



Conference Transcript
The macroeconomic implications of climate action

Session 6: Consequences of policy heterogeneity across countries

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Cecilia Malmström: -- the Eric M. Zolt chair in Tax Law and Policy at the University of California, Los Angeles, and she is also a non-resident fellow at Peterson. And Chad Bown is also a non- -- he's very much a resident of the Peterson. He holds the Reginald Jones Senior Fellow since, March 2018. Following Kim's presentation, we also have a paper by Reinhilde Veugelers, who is professor at the Katholieke Universiteit Leuven in Belgium, and she's also a non-resident, senior fellow.

And we have two presentators also from Peterson. So, this is a full Peterson panel by Maurice Obstfeld, who is a professor of Economics and former chair of the Department of Economics, University of California at Berkeley, a non-resident fellow here at Peterson. And Jeromin Zettelmeyer, who is Director at Bruegel, but formerly Peterson as well. So, all Peterson people here today. I will first give the floor to Kim, who will present. But Chad is also in the room to ask questions later if you have nasty questions. The good questions goes to Kim.

Kimberly Clausing: So, it's such a pleasure to be here for these two days with you all. And I've learned a lot. And I'm looking forward very much to the conversation around this paper. This is my 10th month, by my calculations as a Petersen non-resident fellow, and one of the great joys is events like this. And another great joy is the chance to finally write a paper with Chad, whose work I've long respected. So, save all your hardest questions for him.

So, this is a quick roadmap of where we're going, but the basic argument is that we're in a bad equilibrium that could be better, and that the main actors that we need to bring together to get to the better equilibrium are the United States, the European Union, and China. And I'm going to start by describing some of the trade frictions and the bad equilibrium, but also suggest a path forward that's based around reciprocity or the idea that there are things that can be changed within the World Trading Organization rules.

But that will begin with an agreement by these three parties, that could be mutually beneficial. Why these three parties? Well, they're obviously very large, important jurisdictions that comprise about 3/5 of the world economy. And they also account for about half of global emissions, slightly above half if you look at carbon, slightly below half, if you look at greenhouse gases. We're under no illusion that this is all of the problem.

There's obviously another half of the global emissions that aren't these three. And in fact, 17 out of the top 20 aren't, these three jurisdictions. But we do think it's going to be difficult to get to resolution of some of the vexing climate, and trade issues without bringing these three along. And so, that's the idea. We're also under no illusion that this is going to be super easy, but we do think there are some interesting steps forward that would be helpful.

I don't need to tell this audience that there are asymmetric climate policy choices in the world. I agree with the characterization of many that Europe has done the best, in terms of thinking about climate policy in this area, in part because they are willing to rely in part on cost-imposing policies. And you can see, the European Union as a whole, their ETS system, but also higher carbon prices in places like Germany and France or higher coverage at any rate.

All of these, key jurisdictions subsidized the European Union included, but also China and the United States, although the subsidies vary much in terms of their mechanisms, right? I mean, pricing is used to some extent in China and in some subnational US jurisdictions, but nowhere near as broadly as in Europe. So, this generates a situation where there are large policy spillovers. And in a paper that I wrote with Catherine Wolfram, who's here today and will be on the next panel, we focused on two, the emissions externality, and the competitiveness spillovers.

And so, I think the emissions externality is this number 1 here, and it's the important insight that there will be free riding in part because this is a global externality. And so, when countries do ambitious things that helps them, but it also helps the rest of the world. And that means that there probably won't be enough ambition, right? So, that's one key problem.

A second key, policy spillover is around competitiveness. And this, the part that Catherine I focused on was a combination of 2 and 5, which is the notion that if one jurisdiction is pricing, and imagine you're producing chemicals in Europe, for instance, you might face pricing in terms of the chemicals production. The inputs into this energy intensive production will also be more expensive.

And so, if you're a chemicals company, you will face a disadvantage when you're comparing yourself to competitors in the United States where carbon isn't priced, and where, in fact, electricity might be subsidized through things like IRA, right? And when you have this diversity of policy approaches where there's some jurisdictions imposing costs and some reducing costs you end up with competitiveness spillover, that you can address with something like a carbon border adjustment.

But we should be aware that no single tool, whether it's a carbon border adjustment or a climate club is going to handle both of these types of spillovers. So, as an example, if Europe does a carbon border adjustment the United States might say, "We should be in that too," because measure what matters. But we need to be aware that if the US also just put on the tariff without the price, that that's going to do nothing for that competitiveness spillover, right?

Similarly, if the two just do the carbon border adjustment, and the US doesn't -- that's not going to do anything about the emissions externality spillover. So, the ambitious countries will still worry that they can't handle that without one tool. There are other spillovers here to the administration. Has liked to talk a lot about these learning and scale spillovers, and we saw some slides on that in the last panel but this is important, right? If you have learning like we see in the case of the reductions in cost in solar over the past few decades, that benefits the entire world's transition. That's helpful.

They're also important upstream effects, so if we look at the critical minerals case whether you're subsidizing or whether you're pricing carbon, both are going to drive up demand for batteries and the components in batteries, right? And so, if you're another country that wants to do your transition in a way that uses batteries, you're going to find those more expensive because of those policies. On the other hand, if you're a lithium-producing country, you're going to find that a favorable short run effect.

But these spillovers are important to recognize, and they have caused a fair amount of friction. So, I'm going to turn next to the friction in some of the responses that we've seen. This one slide could really take the full 20 minutes. So, I'm going to try to just keep it brief. I'll talk first about unilateral responses. The European Union has responded to the US Inflation Reduction Act with both some praise, right? It's nice to see, the US back taking action with respect to emissions, and that is helpful.

But also some concern that some of this subsidization is going to come in a zero sum way at the expense of European industries that have already been built around the assumption that they wouldn't be facing that kind of competition. And so, this is suggested some policy shifts, including some proposals to roll back some of the cost imposition on energy intensive

industries or to move towards more aggressive subsidization, which gets in the way of some of the state aid objectives.

And we go through that some in the paper that's still coming that you haven't seen yet, but you will see. The US response has been, somewhat, conciliatory to trading partners in part, because their concerns are real, and some of the implementation has actually helped mitigate some of these concerns. I haven't talked yet about the domestic content provisions, but there are domestic content provisions in addition to subsidies that put the thumb on the scale for US production.

In the case of electric vehicles, there's actually a fairly straightforward workaround that's baked right into the legislation. It didn't even require particularly creative implementation, which is that if it's a commercial vehicle, all of these strings don't attach to the tax credits. And so, in the case of leased cars, which have historically been a really important part, as you can see in this diagram from Chad's recent paper, leased vehicles are a big part of the electric vehicle tax credit market.

Those are also becoming more important, again part, because they aren't facing the same domestic content restrictions that we see in some of the other areas, right? So, there has been a US response is I don't think the US unilateral changes are over, right? I think that this is going to be an area in the future that will continue to face a rethinking in part because of these higher budgetary costs. But there may be some battles down the road.

There's also a host of bilateral efforts, right? So, we could take each pair of these three key jurisdictions and look at their interactions with each other. In the case of the US and EU, there's work towards a mini agreement on critical minerals, and that would give them access to some of the same credits. There's talk of this green steel arrangement, although it's a little difficult to see what's in there.

There's proposals by others, including one by Catherine and Luis and I, to enhance cooperation around methane, which actually might be an interesting area to focus on greater alignment because there's a price involved in the IRA legislation that backs up regulation that's similar to the European approach, right? And so, you might be able to build muscle for more aligned policy in that respect. If you look at the US and China, and the EU and China, they too have their sources of frictions and compromises, right?

In the case of China in the EU, China has complained about the European Union's plan for carbon border adjustment, and they're also concerned, of course, with export restrictions, and investment screening, and some of the other recent trade disputes, trade-related disputes. In the case of US and

China, there's this big controversy about whether this is going to be de-risking or decoupling or what is the evolution of this look like, right?

What we're suggesting going forward is that by focusing on these three jurisdictions, and thinking about reforms to the trade rules, you could actually get to a situation that's less fraught, and it's more collaborative where each of the jurisdictions could have important things, to get from a form of these WTO rules. So, first, let's talk about the principles that we put forward for organizing this thought. And then we're going to go through three types of WTO rules, those affecting subsidies, those affecting export restrictions, and those affecting border measures, right? And all three of those taken together.

If you think about changing the rules a bit, we'll have something that can offer that group of three together. But if you separate them and look at them one at a time, or if you look at each bilateral arrangement one at a time, it's a little harder to get to a resolution. So, the key principle here is that climate change is the paramount priority, but that it's not necessarily the case that trade friction is going to serve that, right?

If we can find ways to reduce and ease this trade restriction that might in fact deliver better climate results as well as better trade results over time, and that the value of rules-based system is in fact that you can have your cake and eat it too somewhat in this extent, but not have to sacrifice, a trade in honor of climate, right? So, let's look at three examples of this, and new guardrails that might help ease these, concerns.

So, take, for instance, the current subsidy rules in the WTO. It's very clear that there's two types of subsidies that are prohibited, right? Those that rely on domestic content, and those that rely on export, right? So, Chad and I suggest that those are very reasonable prohibitions. We want to keep those, and reject and dismantle any national content provisions that are present.

But at the same time, other subsidies are acknowledged as feasible in the context of WTO rules, but actionable in the sense that if your injury is hurt by the subsidies of another country, you can go to the WTO and explain that injury, and get proportionate right to remedy that. This is an important thing to acknowledge too because it seems quite clear to us that countries will want to subsidize. That's not going to go away, and they've been doing that for a long time.

So, the key is to have the subsidies occur in a context that, where the remedies are both expected, and where they themselves come with guardrails, right? So, in the case of recent history, we've often seen these remedies taken to the street outside of the WTO. And that can lead to sort of escalation and trade disputes, right? And it'd be better to have this much

more regularized, right? So that when countries subsidize, they would come with the expectation that, of course, other countries may want to remedy should their industries be hurt by those subsidies down the road, right?

And I think there are some current risks, and the United States government hasn't fully understood, having been the one complaining about other country's subsidies for a long time, that they will be subject to the same complaints, should their subsidies get very large in the context of the Inflation Reduction Act, right? So, the idea here for the guardrails is that we'd expect other countries to respond, but they would respond with evidence, and with sunsets, and with, less fear of capture.

Turning to border measures the standard restrictions through the WTO are that border measures should be subject to most favored nations so that if you levy a tariff on another country's products, you apply that same tariff on a most favored nation basis to all WTO members, and that goods should be treated with national treatment. So, once it makes it over the border, you're not discriminating among products there. There's some concerns that the EU's CBAM would be challenged on these grounds.

I think on most favored nation, the argument would be something like, "Well, you're not treating all of the products the same because the ones with more carbon are being treated differently." One could make the argument, which I think is very sound that, "Well, actually, this is a domestic regulation," the ETS, right? And we're simply applying this to other countries as well, right? So that when they send products to the European Union, they also face the same treatment, right? And I think that that is a very defensible argument.

There's also concerns about the nondiscrimination angle. But, of course, if Europe is phasing out their free allocations, which is the way that they subsidize firms as they're adjusting to this ETS system, right? If they phase those out as they're putting in the tariffs then there isn't a discrimination problem because you're creating a level playing field with respect to all the products that are in Europe, right? So, despite the fact that this can be very WTO-consistent, other countries have made it clear that they view this as protectionism in disguise, with most recently China just complaining about it quite recently in the news today.

So, I think the reform to suggest here is that these types of EU, carefully structured CBAMS would be would receive a green light, but we'd make an explicit link between having a CBAM, and having it be non-discriminatory, right? So that there isn't the temptation to turn to this border adjustment only version, which I think really doesn't address the competitiveness differentials or spillovers between those countries, right? And so, making that explicit, and I think another big step here is to move

toward greater policy alignment. And I'll talk a little bit about that on the final slide.

A final area here is the export restriction rules. If you look at the current WTO rules, they have very few limits in a way here. You're allowed to have an export tax that's not constitutional in the United States, but it is in many countries. There's limits on the use of quantitative restrictions. But there's also this language that says if it's an essential good, you can restrict exports, right? Since essential good isn't particularly clearly defined, that does leave a lot of room for export restrictions.

And I think that creates a lot of risk to the world trading system, and to a peaceful, low friction solution to some of these problems because countries anticipate that trade can be weaponized, and then are more likely to subsidize or do things like discriminate among products in part out of that fear. So, if you look at one of the big motives for the national content provisions in IRA, it was this concern that otherwise China would have too much power, and too much ability to control the transition economy as a whole, right?

So, the reform here is to say, "Okay." If we can bring China to the table, and say, "Okay." You agree not to restrict exports on climate related goods, and in fact, we all agree not to restrict exports on climate related goods, that makes it easier to then say to the other countries, "Okay." You're going to take into account other countries when you're doing your subsidies. You're not going to do domestic content. You're not going to do discriminatory things. But you can rest assured that you'll still have access to these really important climate related transition goods.

Now, if you see these three guardrails together, I think they're much more effective as a package than they would be by themselves, right? The countries that subsidize can expect a more routinized, but limited responses to that. Countries that want to do a CBAM can have that green lit, but subject to the restriction that it really is leveling the playing field and export restrictions can be made more rare, hopefully, or non-existent in a way, that would ultimately make some of the disputes here less. I'm not going to say a lot about dispute settlement, except for that I think a prerequisite to being able to perform that is really to be able to handle some of these other issues, right?

At present, this is dysfunctional. In the past, it's been slow, but it's helpful. But I think in order for a dispute settlement to be fully reformed, you need the United States at the table to which means reconciling some of these other things. Okay. This is my last slide. Just a couple concluding thoughts here. One is, what about the rest of the world? It's clearly extremely important to

bring them along. We've started with these three jurisdictions because we see them at the heart of these trade and climate disputes.

But the hope is if you could get a smoother relationship between those three that could ultimately encourage as a stepping stone reforms to the WTO and better climate cooperation. And I think really two things that this room might think about in terms of this path towards greater climate cooperation is how do we get to better policy alignment, which makes all of this much easier, right?

If everybody were doing the European approach, for instance, it's then we can implement that nice IMF paper, and it's like, "Okay. 75, 50, 25." That makes a huge difference in the path of future carbon emissions in a fiscally sustainable way. It's a lot easier to do if there's greater policy alignment. So, what are the carrots and sticks that can move us toward greater policy alignment?

It's possible that trade can be both a carrot and a stick here, right? That CBAMs and climate clubs are much more possible when the policies are aligned, and can create incentives that lead to more climate cooperation, and that trade liberalization can also be helpful here in market access, right? Keeping open the access to the transition goods, keeping open the free flow of trade in ideas and services is going to be crucial to this transition as well, right?

So, I think in terms of lessons from yesterday, I think, and today, we should think about how to get towards that more aligned output because I think that does make it much easier to have a solution to this really vexing global collective action problem.

Cecilia Malmström: Thank you very much for this, Kim. And save your questions for a little bit later because we will also hear the presentation from Reinhilde and your paper, and then we'll do the commenting on both at the same time. You have actually captured all the buzzwords in Brussels in one single title: Innovation for Open Strategic Autonomy, Clean Energy, Industrial Policy. Congratulations for that. And then we will have Jeremy and Maurice commenting both of the papers, I think. So, we'll have a joint discussion.

Reinhilde Veugelers: Yeah, indeed. That was the trick. But the major word is innovation here because that's actually the angle that I want to take, and it's somewhat different from but still very much in the same line here. So, it's really trying to figure out where we are in respect to innovation rather than trade policy here, and see how we can actually move that agenda further.

So, the reason why we want to focus on industrial policy aspect, and how innovation can actually help for that is because this industrial policy will be

very important to make the transformation from green to green here in a way that there are enough winners to compensate for the losers here. So, that's the industrial policy angle here. But the big challenge here is to really reconcile multi-dimensional objectives here. So, we want to go for decarbonization. We want to go for competitiveness.

And there is also, increasingly, the discussion of we also want security of supply, and particularly of the energy component out of this here. And that gets translated into sovereignty, strategic autonomy, decoupling, de-risking whenever that you want to. So, it's these three dimensions that that are present as an objective function here, and that are very challenging to reconcile here, particularly once they start potentially counteracting each other here.

And so, my major point is actually that if we bring in innovation in this industrial policy, this green industrial policy, then this will actually make it easier to reconcile these three aspects here. But that will not come easily here. So, it doesn't come from itself here that can -- innovation can only play that role of reconciling if it's also properly guided by policy here. So, the innovation machine can be powerful here, but it needs to be steered in the right direction.

And what we want to do is actually lay out the principles or at least some kind of principles in terms of how we should steer the innovation machine here in the right direction. Check whether what we currently having in terms of the performance of these energy innovations, whether that fits with what we could have here, and draw from that possible recommendations here.

Although in general, we will be talking about green industrial policy, clean energy will be very specific focus here because that's also a very pivotal in the whole transition here, in terms of reducing emissions here. But before I embark on making that case for innovations and particularly innovations for clean energy, three fallacies to debunk, which were also raised a bit, yesterday here.

First is the one that comes from degrowth here. The argument there is that we may not need new innovations here. It's basically a change in consumption patterns that will basically do it here. I think that's a fallacy in the sense that it's not one or the other here. It's actually these two complement each other. Also, for innovation, you need consumption patterns to change in order for innovation to have the right take up here. And vice versa, innovations can also make those required changes in behavior also way more easy, less costly here, provided it's properly steered.

Another fallacy is that we already have the necessary technologies, and we don't need innovation here. And here I'm relying on the International Energy Agency. It's very clear that with the existing technology that we have, we will not be able to get to the reach, to reach our targets here, and particularly not fast enough and in the most effective way here. Some of the technologies that are only very few that are truly mature here, most of them are still in early or late-stage adoption, and which still will need improvements here.

And then there are still also never to forget something that the EU also doesn't always look at those ideas that still are completely in the hands of the researchers here or in the lab here. That may still take quite a long time before they actually will be realized but that could really be the next, the breakthroughs that we would need in the future here. So, that's why I do think we still need the innovation machine to improve the existing ones here in order to buy us enough time to also be able to still capitalize on these backstop technologies here.

And then a third fallacy is that the innovation machine already will do its job anyway here. We just have to sit and wait till these innovations come in the market here. But that I think is obviously clear here that we will need the steering of the innovations here in order to get there. One particular element I want to raise is that innovation will be important not just only to get the technologies for decarbonization innovation, and the innovation machine can also help to get to this resilience or this security of supply here.

And that's particularly, I think, very helpful in order to avoid that we have other more costly ways of dealing with these resilience requests here. They will go more in terms of protectionism here. So, the way in which innovations can help in building that resilience is to go for more new methods for energy efficiency, new designs that will use less of these critical minerals that will provide bottlenecks here.

Reuse and recycling is a technology area that still needs quite a lot of development, but that really could also help a lot on resilience here. Material substitutions, particularly substituting those materials, that would be key bottlenecks. And then I think also the development of modular production technologies that can switch between different materials and components much more easily so that you become less sensitive for critical components here.

Okay. I hope I've convinced you, why you should listen to how to get the innovation machine working for green industrial policy here. But it was also yesterday raised, what makes it so special here? Is there anything we need to do different from what we usually do in terms of innovation policy? And yes, we do, because there are some really specifics of clean technologies,

that need to be taken into account, but was already mentioned several times here.

The fact that we have to -- we're dealing here with several market failures here. So, it's a knowledge externality. There is the environmental externality on top of this. And that means that you really need to mix and coordinate the innovation policy instruments. That point has been made quite a lot. Another very important point is that, there is a lot of dependencies and lockings that I'm looking at Philip here.

And this holds particularly also very importantly for clean technologies, which means in order to avoid these dependencies and these network stickiness here is very important for clean because also on top of what we usually see is many of these technologies really need a much longer lead time of investments here. So, that means you get stuck also very long into certain bets. And that's not only the choice between dirty and clean, but also even among the more cleaner, between the very clean, and the more hybrid clean here.

So, whatever choice that you make for a particular technology, even if it's not the most clean yet gets you stuck into, and you have to compensate for making sure that then you don't block the way or lock in the way for what's in the pipeline in terms of even more green outcomes here. So, overall, that means that we need much more directionality than we typically have here to combine these different externalities and this dependency here.

On top of that, and was also already discussed this morning, there's a lot of uncertainty here, both in terms of on the technology side, on the supply side, also in terms of the demand side here. And that makes it also way more difficult because of the directionality, we will need to make choices here. But these choices occur with a lot of uncertainty here. And the problem is if you make wrong choices, you get stuck. You have this likelihood to get stuck in bad dependencies here.

Also very importantly is that in the end, whether we will make it or not, this transition is really up to whether the private sector is taking up these technologies in and turn that into investments for cleaner production here. So, that means involvement of the private sector will be very important, making sure we incentivize that. And the same also for civil society because it's the uptake of these technologies will be very important here. So, because of all these arguments, so it's really very important that we combine different instruments that we choose, that we are able to deal with uncertainties here. So, that puts a lot of pressure on the governance of these policies here.

So, there is a lot of potential risk for government failure here. And on top of that, there is also the longer-term horizon that we need to take here. And government policy choices very often have a short-term window here. They don't want to take risks here. So, there is a lot of -- so, for me also, very important challenge for the whole green industrial policy making innovation based is this governance challenge here. So, nevertheless, I think we have no choice but to try, and try to avoid as much as possible these potential government failures here.

And I do think that we can use some principles from an for an innovation-based clean tech industrial policy from a more known industrial policy perspective, for instance, also laid out by [inaudible 0:33:15]. So, industrial policy is not just about, "Okay. Let's pick winners. Let's go for competitiveness here." So, he sees actually within the new industrial policy perspective, we have to deal with this broader multi-dimensional objectives, not purely picking winners for competitiveness.

And also seeing the policy making really as a process of what he calls institutionalized public private partnerships collaboration, where what's really very important is that you coordinate among different policy instruments, among different stakeholders here, along the whole value chain here, also involving civil society, because they need to take up these innovations too here, making choices, but making choices within a within a technology portfolio perspective here.

So, not looking at individual choices, but really seeing the whole portfolio perspective on this. And that also allows you to take more risk within your portfolio here. So, really balancing the very early stage, highly risk type of projects versus the more established, more mature so that you can actually balance these risks way better here. Going for enough risk also by policy experimentation here. So, really seeing also the innovative angle in policy making here, we need to really experiment but experimenting in a scientific sound fashion here.

So, that means try new things even if we don't know whether they will work or not here. But be sure that you evaluate very quickly whether this will work or not, and adjust or not. Also, very important this, and it's also why you need public private partnerships is to deal with the information challenges here. So, you also need to make sure that the information pieces that are available here, that they are coordinated, and that people have the incentives to contribute to that innovation, and that you also jointly learn, and jointly learn fast as well here.

So, monitoring and evaluation will also be very important of that experimentation part of this here. So, overall, I think it is possible to try to minimize the government failures as much as possible here, and at least do

better than what the market left on its own would do here. But I think it's very clear that this really requires a very strong policy governance here. It's not easy. So, let's have a look and see whether we already have this or not here. So, very quickly, because I don't have the time.

So, in the paper I looked at the performance of the Clean Energy Innovation machine. I looked at clean tech patterns, scientific publications, corporate investments in R&D, and deployment of green bonds, venture capital investments, particularly here across time, across countries, and also across clean tech areas here. I won't go into the details, but I think the overall conclusion is that the innovation machine is working. It's not present here on clean tech, but at a speed below its potential here. The high variance across countries here, fast rise of China is very clear in all the different dimensions here.

The EU has a relatively strong and stable position here already from early on, and the US actually relatively underperforming. It's not really that it's not there, but given its very strong innovation, capacity in other areas like in digital, it's much less so in clean tech here. And, of course, these different choices and performance relate to different givens in terms of innovation, capacity, strength or other advantages here, but also relate very strongly to green innovation policy choices that are different here.

So, very quickly, if you look at -- we've already discussed this quite substantially. You have the carbon price, but you also have the deployment targets, and then the subsidies here. And you see a huge variance here with the EU, very strong carbon pricing, although not covering everything, but with the latest revisions of this will also increase the uptake of this. With the US not on carbon pricing, also not in terms of targets here, you see some areas are way more influenced by targets such as biofuels here, and you also see that in the uptake of these technologies here.

But overall, the US is low on that. The EU and China are much better in terms of targets. And then if you look at subsidies, the total public R&D support here, first important point is actually relatively small. Government R&D support here, certainly for clean energy, certainly compared to other areas here. So, it's increasing but very slowly here. And again, so the EU and China are the growing areas here where the US is pretty stable, in that respect.

But of course, there are the recent trends in this here, and I won't go into too much detail because I'm going to run out of time here. So, the US is really picking up with the IRA, and also the investment, and Infrastructure and Job Act, which really boosts in terms of public R&D spending, not in terms of carbon pricing, but in terms of public R&D spending here.

Also, some of its strength is that it has a few very important components like the Department of Energy, which is the federal agency that really coordinates these investments in, R&D for clean, energy here, where initially, it was quite a lot of emphasis on the early stages here with Office of Science, Funding, providing really the support for the large national laboratories, which have been pretty successful to deliver some of the new, ideas here.

Also, important to note is that RPE, which is the sister of DARPA here, which although it gets very small amount of the total budget here, it still is very specific in the sense that it also nurturing really new strategic energy technologies that are too risky for the private sector, but would actually be potential breakthroughs in the future here. And then finally, also new is the Office of Clean Energy demonstration which is, again, very small amount of money here, but still, again, signals this new approach to partner with the private sector to get into demonstration projects here. So, it's a reflection of this public private partnership here.

So, the IRA, of course, provided massive subsidies here, not so much in terms of for R&D here. It was mostly on deploying it here, and also this local content requirement here. But that was already discussed before. So, overall, I think you could argue that the EU -- sorry, the US is catching up in terms of support for clean, tech R&D here. It has some strengths here that can exploit. But I think the major comment for me is, first of all, in terms of the policy governance linking all these different parts of the programs that it actually has here, and also the longer-term commitment, which is very important here. So, those are still two important weaknesses here.

If I look at the EU, but I'm running completely out of time here, so most of the funding is in the hands of the member states. There are some few projects at the EU level, and they go very much in this direction of public-private partnerships here, with the Battery Alliance, for instance, and the IP case with the hydrogen here connecting really across. So, that definitely is there and goes in the right direction here.

And it also have this mix of policy instruments, regulation carbon pricing, and then a good way of spending at the EU level here, but still missing is so a lot of bits and pieces here, but they're not really integrated, with the systemic governance of all these different instruments here. And then you have the Net Zero Industry Act, which was the reaction to the IRA. Again, don't have much time to discuss on this here, but that was really picking certain selected, net zero technologies and projects here.

So, it's very much, again, selecting here for those. They really have to have a target in the sense of the 40 percent, target that they all have to reach this. And the 40 percent means manufacturing locally over, deployment here. So,

there isn't really a local content requirement here, but it comes pretty close to that here. And the way in which these -- if they are selected, they get them priority status in terms of permitting, and also some favorable treatment in terms of public procurement here. But most of it is still -- I mean, this is no extra EU money for these here. It's just extra support here.

So, what we actually would argue for is that that we that the certainly the new trends with the net zero industry is completely ignoring the EU level here, the EU scale and the EU projects funding here, and we would like to see more of that. It's announced with the Sovereignty Fund here, but still within the current proposals, the EU market is actually not so much, exploited here. And finally, in terms of the global coordination that we would need here, it's definitely clear we need global coordination.

There is not much going on at that level here, despite the fact that there is a lot of bottom-up global cooperation in the private sector here. It's the public sector that's completely lagging behind on this. And what we would argue for is very much in line actually with what was mentioned before kind of global R&D platform, but with the relevant players here for the R&D stages, and the early R&D stages because within the early R&D stages, there's much more room for global cooperation for finding win-win situations here since you're still far enough from commercialization here, and win-win are much more stable collaborative agreements here.

And to do that with the EU and the US because those systems are already highly connected here, and then possibly scaled it up later here. And that kind of platform could also deal with the common problem of addressing the demand for technology that would be specific at the global level for less developed countries here jointly financing these kinds of programs, would definitely be something that this platform could also do here. But now we're really already run out of time, I hope I've convinced you to look at the innovation machine as a solution, but that is challenging. Thanks.

Maurice Obstfeld: And just waiting for the slides. Long and variable lags. I see it on my screen, but not on the -- you can't see it. I can see it.

Cecilia Malmström: I'll do it.

Maurice Obstfeld: Great. Thank you. Right. When you open the door, that's where the switch is. Okay. It's a pleasure to be here. This has been a great conference. And these are two fantastic papers. Great. They're related, though they have different emphases. Chad and Kim focus on frictions owing to the very different US, EU, and Chinese approaches to carbon emissions reductions. A key message is the trade frictions may undermine the search for global solutions, and they suggest that this trio commit to a rule-based approach to

cooperation, or at least to resolving the frictions inherent in their different approaches.

Reinhilde focuses on EU and US industrial policies, but also with some attention to global coordination and global solutions. And she makes the case that existing methods of, supporting research are to some degree insufficient or inefficient. And I think both messages need to be taken to heart. Okay. Let me underline with a chart a point that Kim made, which is that together the USA, the EU, and China, the focus of their paper account for only about half of global challenges. These are 2021 numbers. You show 2019 numbers, but you get the message here. The rest of the world is accounting for about half of emissions. And unless we bring the rest of the world in, we're not going to solve the climate problem.

Most of these emissions from the rest of the world come from low and middle-income countries. India is most notable, with about 7.3 percent of global emissions, but other countries are notable as well. And so, we need to provide incentives, options, and capacity for this part of the world, the lower-income world, to address the climate crisis. And clearly, China also has to be engaged in a constructive fashion. All of this is happening in an environment where, the major high-income countries are looking to shift their supply chains, which will have geopolitical as well as economic spillovers.

The move in the US to, "de-risk," if you want to put it in quotation marks, great, European open strategic autonomy. Before the pandemic, just in time, supply chains were common. The pandemic risks suggested just in case, would be a good idea. And what is very much on the horizon now is just friends. Supply chains. In perspective, more resilient certainly is needed in supply chains, and the just-in-time, and just-friends approach is overlapped to the extent that potential shocks are geopolitical.

Economic theory tells us that networks can be very fragile. Even localized small shocks can destabilize entire systems. There's a great survey in the annual Review of Economics by Elliott and Golub on the current state of theory. And I think one important message is that resilience can't be fully decentralized via market forces. Individual nodes may lack sufficient incentive to invest in resilience, because they don't internalize necessarily the beneficial effects on others.

In fact, another lesson of this literature is that more interconnection may be better for small shocks, but it may be worse for big shocks to the extent that the EU, the US, are worried about big geopolitical shocks or to the extent we worry about big pandemic shocks or big extreme weather shocks. There's possibly a trade-off between security versus efficiency, from maintaining very intricate supply chains, and from breaking them up.

The process through which we bolster resilience is not inconsequential for, where we are going, and where we end up. It's very easy to pursue beggar thy neighbor modes of boosting resilience that will alienate key partners. And that includes hostile acts to maintain, quote unquote, "leadership in technology areas," particularly green technology. These actions risk foregoing the international spillovers beneficial spillovers from R&D learning by doing and innovation.

Flouting the WTO rules is threatening for many potential partners, particularly smaller countries and climate clubs, while on the upside, they may induce favorable policy developments with respect to climate pricing may seriously backfire if poorer countries feel impoverished and penalized. Remember that these countries are also custodians of the global commons. Think of the Brazilian Amazon. It's important to keep them on board.

Proposals like the US proposed fee on carbon intensive imports are discriminatory absent the US carbon price, and amount to barely disguised tariffs, which will have a negative effect on the global system. Ideally, as was pointed out by Kim, we would like countries to embrace similar carbon pricing models with lower income nations supported by private and official foreign resource flows.

There's a symbolism and substance of the social cost of carbon concept. If you pick the right social cost of carbon, it deals not just with your domestic emission, emissions, but with the cost of emissions on foreign countries. So, it's inherently a very cooperative concept. And this is precisely why, what Jennifer Harris alluded to this morning, the Trump administration scaled down the estimate of the SEC to basically take into account, and only minimally take into account damages to the US, not to the rest of the world. That was the whole premise of what they did.

The paper by Chad and Kim is really masterful in analyzing the tensions from diverging divergent approaches, the Chinese emphasis on subsidization, the more price-based approach in the EU, and the US IRA with its Buy American provisions. I'll just mention that one silver lining is that at least these approaches are going in the same direction to mitigate climate damages, and there is the possibility, only a possibility of a net virtuous policy competition cycle which Kim and Catherine mentioned in their JET paper. Jacob Kirkegaard, our Peterson colleague, has talked about this also.

There are huge political economy barriers to carbon pricing. We've talked about some of this. Subsidization is clearly a path of least resistance. Carrots are much easier to swallow than sticks. The US is a major roadblock. I agree with what was said this morning. Just ain't going to happen. Part of it is the

exceptionally strong influence of fossil fuel interests through the US political process, and the EU is not unique, but it may be exceptionally well-positioned because of the wariness of subsidies that could upset the single market that makes a tax on carbon more attractive.

But there are also important fiscal costs of subsidization, and at some level it's much easier to do the fiscal offset to a carbon tax, which is to do lump sum redistributions. And that may be valuable on political economy grounds than to raise the taxes that would offset, offset carbon subsidies. One great example is Canada, which actually put in place a federal carbon price floor in 2019. I think what happened in Canada is indicative of why the US situation is much less optimistic.

Conservatives in Canada basically ran the 2019 election on criticism of the federal carbon charge. They lost that election. Several provinces contested this in court. They lost. The right-wing premier of Ontario, Doug Ford, mandated that gas pumps carry stickers. You can see the sticker on the bottom there highlighting the effects on gas prices of the federal carbon tax. There's also a counter sticker talking about the rebates that people were getting.

The Ontario Supreme Court ruled that the anti-carbon tax stickers were unconstitutional compulsory speech. And when you see this process, you ask, "Well, how would this play out in the United States? How would the post-Trump US court system react?" And one has to be extremely pessimistic. The recent controversy over mifepristone is just the tip of a very big anti-regulatory iceberg that is going to really prevent a lot of progress in the US on anything like a carbon tax.

I want to come back to something that Jim Stark, who was here yesterday, wrote, and that I agree with. And he says this mainly on political economy grounds, which is that the most important thing to focus on is the development of inexpensive fossil fuels that households and businesses will want to adopt, that carbon pricing is necessary, but alone is insufficient because the types of carbon prices we're talking about to really correct the externality are probably too high.

Besides, Pigouvian pricing doesn't deal with a number of issues that we've talked about, extensively yesterday R&D, and learning by doing externalities, network effects, critical mass scale effects, an area where open markets will certainly help. Capital market imperfections are also very important. And one example that's important in this context, but only one is the availability of developing country finance for mitigation investments. So, these are all areas where there are true externalities warranting government intervention, not the pecuniary externalities or spillovers that

are the focus of the controversies over the IRA and the CBAM. This reinforces Reinhilde's messages, which I think are really important.

The US is falling short. EU intervention support is somewhat balkanized and could run at stronger speed. There should be an EU level subsidy regime for early-stage research backed by fiscal resources. Maybe Jeremy is going to go into this since he coauthored a very nice paper recommending this. Reinhilde's Dimension's protectionist measures against the use of foreign superior technologies and support for reshoring, I question whether this is really an efficient way to go.

And I think if China's stance on foreign vaccines, which was not particularly useful for the US, I worry going forward about the permanence of the kind of approach the Biden administration has taken even that approach. The politics is going to create investment uncertainty, which is going to be damaging, and which is going to slow the process. I think there's a larger analogy to the recent and continuing, let's not forget this vaccine challenge. The next pandemic is possibly not far away, just as was the case with vaccines.

We need to pursue many avenues toward lower cost energy, including long shots, and the support of complementary sectors. And Chad has done a lot of great writing on that in the vaccine context. New technologies are going to have to be spread and made available to poorer countries, and they will need help to upgrade energy infrastructure, and to avoid carbon lock-in.

In general. I think we will lose if we try to impede China's innovation in this area in the interests of US supremacy for example. On the right is a chart from Reinhilde's paper indicating something she mentioned, the sharp rise in China's innovation capacity. We shouldn't be holding back China in this area, and this is all the more reason for less confrontation and more cooperation.

Jeromin Zettelmeyer: So, thank you very much. So, I will face the challenge of the clicker now. But before I do, let me just thank the organizers, particularly Adam Posen and, of course, Jean, for inviting me. It's a great honor. They're working on it. These are two great papers. It's coming. But before I actually talk about these papers, let me just say how much I agree with, and how much I admire what Maurice just said.

I mean, Maurice has this uncanny ability of combining nuance with edge, and pointing to where the big bits of an argument are. And I'm very grateful to him, particularly for pointing to the perspective of the poorer countries, which tends to get lost in this whole debate of EU versus US versus China, just like Beatrice did also in the discussion. Okay. So, it's coming up. I can

see this. It's just a bit slow. So, I face a tough choice in my comments because it's really hard to do justice to both papers.

And so, I think I focused on the paper that has, I think, the clearer immediate implications for the debate between the US, and the EU, and industrial policy. And that's actually interestingly not the paper that is mainly about industrial policy, which is Reinhilde, and who I mainly agree with, but it's the closing, and Chad paper. So, let me just say, I know my slides basically before why I think these are two great papers. And I think also what these papers have in common. So, these are basically essentially both survey papers, but survey papers that contain a lot of factual content.

And so, particularly in the case of Reinhilde, it is -- okay. In the case of Reinhilde, she has this great comparative summary of green innovation and energy policies in the US and beyond. And in the case of Chad, what I particularly liked about the paper is it's really a great summary, particularly for non-lawyers of how various climate-related trade actions could bump up to the limits of WTO law, right? So, it just explains this just in much easier terms for any nonlawyer than I have ever seen. So, I mean, only for that reason you should go to read that paper. Okay.

But then beyond that, both papers have in common that they point out that there are all these inherent trade-offs, right? And that's, again, refreshing because it is often lost in this discussion where we tend to think that everything just goes in one direction, and we are a little too quick, I think, in to rush into policy actions in part for understandable reasons, because we are running out of time that could lead to unintended consequences.

And so, both papers are very much about unintended consequences. And both papers do a very valiant job of, in a sense, distilling compromises, and also pointing out to how compromises are actually very difficult, to carry out. Okay. With this now, let me go a little bit into Chad's and Kim's paper. And so, what I'm going to do is I'm going to give you the key narrative. And I'm going to give you an alternative narrative which you can interpret as disagreeing with a key narrative, or you can interpret it as complimenting the key narrative.

Just to say I basically completely, I'm completely on board with any all of the policy conclusions of Kim's and Chad's paper. But I think if you look it through it to the facts through the eyes of my narrative, you will discover additional policy implications which are at least as important as the ones they point out. So, that's essentially the plan for the talk. So, this is the way I read the paper. So, starting with this beautiful [inaudible 1:03:35] paper by Catherine and Kim with that approach through that lens.

They start out with this observation that we have heterogeneous approaches to fighting climate change, that they actually may have spillovers in the trade competitiveness area that induce trade conflict, and that could be very costly to global prosperity, particularly in itself because the trade system might fall apart, but particularly also because it might undermine global cooperation that we need for many reasons, including climate. They then have this great analysis of the WTO. It's not able to resolve these tensions in its current state, both by design and because it is dysfunctional.

WTO reform is needed, and they described how they would reform it but they also say do not expect too much from it. And that was a little underemphasized by Kim's presentation. So, the whole point is that the WTO was designed, as I understand it, to solve a particular problem market access, and most of the things that are forbidden by various -- the subsidies and countervailing duties regime. For example, they're designed to, in a sense, mute or blunt instruments that ways in which countries can cheat essentially to prevent that access.

So, it's not particularly designed to solve the problem we are -- these direct spillovers from climate actions that we have now. And so, they then conclude that we need some kind of plurilateral structure where the big guys just sit together, look themselves in the eye, and say, "Look, we're going to emulate some of the stuff that is already in the WTO, but we're going to make it more explicit. We're going to make the context clear," which is it's going to be about these types of policy actions, right? Not the standard market access debate of the WTO.

And very importantly, it's not going to just restrict trade harmful policies, but it's also going to restrict retaliation to those policies, right? That's the beauty of what they say. So, it's like a Geneva Convention, essentially, of economic warfare triggered by these conflicts. And I agree with all of this.

Okay. So, here's my narrative. So, I started in a completely different way, which is that in my view, there is no intrinsic reason why climate policy heterogeneity should lead to trade tension. It does. But there's no reason why it should. And so, I think that the trade tension creating elements of policy in the policy that is in these packages in the US, EU, and China are not about climate policy at all. They reflect other motivations that were swept and added to these packages.

And so, if we're going to reduce conflict, what we really need to understand these climate extrinsic motivations, and either fight them or address them in ways that are as collaboration friendly as possible. To the extent that these climate extrinsic motivations were needed as part of these packages to make these packages politically feasible, as we heard this morning, we cannot just

fight them. We're going to have to address them in other ways. But we should think about this separately from the implications of climate actions.

Okay. So, there are basically two claims behind this complementary narrative. And I'm going to show you one table illustrating both claims, and then I'll say what follows for policy from this, and then I'm done. So, this is my first claim. Climate policy heterogeneity need not implied trade tensions. So, what I've done here is on the left column, I've written down all the climate instruments that I think one can legitimately argue for. So, these may be more instruments than you really need, right?

So, [inaudible 1:07:22] may not like half of this. Maybe he's right, right? But I think if one writes down a long list of policies that are legit, they would end up somewhere here. So, obviously, the carbon price, then I would add two subsidies on the consumption side, which are about changing consumer behavior that you can argue have to do with maybe behavioral issues, energy efficiency subsidies or maybe credit market failures in the case of energy efficiency subsidies, green consumption subsidies, you're nudging people to change their consumption patterns.

And EVs are one example. All you can say this can be justified simply by the environmental externalities of these goods. So, all good arguments then as a German, we invented clean energy subsidies. We are by far the biggest country producing these subsidies. They were very controversial. They were very expensive in Germany. We've been trying to reduce them, but they will still be bigger, at least than the Congressional Budget Office projections of the equivalent pot of subsidies in the IRA. So, I think clean energy subsidies are okay.

So, this is what was referred to this morning as deployment subsidies. This is for deployment capacity in the production of clean energy, right? So, you either do feed in tariffs for clean energy or you do investment subsidies, for example, to construct a wind farm. And then finally, our most sacred category of subsidies, which we all rally around, thanks to Philippe, but also people like is Reinhilde's green innovation subsidies. We clearly believe in those.

Now, on the right column, I'm arguing that none of these subsidies needs to impart a negative competitiveness effect on foreign firms or rather a positive one on domestic firms. So, the carbon price obviously is going to be adverse first order. You can offset the adverse impact through a non-discriminatory CBAM, but not fully because they will still be disadvantaged in certain markets because CBAMs do not import involve export subsidies. I don't see any distortionary effects on trade from consumption directed subsidies with respect to clean energy subsidies, it depends a lot.

So, I mean, in principle, these subsidies are supposed to offset the higher cost from going to green, energy sources, right? And so, whether in the end, it ends up hurting or harming domestic producers depends a lot of whether they are asked to contribute to that higher cost in the end, right? So, in Germany, the way it used to work is if the subsidy is not paid for by the state, the subsidy is paid for by electricity consumers, and then the energy intensive industry gets a rebate.

But it doesn't fully offset. I mean, it sets them back to where they would have been without the subsidy. And that's why it's okay under state aid rules, right? This is being notified under state aid rules for a long time. So, again, it depends on how you design it. But there's no argument in principle for why this should be a protectionist or should have a protectionist effect.

And then on green innovation subsidies, I mean, if you take Philippe's past dependency point that you're helping a firm innovate, and that puts it into a position to do more innovation in the future, and that may create a competitive advantage. That is agreed. But again, it depends a lot on the design of the subsidy. I mean, after all, part of the reason why you give the subsidy is because of the innovation externality which benefits other firms. And they don't have to pay for that either. So, it is all about the design. They have no obvious trade effects.

So, now claim 2. Sorry. Oops. That was deadly. Okay. Claim to the policies that produce trade tensions that they, Kim and Chad, have in mind actually generally have non-climate motives. So, the first one is the domestic content requirement. Can this be justified on climate basis? Of course not, because it just makes everything more expensive, right? Can it be justified with security arguments? Well, de facto, it's being justified with a security argument. I mean, I said yes here because de facto it is.

If you're thinking about friendshoring, you might be a little more skeptical of this argument, right? So, perhaps I should have put it possibly rather than a yes. Is this an exercise of economic nationalism? So, I prefer the word economic nationalism to protectionism because it's a bit broader, and because it makes the point that the motivation behind this is that we simply prefer to have jobs, good jobs at home when we think, and this might be wrong, of course, that the alternative to having them at home is to having them somewhere else, right? It's the zero-sum mentality. Very much so, right?

So, this is straight, protectionist or nationalist, if you want. The domestic assembly requirement, again, I don't see any climate argument. There is a possible security argument. If you think that this is somehow critical, and then you could be cut off. But again, it can be done in different ways through international strategies. Friendshoring, in any case, it is far less security

critical than, say, getting cut off from Russian gas. Domestic self-sufficiency target.

So, if I can criticize Chad and Kim for one thing is they're too easy on the EU. So, particularly the last iteration, and that's because you stop with von der Leyen's speech in February, which was fine. But if you look at what has come out of that, it's appalling, right? I mean, particularly the NCIA that is discussed in Reinhilde's paper is a truly appalling a piece of legislation because it marries openly protectionist objectives like a domestic self-sufficiency target, right?

They actually go for import substitution and numerical import substitution target. But on the other hand, they don't have serious instruments to actually get there, right? And so, most people just shrug and say, "Well, that kind of cancels." For me, this doesn't cancel because we are endorsing essentially protectionism in a piece of EU legislation. And then we are meek and pathetic, and can actually follow through and do it, right? Now, in the meantime, they are doing other things.

So, this is only one bit of the EU response. On the whole, probably the EU response will come out okay. But again, impossible to justify this with climate arguments, security arguments. It's a bit like domestic content requirements, possibly a bit, but you need an international strategy really to deal with security. And again, I think it's an exercise in economic nationalism.

Now, the most interesting one, and possibly the one we are going to disagree over. And so, I put down the possibly because of Philippe. I don't actually think it is that you can maybe there's a climate justification. So, the argument I don't think it has a climate justification is because the innovation externalities are taken care of by the innovation subsidy. The environmental externality is taken care of by the renewable energy subsidy.

So, you are doing what the Germans did. You're creating a huge demand for solar panels through the deployment subsidy. Do you really need to have a unit-by-unit subsidy of production of solar panels on top of that? What could possibly justify that? So, if you asked sort of an economist, they will say, "Okay. Well, we have obviously all these externalities," but externalities are not all sorts of market failures. We also have things like non-convexities in production learning by increasing returns to scale fixed costs of production.

So, surely if you have a big innovation, like an investment subsidy or a production subsidy for manufacturing, that helps you get around these big fixed costs of production. Yeah, but we have this problem with every single manufacturing good, and usually our way of getting around that is credit

markets. So, maybe I could buy this argument in a economy that has no functioning credit market, and a huge need to support a firm to put down a lot of money to build a factory, I do not buy this for the US.

Okay. So, then the question is, this is my last slide, what are the policy implications of this view? So, first I should emphasize that most, if not all, so there's only one tiny caveat of Chad and Kim's recommendations for WTO to reform and plurilateral agreements continue to apply. Why? Because they don't actually need the intellectual step of saying this is because it deals with the inherent competitiveness problems or trade conflict is induced by climate policy per se, right? They would mitigate discriminatory policy, whatever its motive, right? They are a catch-all.

The one small caveat is that I think I'm a little less convinced, and I know that I'm in a minority here for the case for reform of the WTO subsidies regime. I mean, how would you reform it? Clearly, the currently prohibited subsidies, which are linked to local content requirements should remain prohibited. You guys don't want to change that. What you want to do is maybe create this or go back to a category of non-actionable subsidies that's explicitly tied to climate. But I've just argued that you can get legitimate subsidies of this type off the hook even within the current system.

So, for me, this is not a huge constraint. Of course, I'm in favor of doing something like that, but I think the current regime is fine because it gives enough flexibility. And then the third and most important point is we need to confront the non-climate related motives for discrimination. And this requires first finding policies that reconcile security and trade openness. So, Maurice talked a bit about that, and I think that's the next big thing we really need to do.

We need to be more surgical about this. We need to assess the trade-offs better. And it's hellishly difficult. We know that, which is why I hope that you guys will help. And of course, we need to resist most forms of economic nationalism and protectionism. Now why did I put in this caveat? Maybe I wouldn't have put in this caveat a few years ago. So, even I'm getting corrupted in thinking that maybe, just maybe, there are settings where economic nationalism might be justified in advanced countries. By the way, it's pretty clear that it is justified pretty generally in countries that catch up. And that was Hamilton's argument for economic nationalism in his famous report on manufactures, right?

And the reason why it's justified for those countries, it's because it's a straightforward implication of the case for industrial policy, right? So, if you think if your country doesn't have an industry because it needs to learn, in the meantime, there's a dominant country that has captured the entire world market, then of course, if you apply the standard industrial policy

argument for government support of firms that otherwise will not get industrial growth of, because of, say, learning by doing problems, you have to implement it in a discriminatory way. You cannot give it to the Brits from the perspective of Hamilton in 1791 who already know how to do this stuff, right?

Now, the big question is if you are the most advanced country in the world with the most flexible innovation system, with the best financial system, is there still an argument to do it? And implicitly the argument is, yes, maybe because China is catching up too fast, it's overtaking us, and that's a threat. And so, maybe there is some link between the security argument, and the economic nationalism argument in advanced countries or there could be a political link.

And then the question is, do you call that political link an externality like Dani Rodrik does? Good job externality? And you bring it into the fold of economics, or do you say, "In principle, one shouldn't do it," but then we have implementation issues, political economy issues, and we should do it. So, I think there's a big debate to be had there which has not been had. And you discover this debate by thinking about the same problems that Chad and Kim are thinking about, just very slightly different from what they have done in their very nice paper. Thank you.

Cecilia Malmström: Thank you very much for four excellent presentations. Can I ask you up to the table? Thank you. That was enough food for thought for another conference had ended. And I would like to start by asking -- this is not on. Now it is on. Kim and Reinhilde to comment on all these thoughts. Of course, you have to make it rather brief. I'm sure we can continue the discussion, later. But please, Kim, and then also Chad, of course, if you want to come in.

Kimberly Clausing: Yeah. So, I fully agree with both of the discussants. I think these are excellent points. We wrote that paper in very quick fashion. And Chad may recall that we wanted to put more in there about the rest of the world, and that's to come, I hope. But that's an extremely important point, and I agree with your recasting as well, not to be too agreeable, but I guess my only question for you, which we can follow up with afterwards, it doesn't need to be now, is I think it's absolutely essential to go after the things that you're talking about.

But I'm sometimes left shrugging a little about what exactly we do to reconcile security and openness aside from resisting economic nationalism. And I'm all for resistance, because I think it is misguided in almost every context, most especially now. But I don't have a great set of policy tools for what to do next. And I'll check out that one citation you had.

One other follow-up that I just didn't quite get, too, is I actually think there are some reasons to hope for a shift in the US policy perspective in the years ahead because there's going to be a couple of events that I think might lead to rethinking, one of which is the expiration of the Trump Tax Cuts in 2025. And I think that expiration it costs 3.5 trillion dollars to extend those.

Jeromin Zettelmeyer: Oh, my God.

Kimberly Clausing: And Biden himself has said that he wants to extend the vast majority of them, and the Republicans certainly want to extend all of them. So, this is going to lead to a sort of a fiscal reckoning on top of whatever fiscal reckoning we're already doing. And so, I do view this opportunistically, and maybe I'm too much of an optimist, but as a chance to maybe pivot more towards the price-based approach, and to serve -- and that can be one form of the resistance really is to align better with what others are doing.

Cecilia Malmström: Thank you. Do you want to say anything, Chad? No? Chad is there. You can solve it afterwards. Reinhilde, please.

Reinhilde Veugelers: Yeah. Indeed. It was a very great discussion. So, I'm very happy to be in this panel here. So, two points on Maurice. So, on resilience that there is an under incentive to invest in resilience. And it definitely also holds for innovation because if you look at the examples that I gave in terms of recycling, reuse, energy efficiency, these modular, none of those are being chosen in any of the recent, IRA or net zero here, although they tick all the boxes. But still they were not chosen here.

So, it's not only that the market will not pick them, but also from a policy perspective, apparently, there is an under incentive here which might again also reflect a bit. Maybe there are other motives here than purely resilience that are playing. In terms of for the poorer countries, how to get the innovation machine for the poorer countries. I was a bit short on that, and I hope in the paper to be a bit more elaborate. But there are two dimensions that you need to take into account for innovation. So, on the one hand is making sure that these less developed countries have access to these innovations here.

And I think the extent to which there is policy support for programs that that should also be tied to providing access, for less developed countries for these technologies here as a compensation for the subsidies, that you get here. Also, in terms of not just only access to but also having specific technologies developed for which the less developed countries don't have the capacity here. I think that's exactly why we need this global platform here where there would be global missions defined particularly for these here as well.

And then for Jeremy, I really also buy these other motivations story here. And for innovation, I think there is definitely also the danger of the rhetoric not being on strategic autonomy and resilience here, but really about leadership in technology here, and actually prohibiting that others would actually become technology leaders here. And that means restricting actually access to technology for others here. And if that's the case, then actually the innovation machine will not be powerful enough here.

And then you actually have also the same resilience arguments, extended to the technology, the main here. So, there is then also perhaps a case of technology resilience here. And that can also that will be very dangerous here. And I think there is a rhetoric that goes in that direction as well here, and that will not be the efficient way in which we can steer the innovation machine.

Cecilia Malmström: Thank you very much. We will have time for some questions from the audience as well. Philippe, you first, and then -- yes.

Philippe: It's a great presentation and great discussions. I had just a few very brief questions. I mean, I think one issue with the WTO, and on the one hand, you want to facilitate technology transfers, green technology, but you want to prevent pollution havens. So, how do you do that? I mean, you want to make sure that some countries do not take advantage of free trade to become a pollution haven. So, you want to make sure that what, for example, carbon tariffs can help or threat of carbon tax, but of course, they can be abused and derail the WTO. So, how do you deal with that? That's one question.

Second question, the technology transfers. I think one idea, Michael Kramer in '96 had a very interesting paper where he said, "You have a trade-off between the production of innovation and the diffusion of innovation. You don't want that the diffusion expropriates the producer of innovation." And so, he had thought of the idea that you could have auctions, and there would be a fund that would have a social markup on the auction, and would buy the innovation from the innovator, and diffuse it. Can we have sovereign wealth funds or joint sovereign wealth funds of a community of countries, the G20, I don't know, that would play the role of the Michael Cramer, but adapted to green innovations to diffuse the green technologies? So, is there any thinking on that? Okay.

Next thing, and I'm almost done. China, US, the China Initiative have been doing work with David Stromberg, and other coauthors where we showed a very negative effect of the China initiative on Chinese research. But there's been a complementary paper by [inaudible 1:27:30] I never know how to pronounce her name, showing that there are negative effects also on US research. And what do we make of the China initiative when it comes

to Green? Obviously, they were bad for Chinese research and for US research. What do we make of that?

And my last point is on, yeah, targeted, on targeted, yeah, is that, I take the point that you made, subsidies, but there are issues. Whenever you have an S-curve problem, you need to coordinate resources to go from very basic research to application. Whenever you have coordination problem there, you may need more than credit market. The credit market would not have solved the DARPA problem, for example, in the 1950s. You see what I mean? Where you need to achieve a mission in a very limited amount of time. Credit, I believe a lot in the role of credit, but for such a thing, and I think Green is like the DARPA problem, you need the credit market, but you also need to solve the [inaudible 1:28:28] problem. And that's where smart industrial policy may be useful. Sorry for being long.

Cecilia Malmström: Yes, that I was a little bit long. We have a long list of questions here, so thank you for that. You take notes and you'll be back. Yes. You gentleman by the phone, by the microphone, please.

Audience Question: Thank you. Yes. So, I'm from the World Bank. Of course, they're very interested in this impact on lower income countries. And I think very often everybody acknowledges it's very important. But we don't really get into the what does it mean for the policies? And I think we have one question on the access of the green goods, and we have anecdotal evidence from Africa, for instance, that access to solar panels is becoming more difficult.

And those countries, I mean, we tell them that all of these policies will make technologies cheaper in 10 years, but do we need --? They need those panels just now. So, there is a question of in the next two to three years, are we blocking low-income countries transition and energy access because of some of those policies? And I haven't seen a lot of analysis on this, so that would be really important.

The second aspect is they ask for not access to the goods, but access to the technologies, and to be part of the development of those technologies. There are a lot of European projects in Africa, Mauritania, Namibia. What's really striking is it's all to meet European demands, and we don't hear anything about how those projects can help development in those countries. How do population benefit from them? If that's not part of the discussion, there will be local backlash.

And I feel like if we want those countries to be part of that deal, we need to show how it helps their development. And that's really missing in our conversation. Thank you.

Cecilia Malmström: Thank you very much. Yes. Our friend from South Korea, and then Chad. And then you will be given the possibility to respond.

Han Kuo: My name is Han Kuo. This is my second day at Peterson as a senior fellow. I was former Trade Minister of Korea. A fascinating discussion. Thank you. Thank you very much. I'd like to pick up the last slide from Kim and Chad about what would be the best forum to address this issue because, I mean, we talk about this fragmentation among the three largest economy in the world, but also this global south between advanced versus this global south.

So, I mean, we talk about this CBAM and Climate club, et cetera, but there's not really, I mean, bridging or connecting between advanced versus these developing countries. But in that sense, the Biden administration launched this Indo-Pacific economic framework, and there's a decarbonization pillar, right? And if you look at this, 14 countries, I think it has the most advanced country, but also this developing country, resource rich but also resource poor, and also manufacturing-based economy, but also services-based economy.

So, I think it could be also useful forum if it is designed and negotiated in a right way. So, how do you see, for example, in this IPAF, what do you want to see from this decarbonization pillar? What would be the kind of priority you want to see as a final delivery? Thank you.

Cecilia Malmström: Thank you very much, and welcome to Peterson. Chad.

Chad Bown: So, I have a really hard question for Kim. No, I'm just kidding. I have a question for Reinhilde. Maybe I can just answer that one, though, so you don't have to. Kim when we get there. So, this is a super important point. IPAF and the things the United States is doing informally through soft law negotiations can perhaps socialize a lot of these issues.

Admittedly, when Kim and I started on this, we wanted to embed what we were doing in reality. And the only conversations that we can see the US really thinking hard about the areas of conflict that we thought need to be addressed was first, the US-EU relationship, and then we thought, "Well, we have to talk about China there." So, that could give us a way to bring it in. And also, the idea of having the EU in the room on anything is good for rules, and so would ultimately potentially be more WTO consistent than, and so as a shortcut way of getting around actually getting the WTO there effectively is to bring the EU into the picture.

So, anyway, that was our general approach. But not disagreeing with the importance of what you've suggested. My question for Reinhilde, the pandemic, and I want to basically ask you about some of the innovations that we may have learned from the pandemic that we could apply to the

climate crisis. Are you? So, one thing that came up that I became fascinated with is the work of Michael Cramer, and Susan Athey, and all those folks that were talking about advanced market commitments to try to create new markets for as yet undeveloped technologies to create the right incentives too.

Are we seeing some of that potentially be being applied in on the ground in terms of facilitating some of the innovations? It's not just money, right? It's actually creating the incentives to do innovations differently than we have in the past. Can you tell us a little bit about what we're seeing there?

Cecilia Malmström: Quite a lot. Why don't you start, Reinhilde, and then Kim, and then I will be giving Maurice and Jeremy possibilities if you want to have some final comments as well.

Reinhilde Veugelers: Go in the reverse order. So, thanks, Chad, for raising the question because that's something that's really also close to my heart. I've been working also on like vaccine technologies, and how we could actually improve on that. And there is a lot to be learned also for the green perspective here by indeed using these advanced market commitments here, kind of public procurement, because also in the green area that will be very important.

The government certainly in terms of utilities, is also very often procure, and can use that instrument as well. Unfortunately, it's very little use of the procurement instrument from an innovation perspective. It's not that they are not procuring, but they are not using it as a way to really, also support the innovations that are needed within the procurement here. So, in that respect, they don't take any risk here. And that's very often because of fiscal considerations here. You just go for the lowest price here. And that, of course, doesn't build in any extra incentive here for innovation. And in that respect, for the moment, it doesn't really work here.

Something else that could also be used. And that also relates then to the question from the World Bank here is these advanced market commitments could then also come with, again, a condition of, if we buy these, and if we provide support here, we will also put as a constraint that you have to make these things also available for less developed countries at the lower price here. And that again, will also help the diffusion of these technologies as well.

And then finally, in terms of access to technologies for less developed countries, the EU has indeed these programs here. I'm glad to hear that you also agree that they are not really perfectly working. I think we also need to have more of these characteristics of public private partnerships here where you really also make sure that you involve all the relevant stakeholders in the design of these programs here. And in the case of these missions for less

developed countries here, that means also involving the stakeholders from these countries as well here from the start in the design of these programs here. And hopefully, that will help to make them a bit more effective.

Kimberly Clausing: On the question of pollution havens, and more generally on forums, which I think I'm going to try to find a way to smush those together. I mean, I think one of the keys here is finding a way to truly address the moral, economic, and efficiency issues associated with the rest of the world. And I think Maurice's slides pointed to some directions forward for funding, and options, and capacity.

I was struck by some work by Stefanie Stantcheva on the public opinion around some of these policy tools that carbon pricing isn't particularly possible, but it's -- sorry, isn't particularly popular, but it does increase in popularity when you explain it to people. It doesn't seem to increase in popularity when you hand money back as rebates, at least in her research, which goes across countries. But I could imagine that it's possible that you could earmark some of these funds, either the border adjustment ones or the larger funds for the poorer countries in the world. And that could be potentially a way to increase bizarrely the popularity here.

And I do think we need some sort of international forum that's akin to what happened in international tax, where we spent a long time wringing our hands, and then countries finally came together, and 140 of them were like, "Yeah, we probably should tax multinational company income at some minimum level." I think you could imagine a forum like that. I'm not sure who the convening organization is, but that would help to set some of these principles together, and hopefully in a way, that was more lasting. But I think Maurice's slide is a good starting point.

Cecilia Malmström: There was one final question by Jean. I think you need to walk to the microphone. Whatever is quickest.

Jean Pisani-Ferry: So, as a question to Reinhilde, you and many use the metaphor that the innovation machine must be steered in the right direction, and in general for us to solve the climate issue. And in general, that's of course true. But is this metaphor really good for EU? I find it hard to think that there could be any stronger incentives than those that are now put in place by the [inaudible 1:38:23] 55. From 2035, fossil fuel cars are not going to be allowed to be sold from 2039, cement, power, steel.

All these things need to be fossil free from 2043. That applies to the whole fossil sector. So, all these firms there, they need to close if they cannot come up with fossil free incentives. But the business opportunities are of course going to be there. So, it's an enormously strong policy in steering innovation in the right direction. And I'm afraid that this metaphor is powerful in

actually driving the problems that Jeremy is talking about. So, we get policies that are not really helpful, but do these other bad things.

Reinhilde Veugelers: Yeah. Well, very short. Do I think you make the point that steering is important, but of course it has to have the right kind of steering. And that's the tricky thing here like also what Jeremy, it's very tricky, very challenging, very complex. We can make a lot of mistakes by steering wrongly here as well. And steering wrongly will also have big effects as well here.

So, I think we all agree, it has to be steered. We have to find out how to steer it in the right way here, which is challenging. But that's why I'm also calling for way more experimentation, trying to steer, but making sure that you very closely monitor whether you go in the right direction here, and be able to very quickly adjust your policy choices when needed here. So, it's learning how to steer. That's the thing. But it needs to be steered.

Cecilia Malmström: Thank you. Jeremy, Maurice, did you have any comments or pick up on the questions?

Jeromin Zettelmeyer: Yes. So, I'll pick up on two points on Kim. How exactly do we reconcile economic openness and security? The difficulty here is it need to work exactly. So, in principle, you give the answer in your paper diversification, right? There's two complications to that, which is when you diversify, of course, you have to wait in some sense the potential security risk of a particular imported or exported product or supply chain with the nature of that product. So, like Jim Stock pointed out, lithium prices rise once you have your capacity installed, are far less relevant, maybe irrelevant for your economic security than gas prices, which you need on a flow basis, right? So, that's number 1.

Number 2, you will probably have to weight them with some sort of threat or shock probability, right? Some distribution of what could go wrong in the world out there. And it's not just security shocks. It could be the next pandemic port closures. And, of course, you have to worry about domestic shocks as well. So, that's complication number 1. And then the super complication is maybe some of these shocks are endogenous, right? Particularly these security shocks.

So, it's hyper complicated, which is why I hope that Chad will write a paper and solve it all. On Philippe's point, so thank you for making this point on coordination. I guess my point is that it's a question to you. We can discuss it offline. I find it difficult to believe that you need production unit-based subsidies to achieve that coordination when you already have a massive deployment subsidy that basically tells the photovoltaic industry your

demand in the US has just quintupled over the next 10 years. Isn't that coordination enough, right? That's my question.

And then Stefan's super important point on what's happening to the global south. So, is there essentially a crowding out effect where all the deployment is being pulled into the advanced countries. So, my sense of this, but I'm not an expert is that I'm not so sure there would be a physical shortage or a price effect in that crowds out deployment in the emerging markets in part because of course the IRA has one very beneficial spillover, which is China is going to be -- it's a bit like a sanction on Chinese, on the Chinese value chains, right?

And so, just like the sanctions on Russian gas, it means these goods are going to be redirected to the emerging market world probably rather cheaply given the enormity of supply there. So, the main problem, I think, is that the EMS probably won't be able -- they're not in a great position to develop their own learning by doing there. But that's more of a medium-term problem. But mainly it's about money, right? It's about buying this stuff.

And so, here I'm persuaded with buyers scheme to save the world, which is that we give everyone in principle a carbon budget that corresponds simply the remaining world carbon budget divided by the number of people in your country. And then if you want, you can trade that away, and indeed it will most be traded away because it'll be hugely inefficient to actually keep it right. The US is going to really buy very high prices for those carbon entitlements. So, if we can implement that scheme somehow it would solve all problems.

Cecilia Malmström: Good. We've sold that then. Maurice, please.

Maurice Obstfeld: Just briefly on this pollution haven point, I think dealing with that requires carrots and not just sticks. It's a little bit like telling low-income countries, "Well, we're not going to give you vaccines, but you can't enter our country unless you're vaccinated." You have to -- there has to be some resources there. And I think the suggestion about sovereign wealth funds, great suggestion. The World Bank is, and other MDBs are, in the midst of an initiative to leverage their capital more efficiently for climate and health purposes, which I think will help. It's clearly not enough.

And so, I think this is a first order issue. We can't just penalize, imports from developing countries on the grounds that they're carbon intensive when we're not providing the requisite support for them to solve the problem, and as Stefan said, to solve their development problem more generally.

Cecilia Malmström: Thank you so much. This has been fascinating. I have learned a lot, and it has also given more thoughts to discuss. There is lunch now. Adam, please, did you want to say anything before we thank the panels?

Adam Posen: No. First, just thank you all. That was terrific. Thank you very much. Applause.

Cecilia Malmström: Yes.

Adam Posen: And second, that we have lunch now, and we'll reconvene at 01:00 p.m. Eastern Time. Thank you.