



## Conference Transcript

### The macroeconomic implications of climate action

#### Session 4: Climate action, reallocation, and stranded assets

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Maurice Obstfeld: And welfare. And so, this is a very natural extension of what he's done in the past. We have two discussants. Ioana Marinescu is a Professor at Penn School of Public Policy & Practice, formerly at the Harris School at Chicago. She is on leave from Penn as Principal Economist in the Antitrust Division of the DOJ. And her specialties are wage determination, antitrust law, and labor markets, economic security. She's very active in the public sphere, testifying before Congress with a podcast, and also a column, that she did in *Libération* [ph 0:00:52].

And finally, Stefan Scarpetta is the Director since 2013 of the OECD's, Directorate on Employment, Labour, and Social Affairs, DELSA. He represents the OECD at the G7 and the G20 on labor, social, migration, and health issues. Between 2002 and 2006, he was at the World Bank, and he led the World Bank's programs in employment and development. With that, I'd like to invite, Stefan to come up and present. You all know the ground rules. 20 minutes for each presenter, 15 minutes for each discussant.

Stéphane Hallegatte: Thank you. Thank you so much. And thank you very much for the invitation to speak to you. It's really a great pleasure. You're also very brave because it's the fourth session of the day, I think. There's a lot has been discussed, so I hope I can keep you focused on my presentation today. I want to do two things.

I want first to talk a little bit about the country climate and development reports, which, are new diagnostic that the World Bank Group has created last year to help us help country achieve their development goals and their climate objectives. And I will then use the case of Turkey, to dig deeper into the methodology that we use to look at the interplay between what's happening at the sectoral level, and the macroeconomics of the transition.

So, let me start with those CCDIES. So, this is part of our Climate Change Action Plan. This is a busy slide. No need to try to read it, but it's just to tell you that we're doing a lot of things. And the CCDIES is only one part of what we're doing on climate. But basically, the short story is, maybe 10

years ago, it made sense to do development, and then to have some climate projects, also climate policies.

We feel that today, it doesn't make a lot of sense anymore. Having like two buckets, development and climate, doesn't work. What we need is to have in countries resilient, low-carbon development pathways that we can basically support with everything we have. And so, this mainstreaming of climate change into development, we realized requires to identify the synergies, the opportunities, but also the barriers and the costs. And in many countries, we don't have that.

So, we decided to start with those diagnostics so that it could inform our own programing. So, what we invest into, but also help inform the policy discussion in countries. What's really important with those reports is that they are not climate reports. They are development reports. So, the question we're asking is, how can countries achieve their development objectives, economic growth, access to energy, poverty reduction, access to water and sanitation, even though, first, they are climate change impacts and natural disasters? Even though the world is decarbonizing and the technology landscape is changing?

We talk about CBAM and so on. And third, countries themselves have their own development -- climate objectives like Turkey has committed to achieve net zero emissions in 2053? So, the question is really how to achieve those development goals in that different world but we're really interested, first and foremost, into having the countries achieve their development goals? That's a really important part of this discussion. Those reports are done by the World Bank Group, which means with our private arm team.

And one thing which is really important in those reports is to try to find ways to bring the private sector into the discussion. So, it's not only about policies, it's also about what active role the private sector can have in that transition. What I will talk about is the first wave. So, in a year, we did 25 countries, that we covered with CCDIES. So, 34 percent of the global population, 36 percent of global emissions, and 23 percent of global GDP.

We're not doing, CCDIES in high income countries, but we're very happy to see, for instance, the report that Jon and Selma have produced recently, because, we feel that this is the equivalent of CCDIES in high income countries, and it's really important to get the global picture right. Hopefully by the next fall, we will have a new wave of something between 15 and 20 new CCDIES. We will do that in all of the countries where we have an active portfolio. So, it's a huge undertaking. Each of those reports is a team of maybe, I don't know, 50 to 100 people ranging all of our sectors from energy, and water, and finance, and macro, poverty, and so on.

So, it's a lot of taking all of the evidence we have and all of the knowledge we have in all of the sectors, and to put that together. And of course, the macroeconomics is critical to put things together, and to make sure we have a consistent narrative, and that what we propose is feasible. And I'll come back to that in a minute. So, we have a summary paper that we published at, COP27 on those first 25, countries. I'll just give you some of the key findings, and then I'll explain on the case of Turkey how we get there.

So, I will focus on the energy emission reduction agenda. Those reports have a lot of discussions on adaptation, and resilience, but it's 04:00 p.m., we cannot cover everything. So, I will just focus on that part of the equation but don't think that we're not looking at adaptation and resilience. Of course, if you want to achieve your development objectives, resilience is a critical part of the agenda, I'm very happy to tell you more in front of a glass of wine a bit later today.

So, on emission reductions, those reports are completely bottom up, right? So, there is no global goal that then we would impose on countries. Our teams working in each country are using low-carbon development pathways that they feel are informative and useful to think through the opportunities and the barriers. Those reports are not normative at all. We're not telling countries, "You should do this." We use a scenario to analyze the cost and the benefits, and better understand what's possible, and what are the costs, and what needs to happen.

You see here the emission scenarios that we have in our low carbon pathways. The blue ones are the upper middle-income countries. So, the China's and the Argentina's and Turkey of this world. And you see in those countries, in most cases, our emissions are going towards zero between 2050, and, 2060, 2070. The orange ones are the lower middle-income countries and you see a much larger range. And that's because those countries are very different.

What's possible politically palatable in those countries is different. Our teams decided to explore those scenarios. Taken together, it's a reduction by 70 percent of emissions in those countries. So, keep in mind, compared with the IEA scenarios, for instance, which are global net zero top down, here, we're bottom up, and we're only -70 percent. So, those are not net zero scenarios at the global level. And it's an important when we look at the numbers and compare with other reports.

One thing that we're doing is in all of the sectors, we're looking at what needs to happen to follow those pathways that I just showed you. And we look at the investments that are needed to achieve those pathways. And this is maybe the figure that has attracted the most attention. You have the GDP

per capita of countries going from China being the richest of the countries we have to the G5 Sahel being the poorest. And on the Y axis, you have the additional investment needs to realize those development goals in a resilient and low-carbon way.

And so, what you see, and it's interesting that it's consistent with some of the numbers that we have discussed earlier today. In upper middle-income countries, investment needs are around one, two percent of GDP per year. If you go to middle-income countries, lower middle-income countries, you're more at between like two and five, six percent. And if you're looking at the very poor countries, you're more around like eight, 10 percent. So, couple of things. First, this is resilience and low-carbon development. So, at the left-hand side, a lot of those needs are for adaptation and resilience.

Second comment, if you're looking at a country like China or Argentina or Turkey, yes, they need to invest more for that transition, but they also have to invest less on other things. And the DELSA is relatively small. If you're looking in the Sahel, they have to invest more. There's just nothing that you don't do in those countries. So, the difference between the numbers is a lot because of the baseline, right? In Turkey or China, you have the investment you need. There might not be in the right thing, so you need to reallocate. If you're looking at lower-income countries, it's a lot about managing to invest more.

Last comment on this figure. When you hear people talking about all of these trillion and billions, and hundreds of billions, and all of these huge numbers, it's all at the right-hand side of this figure. And that's all of the numbers for the countries where things are kind of manageable. Where it becomes impossible is on the left-hand side. I mean, Cameroon, and the Sahel wants invest 10 more percentage points of their GDP in that. So, what is most difficult where countries need the most help is on the left, but the numbers in absolute value are fairly low because those countries are really poor.

So, 10 percent of their GDP is really very little. So, we're talking about hundreds of millions there. So, one point is all of these big numbers that we're playing with sometimes are a little bit misleading. They make us look at the China's that can probably reallocate their investments, and not enough at the Sahel of this world, which are the countries, in need of help. So, what are the macro consequences of that? Because one of the question, of course, is if you manage to get the investments right, and you manage to just follow those pathways, what does it do to your economic growth and GDP?

And so, this is what we have separated for low income, lower middle income, and upper middle-income countries, and that's for 2030. It should be on that slide but it's not -- so, GDP is it in all of the countries, we

basically have something that's between nothing, and an acceleration of economic growth. And to me, that's also really important for the discussion we had today, because a lot of our discussions was about the production frontier, and how changing -- relative prices can change a little bit the frontier.

In most of the countries we're working in here, the economy is very far from the frontier. And basically, what we're doing with the sort of policy recommendations, and investment we're talking about here is bringing them closer to the frontier. So, we have an acceleration of economic growth. And I'll come back to that in the case of Turkey in a minute. The second, row is for consumption. And of course, here things are a little bit looking less good, right? Because, yes, you get more economic growth, but you have much more investments.

So, depending on how you do it, of course you have this trade off that you have to move some of your consumption towards, investments, and it reduces consumption. And that's why you really need to take care of the second part of your income distribution to make sure if you relocate from consumptions to investment, it's not the people who are very close to poverty and don't have access to decent standards of living because those people you want to see their consumption increase, and not the opposite.

So, what's really important in this figure, you can imagine we have discussed them internally quite a lot is to realize those gains, there are a lot of things that you need to get right. There are a lot of policy reforms which are all very difficult to do. Reallocation of public resources, which we know the political economy, is tricky. You need a lot of private investments, and the private sector to play a very active role. And I'd say it's not just private capital flowing into the right projects. It's also the right business models, the right innovation in countries.

So, the private sector is much more than the private capital. You need to protect the poorest, and make sure they are not affected. And to get that right, especially in lower-income countries, you need the international community to help. And for the countries that need a lot of investments, we don't really see that happening if you don't have a lot of concessional resources much more than what we see today going into those countries to help them increase quite a lot their investments while maintaining their macroeconomic framework.

One thing I'm thinking of also now is to get those investments, you also need a stable macroeconomic framework. So, this morning, we discussed the role of monetary policy. I think in all of these reports, we flagged that if you don't have the basic stability in terms of, money, and in terms of, public finance, it's very difficult to get private investments, and so all of that

becomes impossible. So, the first role of Mr. Finance, and Central Bank of keeping a stable system where people can invest is an absolutely critical prerequisite to get the transition right. Something that we have in all of those reports.

Let me jump a little bit into the macro work, and we have, a methodological paper, that's focusing on this, which I describe a little bit, and I'll take the example of Turkey. So, this is, the so-called volcano figure. So, you see on the left, the emissions in Turkey, from 1990 to 2018, which is the last date for that data. And then you see our scenario on the right, which gets net emissions to 0 in 2053, as per the country own, objective. And so, we have different sectors, and those different sectors have been produced by our sectoral teams.

So, I won't go into everything, but just on the top here, you have the power sector and energy. This is our power sector modeling team doing a modeling of the power sector, trying to see how to decarbonize it. And it's a very granular model of the power sector. You have like all of the plants in all of the technologies, what you need in terms of transmission, and distribution, and you do an optimization. So, it's a least cost model so that you get to where you want to be in terms of emissions at the lowest possible economic cost.

And so, you see -- I mean, I don't want to get into the details, but what you're doing in Turkey is basically to invest much more in renewables because it's much cheaper, and you do that with or without climate objectives. And that's the thing that is maybe the most important is if you're looking at Turkey today, their pipeline of power sector investments has a lot of coal. If you don't care about climate, and you look at the least cost way of meeting Turkey energy demands, you wouldn't do coal. Coal is expensive, much more expensive than alternatives today.

So, what's really important is our baseline is really not an optimal baseline where everything we would do would have a net cost. We have a lot of room to improve on top of the baseline by getting the system closer to the frontier. And the reason why it's far from the frontier is because it's not driven by prices, right? And if it's driven by prices, the prices, are changed by a lot of taxes, and subsidies and so on. So, the prices, the market prices are not the economic prices.

So, only a lot of the reasons why we have this gain in terms of GDP is because in sectors like energy, we can find scenarios that are better in economic terms, and better in terms of emissions. Similar things on transportation. A lot of congestion, a lot of inefficiencies that offer some opportunities to improve on both sides. And again, don't try to read all of those numbers, but basically, sector per sector, we have a technological

roadmap that gives us how much investment you need, how much transit assets you have because you have to retire some of your assets earlier, and it gives you things like how much fuel the country needs to import.

I mean, Turkey is importing all of its fossil fuels almost. So, you get all of these benefits plus some, some benefits in terms of costs. For instance, we have a lot of investments in the building sector, and it means that households will spend less in energy, and that's a saving. All of that comes from sectoral roadmaps that then we plug into our CG model. So, in that case, we have buildings, transport, power, and forestry, which are coming from sectoral roadmaps.

In other countries, it's a different set of sectors. And then we basically force the CG. Basically, we replace the colon and the row for like energy by whatever the sectoral team is giving us. And so, you have the policies in transport buildings, energy, and forestry, which, by the way, are four sectors where pricing is not great to change behaviors. So, we have a lot of non-price policies, in those sectors. Then we plug that into the CG, and we add economy wide policies, which includes here a change in the subsidies, and a carbon price.

And then we run the CG with a few sensitivity analysis about labor market frictions, co-benefits from air pollution. How do you finance the increase in investment that you need? Do you crowd out other investments or do you crowd out consumption? And some sensitivity analysis on how much of the costs in the power sector you transfer to electricity prices for customers? And then we look at GDP consumption and so on. I don't think I have the time or to go through all of the variables that we use to connect the road maps to the CG. But of course, this is key, right? How do you connect those two models? And I have to say, it's not perfect.

So, at the end, we do this connection. We don't have one perfectly, consistent scenario because we cannot connect all of the variables. My take on this is you should not compare that with doing something perfect because nobody does anything perfect. You have to compare that with the alternative that we had, which is to use a very simple model, for instance, of the energy system that you can have in a CG. And I claim that our approach of coupling models with different levels of granularity is superior to the best energy modeling we can do in a CG or the best transport modeling we can do in a CG.

This is what it does on GDP growth in Turkey. So, you see, our main scenario is the dark blue, one. That's our resilient, net zero pathway. And it's resilient because we also have to invest more for resiliency, especially I mean, this was done before the earthquake, but we have earthquake risks in those simulations. And then you see some scenarios with higher benefits.

If you take into account the benefits from lower air pollution on labor productivity, for instance, and you have the one at the bottom, which is one where we fix the savings, and investments available in the country. So, here, you have pure crowding out. So, all of the investments you're doing for the transition is taking away from investments in other things in the productive sector. And this is something which is really important because at the end of the day, it's not as complicated as it looks. Right?

You have two questions. One is you increase the total investments. And so, the question is, where do you find this financing? From consumption, from external finance or from other ways? And then you have to reallocate your financing. And here or zero is a very small number. And here, the question is what are the returns on my investments in the transition compared with the returns I would do otherwise? And here, it's all about the energy, and efficiency gains that you have on land use and energy.

And if your returns because you have gains in terms of energy expenditures or in terms of land use are higher than the average returns in your economy, you have a net gain at the beginning, and at the end when it gets more difficult, well, the returns change, and then you have like a decline. But I think we understand very well why we have this curve, and what it takes in terms of the returns of the different levels of investments. So, I'll stop here. Just flagging one thing, which is GDP here doesn't tell you anything about the challenge for the country. It's all about reallocation.

And so, we're also saying that what happens is that we have a lot of decline in the heavy energy heavy sectors, and a lot of gains in the rest of the economy, especially construction. And of course, then you have to discuss because for governments trying to promote manufacturing in the country, this is not necessarily a very good news. But the question is much more a question of the political economy, and managing the transition than anything else, and basically, our assumptions about reallocation of labor and capital is driving our macro results.

So, facilitating the transition of workers especially is something that we want to do to be nice, but it's also something we really have to do to be efficient. If the reallocation is slow, then you have much higher, macroeconomic costs. So, let me stop here because I've been too long, but very happy to answer any question. Thank you very much.

Robert Z. Lawrence: Well, thank you. It's a pleasure to be here. This is a topic which I haven't really worked on before, and so I really enjoyed learning about the subject. And but nonetheless, I come from a trade background, and I think the experience in working in trade has sort of, inadvertently almost equipped me to think about this experience. The title of my paper at the moment is



Factor Reallocation Relevant. I'm trying to deal with the fact of reallocation of labor and capital, but I was expecting that in the first paper, they would be mainly dealing with capital.

So, I'm going to mainly deal with reallocation of labor. And in fact, what's striking is if you look at the simulations, by and large, both, looking at previous experiences of environmental policies, and simulations which, look at climate change over the next -- the effect of climate policies, over the next 10 or 20 years. We've seen numerous of them today. Their aggregate employment, and investment effects don't look like they really big from a macroeconomic, standpoint. But they do require a lot of, or a significant amount, of reallocating of workers and of investments.

And for some of the workers, these impacts are going to be negative and consequential. As for some of the investments where there is a danger, investments could be prematurely scrapped, and especially for communities because a characteristic of something like a coal mine, as we will see, is that it is often located far away from other economic activities. And these reallocations present real policy challenges. And so, we should, not ignore the micro economic underpinnings of those, aggregate results because in fact, they can have real policy impacts.

And I was discussing before how, the trade experience, I think, is something that we really need to learn from, because if you look at the effects of trade, say on something like, the declining manufacturing, employment shares that we have had in all industrial economies, trade is part of the story. But typically, on the order of 10 or 15 percent of the story, much less important in my view than technological change, and often ignored in those discussions demand patterns of demand growth.

Nonetheless, of those who have been were hurt by trade, we've had a burgeoning literature which has shown that, for particular individuals, displacement can be very costly, and for particular communities, there were, serious effects not only economic ones, but also, social consequences. And a lot of these, places happen to be politically consequential. And the result was, we got Trump, we got Brexit.

So, we got a lot of powerful effects. If you listen then to the discussion in the United States about fiscal policy, well, our fiscal policy today, you couldn't tell a story about American fiscal policy today, without mentioning Joe Manchin from West Virginia -- worried about his climate constituents, and maybe his own purse. And so, this consequence is something we ignore at our peril.

And when it comes to climate change itself, we notice, policies being adopted. Certainly, if you'd been sitting in our discussion this morning and

this afternoon, you would have thought it's obvious, it's a no brainer. It's a price approach. And yet the United States has had to steer away from that. And indeed, in the Inflation Reduction Act, it's added in a whole lot of other goals, to try to make it more palatable, certainly to certain constituents, in order to get it passed.

And then finally, if we look at the European situation -- President Macron learned at some political cost, that his climate policies, which were very ambitious, were not always politically palatable, and he had to retreat a few years ago, and more recently, we're hearing from numerous places in Europe that there's a need to slow down.

So, clearly, there are these political ramifications, and a major reason is that a significant amount of our economy, and particularly a significant share of local economies have jobs that are at risk. And loosely, we could talk about these as brown jobs, although as you get into it, you start to realize that you can take a narrow perspective, but it's inadequate, and you start to become aware of the extent to which certain, the number of jobs actually are at risk.

So, the narrow approach is just to say we're going to look at occupations which relate to fossil fuels, and you're going to get in the United States something like 0.3, eight percent, of the employment. But then you say, "No, we shouldn't just look at occupations that we can clearly identify as only being in these fossil fuel activities. Let's take industries." And you get kind of a mid-range, definition, take extraction, including refining, and now, you've got, something like, 927 x 1 measure, 1000 jobs, and you're up to 0.66.

And then you say, "Hey, but actually, what about energy intensive industries?" They are often located close to energy sources. They use, fossil as an input. They could be adversely affected. And then you get closer to two million workers. But that's too small because you should also recognize that technologies are going to change. And so, there's a huge potential for disruption as products are reconfigured to reflect the fact that, we're eliminating the possibilities or we're trying of greenhouse gases.

And a classic example, and I've got a couple of little short case studies in the paper. A classic example is the change from, combustion engine driven automobiles to electric vehicles. And when you start to think about it, electric vehicles have no transmission, don't have combustion engines, they're being driven by a different, mechanism, and when you start to add up the number of jobs that are going to be, potentially dislocated, you've got a significant share of the parts industry, people making powertrains today, and then, by some measures, electric vehicles have about 200 parts compared to 1200 in, automobiles with combustion engines.

So, you can be able to manufacture them using fewer workers. And overall, you could get something like out of the million jobs, you would no longer need 265,000. So, I've got 26 percent of the jobs. They certainly are going to be affected. So, in addition, and I think this something that should really be appreciated, you have a dynamic, within the automobile industry that is going to significantly change the market shares of the current incumbents.

Tesla will expand other electric vehicles will be sold in the United States market. I don't think the total number of automobiles purchased will change, and so that means others are going to lose. And within Europe you have auto companies whose prestige, and brands are all tied to their engineering, and their sophisticated transmission mechanisms, and combustion engines, and that's not going to be valued anymore.

So, I believe there's going to be a signif- -- and then also, we know now that the Chinese are at the cutting edge. There are huge number of firms. BYD, and others are doing extremely well. They're going to take more, and more market share. And so, again, we've got jobs at risk. And that's in a sense, just the beginning, because if we wanted a comprehensive view, we'd look upstream, we'd look downstream, and then there are spillovers into communities where big plants, close.

So, a significant number of jobs at risk. It's hard to be precise. Nobody can really do that, but nonetheless, a large number. They were at risk. So, what's going to determine the adjustment challenges? The first thing I would emphasize is that we already know from evidence in the United States, say Von Wachter, and, Steve Davis did a very good paper in which they showed that on average, workers who were dislocated, if they'd been working for three years, and then lost their jobs in mass layoffs of 50 workers or more, lost 1.4 times their annual income.

Because they don't just lose. It's not the costs of adjustment. It's the fact that they have specific human capital, seniority, and when they take their next jobs, they never catch up. So, this is before we start to talk about climate. Just to understand, dislocation is extremely, costly. Now, in many communities, the employment shares are very low actually when it comes to fossil fuel community but in some, they are significant. And if you get laid off in a period when many other people in your local economy are being laid off, your costs have been greater than the ones I've just described.

So, before we even start to talk about climate, we should understand that these can be, significant. But if we look at mining, and extraction, what we see is a high degree of what I call, what others have called, but I can't pronounce it rurality. They're in rural areas. They're far away from other opportunities. And clearly, this is going to be adversely affect their ability

to adjust. Then there's a question of skills. Do the current displaced workers have adequate skills to take the new jobs?

Actually, the literature, as I read it is quite mixed. Some people think it's not going to be all that hard, for these some of these workers to find other jobs. But there is also extensive work which suggests that, if you will, green jobs have very different skills to the brown jobs. Now, as I say, the literature is mixed on that question, but my reading is that, this is yet another change. This transition, is another change in our labor markets in which, a lot of workers who, in a sense, were working in routine jobs.

A lot of workers had a change, and we've got skill-biased technical change. And in a sense, it, it seems to be present as well. The communities are also adversely affected. There's a fossil fuel community is an adverse, position, particularly if a lot of its income comes from fossil fuels. We've also have immobility, in the American labor market as well. Now, I don't want to deal a lot with -- I don't have the time to go into detail about American policy but I do want to take one dimension, which I think is very instructive.

The US has acknowledged that disadvantaged communities need to be helped. And within the United States, therefore, there was an inter-agency working group, and at the start, they decided they really needed to prioritize, and they named 25 communities, and we're going to focus their resources on those communities. But when the bill actually passed through Congress, Congress defined as an energy community, any zone, which had a share of employment greater than 0.17.

Now, the average share of employment in the United States in fossil fuel industries is 0.78. So, in this map, all of anything that's colored is potentially going to be an energy community. But they then constrained it, and they said, "Well, if it's only the communities whose unemployment rate is higher than the national average," and that's the dark red area. So, what we're saying is our energy communities are going to be something like 40 percent of the geographic area of the United States.

And then in addition, we're going to have some special programs for retired coal plants, and places with brownfield sites, and, closed coal mines. And the consequence is that in the subsidies that are being allocated for renewable energy in the United States, there's this complex set of criteria. And among them is an additional 10 percent. You're going to get on investments, and in production of renewables if you're in an energy community.

So, in my view, what we see here is something that's operated in several historic- historical feature of the American system that it has an utter incapacity to prioritize, and simultaneously get the policies through

Congress. And so, it's been this, particular program has been watered down to the point where, now, its range or coverage is no longer truly prioritizing. There's a second feature of the program, which is that most of it is focused on the idea that today's existing, energy producers should in the future become energy hubs.

So, instead of asking what are the best policies for the community, what's happening is a policy which is going to try to convert those communities into energy communities. And that's because all of this takes place in the IRA, which is a bill that is devoted to energy policy. Now, some of those communities are going to be able to do that. They are suitable, but a lot of places where you put coal mines aren't necessarily the right places for wind or solar. And so, this isn't, in my view, a comprehensive enough perspective, in terms of trying to deal with these adjustments.

Now, I won't go through -- since I'm running out of time. What I will say, I also in the paper go through the European approach. And what's so striking, to me is the contrast in the way in which Europe is approaching, these same questions. The, Europe's position is quite similar analogous to the United States in terms of having jobs at risk, and having to take steps to deal with them, so let's go to the policies.

So, Europe already has a set of extremely generous, structural programs. Long before climate policies, these are cohesion policies, and you get a long list of them, but they're in 500, 600 billion Euros over seven years kinds of things. So, already Europe has general adjustment programs, labor market programs, training people, helping people adjust, also geared towards communities. And when it comes to climate, there is the just transition mechanism in which regions have been singled out.

Each region has negotiated with the European community a particular strategy to deal with its problems. So, the view is not necessarily they all have to become energy communities. The plan is how can we best help you? Now, will they succeed or not? I don't know. But I hold up these two pictures, and I think they're worth a thousand words, in illustrating the difference between the coverage. The green areas are the areas which have actually gotten approved. Territorial, just transition plan.

So, the European approach is to compliment a broad structural adjustment, context with specific programs to deal with climate change, and clearly has been, prioritized. The American approach is to spread the money around, and to have very weak general adjustment, policies. So, I just, believe this is a major flaw in the US approach. I'd be very interested in the Europeans within this audience to see whether you believe I'm accurately characterizing the approach.

Now, any kinds of regional adjustment, programs are very difficult. You will always get a mixed outcome, just as we've poured trillions of dollars actually by now into foreign aid, and, to help countries develop, and sometimes they do, and sometimes they don't. So, it's a very complicated problem. Nonetheless, just let me finally conclude. So, why should we have these programs? One view is that, we want to help the people who are really in trouble. A second is we expect there to be some positive political effects. It's going to make our climate change policies easier to implement. Well, we looked in the early experience. I already mentioned that Europe has very generous, programs, but the populist, right in Europe has nonetheless thrived.

So, simply giving people, financial support doesn't really seem to take fully care of their, of their concerns because they may not be primarily purely economic ones. In a very similar way, now in the United States, we have, the major beneficiaries of our climate policies are to be found in red states. And you might hope that since they now have an economic interest in these policies, they will be more supportive of them, but that is something we have yet to see take place. Sorry for taking too much time. Thanks.

Ioana Marinescu:

All right. So, I'm very pleased to be here to discuss, these, very complimentary, papers. So, I'm Ioana Marinescu, and I'm at the University of Pennsylvania. And one thing I want to say before I even start my slides is that I'm going to focus very much on labor reallocation. But before we start, I think it's important to connect that with capital, which the papers, partly do. So, why, why, why are they linked? It's somewhat to state the obvious, but I think it will help us from a macro perspective to think about that.

First of all, obviously, without capital reallocation, you're not going to have job creation in those new sectors as well as spillover effects -- in terms of job creation. So, that's number one. Secondly, capital reallocation is going to determine the wages of these workers as these -- they reallocate because obviously, wages depend on productivity, which depends on capital. And third, and that's less obvious, but it's been treated by -- the paper from the World Bank.

Importantly, it's linked to workers through the savings channel, to the degree that you're going to finance investment, additional investment capital with savings, the savings got to come from somewhere, and part of it could come from, labor income. So, there's a lot of linkages that we have to think about in the macro economy between capital reallocation, and, labor reallocation. But now, let me, summarize. So, I'm going in reverse order the second paper. So, this paper is a review of the evidence, right? On the impact of the green transition, specifically on jobs, and workers. You didn't

have time to talk much about Europe, but it's actually quite evenhanded in talking about both US and Europe.

There's three big takeaways. The first one is that the aggregate employment effects are pretty small in the aggregate for both the US, and the Europe, but there's nevertheless very important adjustment costs, especially for lower skilled workers, and the communities. So, there's a local, economic development aspect to this. And the third point which is quite interesting is that the EU has a lot more funding that's allocated to a green transition than the US even once we include the recent policy developments.

So, one, thing I want to say here is that it is a concern -- that this transition is going to disproportionately affect low income, and less skilled workers in their communities but, as been mentioned, I have some recent work on green jobs, where we look specifically at wind, wind, and solar jobs, and we define them by the specific skills that employers, advertise in their job ads. So, we find in this context that wind and solar jobs have about the exact same educational requirement distribution as other jobs.

They are similar to other jobs in the economy, and this approach that we use for this paper is based again on the employer's own description of what they're looking for, whereas a lot of other approaches have looked at specific occupations. So, therefore, it's not job specific. It's at the level of the occupation, and they tend to be a little more likely to find that green jobs, require higher education. So, back to the wage levels. So, as I mentioned, the reallocation of capital, of course, that's part of what affects wages.

In our paper, we find that wind, and solar jobs are higher paying than other jobs. They are created in higher paying occupations. In fact, there are 21 percent higher paying. And interestingly, it's especially the jobs with high skill requirements or sorry, high school or less, or no education requirements that tend to be created in high paying types of occupations. So, it seems to particularly advantage the opportunities of, less, skilled workers.

Finally, and that's also interesting, we have also found that wind, and solar jobs are disproportionately located in communities, in counties with fossil fuel production. And so, all of this together, so they are relatively, jobs that are not requiring more skilled. They're higher paying, and they tend to be located in fossil fuel communities is, I would say, the optimistic, and perhaps, unexpected message here that there is an opportunity. So, that's great.

Nevertheless, it's still the case that for particular individuals, the transition could be rough. So, even if there's this correlation, there's these nice jobs

out there, it doesn't mean that for any particular worker, perhaps, especially if they happen to be, if you as a worker happen to be in a depressed community in West Virginia and your mind is closing, all I'm saying here may not help you all that much. So, that doesn't mean we don't need to worry about the cost of transitions, for workers.

And here, I think one important policy to think about as an example, is in the US We have the Trade Adjustment Assistance, Program, and there's a very nice, paper by Ben Hyman that shows that, with this, TAA, workers were approved, made an additional 50,000 dollars more in earnings after getting approved. Thanks to this program. And this program has two components. It has training and it has enhanced unemployment insurance benefits. So, it both provides income smoothing as well as a training component.

Interestingly, it seems like the training component was most important in generating higher income for workers. And there's a whole literature that shows that training investments tend to be, on average, fairly, effective in the long run. They're costly in the short run, but they're effective in the long run. There's some additional policy tools we can think about including wage insurance. So, if you take a job that's less paying than when you used to have, you can get that difference, covered through public funds, and then early retirement subsidies. We know that training tends to be less effective for older workers.

So, one policy we can think about is, as was done in Germany, this was mentioned in, Lawrence's [ph 0:54:16] paper that, German workers were able to draw on retirement benefits earlier when they were retiring from mining. So, that's something that has been done for prior technological transitions. Now, in terms of how hard is all this? Well, in the end, the number of workers that are directly affected that are in fossil fuel industry is in the US, especially, and Europe is not that large. It's a fairly small number of people.

So, if we're going to do a targeted support, the fiscal cost is not going to be all that high if we limit it to the people who are directly impacted. Now, of course, there's the indirect effects, but if we're targeting those people, there is an opportunity in terms of the low cost. And I think that also echoes some prior papers where we saw even at the global level -- a lot of the costs perhaps could be handled. Interestingly, there's also the issue of flexibility. So, you have to allow for the economy to adjust as much as possible in an efficient way.

And even though green jobs are great and all that doesn't mean that every worker who lost a job in the brown economy now got to go in the green economy. I mean, that's not necessarily the best place for them to go or the



more effective way. So, that's why we have to think about a policy package that allows for reallocation in a more flexible way. For example, with retraining that is not necessarily for green jobs, but an open opportunity for retraining, to workers or income support policy that again, isn't linked to green jobs but it's just if you were, in a dirty sector, you will get access to those, income support policies.

And finally, actually, what I was really interested to see that there's all these policies in the EU -- around the green transition, and to support workers. And in fact, I'm curious to know, do we already have any evaluation? As somebody who is interested in labor market policy, what was the result of all that? How effective was that? As I said, the TAA seemed pretty effective in the US but what do we already know in Europe, and what lessons can we draw? So, that's for the first paper.

Then moving on to the next paper, by Alger and coauthors. So, this is a paper that's macromodels, a suite of models that apply to Turkey. And so, this we're switching gears to more of a middle-income country. So, we've looked at US and Europe more of a middle-income, situation. And so, this is a new context to think about this topic. And so, here, we have a macromodel suite again, to address this issue, and it's part of a multi-country initiative where the team applied this model to multiple countries.

I really appreciated that the way they did it was in trying to take into account the countries own objectives, not imposing necessarily a optimal policy package from the top down, but trying to look into the specifics of what the country was trying to do. So, the model blocks here are three-fold. First, they have a technical model, and the sectoral level has been described is quite detailed to take into account specifics of the sector. They input that into a general equilibrium economic model to model the adjustment.

And finally, they have a detailed model to get into the government budget, and the fiscal adjustment, process. So, for Turkey, the key results, for the green transition relative to business as usual are pretty positive. We're seeing increased growth, increased aggregate, employment, although we saw that labor reallocation frictions reduce growth compared to what it would be with less, frictions. And in the end, we also see a progressive welfare impact because we see an increasing consumption for the poor, and decreasing consumption for richer households.

So, one, this is more my slide of some questions that I had while reading this. You show positive effects of the green transition on growth in Turkey, and there are two key assumptions that make it more positive that we get this boost, to growth. One is that currently, there are market inefficiencies. And in your presentation -- you focused on -- you told us that coal was

overrepresented even though it's expensive partially because of public policy.

So, I found that interesting in terms of -- where are these inefficiencies coming from? And perhaps, it depends on which country we're talking about. So, knowing what they are is important in terms of what are our opportunities to do better based on the existing inefficiencies, which could be somewhat, country specific. And secondly, there's this issue of crowding out. So, is it the case that the new investments in the green economy, are these additional investments or crowding out other investments?

And so, that's important because if -- we need to avoid that means you have to increase savings. And that's painful from the consumer perspective. You have to reduce consumption relative to the counterfactual. And so, that's something that we have to think about in terms of the policy design. And then the second big bullet point was that the effect of the green transition tends to be more negative in lower-income countries in their model, not as favorable in terms of boosting growth.

And I was wondering why, but in your presentation, I think I understood that it's because the level of investment need is so high. Therefore, the reduction in consumption needed is so high that it's very painful for those countries. They don't have the basis. They have to invest a lot, and that makes the adjustment much more painful. So, that was new to me, and that was an interesting aspect of your model as I was reading it.

So, now, let's talk as last sort of minty topic about the carbon tax, which has been talked about a lot today. So, in their model, they actually do rely, partially on the carbon tax. Right now in Turkey, as I understand it, they don't have a carbon tax, but they do have a high tax, on liq- liquid fuels. And I mean, the issue with the carbon tax is that it can be politically challenging. I have a paper, with, Soren Anderson, and, Borussia has just been published, looking at the US case, and showing that the carbon tax is really thwarted by political, and partisan polarization.

Whether the carbon tax finance is a dividend, which I thought was such a great idea or if finance is green investments. We looked at the state of Washington that had both. It really drives a lot of opposition -- from Republicans. And it couldn't pass in a state level referendum. Of course, there's the case of the Gelasian [ph 1:01:11] in France. And so, there's huge popular opposition, and there's a very nice paper by Duane and Faber.

And one of the things they show is that the opposition is largely driven by seemingly biased beliefs about the impacts that people were overestimating the negative, impacts, and it's very hard to correct these beliefs. So, that's part of the work that policymakers have to do in terms of presenting those

policies to the public. And one idea I want to suggest is that if you're going to use a carbon, tax and dividend, you have to think about the fact that as we transition to a green economy, that dividend is going to dwindle.

So, if part of the goal is to provide a dividend -- you have to provide some sort of automatic adjustment if you want to continue to provide a dividend moving forward. So, one suggestion I have before I conclude is for this paper. I thought it was very interesting to think about country specific policy proposals. And I was thinking -- some people do this web widgets like -- our world in data, et cetera, where you can click through different countries, different scenarios.

So, it would be fun if we could be able to say -- I'm country X -- if I increase carbon tax for this, and I add this subsidy, and this thing -- what would be my result in terms of the GDP, employment effects, and so on and so forth? Their outcomes, they might care about. So, to conclude, facilitating the reallocation in the green economy. So, we've seen that -- we have to rely, I would say on macro evidence, on policies that support workers during the green transition, things around labor reallocation, income support, and also take into account the political economy, which is really critical for the feasibility of policy in practice.

And secondly, the macromodel comes in handy to be able to incorporate some of this micro knowledge about existing policies that we've done in the past to simulate what would happen in the macro economy, and therefore, offer policymakers a menu of options, for moving forward with this green transition. Thank you.

Stefano Scarpetta: Well, let me start by thanking, Adam, and Jean, and the Peterson Institute for inviting me. I think a disclaimer. I think like Bob and Jason said, thank you for inviting non-climate expert to this conference, and also try to keep it short, because I think the two presentations were extremely good, and Ioana did a great job also in providing a number of important comments. I agree with her that the two papers are very much complementary, so it was really a pleasure to read them in sequence. I will try to discuss them also in the same sequence.

So, we'll start with the paper that Stefan presented, and then I will discuss the paper by Robert. But let me start by quoting Stefan. I think one of the last sentence he used was that we are focusing on reallocation not just because we have to focus only on GDP, and not just we are focusing on reallocation because we care about the social impact of distributional considerations, but because focusing on reallocations also means looking at efficiency of the transition to net zero. Let me move to the first paper, the one that Stefan presented.

Now, this is not a paper. It's actually a summary of an extensive work that the World Bank is doing. And I think, as Stefan said, there are many people working on it so it's a bit of a challenge to comment on that. I think a number of important points. First is part of this Country Climate and Development report, and I'd like to underline, "And development." So, here, we are moving away from a silo approach in which we're looking at policies to promote towards a net zero, and to look at policy to achieve net zero together with development objectives. And that's, I think, is quite important.

It's also interesting because it is a combination of different approaches. I think as Stefan said, it's a bottom-up hybrid modeling approach. First and foremost, we start with the resilient net zero scenarios which, again, are embedded into a developmental model. So, it's not just by themselves but part of the global approach by the country. In the example he gave, we focus on four main sectors which are crucial in order to achieve net zero. And this, of course, is power, building, transportation, and forest.

I think Stefan said that in other countries, the focus might be in other sectors, so it's not always the same one. And I think the objective here is to achieve the net zero decarbonization in the case of Turkey, 80 percent by 2053. So, the objective are fixed in this particular sectors. And then these scenarios are brought into the standard, I would say, CG model in which the model itself is calibrated to replicate the emission reduction, which are determined in the sectoral analysis in the four different sectors.

So, basically, the investment requirement to achieve the net zero, for example, in the power sector are introduced into the CG model as an exogenous shock. And then, the second model, the CG model is brought into a World Bank, and macro model, and an aggregate macro model to assess the macro financial consequences of the sectoral, net zero strategies. In the case of Turkey is we're talking about 330 billion cumulative additional investment, that have to be taken place.

Of course, the issues here are, how we are going to finance this investment. There are baseline assumption, which is 50 percent by the government and 50 percent by the private sector. Two crucial element here. I would like to hear more about it. One is a very benign scenario, which is a TFP scenario in which the reforms that are part of the development model of development strategy itself will actually generate a significant boost in TFP. And these to some extent will also finance the needed investment in the fourth sectors.

And more reasonable scenario is the one that would imply a significant carbon tax, and of course to some extent, crowding out effect in between big investment, meaning reduction in consumption, reduction in investment in other sectors. A combination of all of these. What are some of the main

findings? And again here, of course, we are looking at one particular example. This is the one of Turkey. You may have seen the chart that Stefan presented. This seems to be fairly positive in terms of GDP in most of the countries it shows us.

In the case of Turkey here, we are looking at the long run positive effect on economic growth but, there is a big but here, because this depends on the degree of frictions in the labor market. If, as in the modern, the CG model, there are indeed significant friction in the reallocation of labor across sectors and across types of jobs. Then the overall impact, of course, is much, much smaller, and of course, depends very much on the crowding out effect or lack of crowding out effect or the extent to which.

The second important point is that if we look at the end point 2053, there seems to be progressive. This type of evolution and transition. But of course, we have to pay a lot of attention into the short-term effect on poorer households. This is a point that also emerged very clear in the paper by Rob, by Bob. We have to take into account the short-term adjustment costs, especially if these crowds out consumption, and to the extent to which we use a carbon tax, because we know very well that this will weight very heavily on low-income households.

And there is also a result which is specific to Turkey. Again, here, the four sectors have been chosen in, I think, a discussion with the country itself. But the fact that the industry is not included into one of the sectors, and therefore there is also investment in the industry. One of the side effects of this type of analysis in the case of Turkey is that there is a process of de-industrialization. So, there is a significant shift of employment away from industry into other sectors.

And of course, it is also implication because one of the sector mergers is actually the building sector, which tend to offer lower wage, and therefore, it's not just a question of moving workers from some sector to others, but also moving workers from relatively high pay to low pay sectors. So, indeed, the -- my main suggestion is one, and again, it might be asking too much, but maybe having the industry sector included into one of the core sector. It's important. Bob reminded us that when we talk about industry, just think about automotive. This is a sector that is going on to massive and massive adjustment itself.

Second, is not very clear, at least in the paper. I'm pretty sure that the extensive discussion on that, what are the conditions under which the TFP scenario may become slightly more likely, maybe not a full TFP increase, but maybe a bigger or better combination between TFP crowding out effect. Here, of course, they talk about reforms.

Some of the reforms indeed might not be very costly. They might be costly politically, but the rule of law in the case of Turkey improved market regulations, but other in my view are costly, and these are about better institution investment in human capital, especially in a country like Turkey that invests very little not only in education but actually in lifelong learning. This is an issue.

And of course, better social protection programs. And I think I would like to see more, and maybe again the analysis, there is more than what I found in the paper about the distribution effect, the short-term effect versus the longer-term effect. Even if in the long run, low-income households may benefit in terms of employment. Even wages, I think the short-term adjustment costs are likely to be borne in particular by the low-income people, and therefore, this might have an impact about the support for this type of reform.

Let me turn it to Bob, because I think, as I said, at this paper is complemented very well what Stefan presented here. We focus on the collateral benefit of climate policies on workers, and investment, as well as on the painful reallocation of labor and capital. And even if there might be, and indeed the literature suggest that there could be positive long run aggregate employment effect, what really matters is actually the reallocation or cost of this reallocation will be, for different people. And also, this is important for the public support for climate change.

There are various reasons why the costs of job displacement will be larger in the brown industry. There is a literature that job displacement costs are largely in decline in industries. Job displacement costs may be large, and also in high wage firms that are some of the brown industry themselves. And therefore, there is a need to support the displaced worker. Here, I might somewhat differ a little bit from what Ioana was presenting in terms of the cost of adjustment.

Let me share two things why it is important to focus on the support for net zero transition. This is just, an illustration of the correlation between the beliefs, and the support for [inaudible 1:12:46] tax packages. You can see on the top the correlation is positive. Policy would indeed be successful in reducing emission, inequality is important problem that is dealt with, with these policies, and trust in government is high. And therefore, also, I believe that this net zero will be successful.

But then look at the bottom. If people consider that this transition will actually be costly for the income of the household, then the support is certainly negative, and the same, of course, low-income earners will lose. And also, people don't understand what climate change actually is, and what they should be the main priorities. Now, I go to the point about the

adjustment cost. This is an ongoing work at OECD. It looks at the brown industries versus non-brown industry.

You see that there is an adjustment cost in terms of total earning, number of years after the displacement has taken place. And this larger of course in the brown industry, it is in the non-brown industry. But I think what is interesting is also when you decompose this, total earning effect because one of it is about employment, but actually where is large is also in terms of post displacement, wage, and actually firm premium. A number of those work in the brown industry tend to have high wage and particular firm premium.

They tend to be paying much higher than what basically a similar level of education people tend to get in other sectors. And of course, it might be difficult for them to reallocate into another job where there is a green job or another type of job being paid the same given the level of education they might have. So, there is certainly a more persistent effect in terms of wage, post displacement, and also in terms of the wage premium they might -- they might face going forward.

So, what are some of the key messages of the paper by Bob? We have to move away from the notion that there are no frictions in the labor market, and actually focus on how to target, and what are the modalities of the support we provide. Of course, Bob discussed a lot at the US IRA approach, the definition of the community, which are most likely to be affected very broadly in the chart it shows us, but also a type of approach that is used.

Are we investing in the brown communities by let them invest in green activities or actually they have to invest in something else? That's a very important point. So, is the focus on the green in investments, and what isn't important. So, it says that the IRA is poorly targeted for the purpose of the environmental justice, and too, focus on renewable energy as additional investment in the affected communities. Here, I would add that I think there should be a focus on short term, and medium-term income support systems in wage insurance. You want to refer to that, and also on activation policy.

One thing which is good about net zero transition is that its policy induced. So, to some extent, we can foreseen what are going to be the changes, and we can put in place policy which are preventive, and not just policy that cope with the shock when people have lost their job. Final point is, I think we have to -- and this, again, on Bob papers, we have not only to focus on individual affected by the transition as workers, but actually also as consumers.

There might be a high overlap between the two, but I think there are also people who might lose as consumers even though they are not directly

affected in terms of job loss as workers. And I think then we have to move probably from individual costs, both in terms of wages and employment, and in terms of consumption, but also in terms of communities. So, the focus on communities, but perhaps, and here very much follow the point that Bob was making, looking at those communities who are likely to be very significantly affected by this, transformation.

And think about what kind of investment or reinvestment in these community may be needed may not be in green activities, may be in other important activities. And with that, I conclude, and thank you for your attention.

Maurice Obstfeld: Right. Okay. When, when we conclude at 06:00 p.m., I don't want to place any undue obstacles between you and the cocktail, so let me make one announcement now. There will be a reception from 06:00 to 07:00. A buffet dinner from 07:00 to 07:30. At 07:30, we have an evening program which will feature Andrew Steer, President, and CEO of the Bezos Earth Fund, and he will be having a, conversation moderated, by Adam.

And your participation will be, will be encouraged in that. With that, let me, turn back to the subject matter, and thank, Stephan, and, Robert, and Ioanand Stefano for excellent presentations, and discussions. One, one big takeaway, I think from this discussion and just following up on, Stefano's final remarks is that if we think of the green transition, it's kind of like the combination of a huge, technology shock and trade shock, and we know from past experience, a lot of Robert's work, other work, how, how disruptive that is.

So, I hope in the discussion, we can address more if we have a sense of the best practice, for, easing the kind of frictions that are implicit in the World Bank's model. Whether, whether the bank, the fund should be advising on those, and how we think about, support for communities, not just for individuals because part of what we learned from the China shock literature is that these community effects are very important. Why don't we start by letting Stefan and then Robert, reply to any comments of the discussants, and then we'll open it up to the floor for questions?

Stefano Scarpetta: Thank you. Thank you very much. And then just to start, it's a bit embarrassing when the discussion do a better job than the presenter on the paper. So, thank you very much for presenting especially what I had no time to discuss at the end. Just a couple of, targeted points on your question. One is, I mean the big question we have is an investment and a financing question.

And so, the big question is -- okay. We have all of those investments. Where are they coming from? And what's really interesting when you start to



mobilize different economic models is depending on what model you're using, you can do this in different ways. So, with the CG, we could go directly, and increase investment exogenously in the model. In the macro structural model, you can't do that. It's all completely endogenous.

And so, you have to find a way to explain where those investments are coming from. And so, the two scenarios that we have where basically two extreme cases, one sort of like magical case where you basically have to do it with an increase in productivity, and people want to invest more because you have the returns. And one, very pessimistic one where you really have to force it by just taxing, in the model forcing the investment.

And I think what was interesting is those very extreme cases gave us, I think, a lot of confidence on the impact on the current account, especially because when we were doing that, and we engage with our colleagues at the IMF, one of the things that they said is you should really be looking at the current accounts because that's our main area of concern for Turkey. And so, we had a specific model that we deployed to look at this, and being very pessimistic in that case, it's useful because if you use the most pessimistic assumptions, and it still works, then you're of course more confident.

I think what's really interesting in what we're doing with the carbon tax, especially in the CG, is, and that's something we find in a lot of NICCDIES. The main role of the carbon tax is not the incentive in the end in those reports. I mean, it plays a role through basically providing the incentives in the other sectors. So, especially for the MSMEs, the household consumption choices. But for transport, for the power sector, for the building sector, it's a lot like other tools that create the incentives.

And that's because they are not very responsive to prices either because they are completely regulated, and it's not price driven or like for transport, that's even like a 40 dollars carbon tax is just a few cents in the price of gasoline. So, this is not going to get you modal shifts or like electrification. So, it's other policies. But the carbon tax is really critical to finance the investment that you need, and to compensate the people who are negatively affected so to help you with the transition.

So, I think we get back to the previous session where the fact that the carbon tax gets you, especially in low-income country, a very efficient way of raising resources, it's difficult to evade, it's cheap to collect, especially in countries like Turkey that are importing all of their energy. So, you have just a few port of entries. If you tax there, you're good, right? You don't need like a VAT to create something very sophisticated, which in many countries is difficult.

So, it's very much because it's a good fiscal tool that is being selected, and the incentive is sort of a co-benefits of that, which I don't think we expected that when we started. Second point I wanted to make, and I don't want to be too long, is in the shift on sectors. So, we also have reviewed some of the literature on how to help, regions, communities, people transition to new activities. To me, there is one thing which is really important is nobody is really interested in compensation.

What people want is a development path with good jobs and good activities where they just make a living from what they are doing. And I think even the language sometimes is a bit problematic when you say -- especially in the forestry sector. All you have to stop deforestation. It's okay. You will be compensated. I mean, people are not interested. They want jobs. They want activities. And I think what's really interesting when we looked at the lesson in Europe from the success, and huge failures of helping communities shift away from coal is what did not work is to help the workers one by one.

What did work are like packages on communities with investment in infrastructure, and very often, some sort of tax incentives to bring different activities into the affected region. So, you have all of what you mentioned, I think, for retraining, and so on. It's absolutely essential because the labor force is part of what will attract new investment. But the key decision between success, and failure is if you bring investments from other sectors in the affected region. And it's a community-level question. It's not a worker question.

Of course, you need because you can't do that everywhere. You also need to make sure, for instance, the way you help workers is portable. So, if they want to move, they can move with the support, which is something that in France, for instance, created these pockets of poverty because you help people, but they have to stay in the area that had the coal mines. And then you create a communities of poor people living from transfers, and that's, of course, not good.

So, there are a lot of technical things about how to do this. But clearly, this framing in terms of what is the development project of my -- right now, coal centric community, and what can I offer is much more important than talking about communities for the political economy. That's one of the example I said later that the political economy is not distributional impacts. It's as much about the project, and the narrative that you have on the transition, and not only on getting people's money.

And finally, I want to conclude on this, since this is a group of macro economists mostly, one of the things that we really tried to do with those reports is not to have the macro economists replace the energy expert or the

water experts or the transport experts but to create this discussion across the different experts. And that's exactly what we see also in governments, when you have the Ministry of Energy begging the Ministry of Finance for more resources to do the energy transition, and if you don't have this exchange in terms of the strategy, and how this is going to happen, you have this very inefficient dialog.

And what we're trying to do with those reports is not only to produce a number, and the nice glossy reports. It's to engage in the discussion. And I think that the process of doing that -- them and the discussion is much more important than the result at the end. So, I just wanted to say that because, of course, our models have plenty of problems, and errors, and things. I mean, this is very imperfect because this is very difficult. The question is to discuss the right questions at the policy level so that you have decisions that are made. Thank you.

Robert Z. Lawrence: So, I appreciated the comments. I felt heard as a writer, I think that's important. I did think in Iona's presentation, she tended to, at times, talk about what our policies are, and at times what she wished our policies would be. And I think keeping the difference in mind is very, very important because I believe that America's policies are utterly inadequate when it comes to dealing with adjustments in the labor market. And I think part of the re- -- I was really struck.

I looked at which I mentioned earlier, and deal with in the paper, this inter-agency working group that was supposed to deal with -- coal and other energy communities. And I noticed the secretary of labor wasn't one of the people in the room. So, in other words, the agency responsible for labor market adjustment is not even discussing them. And I think part of this relates to the fact that our unemployment insurance system in the United States occurs at the state level, not through the federal government primarily.

And the result is we have a hodgepodge. Some states may be effective, others may be are probably not. And so, when we get a generic problem, and we, like trade or in this case, like climate, which I think does warrant a national approach, we're not up to the task of doing that. And when it comes to community development policy, the Economic Development Agency, which is part of the Department of Commerce, its budget is four billion dollars last year, I think.

And that's been upped by the Biden administration. So, we don't have adequate funds. And the Trade Adjustment Assistance, Program, I think a fair reading of the evidence is that it's mixed. There is a very good Hyman paper which showed positive benefits, although they fade after 10 years.

And then there are a set of other studies which actually, come to very negative conclusions. So, it's a kind of a mixed story, for the United States.

Chad Bown and Caroline Freund did a good survey, of policies in the whole OECD, and sort of brought out, I thought, the inadequacies of the American, Labour Market Adjustment Program. And so, I think that's where, the US is lacking. I'm not going to say that, the Europeans always succeed. I tried to indicate, firstly -- there's a criteria which is that no one should be left behind.

And there's this desire, to get convergence across Europe. And it's a wonderful idea. But it may not be feasible, particularly given the underlying economic realities of the fact that we're seeing very powerful forces towards agglomeration into superstar cities, and I think technology is driving us into regional differentiation. And that's a force that we have to accept as part of the reality of the structural change in the economies in which we live.

And in a sense, it's an illusion to think that we're going to get income inequality regionally across all nations, and a whole group of nations in the case of Europe. But nonetheless, this doesn't detract from the idea that we really need to have, much more active, assistance being, I think, are being provided to people. And years ago, actually, in the '80s, Robert Layton, and I came up with this idea of wage insurance, of compensating people who take a job at a lower level, and that's because we saw people never get -- and you saw some wonderful -- Stefano gave us some results of his colleagues, I guess, where people never get back to their previous earnings paths.

And so, that's what wage insurance is designed to do conceptually, to compensate you for the loss of your specific human capital. Not your general, but that's what it's aimed at. I also believe that we, and have written on this, we ought to have a tax-base insurance program where all communities like we have with unemployment insurance for individuals. We should allow communities to pay in advance to get insurance policies, and if they experience a huge loss, maybe because of a planned closure, maybe because of trade, maybe because of a crop failure, umpteen different reasons, not because they lowered their tax rate, they would be allowed to draw from the fund to help ease, some of those, adjustment burdens. So, I'll end it.

Maurice Obstfeld: Okay. Let me take a couple of questions. Please introduce yourself even if you've, been in two sessions today. I'll take Jason, and then Chad, and then I'll take all three of you, and then we'll go to the panel.

Jason Furman: Jason Furman. I was in two sessions today, and have three interrelated questions for anyone that knows the answer to any of them. Number one,

how do we compare the magnitude of reallocation we think we're going to get from climate change to the reallocation we're going to get from everything else that's going to happen over the next 30 years? Trade technology, just the underlying background reallocation, the amount we've seen over the last 30 years, just benchmark compared to something, number one.

Number two -- and Robert, you sort of hinted at this in your comments you were just making, but less in your presentation. Most of us thought that you shouldn't be have separate programs for trade, and for job loss due to this, and job loss due to that that you want one. And so, I looked at your map of the United States, and sort of, "Oh, my God. Three quarters of the country, that's crazy." And then I was like, "Wait, why isn't it all of the country?" Because anyone that loses a job anywhere, should come under this.

So, is this because of some budget constraint? Is there some other reason why you want to do something separate for this than everything else? And then the third question is our normal considerations about helping people, versus helping places. Is there anything different about this problem, or I can repeat the same debate I'd have in any other context on that issue? Thanks.

Robert Z. Lawrence: So, should I?

Maurice Obstfeld: Let's take three questions.

Robert Z. Lawrence: Okay. Well --

Chad Bown: Chad Bown, Peterson Institute. Robert and Stefan, really nice, research presentations. Thanks, thanks for doing it. Stefan, I had a question for you. So, the work that you're doing, you've got 20 something countries. I think of them, they're probably relatively small economies out there. How are you thinking about situating them in terms of -- this is the Peterson Institute for International Economics, right? Many of them are open. And your results on Turkey were striking, right?

So, they do this policy, the allocation, the reallocation toward construction, away from steel. Right? But what do you advise them or how do you think about these models in the context of international trade? They trade a lot with Europe. Europe is thinking about a CBAM, right? If they impose the CBAM, that seems like it would support sort of the transition that you have in mind in this model for Turkey but if they don't, then there's more market access for Turkish steel, to flow into Europe, and there's going to be really hard forces pushing against, the forces in the policy recommendations you might be thinking about.

So, how are you thinking about --? Turkey's just one example. How are you thinking about that more generally within this exercise? Are you adding up constraint to make sure that the results are sensible across countries, et cetera? Thanks.

Will Martin: Yeah. Thank you. Just to follow up, Will Martin, previously the World Bank. Wonderful presentation. Thanks very much. The border adjustment seemed to me potentially quite a sensible idea, but what worries me is the way it's evolved in Europe. The border adjustment is only on imports, and there's no symmetric, export rebate the way there is with the VAT.

So, you've now got a tax on imports which we know is a tax on exports. There's that's going to set off a whole series of totally, unneeded additional adjustments throughout the economy. And it troubles me a lot. And I just wondered, sometimes some policy instruments can create more disruption even than the original shock. So, I just worry about that problem. Thank you.

Maurice Obstfeld: Yeah, we're going to have a lot on that, tomorrow in session 6, I guess. So, if anyone has a strong view, go ahead, but we are going to take that up in detail tomorrow.

Robert Z. Lawrence: Okay. So, Jason asks three questions, and one was whether this climate shock is, how does it compare to other shocks we're likely to have in the future? I don't claim ever to know the future, but you can look back. The estimates of Don and Hansen was that due to the China shock, like a million jobs had been lost. Now, I don't actually -- I have some problems with some of their methodology, and their conclusions, but let's take that as an order of magnitude.

Well, it's quite plausible to me that we're talking about a similar order of magnitude in this case. When I tried to list all of the different estimates of how many brown jobs are under threat, I could get to a similar order of magnitude. But what is of concern to me is that my reading also of the literature, on adjustment is that this is a kind of shock that's taking us in the same direction as the other trends in our economy.

The trend of deindustrialization, the trend towards skill-biased technical change. Maybe AI will change that, but I still think that's been a powerful force that's been operating the trend towards regional differentiation. All of these features of our economy in the past look like to me, this is going to be yet another one of those. And so, in that context, the broad community doesn't quite distinguish among these causes, and they tend to get melded together.

And I think that's what's happened to trade. It's been blamed for a lot of things where actually the forces, in my judgment, weren't trade. So, I think it's a significant shock. And we've seen what's happened with the interpretation of the other shocks. Should we have adjustment policies? The classic one, we just heard, it should be places, or should it be people and the --? Should we first --? It seems to me we need a combination of both.

For some people, I think mobility assistance could well be part of the solution. Of course, that leaves the community without the most mobile people. And so, in a sense, you could actually weaken the strength of the community, but I don't believe that simply helping people is going to be enough, because there are just as people don't like being compensated and losing their jobs, particularly in recent times, with a lot of places where there are opportunities being very expensive places to live, people's mobility has significantly declined.

And under those circumstances, helping them where they are -- particularly this feature of non-employment, where they withdrawn from the labor force has become a chronic problem.

Jason Furman: Robert, I'll just --

Robert Z. Lawrence: One more.

Maurice Obstfeld: I wonder if we could save the last for cocktails so we have --

Jason Furman: All right. Sorry.

Maurice Obstfeld: Because we're running out --

Jason Furman: I didn't realize that.

Stefano Scarpetta: Okay. I try to be very quick. Reallocation compared with everything else. So, if we look at finance, for instance, aging will be playing like a role that might be just bigger than these additional investments, at least in many countries. So, I think we really need to look at all of these drivers together. Otherwise, we're missing the point. One of the challenge I see is everybody agrees on this just transition. We don't really know what kind of job loss qualifies as a just transition.

And if you look at coal in the world, there are a lot of jobs being lost to mechanization. It's not climate, right? It's lost anyway. Do we treat differently what is due to climate, and what is due to just technical change? I think in the design of the policy is really important. On the international economy, we looked at CBAM in all of our countries, climate, and development reports.

In Turkey, it was fascinating the impact of CBAM without being implemented, because basically, what's happening is the private sector is calling on the government to decarbonize the power sector because they can see that if they want to access the European market, they need carbon free power. So, you have quite the opposite of many countries where the private sector is pushing the government, the government being reluctant because of the political economy of coal.

On steel, you see steel and cement going down but I think that's where we should have another sectoral pathway here because the CG has not many options to reduce emissions in those sectors, right? So, it makes it makes them reduce. But the demand for steel, and cement is not going anywhere. So, basically, those sectors will be able to pass some of that, cost increase if they have to use CCS, maybe more than other sectors. And it leads me to my point on the hard to abate sector.

We're defining hard to abate sector as the sector with a lot of carbon intensity now, but I'm really wondering if there will be the hardest because there are big companies in many countries not all, but in many countries access to financing. You have like MSMEs who might have like only a little emissions, but if you can't access finance, you might close. And MSMEs is where like 90 percent of the jobs are. So, if you think like economic growth, development, job security and so on, looking at those hard to abate sector because it's small firms with no access to finance might be more important. And I think I'll stop here.

Maurice Obstfeld: If our last two questioners could ask very brief questions, we could squeeze in very brief answers, and then maybe even let the discussants have last words.

Ioana Marinescu: Yeah. From Leuven, Peterson, and Bruegel, it seems that we have discussing mostly the transition from brown to green and white jobs, between firms. But I was wondering how much of this transition, also takes place within firms that have to adjust, adopting new clean technologies, and whether that transfer that transition within firms, also faces some hurdles that need to be supported.

Audience question: You asked for a European commentator. So, I thought maybe -- it is actually a bit more of a comment than a question. So, just quickly, why this issue for a green transition rather than others? Surely, it's basically because it is a purposive, government driven transition, unlike some of the others. So, of course, people say, "Hey, what are you doing to me?" As opposed to, "What is the world doing to me?" And on the point about differences between Europe and US, it's really, you have to bear in mind.



In Europe, this is layered on top of three decades at least of structural policies, cohesion policies, all designed to help cement the European Union, and deal with the political threats that would arise from inequality in the process of developing the EU. So, this is like added on top of a long layer of distributional concerns. And I think that has actually eased the ability to target where help was most needed. Just one other remark. Anything like that is going to be pretty difficult, and messy, and incomplete, you could look at the UK situation.

I was once asked about how did the UK do its just transition out of coal. We nearly laughed. It was one of the most brutal political battles you've seen. The scars are still there 25 years later. So, it's worth thinking strategically. Ultimately, just transition is going to be in part what makes it politically acceptable for the stakeholders involved.

Maurice Obstfeld: Okay. If any of the panelists have answers or reactions, dive in. Stefan.

Stefano Scarpetta: Very briefly. I think, first, the question on the transition within sectors is absolutely essential because for like automakers or steel or cement, this is what's going on now, right? You see that you have companies winning and some, some losing much more than the sectors collapsing just because we need those sectors, and what they produce. So, I think this is where a lot of the -- all of the tools that we have for stress testing, for instance, the banks and so on, which are very sector focused, I think are very short to what we need.

And I think it connects to the question of, "What are you doing to me?" Because at the moment, any bad automaker will just blame the transition to electric vehicles, right? So, at one point you have this question of how do you avoid to start from, "Okay. We need to help people affected by the transition to we need to help any bad company in any sector who is using energy because that is going to be complicated." And I think this criteria will be really hard to find.

And last word. We're talking a lot about the just transition for mitigation. I think we should really think about adaptation because we have adaptation, and risk management policies today with massive redistributive implications, especially through land prices. So, there is a question of who will we help also manage the impact of climate change, and what are our -- ? What is a just transition for like small farmers in India facing a change in rainfall, for instance? I think we don't have really an answer for that because we're looking at coal mostly, and energy in general, but not so much at the adaptation challenge.

Robert Z. Lawrence: I think that within firm, changes are going to be very considerable in certain sectors, where the process itself leads to the emitting emissions, greenhouse

gas emissions, other kinds of emissions that are harmful to the atmosphere, there is going to have to be innovation. And when there is innovation, there could well be a transformation of who, who gets hired and who the workers are.

When we have the electric vehicles, we need far more software engineers, we need far more electrical engineers, and we need fewer mechanical engineers. So, I think these are going to be transformational within firms, and that's the change that below the surface. It won't be at the level of the whole community, but it will change the demands for different skills and educational levels.

Maurice Obstfeld: Okay. Ioana, Stefano.

Ioana Marinescu: Yes. So, for the place-based policy versus people-based policy, that's such a tough one. I mean, my work shows that labor markets are very local. And so, in that sense -- it's not going to be easy for workers necessarily to go outside. And there are some local spillover effects that are probably important. But at the same time, the way I read the research evidence, and I'm really curious, let's talk -- after this that certainly for the US, there are very few proven place-based policies -- based on academic articles.

The only one I can think of is the Tennessee Valley Authority. I can't think of any other one. That's a clear, big positive impact of a place-based, policy. And a lot of them seem to be pretty not well working. There's the reviews by Bartek where it's like -- I tried to pull the firm in, but in the end, it doesn't seem to do much. However, that doesn't mean that we should be the economist arrogant and say, "Therefore, you're dumb." Don't worry about that.

I think there's a duty to respond to public demand from policymakers, from people, and so therefore, we have to keep thinking, look at policies, and maybe if there's policies that are not exactly the traditional place based, but can accomplish some of the similar objectives, I think that's where we want to expand the space of possibility. And I'd be really curious to hear more from others around this topic.

Maurice Obstfeld: And Stefano.

Jason Furman: Last word. I mean, one takeaway. I hope that I think one of the messages from this panel, I hope this will also resonate with the rest of the conference, is that reallocation should be really an integral part of any successful net zero transition strategy, not only for social, and political economy consideration, but actually for efficiency consideration. And maybe as a final word, I'd like to go back to the question that Jason was raising.

So, what is different in this particular type of reallocation compared to the many other reallocation that are taking place? And I think it's the cumulative effect of a number of elements which are specific. One is I think we have been discussing that extensively. This job highly geographically concentrated. Many of these job enjoy today a significant firm wage premium. So, reallocating these worker is very complicated because they might lose these firm specific wage premium.

I think the comment that was made at the end was essential. This is a policy induced transformation in our economies. That's why people are questioning, should we really do that? Should we do it with a speed at which the policymakers want to do it? And the other important point, let's not forget that this is not the only transformation that our economy is undergoing. And I think there is also a sense of fatigue. I mean, people have gone through Covid. People are doing on a daily basis a digital transformation, and so on and so forth.

And last but not least, many of the new jobs are different types of jobs, certainly more secure than many of the brown jobs that people used to have. And therefore, the idea, not only in terms of wage, but also job security for many of the people involved, I think can be somewhat challenging. I think precisely because it's a policy induced transformation, we have to invest more into preventive measures and not just coping measures.

Just one example. Job Security Council in Sweden is a policy which is actually managed by the social partner in which for any company undergoing a major transformation with many job losses, they actually work with the workers at ex-ante before actually transformation takes place in order to facilitate the transition into the new job.

And last, maybe because I'm Italian, I'm certainly biased from that point of view. Community-based policy, yeah, but I think in some countries, tons of money has been put into local communities with very little success. So, it's not just a question of transfer of resources to the community affected by this transformation, but actually the capacity to rethink themselves, and to invest in an effective way. So, I would certainly be cautious about the idea that just putting more money into this community is going to solve the problem. Thank you.

Maurice Obstfeld: Okay. Thank you, everyone. That brings day one of the conference to the close, close. We're going to reconvene tomorrow. Registration and breakfast is 08:30 to 09:00, and then session 5 begins at 09:00. So, have a good cocktail. Have a good evening.