CBAM is implemented in conjunction with the phase-out of free allowances (the imposition of an equivalent cost on the domestic industry), then the net result is zero change in EU market access for foreign exporters.<sup>56</sup> (Put differently, phasing out free allowances would have provided such countries with additional EU market access had it not been done in conjunction with CBAM; the CBAM is designed to offset only the additional market access.)

Second, suppose that the CBAM hits different trading partners with different rates—a higher rate on an import arriving from a carbon-intensive producer abroad and a lower rate on an import arriving from a country that emits less abroad. This approach could be seen as a potential violation of GATT Article I, or most-favored nation (MFN) treatment, which requires nondiscriminatory tariff treatment across all WTO members. An EU counterargument could be that the CBAM is not a border measure but part of a regulatory system that applies equally to domestic and foreign-produced goods.

Suppose the European Union overcomes those first two potential hurdles in WTO rules. The next challenge it may face under WTO rules is GATT Article III, on national treatment. National treatment is another nondiscrimination rule holding that once an imported product has paid its tariff at the border, the product is supposed to be treated identically to a domestically produced good. The European Union plans to phase out free allowances as the CBAM is implemented, which would address such concerns. If

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given that SOEs are ubiquitous in certain areas of the Chinese economy, with decisions influenced by the Chinese Communist Party rather than commercial considerations.

56. See Staiger (2022, chapter 8).

it fails to do so, the result would be discrimination between domestic firms (which would not face these costs) and importers (which would face the costs via the CBAM) and thus a potential national treatment violation.

The European Union could also seek to justify the CBAM under a WTO “General Exception,” such as GATT Article XX(b). These exceptions are for measures “necessary to protect human, animal or plant life or health.” This route has never been attempted or litigated.

The WTO consistency of any potential CBAM will remain unknown until it has been litigated in Geneva. (In the absence of a negotiated agreement authorizing CBAMs *ex ante*, it is highly likely that some trading partner will formally challenge it through a dispute at the WTO.)

### WTO Rules on Export Restrictions

The WTO has always had relatively weak disciplines constraining national use of export restrictions. GATT Article XI contains the system’s current limits. Quantity restrictions on exports are not permitted, but there are exceptions, including “export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other *products essential* to the exporting contracting party” (Article XI 2(a) [emphasis added]), though “essential products” are not defined.<sup>57</sup> In contrast, export taxes—a largely equivalent policy instrument—are permissible.

There are at least two related concerns with the lack of WTO discipline on export restrictions. First, export restrictions on upstream producers can be used to provide implicit subsidies (to downstream industries) that have additional competitiveness effects. Second, export restrictions can be used to punish countries for noneconomic policies.

In its accession to the WTO in 2001, China made explicit commitments to bind its export taxes at certain levels and not to introduce new export restrictions. According to the WTO, China violated those commitments on numerous occasions, including by imposing export restrictions on rare earths and raw materials.<sup>58</sup> China’s export restrictions have also had

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57. Export taxes are like tariffs, in that they reduce the gains from trade, as exporter firm losses exceed consumer gains. However, collective action may be less difficult to maintain, because producer interests will be in favor of liberalization and are more likely (than consumers) to advance their own interests with the domestic government. Tariffs also reduce the gains from trade, as consumers lose more than domestic producers gain, but the benefits of tariff reductions are diffuse whereas producer losses are concentrated. Trade negotiations can be helpful to overcome this collective action problem, as exporters at both home and abroad will have an interest in reciprocal tariff liberalization even if political economy concerns render unilateral liberalization less attractive.

58. The United States initiated a third such WTO dispute over Chinese export restrictions in 2016, but the Trump administration chose not to follow through; it adopted a different set of policy approaches toward China as well as the WTO more broadly.

important economic effects in areas that are not subject to formal disputes, such as providing implicit subsidies to Chinese downstream industries, including aluminum manufactures (OECD 2019a), which improves their competitiveness relative to foreign firms.<sup>59</sup>

China is not the only country to use export restrictions. Other emerging economies—including Argentina and Indonesia—have imposed export restrictions on inputs in order to subsidize local downstream refiners or manufacturers as part of a strategy to spur industrial development and capture more of the value added in certain finished products.<sup>60</sup> Indonesia has even contemplated working to establish an OPEC-like cartel for nickel and other critical minerals.<sup>61</sup>

The United States has used export restrictions in some high-profile historical episodes as a foreign policy tool or to address national security concerns. In 1979, for example, it halted grain shipments to the Soviet Union after the Soviets invaded Afghanistan. In 2022, after Russia invaded Ukraine, the United States coordinated with 37 other countries to prevent a long list of high-tech exports from reaching Russia and Belarus.

The United States also employs an extensive export control policy for sensitive dual-use technologies, often alongside other countries, through the Wassenaar Arrangement. Recent US controls include limits on exports to Huawei for its 5G telecommunications equipment, to companies building military islands in the South China Sea, and to indigenous Chinese semiconductor firms out of concern with President Xi Jinping's military-civil fusion policy.

These actions notwithstanding, the US Constitution bans export taxes. Export restrictions are also not an area the United States has historically prioritized in trade agreement negotiations. An exception may be the new critical minerals agreements the United States is negotiating in light of the Treasury regulations announced March 31, 2023.<sup>62</sup>

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59. China's selective rebating of exporter value-added taxes has also had important economic effects (Gourdon et al. 2022).

60. Since late 2020, Indonesia has restricted exports of nickel. Its export restrictions on palm oil arose as part of a WTO challenge to EU antidumping measures (Fischer and Meyer 2020), as did Argentina's export restrictions on soybeans (Crowley and Hillman 2018).

61. Harry Dempsey and Mercedes Ruehl, "Indonesia Considers OPEC-Style Cartel for Battery Metals," *Financial Times*, October 30, 2022.

62. The criteria for a critical minerals agreement with the United States would be one in which each side (a) reduces or eliminates trade barriers on a preferential basis, (b) commits the parties to refrain from imposing new trade barriers, (c) establishes high-standard disciplines in key areas affecting trade (such as core labor and environmental protections), and/or (d) reduces or eliminates restrictions on exports or commits the parties to refrain from imposing such restrictions on exports (88 Federal Register 23370, April 17, 2023).

## Limitations of the WTO Dispute Settlement Process

The discussion so far has assumed that WTO rules exist in an institutional framework that makes them enforceable. In fact, the WTO dispute settlement system is currently not working as drafted. In 2019, the WTO's Appellate Body ceased to function after the Trump administration refused to allow the appointment of new members.<sup>63</sup> The Biden administration has not reversed that policy. As a result, if a trading partner loses a first-stage panel decision in a dispute, it can appeal that decision “into the void,” effectively putting the dispute in limbo and not allowing it to reach the stage of authorized retaliation.

The G7 leaders in Hiroshima and the WTO trade ministers at the Twelfth WTO Ministerial Conference committed to having a well-functioning dispute settlement system in place by 2024. However, whether they agree on the WTO reforms needed to achieve such an outcome—and what those reforms would imply for subsidy rules and dispute settlement—remains uncertain.<sup>64</sup> As a result of the impasse on the dispute settlement mechanism, some WTO members, including China and the European Union, have implemented a plurilateral mechanism, the Multi-Party Interim Appeal Arbitration Arrangement (MPIA).<sup>65</sup> The MPIA is an attempt to introduce a second-stage appeals process to help resolve disputes among MPIA members that might otherwise be blocked due to the currently nonfunctioning Appellate Body (Pauwelyn forthcoming)

In light of this institutional reality, trading partners may stop using WTO dispute settlement to register their concerns and instead start acting unilaterally, making themselves judge and jury of the US, EU, or Chinese policies in question. If the US, EU, or Chinese response to such actions is hostility, trade relations between countries could spiral, risking trade wars and the resultant destruction of the gains from trade.<sup>66</sup>

A broad multilateral dispute settlement reform may require compromises on green subsidies (carve-outs) as well as permission for the EU CBAM. The United States and the European Union are unlikely to embrace a new and binding dispute settlement process if it puts their climate policies at risk, and China is unlikely to agree if the process overly constrains its

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63. For a discussion, see Bown and Keynes (2020).

64. See G7, “G7 Hiroshima Leaders’ Communiqué,” May 20, 2023, and WTO, “MC12 Outcome Document, Adopted on 17 June 2022,” WTO, WT/MIN(22)/24, June 22, 2022.

65. As of the time of writing, the MPIA included 26 WTO members.

66. For example, both US tariffs and Chinese retaliatory tariffs imposed during the trade war of 2018–19, which remain in place, and are *prima facie* violations of WTO rules, in particular GATT Articles I (MFN) and II (schedule of tariff concessions).

economic development model of state capitalism. (We return to this issue in the following section.)

Nevertheless, there are at least three counterarguments to the idea that trade rule enforcement under WTO dispute settlement would play a net beneficial role in climate policy. The WTO's system of dispute settlement was good for managing many challenges of the past, but it also had flaws that could limit its effectiveness on climate policy if left unaddressed.

First, even a fully functioning WTO dispute settlement system resulted in asymmetric enforcement. Historically, larger countries and countries with more market power had more success in WTO disputes than other countries.<sup>67</sup> The lack of third-party enforcement thus disadvantages smaller economies with less market power. Furthermore, WTO dispute settlement was largely ineffective at changing the trajectory of a major nonmarket economy such as China.<sup>68</sup> Asymmetric enforcement of trade rules can lead to asymmetric application of WTO-consistent policies in the first place.

Second, WTO litigation is time-consuming. The first stage of a WTO dispute process involves a report of convened trade experts, who would provide a first-stage ruling. Given the complexity of trade-related climate measures as well as competing justifications, their ruling could be legally messy. If either country disagreed with the ruling, it could be appealed. (Over time, more and more panel rulings were appealed, increasing the average length of a dispute settlement proceeding.) In the past, if the Appellate Body agreed with the panel about a finding regarding a WTO inconsistency, the respondent government was given up to 15 months to bring itself into compliance with the WTO ruling. Only then, if the complaining country does not believe that the respondent has complied and convinces the WTO that it has not, does the case proceed to arbitration. The arbitrators then decide the level of tariff retaliation.

All told, it can take years for the full process to play out, even when the process is fully functioning.<sup>69</sup> Governments have taken advantage of the length of the process by knowingly imposing WTO-inconsistent policies (and waiting to reform them) until some time in the future after the dispute settlement process is completed.<sup>70</sup>

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67. See Bown and Reynolds (2017) and Bown (2004).

68. See Bown and Keynes (2020).

69. In an extreme case, the WTO process over the US–EU disputes over subsidies to Boeing and Airbus, which began in 2004, concluded only in 2019—and even then the parties did not remove the WTO-inconsistent subsidies, instead negotiating a solution.

70. The United States has repeatedly used tax-based export subsidies, removing them only after slow processes of trade dispute resolution. Examples include domestic international sales corporation rules, the extraterritorial income exclusion, and the foreign-derived

Compare that outcome to the way in which the United States addressed the concerns raised by the European Union and Korea over the IRA's discriminatory tax credits for EVs. The United States found at least some temporary solutions within a matter of months, avoiding litigation that could have taken years. Because the European Union, South Korea, and the United States all knew that WTO litigation was not a political option to diffuse tensions over the issue, they confronted the challenge sooner rather than later.

Given the existential threat that is climate change, it may be a feature and not a bug that policymakers do not have the luxury of pushing hard issues off by engaging the old approach of WTO litigation, relying on the actions of ad hoc judges in Geneva, and then forcing some future governments to resolve it.

Third, the purpose of authorized WTO retaliation in a dispute historically has been limited. There are no retrospective penalties for past losses, only prospective remedies that are extremely restrained. In a subsidy dispute, for example, tariff retaliation has typically been limited to the size of the subsidy. In a border adjustment dispute, the tariff retaliation would likely be limited to a duty that would reduce exports from the respondent to the complaining country (of some other good) by an amount equivalent to the amount of trade lost by the original WTO-inconsistent policy. Sometimes this retaliation can be targeted in a way that generates additional political-economic costs within the respondent country that convince domestic policy makers to bring the underlying policy into WTO consistency. But often it does not, or not right away.<sup>71</sup>

In short, WTO authorized retaliation is limited by construction. The WTO system was designed to rebalance market access concessions in light of a WTO-inconsistent policy. It was not designed to impose large punishments to induce compliance or that might completely deter WTO-inconsistent policies in the first place. In many respects, the process limits retaliation in order to defuse trade conflicts and prevent them from spiraling into waves of retaliation and counter-retaliation. In the end, the traditional remedies authorized under WTO dispute settlement may not be sufficient to induce timely compliance with WTO rules and will not ensure international cooperation.

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intangible income deduction (FDII). The FDII deduction is still in place, although the Biden administration has proposed repealing it.

71. Both the United States (cotton subsidies) and the European Union (bananas) decided to live with the outcome of a WTO-inconsistent policy and retaliation (or some other form of compensation). The United States paid the Brazilian government \$147 million a year after losing the cotton case rather than complying (Alan Bjerga, "U.S. Reaches Deal With Brazil Ending Cotton Dispute," Bloomberg, October 1, 2014.)

## **Possible Steps Forward for the European Union, China, and the United States**

Climate change is a global problem requiring a global solution. No progress on the intersection of climate policy and trade policy is going to be made, including at the WTO, unless the main protagonists—the United States, the European Union, and China—resolve some of their other major differences over trade rules.

This section describes the foundational principles that should guide policymakers as they struggle with this global collective action problem. It then discusses how best to leverage these principles in resolving disputes between the United States, the European Union, and China.

Four principles guide our suggestions:

- Climate change is a paramount priority, and the world needs much more aggressive policy action in order to avoid catastrophic outcomes. Policymakers should therefore prioritize emissions reductions whenever possible.
- Countries have different economic systems, and they will inevitably make different policy choices that reflect their own institutional, political, and economic constraints. Asymmetric policy choices will introduce competitiveness concerns and trade frictions, which need to be addressed in a way that does not lead to escalation, trade wars, or the unraveling of effective climate policy choices.
- The gains from trade are mutually beneficial and large, and there is great value in a rules-based trading system, including the provision of frameworks that reduce the frictions around countries' asymmetric policy choices.
- Over time, such frictions will be minimized if jurisdictions move toward greater policy alignment. International efforts should work to build mechanisms that nudge countries in that direction.

Our proposal is to start with the United States, China, and the European Union. The three massive jurisdictions should use the existential climate crisis as a political opportunity to come to the table and negotiate new plurilateral disciplines that facilitate joint action over a wide range of topics. These disciplines would create tradeoffs; the aim is for each party to enjoy gains in some areas that offset its perceived losses in others (see figure 8.4). Agreements would include guardrails for subsidies, carbon border adjustment mechanisms, and export restrictions. The process would focus on the most meaningful climate ambition the three could achieve while also tackling their first-order concerns on trade. Finally, an ultimate long-term goal

Figure 8.4

**Through coordinated action, the US, EU, and China can each enjoy gains resulting from climate and trade negotiations**

Examples of coordinated action

|                           | United States   | European Union  | China  |
|---------------------------|---|---|--|
| <b>Gets</b>               | <ul style="list-style-type: none"> <li>Less trade weaponization from China</li> <li>Access to appropriate trade remedies</li> </ul> | <ul style="list-style-type: none"> <li>CBAM acceptance</li> <li>Less trade weaponization from China</li> <li>Ability to offset competitiveness effects of other countries' climate subsidies</li> </ul> | <ul style="list-style-type: none"> <li>Accommodation of its NME</li> <li>More certainty around trading partner responses to its subsidies</li> </ul>                             |
| <b>Gives</b>              | <ul style="list-style-type: none"> <li>No national content provisions</li> <li>Accommodation of NMEs</li> </ul>                     | <ul style="list-style-type: none"> <li>Allows for others to subsidize</li> <li>Accommodation of NMEs</li> </ul>   | <ul style="list-style-type: none"> <li>Less ability to use market power to weaponize trade</li> <li>Commitment to adhere to reciprocal market access with WTO members</li> </ul> |
| <b>Coordination gains</b> | Functioning dispute settlement  | Rules based system  | Commitment to greater climate ambition   |

CBAM = carbon border adjustment mechanism; NME = nonmarket economy; WTO = World Trade Organization

Source: Created by the authors.

would entail the three coalescing around a global carbon price that increasingly approaches the social cost of carbon. While we focus on these three jurisdictions as a starting point, we are under no illusion that other countries are not important, and we discuss the larger problems of multilateral coordination below. We view these three players as an important first step toward building wider cooperation and consensus.

**Export Restriction Guardrails**

The three jurisdictions should commit not to implement climate-related policies in any form that restricts exports. Prohibited policies should include export bans of any type, export taxes or quotas, selective rebate of value-added taxes, and more. The failure to put guardrails on export restrictions is driving concerns over excessive market concentration, creating a separate incentive for other governments to subsidize beyond what is needed to tackle the climate crisis and, in some cases, to also pursue discriminatory trade policies.

## **Subsidies Guardrails**

The three jurisdictions should accept that some countries will subsidize and focus on shaping the transparency, effectiveness, and implementation of those subsidies. Consistent with current WTO rules, countries should reject future national content requirements and dismantle those already in place. In addition, they should seek to minimize subsidies that create international competitiveness spillovers while at the same time recognizing as legitimate a trading partner's policy response to those subsidies that harm its domestic industry.

## **Subsidies Response Guardrails**

As some subsidies will reduce foreign countries' competitiveness, guardrails are needed regarding the ways in which trading partners respond to these adverse consequences. Trade remedies (antidumping, countervailing duties, safeguards) should be limited to those needed to facilitate the greater goal of maintaining a generally open trading regime and continued cooperation. These remedies should be accepted (within limits) and not result in additional tariff threats that would be escalatory in nature.<sup>72</sup>

Remedies should also be designed to avoid domestic political capture, require evidence before being imposed, and be subject to automatic termination after, say, three or four years (like measures imposed under the Agreement on Safeguards), with continuation requiring a newly established set of facts and evidence (as underlying economic conditions are likely to have changed).

## **CBAM Guardrails**

CBAMs should be greenlighted, as long as they treat imports the same as domestic goods, with full credit given to countries that impose their own carbon pricing regimes. However, critically, emissions-based fees need to be applied domestically as well; a CBAM is not possible without a domestic carbon price.

It should be permissible to give credit for subfederal (e.g., US state) or member state (e.g., in the case of the EU) level policies or real regulatory costs. However, regulatory costs are generally small. Given that measurement issues are already vexing and that converting regulatory costs to their equivalence in carbon pricing would be difficult, it will be incumbent on the policy-imposing country to make the evidence-based case for equivalence in advance of any CBAM imposition.

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72. Failure to reach agreement on trade remedies is what eventually undermined US support for the WTO dispute settlement altogether (Bown and Keynes 2020).

CBAMs are useful for addressing self-imposed competitiveness concerns associated with carbon pricing. They will not address these concerns in third markets, however, where a company in a pricing jurisdiction may face competitors with cost advantages. Still, CBAMs can encourage both domestic and foreign adoption of carbon pricing, ideally reducing the importance of this issue over time.

### **Big Picture Guardrails**

The three jurisdictions may need to recognize and accept the differences in each other's policy approaches and economic systems, as well as the acceptable responses to those approaches and systems. Those responses could include acceptance of both nonmarket economies and the policy responses needed to counteract the anticompetitive impacts of those practices on other countries. Such responses include policies to address concerns over excessive geographic market concentration of production and policies that ensure continued commitment to achieve and maintain reciprocal market access toward the full WTO membership.

### **Moving toward Greater Policy Alignment, Coordination, and Ambition**

As of 2023, more than 70 jurisdictions (and 39 national jurisdictions) employed some form of carbon pricing, covering 23 percent of worldwide greenhouse gas emissions.<sup>73</sup> Over time, the United States should work to better align its climate policy with that of the European Union, including by making greater use of carbon pricing and adopting a (nondiscriminatory) CBAM that would motivate policy action abroad.<sup>74</sup> China should work to further develop its carbon pricing regime, expanding coverage and increasing emissions-reduction incentives. This sort of policy alignment can reduce competitiveness concerns and allow relatively uninhibited trade flows. This approach also has fiscal benefits, which may be particularly important for countries with pressing fiscal constraints.

While policies remain divergent, jurisdictions should implement their climate policies with an eye toward minimizing potential frictions, solic-

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73. See <https://carbonpricingdashboard.worldbank.org/> for details on these regimes.

74. Clausung and Wolfram (2023) discuss these policy dynamics. Countries with carbon-intensive exports to CBAM countries would be incentivized to employ carbon pricing in order to access CBAM markets and to convert foreign tariff revenue into domestic tax revenue. In addition, there may be rhetorical and political benefits from adopting carbon pricing in order to both avoid paying CBAMs and to join groups of "club-like" CBAM countries. Of course, CBAMs can backfire if they lead to trade disputes, retaliation, and trade wars, so the guardrails suggested above are important.

iting feedback, and expecting to accommodate tweaks in their approaches to limit the cross-border competitiveness impacts of their policy choices on trading partners.

Negotiations over policy alignment should be coupled with a commitment that each jurisdiction undertakes even more ambitious commitments to reduce emissions and that the three jurisdictions will coordinate policy actions to implement those commitments.

## The Rest of the World

Countries outside of the United States, the European Union, and China account for more than half of global GHG emissions and more than 70 percent of the world's population.<sup>75</sup> A particularly important player is India, which accounts for about 7 percent of the world's greenhouse gas emissions (see figure 8.1).

Many of the other jurisdictions of the world are poorer than the United States, the European Union, and China. Poorer countries are less responsible for the stock of carbon emissions in the atmosphere, face higher opportunity costs of expending resources in climate mitigation, and are at greater risk (on average) from the damages that result from climate change (Carleton et al. 2022). Their challenges need to be recognized and accommodated.

Some of the policy tools described here are likely to have important impacts on poorer countries. For example, although the European Union's CBAM is designed in a nondiscriminatory fashion, if applied across the board, it may slow exports and economic growth in some less developed countries, including Cameroon, Mozambique, and Nigeria (UNCTAD 2021; Holzhausen and Zimmer 2020).<sup>76</sup> Poorer countries may also find it difficult to afford costly green subsidies or to seek remedies against other discriminatory trade policies.

Possible policy responses to these concerns include turning off CBAM tariffs at lower implied carbon prices for lower-income countries, similar to the tiered carbon price suggested by IMF economists in Parry, Black, and Roaf (2021). Poorer countries would also benefit from delayed implementation, technical assistance, and larger flows of climate finance.

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75. All data are from the World Bank. All series are for the latest year available at the time of writing.

76. The World Bank recently developed a CBAM exposure index (<https://www.worldbank.org/en/data/interactive/2023/06/15/relative-cbam-exposure-index#3>).

A rules-based system has much to offer poorer countries, which are more likely to be excluded from ad hoc arrangements and which have less power to negotiate effectively bilaterally. The proposed agreement among the United States, China, and the European Union could serve as a starting point for a broader rethinking of multilateral trade rules that will hopefully promote more ambitious climate policy action within a stable and open world trading system.

## **Conclusion**

Given the current state of conflict, progress by the European Union, China, and the United States is a necessary first step for better policy cooperation for the world as a whole. The fact that the three jurisdictions are so different from one another means that any framework that covers their core interests (in a rules-based way) is also likely to capture the systemic interest of most other higher-income countries as well as many emerging economies. Having three major players in the negotiating room is much less likely to lead to a discriminatory outcome (at the expense of the rest of the world) than including only two parties. Including the European Union—which represents the interests of 27 smaller member-states—is important, because it is more likely to ensure the continued importance of rules, something that is critical for the overall EU approach to trade policy.

Our proposal is only a starting point. Of the top twenty countries in terms of greenhouse gas emissions, seventeen of them, and about half of worldwide emissions, are outside the scope of these three big jurisdictions (see again figure 8.1). Resolving trade and climate issues among the three large economies is an important precursor to reconciling major trade and climate issues and facilitating WTO reform, but it is just part of the task at hand. Future policy actions will need to address the myriad issues surrounding climate change mitigation and adaptation that affect the vast majority of the world's population.

The agenda for smoothing trade and climate issues among these three big economies outlined here is not the only path forward. If the United States, the European Union, and China cannot get in a room together, smaller groups of countries could still make progress on rules, as they have in other contexts, such as the plurilateral MPIA. Such approaches, however, are less likely to create a framework that can comprehensively address a truly global externality.

Establishing the parameters of cooperation over climate is likely to have positive macroeconomic effects as well. Rules that help reduce uncertainty about what policies are permissible and when to expect a trading partner response may help galvanize private sector innovation and investment, if

they allay firms' fear that trading partners will use a border measure to limit their exports ex post if they accept such subsidies.<sup>77</sup>

The world is running out of time. The European Union, China, and the United States need to take advantage of the current crisis in their trade relationships to further efforts on climate policy.

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77. One noteworthy example was the offer by the UK government to subsidize a Nissan plant to keep it operating post-Brexit. The carmaker recognized that such a subsidy would be a violation of EU state aid rules and would thus be unsustainable and subject to countervailing duties or other trade restrictions that would make the vehicles uncompetitive in the EU market. See Ivana Kottasová, “UK Offered Nissan \$100 Million to Ease Its Brexit Fears,” CNN Business, February 4, 2019.

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