



EUROPEAN TRADE FINANCE

SPRING 2025

FRANCOIS *ET AL* EXAMINE
NON-TRADE OBJECTIVES
IN TRADE AGREEMENTS
AND THE EFFECTS ON
DEVELOPING COUNTRIES

GLOBALISATION RECEDES,
CONFLICTS MULTIPLY.
SUZANNE BERGER REFLECTS
ON EVENTS UNDERMINING
GLOBALISATION

MARIUS FABER, GLEB
KOZLIAKOV AND DALIA
MARIN FIND THAT THE
OPENNESS OF THE WORLD
ECONOMY HAS STAGNATED

A EUROPEAN PERSPECTIVE ON TRADE FINANCE

Foreword

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Welcome to the Spring edition of ETF, a *World Commerce Review* supplement. This publication has been prepared in response to readership demand for an overview of trade finance from a European perspective.

In these turbulent and unique times issues such as geopolitical tensions, macroeconomic volatility, trade digitalisation, sustainability and shifting supply chains will be examined in forthcoming editions, with the most respected authors providing the reader with the most comprehensive information available.

Our brief is to provide all the data necessary for the readership to make their own informed decisions. All editorials are independent, and content is unaffected by advertising or other commercial considerations. Authors are not endorsing any commercial or other content within the publication. ■

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Globalisation recedes, conflicts multiply

Suzanne Berger considers the lessons learned from COVID-19 and how heightened war risks have added to the backlash against domestic manufacturing losses, undermining globalisation

In 1914, globalisation ended in one week – between 31 July when the London Stock Exchange closed, and 4 August when the British government declared war on Germany. International trade and capital flows subsequently collapsed – not only for the duration of the war but for more than six decades. Only in late 1970s did the level of crossborder flows of capital and trade return to the 1913 levels.

In 1914, however, after a half century of globalisation, people's views on how damaging the changes would be – even how damaging the war was likely to be – were quite optimistic, and wrong. Even John Maynard Keynes, for example, still claimed: *“War absorbs current savings and current income; it consumes and depletes our stock of consumable goods. But only to a very slight extent indeed does it destroy or diminish the world's accumulated improvements”* (Keynes, 1914).

Today, the costs and dangers that the end of globalisation is likely to bring are again greatly underestimated. There isn't even agreement on whether globalisation is over. Is deglobalisation happening? Or is there something like half-globalisation, with trade in goods and foreign direct investment falling but trade in services rising?

Or is reglobalisation being organised in regions? Goods from China are still arriving in US markets, though they now arrive after long detours via Vietnam and Mexico. And these detours mean, of course, that they are more expensive.

For a political scientist, a simple definition of globalisation is the most relevant for understanding the current predicament. Globalisation is a state of the world economy in which strong competitive pressures force firms to behave as if there were a single world market. In short, it's a world in which firms above all else seek to lower costs and prices.

In the past, distance and time were the main factors that blocked the emergence of a single world market. The border-level barriers that states raised in the form of tariffs to tax crossborder flows certainly played a role, but 'natural' barriers such as distance did much of the work.

Today, we are moving in a very different direction from the past forty years. States around the globe are raising the political barriers that surround their territories

Think of the huge flows of capital from France to Russia at the end of the nineteenth century (Crisp, 1976), but the absence of any significant flows of goods from low-cost labour working in French-owned factories in Russia back into France. Few manufactured goods made the trip across great distances.

The new technologies of the 1980s and 1990s eliminated barriers of distance and time that had hindered the emergence of a single world market. Digitisation, container shipping, new financial instruments – these helped erase those obstacles. Once it was possible to send a digital file from chip designers in California to a chip fab in Taiwan there was no longer a need to co-locate the chip designer and the engineer making the mask.

The emergence of large new semi-skilled, low-cost labour markets in Asia made offshoring feasible. For the past thirty years, firms have in fact behaved as if they were competing in a single world market. The advent of digital technologies in the mid-1990s allowed them to outsource and offshore just about everything. And financial markets reinforced the message by privileging those firms that were ‘pure-play investments’. Firms that had outsourced and offshored everything except their ‘core competence’, and got rid of factories and workers, did best on Wall Street.

Barriers going up

Today, we are moving in a very different direction from the past forty years. States around the globe are raising the political barriers that surround their territories¹. It’s true that the overall level of trade has been fairly stable since peaking in 2008. That is why people disagree about whether what’s happening is deglobalisation or reglobalisation or new globalisation.

Those who disagree about the reversal of globalisation tend to point out that Apple is still in China, as is Tesla, or that what leaves China gets sent to Vietnam or Mexico. But uncertainty is the greatest pressure on firms today as they consider markets and location.

This uncertainty is not only about what can be sold to, or exported from, an increasingly hostile China. It's uncertainty even about what comes and goes from allies. Consider the restrictions in the US Inflation Reduction Act on green production subsidies. Or the refusal to allow Nippon Steel to buy US Steel² – even though Nippon Steel is a company from the US's principal Pacific ally. For American firms the greatest uncertainties and the roughest rides are yet to come under the second term of President Trump – The Mighty Disrupter.

But it's worth noting that none of the border-level barriers erected during Trump's first administration were dismantled during the Biden administration. On the contrary: during the Biden presidency, in then-US National Security Advisor Jake Sullivan's 'high fence, small yard' approach, the 'small yard' kept expanding and the 'big fence' kept rising. So, waiting it out is not a rational strategy. This is not a situation that is likely to reverse four years from now.

Three destructive forces

Three big changes have been at work to destroy globalisation: first, reactions to job losses arising from imports; second, the lessons people drew from COVID-19; third, war: war in Ukraine and the threat of war with China.

On the first point, globalisation was great for much of the world, with extreme poverty levels falling from 42 percent in 1981 to 9 percent in 2018 (Aiyar, 2024). But globalisation was not great for US and other liberal democracies. American blue-collar workers lost 6 million jobs because of imports, and parts of the country – Youngstown, Ohio; Detroit, Michigan; parts of Wisconsin – that were basically single-industry towns became wastelands. The same phenomena fed into Brexit and other developments.

COVID-19, meanwhile, taught the public that there are severe dangers in a production system based on just-in-time production, zero inventory and extended supply chains. The problem was not just the length of supply chains, but

the basic firm structure that had emerged in the US because of globalization. Forty years ago, the greatest American companies were all vertically-integrated firms: IBM, Motorola, Dupont, Texas Instruments, GE. Not one of these firms remains structured today as it was then.

Under pressure from financial markets, these companies all broke apart into 'core competence' firms, and outsourced and off-shored everything they could. These companies became highly dependent on suppliers. And COVID-19 highlighted that dependence.

Companies were largely inspired by 'lean manufacturing' mantras: eliminate waste, eliminate inventory, Six Sigma (a process improvement methodology). This production paradigm – inspired by the Toyota model³ – emphasises optimisation of current practices and tends to discourage innovation. In fact, introducing innovation and experimentation on a factory floor is costly and disruptive.

The COVID-19 experience dealt a serious blow to the lean-manufacturing paradigm. It led to a higher valuation of resilience. But it also highlighted the lack of experimentation and innovation in manufacturing. The manufacturers that survived after the waves of offshoring had lost 6 million jobs. They are wary of innovation and they are risk-averse. The manufacturing ecosystem has been thinned out, drained, depleted.

Shortly before COVID-19, I visited an Ohio manufacturer with about 300 workers. I asked him what he looks for when hiring. He said: someone who'll come on time and stay. I asked how much he was paying: \$13/hour. Did he ever think about hiring people coming out of community colleges who've taken classes in robotics and 3D printing. *"No: I want people who can work on the machines I have."*

I visited his factory floor and saw 1940s Davenport milling machines his grandfather bought alongside a few new CNC (computer numerical control) machines. The general picture in manufacturing is of a few new great companies such as Tesla and Rivian, while the vast majority of suppliers remain stuck in a low-tech, low-skills, low-productivity, low-wage trap.

This matters all the more because as war with China comes to seem possible – the third major factor in the receding of globalisation – American policymakers, whether Republicans or Democrats, will be raising even more border-level barriers.

The US' difficulty in supplying arms to Ukraine since 2022 is an ominous sign of how far US defence manufacturing has declined over the past thirty years. In the defence industry, there are a few great companies at the top: Raytheon, Lockheed Martin.

There are some new high-tech Silicon Valley defence manufacturers such as Palantir and Anduril, which are still in their infancy. And then there are the myriad suppliers that are small and medium-sized firms employing fewer than 500 workers. Of the sample of small and medium manufacturers we interviewed in Ohio, roughly 40 percent had had at least one defence contract in the previous ten years.

So, the hollowed-out manufacturing ecosystem that I have described is the defence production base. Given the predictions about the likelihood of war, it can be safely predicted that the barriers around the American economy will only rise in the next years.

I believe globalisation will recede as uncertainties undermine all dealings between nations. In the past, the US has been an 'indispensable' partner in sustaining international order and cooperation. Now, Europe must learn to live

without this partner. Even further: I fear the consequences as Europe has to deal with such a nation as the US is becoming. ■

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Endnotes

1. Pinelopi Koujianou Goldberg, *'Are Tariffs Worth It?'* 20 November 2024, Project Syndicate.
2. See Nippon Steel press release of 3 January 2025, *'Nippon Steel Corporation and U.S. Steel Condemn U.S. Government's Unlawful Decision to Block Proposed Acquisition of U.S. Steel - Companies will take all appropriate action to protect their legal rights.'*
3. See [here](#).

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Global challenges and expectations

Andrew Bailey reflects on the role that public institutions have played over the last eighty years. As these institutions continue to face challenges there is a need to reinforce these institutions and their governance in terms of accountability

I am going to interpret my theme quite broadly. That said, let me start with a quote from Keynes at Bretton Woods – on the importance of monetary stability as a prerequisite for reconstructing the world economy (with thanks to Martin Daunton for using it in his recent book on *World Economic Government*):

“Without currency agreements you have no firm ground on which to discuss tariffs. In the same way plans for diminishing the fluctuation of international prices have no domestic meaning to the countries concerned until we have some firm ground in the value of money... It is very difficult while you have monetary chaos to have order of any kind in other directions.”

The focus on monetary frameworks and currency arrangements reflected the tension at the time between on the one hand national sovereignty and discretion and on the other hand multilateral frameworks. However, while monetary stability remains the bedrock today, the agenda has of necessity broadened out substantially in terms of economic policy.

These days, global co-operation focuses more on ensuring a well-regulated financial system. That reflects the perennial tension between the national scope of governments and the more global scope of markets. Solving that tension requires multilateral frameworks and institutions.

Another theme concerns the Bretton Woods institutions themselves. We can't be misty eyed about Bretton Woods. On monetary stability, it was a halfway house solution to dealing with the implications of free international convertibility to gold for domestic economic management. It couldn't be implemented in full for some time, and didn't survive for long when it was.

To borrow Dani Rodrik's phrase, Bretton Woods was shallow multilateralism with a small role for the Fund and the World Bank, and it didn't pass the test. Subsequently, global financial integration and its scale has become much more extensive and created its own instability.

By building its surveillance offer and working with members on how to build ex ante resilience, the Fund can be seen as a trusted problem solver which can be turned to in moments of crisis, rather than an institution which calls out where things went wrong and mops up after the crisis occurs

In doing so, this has required a reassessment of multilateralism and the Bretton Woods legacy, and brought the Fund and Bank to centre stage. They have been evolving, in response – but perhaps, so far, not fast or far enough. Understanding the drivers of global financial stability, and acting to preserve them is the new frontier.

But we now live in a world where public institutions are under much more strenuous challenge to their legitimacy. The challenge now is to reinforce the institutions and their governance in terms of accountability and thus legitimacy.

Otherwise, a democratic deficit exists which damages effectiveness. Can the institutions support the necessary multilateralism – to go back to the tension with national sovereignty? Can they embody the multilateral authority to speak truth to national power?

There is nothing new about this challenge. But it has taken on greater force in a world of so-called populism which embodies at least three pertinent features: first a greater emphasis on domestic production and the distribution of wealth relative to stability and the benefits of openness; second, a tendency to attribute unfavourable conditions to outside forces in a context of low trust societies; and third, with this decline in trust institutions are viewed as distant, unresponsive and acting for the benefit of powerful and uncontrollable interests.

It is a mistake to dismiss these features as not a reflection of the real world as we see it. Other people do see it that way. The challenge for international organisations is to be seen as part of the solution, not the problem.

I'm going to use the rest of my time to try to put these issues into the current context and draw out some priorities to go forward.

The theme of balancing national interests with international co-operation runs through the last 80 years. How do we preserve and develop the view that international co-operation is the best way to protect national interests? The argument was won at Bretton Woods because of the terrible context of global war.

The issue is again with us today. Moreover, the whole issue of the benefits of international co-operation has become more pressing as markets – in goods and finance – become larger and more global, with a sense of diminished national control and greater exposure and susceptibility to shocks.

The question then becomes, how can multilateral institutions build influence in this context, to put themselves in a position to influence the balance of national interests and international co-operation? What is their comparative advantage? I think the answer lies in putting more emphasis on the surveillance role, and the effectiveness of the messaging of that work.

In a more shock prone world, with the international monetary and financial system potentially being profoundly altered by a series of major transformative trends, the returns on effective surveillance will be much greater. Forewarned is forearmed. Prevention is more effective than cure. The Fund's voice remains a powerful one, but unless its surveillance activities keep pace with a changing world, risks and vulnerabilities could be missed. None of us will be forgiven for missing the next crisis.

In particular, to return to where I started, financial surveillance needs to be a particularly high priority for us all, including the IMF. There remain, and will do so, financial vulnerabilities to be fixed. We are seeing major changes in the form of financial intermediation as the role of non-banks grows. But – and just as Hyman Minsky predicted – there is a growing resistance to regulation and rule-making as memories of the Global Financial Crisis recede.

We have to continue to win our arguments, and it is becoming more challenging. Bilateral and multilateral surveillance are an important tool here. We will have to lay out the risks and vulnerabilities with more prominence and thereby directly challenge the naysayers.

Now, let me be clear, the Fund's surveillance analysis is very high quality – the WEOs and GFSRs are excellent, and they are just the tip of the iceberg. But I think the work can and should evolve in a number of areas in response to a more shock-prone uncertain and complex global economic and financial system, with a focus on resilience building, spillovers, more systemic and macro-prudential assessment, and greater financial market surveillance.

Let me return to the main theme of balancing national interests and international co-operation. I want to draw out an element of the issue of national interests. It is the saddest and most dangerous. We are seeing the return of destructive nationalism, most obviously in Russia. I was an economic historian, not a central banker, when I was at Queens'.

Of course, history doesn't end, and we are being reminded of that. Bretton Woods was an important part of the response to the most destructive and tragic nationalism of modern times. At Queens' I was taught history by Richard Overy, who has written extensively on modern warfare. Recently, Richard has written a book called *Why War?* which seeks to understand the human propensity for conflict, no small task. He quotes the father of new realist political science, Kenneth Waltz, who wrote: *"Theorists explain what historians know: war is normal."*

Richard sets out four broad motives for war: resources, belief, power and security. I mention this because as well as powerful and more detailed surveillance, for multilateralism to have impact it has to speak to the big issues. A criticism of the early history of the Fund and Bank is that they were often invisible. To be fair, Bretton Woods was not designed with the Cold War in mind, so the world moved on very quickly.

But, since resources, belief, power and security cannot be separated from economics, with the rising threat of destructive nationalism we have to go back and determine what role the multilateral institutions should play to re-establish – and explain the value of – economic co-operation.

Another dimension to the issue of balancing national interests and international co-operation is the question of how many poles are there in the system? Bretton Woods is often portrayed as the transfer of authority from one single pole (Britain) to another (the US), the creation of a new era. It also gets portrayed likewise as the wrestle between Keynes and Harry White.

At the time, the importance of enabling this transfer of poles was cast in terms of avoiding going forwards the dangerous nationalism of the 1930s. Very quickly, the issue became the different one of whether collective international co-operation could embrace capitalist and communist systems, it couldn't.

Over time, the issue moved on to the tension between advanced countries and those in the developing and emerging ones, and it is this tension that has been a persistent feature of the Fund and the Bank in their more mature and influential era since the 1970s. Even if issues around voting shares remain to be resolved, the Fund has been able to evolve its toolkit in order to lend more money to vulnerable countries.

Today, the issue of whether/how much the world is multipolar is complicated by the question of whether it is possible to frame effective international co-operation in a world where the two largest economies, the US and China, have such different philosophical underpinnings. This strikes me as more fundamental than the traditional Bretton Woods issue of how to design a system which creates appropriate discipline for creditor and debtor nations, though I don't want to deny the importance of that issue.

The conclusion I draw here in terms of making multilateralism work is that we have to do all we can to make it work, and that this should be an acknowledged objective. Not least because many of the challenges we face cannot be fixed within national borders. We may end up with shallow multilateralism, and that may or may not be a helpful outcome. What we can't do is give up in the face of a more difficult environment.

This brings me, finally, back to the point about speaking truth to national power. Clearly the context matters a lot. Global co-operation has a greater chance of success when economic benefits are widely shared, as are the risks perceived to be – ie. we are all in this together, and know that we are so – and we exist in conditions of broad economic stability. We can hope, but hope is not a winning strategy. A world where there is greater actual and perceived risk of unequal outcomes and instability is one where collective action is harder and less likely to succeed.

At least up to a point, because I think the lesson of Bretton Woods as it played out is that the influence of collective action is non-linear. In other words, when the situation gets really bad, take the financial crisis, the call for international collective action and the willingness to submit to it, grows almost exponentially. It takes a good crisis as they say. But this is not a basis on which to run good policy.

And this is the risk we face today – the vulnerabilities are growing, and the necessary solutions are global, but they are not sufficiently great to tip into crisis multilateralism. And we don't want that to happen.

As so we come back to the issue of how to influence by speaking truth to national power successfully, in a world of hostility to institutions. I will end with one thought on this, which I recognise may come across as too pious by half. We have to speak with humility and humanity. We don't know all the answers, and that is not a failing. The world is highly uncertain – and shock prone – and that is reality.

By building its surveillance offer and working with members on how to build ex ante resilience, the Fund can be seen as a trusted problem solver which can be turned to in moments of crisis, rather than an institution which calls out where things went wrong and mops up after the crisis occurs. We serve the people as a whole at all times. I say this because when we look back at the last 80 years, it has not always been viewed this way by society as a whole. ■

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Europe's challenge and opportunity

Donald Trump has launched an all-out attack on the rules-based international order. Olivier Blanchard and Jean Pisani-Ferry argue that the EU should take the lead in convening alliances of countries to counteract threats to the global order

President Donald Trump has launched an all-out attack on the rules-based international order, which most governments regard as the bedrock of peace and prosperity¹. Many governments are appalled by his initiatives². They still believe in respecting trade rules, in limiting tax competition and in fighting global warming. The European Union, which is governed by such rules, has the potential to organise an effective collective response. To do so, however, it must overcome two obstacles – its size and its internal divisions.

First, the EU is often a secondary player on the world stage, accounting for just 6 percent of global greenhouse gases emissions and just 11 percent of global equity market capitalisation. On such issues, Europe cannot lead unless it builds a coalition of like-minded partners.

Second, the diversity of policy views within the EU, especially in a context of strong foreign influence on countries such as Hungary and Slovakia, hampers agreement on common positions and can result in stalemates.

To overcome these shortcomings, EU countries ready to go ahead should work with non-EU countries to form international partnerships, or ‘coalitions of the willing’. In fields such as trade policy that belong to the EU’s core competence, this implies that EU countries must abide by majority decisions.

In other fields, flexibility can be found, giving rise to two-speed integration, as is the case for the Schengen area, the free-travel area that does not include all EU members, but does include several non-EU countries.

In what follows, we explore how this could work for three issues: climate action, trade and taxation of multinational corporations. (To be clear: building coalitions is only one of the issues facing Europe. It must also address structural weaknesses, which long precede the Trump presidency, as well as determine its collective response to potential US tariffs. We leave those issues aside here³).

A climate coalition

Start with efforts to combat climate change, for which the EU sets policy targets through a complex process involving the country leaders, ministerial councils and the European Parliament. Major decisions are taken based on European Commission proposals which, after they have been broadly endorsed by the leaders, are approved both by a qualified majority of member countries and a majority of votes in the European Parliament.

The question for Europe is whether it has the clout to take the initiative and bring together a group of countries willing to salvage what is left of trade multilateralism and define an agenda for its future

This process, known as 'co-decision', results in EU decisions that are binding on the member countries. Accordingly, the EU participates in the international negotiations on their behalf.

Because this governance structure formally ensures European unity, the EU can form alliances with third countries and exert significantly more global influence than it would otherwise enjoy. Especially, the fact that member countries are legally committed to meeting agreed targets and can be fined for missing them gives leverage to the EU level.

Building on this architecture and on its 2040 emissions reduction targets, the EU could thus negotiate climate partnership agreements with third countries and build a coalition of the willing that would help keep the momentum toward net zero despite the US withdrawal from the Paris Agreement.

Potential partners in this coalition include major advanced economies such as Japan, emerging countries such as Brazil and possibly India, but it should involve first and foremost China. Despite being the world's top emitter of greenhouse gases, China has a major stake in the building of a green economy. It is not yet clear when its own emissions will peak, but at any rate it should happen before 2030.

Moreover, China's resounding success in manufacturing green equipment implies the country has a vested interest in the pursuit of the transition to net zero.

In doing so, the EU should find ways to overcome the curse of such coalitions: as pointed out by William Nordhaus (2015), the larger coalitions are, the stronger is the incentive to leave them and free-ride on the discipline they provide. A straightforward way to avoid this is the use of carbon border taxes on imports from non-members, but this is only partially effective.

The solution advocated by Nordhaus is to form climate clubs whose members would levy a tariff on imports from non-participating countries. The problem with this otherwise effective solution is that a tariff based on climate policy – in effect, a penalty – is not legally feasible under currently prevailing World Trade Organization rules. Given President Trump's misbehaviour, however, bending these rules should not be excluded.

Maintaining trade rules

The next case is international trade. As the US shifts toward protectionism, the EU has a major card to play. Building on existing trade agreements, it can create yet another coalition of the willing to help reform the global trade architecture.

EU trade policy is governed by exclusive EU competence, which means that the European Commission negotiates trade agreements on behalf of all EU members, based on negotiating directives issued by trade ministers meeting in the Council of the EU. Once an agreement has been reached, it must be approved by the Council (by qualified majority) and the European Parliament (by simple majority).

This decision-making process ensures that, as illustrated by France's inability to block the EU-Mercosur trade deal⁴, a minority of holdout countries cannot prevent the conclusion of a trade agreement approved by the majority. This governing arrangement provides overall EU effectiveness while preserving the rights of member countries.

It has proved instrumental in making Europe a global trade player. In the heyday of multilateralism the EU was, together with the US, Japan and India, part of the informal steering group for global trade negotiations.

The question for Europe is whether it has the clout to take the initiative and bring together a group of countries willing to salvage what is left of trade multilateralism and define an agenda for its future.

This will be demanding, as the existing apparatus of rules amalgamates fundamental principles that must be upheld and provisions that have become ill-suited to a much more heterogeneous global economy. The agenda should thus help sort out the indispensable from the secondary.

A coalition of the willing could comprise the United Kingdom, Japan, Korea, Australia, India, Canada, Mexico and members of the Mercosur and ASEAN blocs. It would thus build on existing regional trade agreements. We suggest that the EU could convene a dedicated summit to discuss issues and define an agenda.

Again, a major negotiation with China, recognising the relevance of security considerations, the desire to keep alive certain industries – such as the European automobile industry – and the rules determining when the use of tariffs is justified or not, would be a signal that the EU is not following the US blindly and that much of the world wants to continue to play by reasonable rules.

Tax deal teetering

Finally, take the taxation of multinational companies. After a long discussion process, more than 140 countries and jurisdictions, in effect an already existing coalition of the willing, agreed in October 2021 on a minimum effective tax rate of 15 percent on the profits of multinational firms.

More importantly, they agreed on the taxation of extraterritorial profits in the following way. To the extent that the firm did not pay 15 percent in one country, implementing countries could collectively tax the difference between 15 percent of the profit and the tax actually paid in that country, and then pro rate the distribution of the proceeds according to the share of production in each country (more specifically, a mix of the share of capital and the share of employment in each country).

The great advantage of this system is that, in contrast to the race to the bottom in which countries cut the tax rate to attract firms, it is self-enforcing. If a jurisdiction does not collect the 15 percent tax, it will be collected by other countries. Better then for jurisdictions to collect it themselves. The race to the bottom becomes a race to the standard.

To come into being, the agreement must be voted on and approved by national parliaments. So far, more than 40 countries have done so, and many are scheduled to soon do the same. The US departure, announced in January⁵, is largely symbolic, as Congress has not voted yet to approve the agreement. The absence of the US does not make the agreement irrelevant.

Other countries could build this other 'coalition of the willing', although they must expect strong US pushback on the issue of taxation of extraterritorial profits. One possibility, to avoid an open conflict with the United States, is to exclude US profits from global profits for purposes of the computation of extra-territorial profits. This would weaken but not destroy the existing agreement.

The world of the future, at least of the near future, is a world in which the major multilateral institutions may be largely paralysed. This has long been the case for the UN, with the veto power of the five permanent members of the Security Council. It has been the case for some time at the WTO, with the unanimity rules and the blocking of the Appellate Body (Grieger, 2024).

It may well be the case for the World Health Organisation, perhaps even for the World Bank and the International Monetary Fund. In that world, progress and cooperation will have to take the form of coalitions of the willing. We have explored three cases and discussed how Europe, hopefully joined by many other countries, could lead by example and thereby help keep multilateralism alive.

Should Europe follow this route and be joined by others, there will be many problems to solve, from the response to heterogeneity within large coalitions, to enforcement mechanisms and cross-issues linkages. We have just emphasised the positive role the EU can play and outlined a path forward.

We are convinced that the rest of the world should not respond only bilaterally to the Trump administration's initiatives. US leadership was instrumental in building a rules-based system and addressing global problems.

As the current administration openly repudiates the global responsibilities taken on by the United States, the world, and especially Europe, cannot afford to stand by. ■

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Endnotes

1. See the [opening remarks](#) by State Secretary-designate Marco Rubio on the occasion of his Senate confirmation hearing, 15 January 2025.
2. The Economist, [‘Donald Trump poses a grave threat to others’ sovereignty and freedom, says Chrystia Freeland’](#), 4 February 2025.
3. But see Grabbe and Zettelmeyer (2025) and García Bercero et al (2024).
4. Sophia Khatsenkova, [‘Explainer: Can France block the Mercosur trade agreement?’](#) Euronews, 2 December 2024.
5. The White House, [‘The Organization for Economic Co-operation and Development \(OECD\) Global Tax Deal \(Global Tax Deal\)’](#), 20 January 2025.

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Europe has strengths it can build on

Remaining competitive is fundamental for Europe's future. Christine Lagarde and Ursula von der Leyen argue that Europe needs faster economic growth and higher productivity to protect the quality of life for Europeans – from their jobs and incomes to their security and welfare

Europe must act. Our competitiveness is at risk. While a global revolution in artificial intelligence unfolds, the EU could find itself on the sidelines. Our traditional manufacturing champions are losing global market share. Geopolitical shifts are turning dependencies into vulnerabilities and burdening our companies with high energy prices.

Europe must and will find its place in this new world. The prospects for our continent are better than they might seem. The EU has strengths on which it can build – and it has a plan to fix its weaknesses.

Europe has strong economic fundamentals. We have institutions governed by the rule of law, and an independent central bank committed to price stability. Inflation is returning to the ECB's 2% target, allowing borrowing costs to fall. Public debts and deficits are lower than in other major economies.

Europe also has the necessary ingredients to catch up in the technological race. The EU turns out almost as many STEM graduates per million inhabitants as the United States. That talent produces a lot of ideas: Europe's share in global patent grants is close to that of the United States. And we have the money to finance them, with households saving around €1.3 trillion every year.

We have an opportunity to bring down energy prices in a lasting way. The shift to secure, low-cost clean energy sources is on track: by 2030, over 40% of our energy consumption will come from renewables. And we are well placed to become a global hub for clean tech innovation, especially as some countries strike out in a different direction.

While others must cut their dependencies by building up domestic capacity, the EU can choose from a broader set of options owing to its unique position in global trade. We are the top trading partner for over 70 nations and we

continue to strike new agreements, most recently with 400 million Latin Americans. And in a deal with the EU, what you see is what you get.

But these strengths are meaningless if Europe is hamstrung by its weaknesses. We need profound change on three fronts.

The EU will strive not only to lower the barriers facing companies, but also to ensure that they have the resources they need to thrive here – be it finance, compute, energy or skills

First, we need to make the EU an easier place for innovative companies to grow. Only one-third of university patents in Europe are commercialised, while companies that try to scale up in our Single Market face many internal barriers. Despite our savings, entrepreneurs lack access to risk capital, because capital markets are still too fragmented.

Second, we need to make Europe a better place to invest. Two out of three EU companies say that regulation is a key obstacle to investment, while just 14% of them are using AI. Firms still face long permitting procedures, onerous reporting requirements and diverging enforcement of digital rules.

Third, we need to make doing business in Europe cheaper, especially in terms of energy costs. While the shift to renewables creates good jobs and strengthens energy security and independence, it also comes with greater intermittency and greater energy losses through curtailment. For the benefits of decarbonisation to show up in companies' bills, we need massive investment in grids and storage and smarter market design.

Europe has got the message. The European Commission has presented its Competitiveness Compass which sets out ambitious proposals to address these shortcomings. From now on, the EU will strive not only to lower the barriers facing companies, but also to ensure that they have the resources they need to thrive here – be it finance, compute, energy or skills.

For example, the Commission will propose a so-called '28th regime' for innovative companies, allowing them to benefit from a single legal framework across the EU for aspects of corporate law, insolvency, labour law and taxation. It will launch a plan for a Savings and Investments Union, which will ensure that innovative companies can find the financial backing they need.

The EU will also give companies access to our world-leading network of supercomputers. This will help develop new advanced technologies and spread AI faster among established champions. The ECB will play its part too by keeping Europe at the forefront of digital payment technologies, including through the digital euro project.

In parallel, the regulatory burden will be lightened by an unprecedented simplification effort, starting next month. This will include a far-reaching simplification of legislation on sustainable finance reporting and due diligence. And energy prices will be brought down through a range of measures to integrate markets, increase contracted energy and reduce taxes.

This is only a snapshot of what lies ahead. Companies and households want to see action – and a wave of actions are coming. We can no longer squander our strengths with self-imposed handicaps. There is too much at stake. We are ready to do whatever is necessary to bring Europe back on track. ■

Christine Lagarde is President of the European Central Bank, and Ursula von der Leyen is President of the European Commission

Non-trade objectives in trade agreements

Trade agreements increasingly include a focus on sustainability goals. Joseph Francois, Bernard Hoekman, Miriam Manchin and Filippo Santi examine the impact of environmental, labour, and civil rights provisions in trade agreements on related outcomes in developing countries

Over the last few decades, trade agreements have increasingly been seen as a potential tool to address environmental and social issues. As climate change intensifies and human rights violations remain persistent in many parts of the world, the question of whether trade deals can be an effective mechanism for attaining sustainability goals is an important one.

This issue is particularly salient in the EU, where the promotion of core values is embedded in its founding treaties. The EU has positioned itself as a leader in incorporating non-trade provisions (NTPs) into trade agreements, but the trend is a general one.

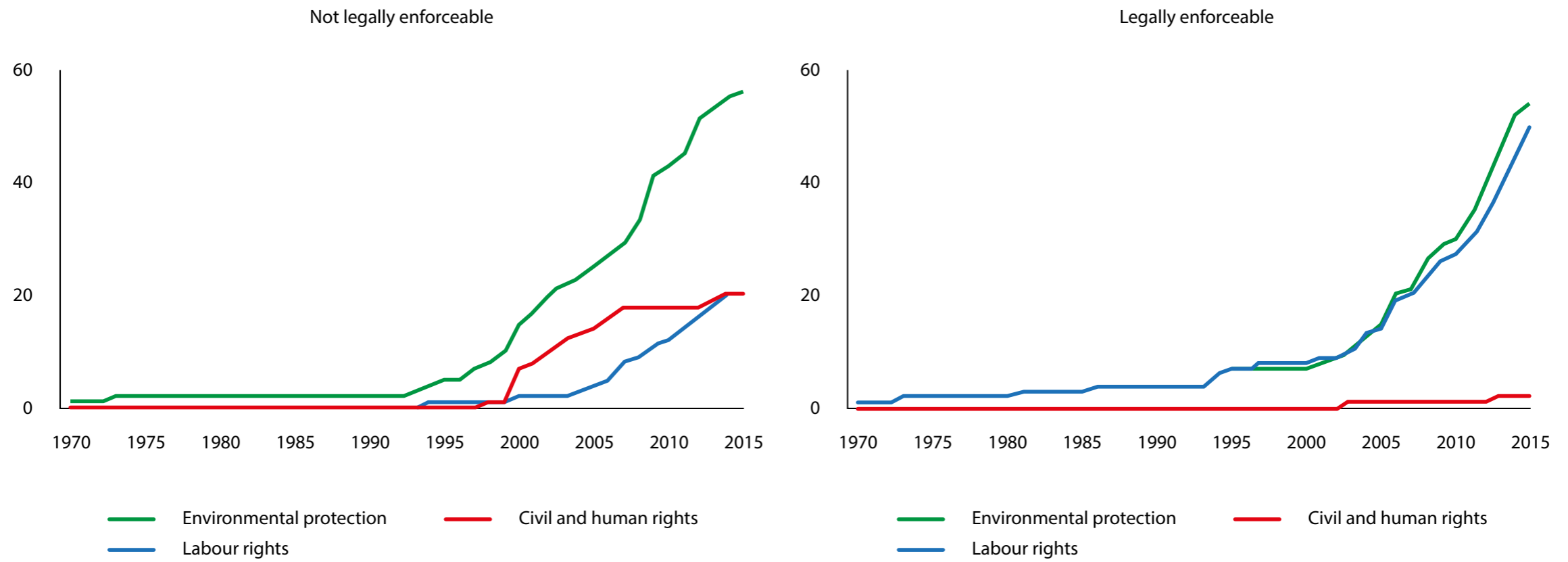
Almost two-thirds of all preferential trade agreements (PTAs) in force include provisions that go beyond traditional trade liberalisation commitments (see Figure 1), addressing objectives as diverse as environmental protection, labour standards, and civil and human rights (Hofmann *et al* 2019).

Existing research has focused primarily on the implications of non-trade provisions for trade (eg. Winters 2023, Hoekman *et al* 2023). Limited attention has been given to their impact on associated non-trade outcomes (Fernandes *et al* 2023). While the motivation for such provisions is to improve standards in developing countries, a key question is whether they are effective in doing so.

In Francois *et al* (2025), we investigate whether non-trade provisions in trade agreements addressing environmental protection, labour market regulation, and civil rights promotion affect the performance of developing countries with respect to related non-trade outcome indicators. The analysis is motivated by – and contributes to – two dimensions of the trade and development policy debate.

Figure 1. Evolution of provisions in preferential trade agreements

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Source: Hofmann et al (2019)

The first debate concerns the design of non-trade provisions in preferential trade agreements, specifically whether provisions should be enforceable through legal action, allowing trade to be used as a sanctioning device. Advocates of enforceable provisions argue that this is necessary for non-trade provisions to be effectively implemented and that soft law or best efforts-type non-trade provisions will not lead to meaningful improvements in desired non-trade outcomes (Bronckers and Gruni 2021).

Almost two-thirds of all preferential trade agreements in force include provisions that go beyond traditional trade liberalisation commitments, addressing objectives as diverse as environmental protection, labour standards, and civil and human rights

In contrast, development professionals often argue in favour of soft law provisions, based on the view that these are more likely to improve outcomes of interest by providing a focal point for dialogue and cooperation between preferential trade agreement signatory governments and engagement with stakeholders (Fiorini *et al* 2019).

The second policy debate concerns the role of development aid to strengthen the capacity of developing countries to implement non-trade provisions and achieve associated sustainable development goals. Many development professionals argue that technical and financial assistance targeting specific non-trade goals is needed to complement non-trade provisions, whether enforceable or not (Berliner *et al* 2015).

We expect non-enforceable non-trade provisions to be conducive to more development assistance, whereas enforceable non-trade provisions may not lead to more aid. Insofar as signatory countries have put in place the associated regulatory regime or legislation (ie. have implemented the provisions), this could obviate the need for assistance.

Moreover, if dispute settlement procedures are regarded as an effective means to ensure compliance, this may lead to less aid allocated to areas covered by enforceable non-trade provisions.

Non-trade provisions do not lead to improvement in most outcome indicators

In Figures 2 and 3 we report estimates of the impact of enforceable and non-enforceable environmental, labour, and civil rights provisions on corresponding outcomes. We use a synthetic difference-in-differences methodology, comparing countries that signed agreements with provisions to those that signed similar agreements without the provisions of interest.

In both figures, a red marker indicates a significant deterioration in the related non-trade outcome, while a green one indicates a significant improvement (with grey colour indicating estimates that are not statistically significant).

Looking at non-enforceable provisions, we only find a significant improvement in one environmental indicator, PM2.5, in the case of the agreements signed with the EU. Nonetheless, the change appears rather small, amounting to only a 5% improvement compared to the sample mean.

Conversely, non-EU agreements are more likely to induce a deterioration in some of the environmental outcomes considered, presumably reflecting the consequences of an increase in economic activity following the entry into force of a preferential trade agreement. We find no evidence of any impact of non-enforceable provisions pertaining to labour market regulation and standards or civil rights in signatory countries.

In the case of enforceable provisions, we do not find any significant relationships, with the exception of a deterioration in one of the labour market variables, workers' representation, in the case of non-EU agreements.

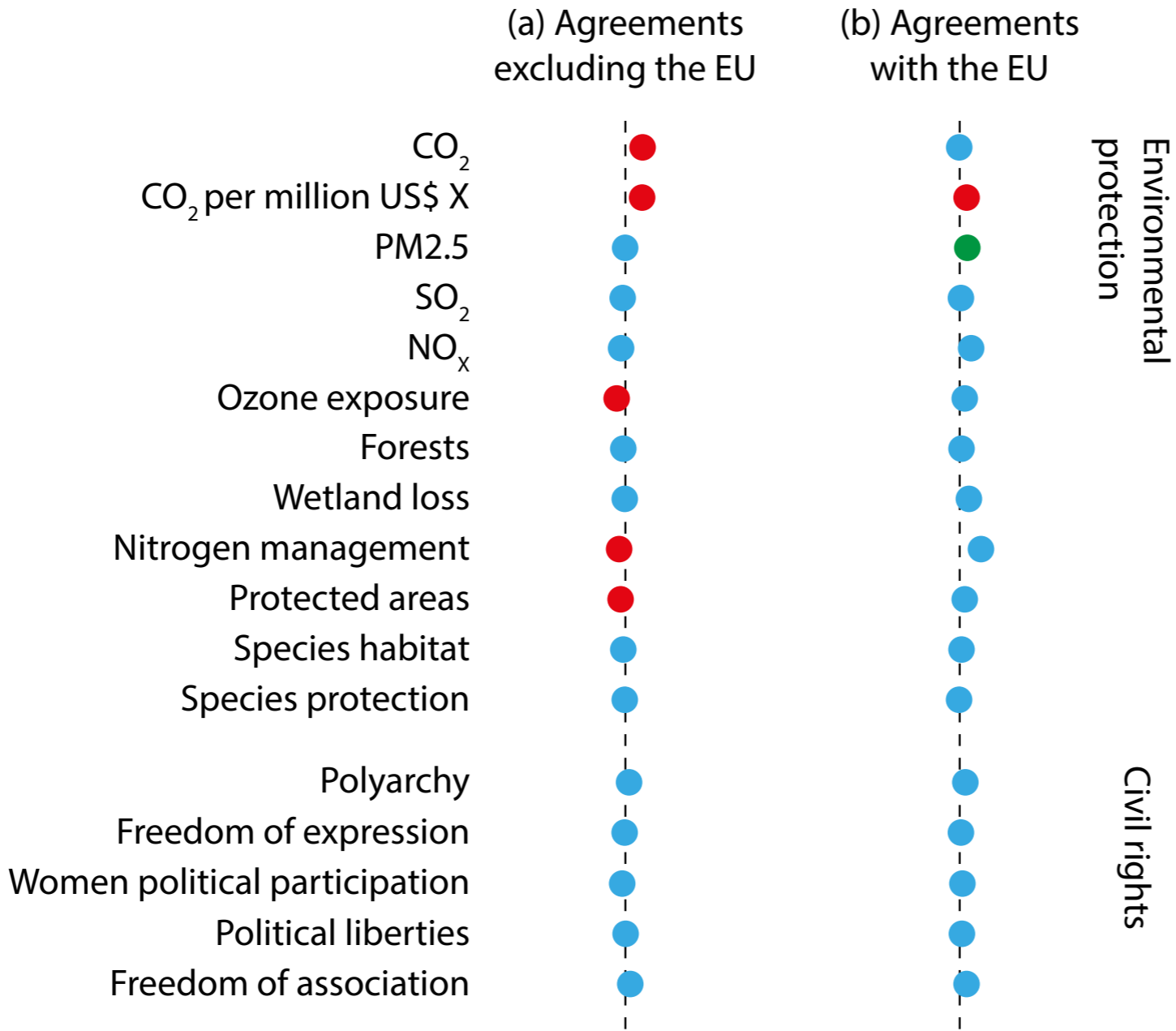
Overall, the results reveal few statistically significant effects, and for almost all outcome variables where significant changes are found, the relationship is negative, with non-enforceable non-trade provisions in non-EU preferential trade agreements associated with a worsening of some environmental outcome indicators. This is especially the case with emissions.

Non-trade provisions may be more effective if flanked by financial support

The second policy debate motivating our analysis concerns the relationship between inclusion of non-trade provisions and the allocation of official development assistance (ODA). We assess whether policy-specific (sectoral)

Figure 2. Non-enforceable provisions vs. no non-trade provisions (standardised average treatment effect)

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ODA varies with non-trade provisions covering the sectors (policy areas) concerned, and whether the overall level of ODA is affected by different types of provisions and their enforceability.

This question is relevant for governments in developing countries that may accord higher priority to policy areas and projects not covered by non-trade provisions and thus seek additional aid to pursue these as part of the negotiation of a deep preferential trade agreement. Successful issue linkage strategies by developing countries might be reflected in increased overall official development assistance allocations.

We find non-enforceable environmental provisions tend to correlate with increases in official development assistance, but only in EU trade agreements. Enforceable provisions show no significant relationship with aid disbursement.

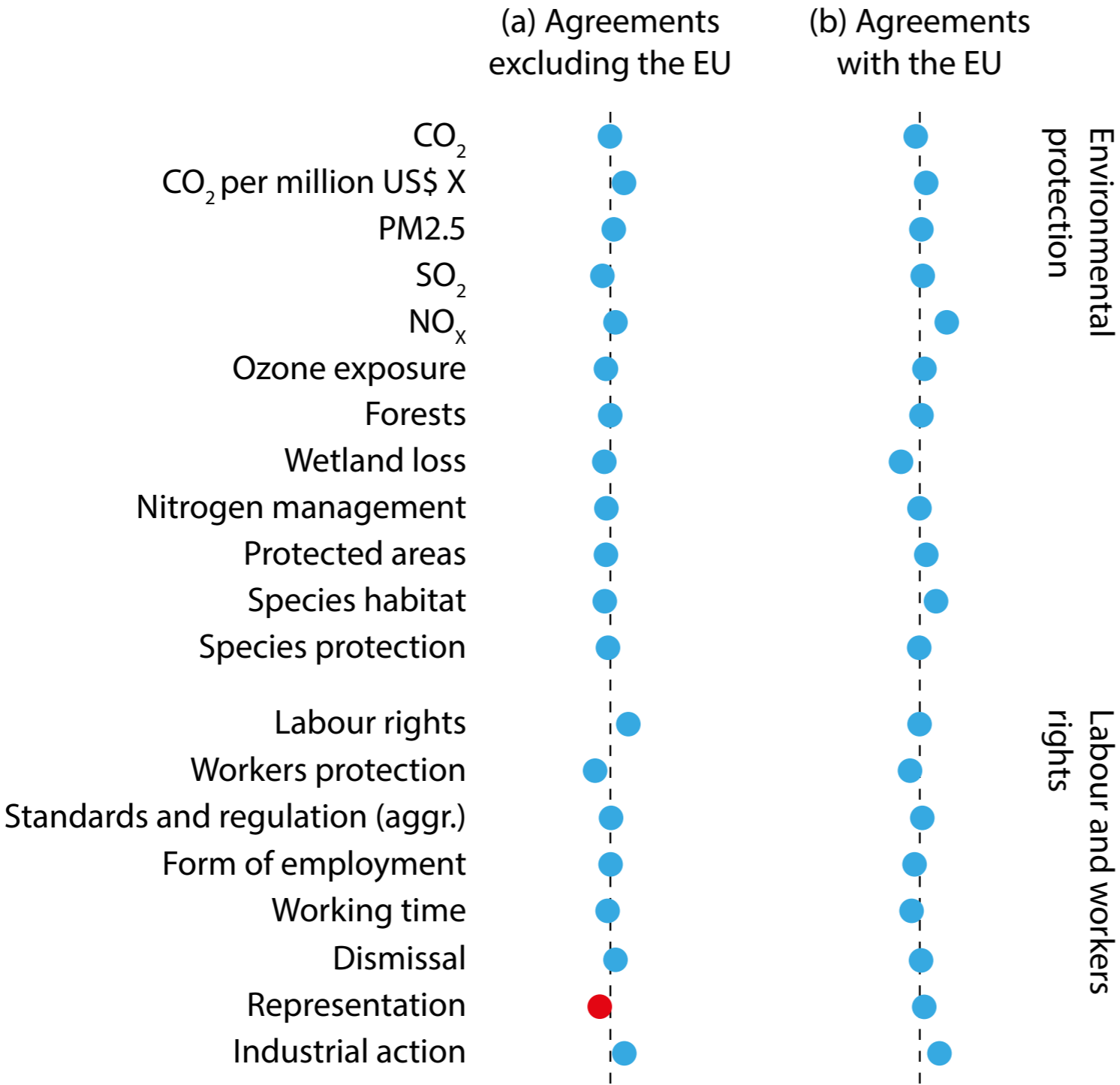
Furthermore, we find a negative association between the acceptance of enforceable non-trade provisions and official development assistance targeting the conditions in the labour market or the promotion of civil rights. This finding suggests different mechanisms may be at work when countries incorporate environmental and social objectives into their trade relationships.

While enforceability – with the implied commitment to implement a non-trade provision – appears to be a substitute for development assistance for non-EU advanced economies, the results suggest official development assistance is a complementary policy instrument for the EU.

Overall, our results suggest that non-trade provisions in trade agreements have little impact on the associated policy outcomes. While some effects are observed for environmental performance indicators, particularly in non-

Figure 3. Legally enforceable provisions vs. no provisions (standardised average treatment effect)

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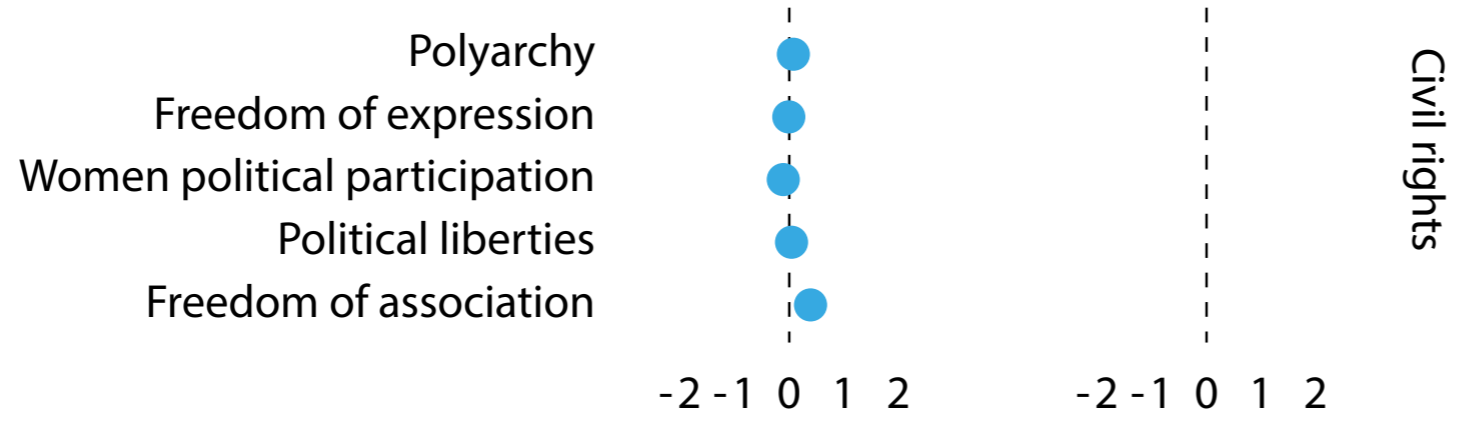
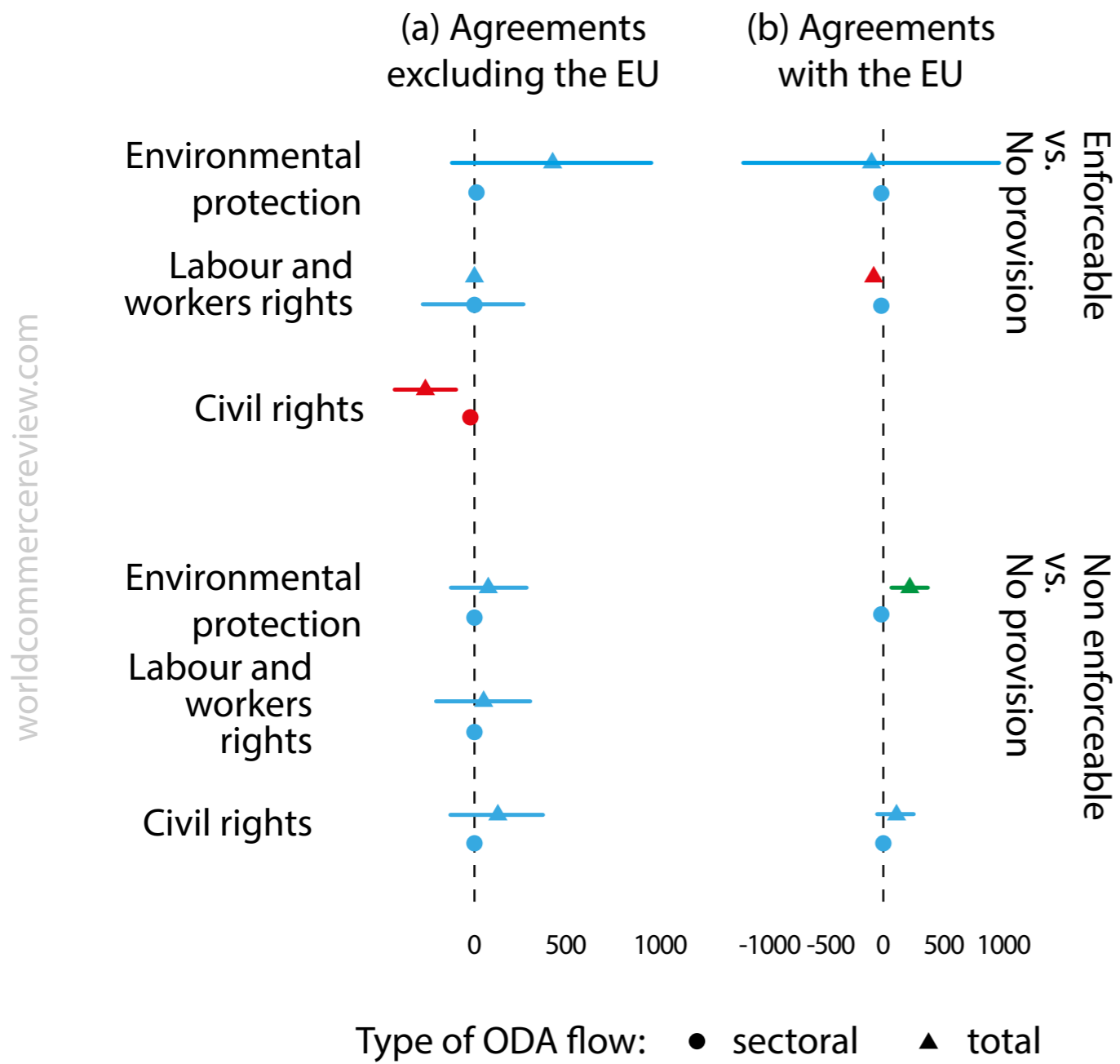


Figure 4. Official development assistance and non-trade provisions in preferential trade agreements



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EU preferential trade agreements, where there is evidence of deteriorating environmental outcomes, no significant effects are found for labour or civil rights provisions.

Interestingly, observed significant relationships mostly involve non-enforceable environmental provisions, with enforceability appearing to prevent the deterioration of the associated non-trade outcome indicators in developing countries. Finally, non-trade provisions are not consistently linked to an increase in development assistance.

While some complementary relationships exist for non-enforceable environmental provisions in EU preferential trade agreements, enforceable labour provisions in EU agreements and civil rights provisions in non-EU agreements actually may substitute for aid, highlighting differing priorities among high-income countries. ■

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How to improve the EU's sustainable finance framework

The EU is nudging corporate behaviour to adopt rules on sustainability. Silvia Merler discusses five adjustments would make the EU sustainable finance framework more effective at delivering the desired alignment of incentives

Executive summary

The European Union has sought to steer corporate behaviour to support its climate goals by adopting a large body of rules on sustainable investment, sustainability disclosures and sustainability labelling of financial products, underpinned by a taxonomy of activities considered sustainable. It is unclear, however, if this effort has had significant results.

Examination of financial market data and metrics of investment flows towards green and sustainable investment shows up several weaknesses – both contingent and structural – in the EU sustainable finance framework, which could limit its effectiveness in aligning capital flows with climate objectives.

The Sustainable Finance Disclosure Regulation (SFDR) is aimed at making the sustainability content of financial products more transparent but rests on a concept of ‘sustainable investment’ that is too broad and loosely defined.

Meanwhile, the EU Taxonomy Regulation has not yet become established as the reference framework for corporate bond issuance or sustainable investing. The EU also lacks a coherent framework for transition finance – or investment that is not yet classified as sustainable but that represents progress to greater sustainability – despite this being the market segment to which the largest volumes of investment will need to flow in the short to medium run.

Five adjustments would make the EU sustainable finance framework more effective at delivering the desired alignment of incentives. First, the taxonomy framework should be completed and clarified. Second, the SFDR definition of sustainable investment should be toughened. Third, the neutrality of the framework across capital market instruments, in particular debt versus equity, should be ensured. Fourth, a dedicated framework for

transition finance should be developed. Finally, formal sustainable and transition labels for financial products should be introduced.

This approach would make the sustainable finance framework more easily applicable to all kind of companies and all types of capital market instruments, regardless of whether they limit the use of proceeds, and it would be naturally extendable into a framework for transition finance and into a transparent sustainability labelling regime for financial products.

Over the past decade, the EU has set ambitious climate goals, which will require massive investment. Sustainable finance must play a major role and much regulatory activity has gone into building a framework to reorient capital flows in line with climate goals

1 A cover-all regulatory umbrella

Over the past seven years, sustainable finance has been the focus of a huge legislative effort in the European Union. The underlying premise has been to put the allocative function of financial markets at the service of climate objectives, including the EU's goal of a 55 percent greenhouse gas emissions reduction by 2030, compared to 1990.

Among a broad series of sustainable finance strategies and plans, including the 'Strategy for Financing the Transition to a Sustainable Economy' (Figure 1 and European Commission, 2021), the European Commission proposed regulations aimed both at defining what is meant by 'sustainability' and at prescribing sustainability-related disclosures and actions to corporates and financial market participants.

In this *Policy Brief*, we focus on two of the most consequential of these rules, the Taxonomy Regulation (Regulation (EU) 2020/852) and the Sustainable Finance Disclosure Regulation (Regulation (EU) 2019/2088) and ask whether they have been successful so far in aligning financial incentives with the EU's climate policy priorities.

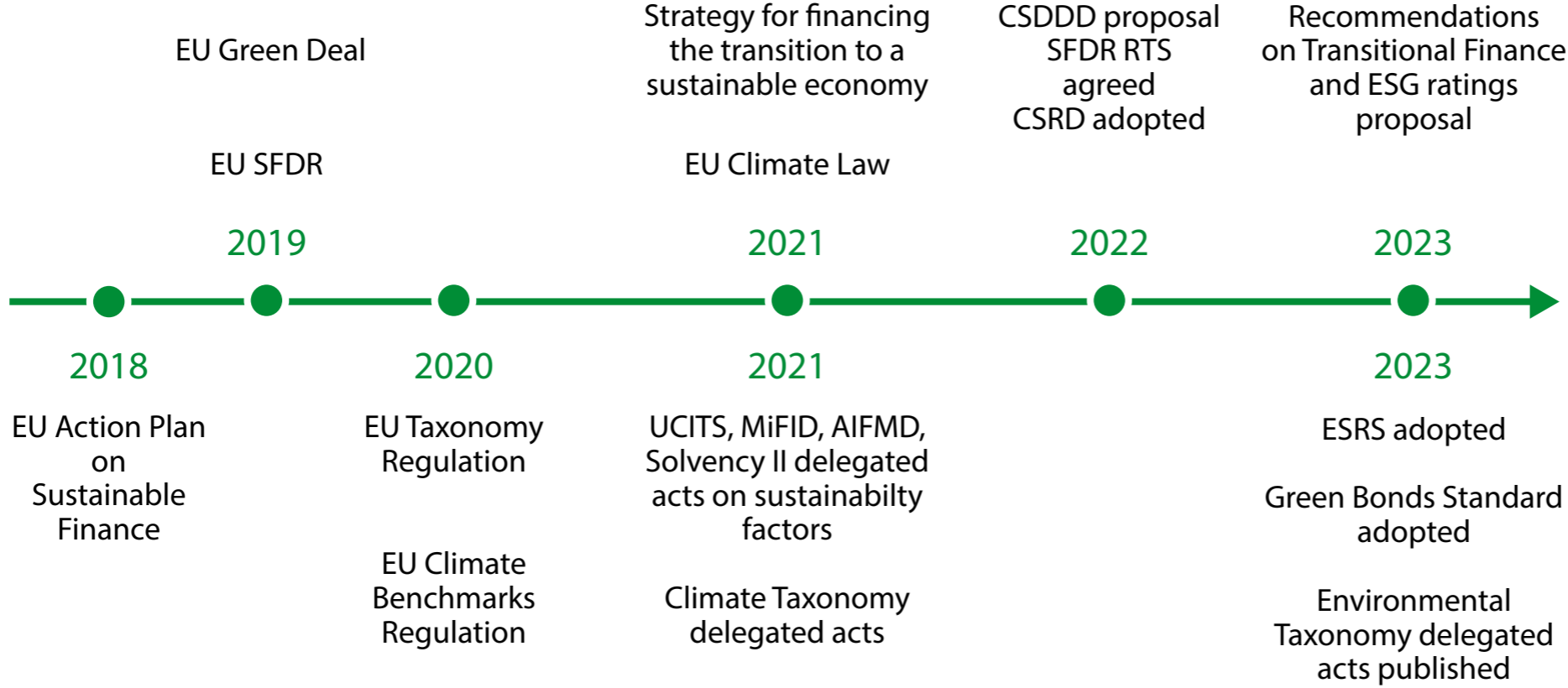
We find gaps in the framework, which risk limiting the effectiveness of EU regulation in getting finance to focus increasingly on the activities most needed for the transition to net zero emissions and suggest how to plug these gaps.

An opportunity to do this is imminent: the European Commission has said it will in late February 2025 propose "*streamlining and simplification of sustainability reporting, sustainability due diligence and taxonomy, and create a new category of small mid-caps with adapted requirements*" (European Commission, 2025).

The landmark Taxonomy Regulation was finalised in 2020 as the world's only mandatory framework of its type. It sets out criteria to assess the environmental sustainability of economic activities around six objectives: (i)

Figure 1. Timeline of the EU sustainable finance framework

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*Note: SFDR = Sustainable Finance Disclosure Regulation; UCITS = Undertakings for Collective Investments in Transferable Securities; MiFID = Market In Financial Instruments Directive; AIFMD = Alternative Investment Fund Managers Directive; CSDDDD = Corporate Sustainability Due Diligence Directive; CSRD = Corporate Sustainability Reporting Directive; ESRS = European Sustainability Reporting Standards.
Source: Bruegel based on European Commission documents.*

climate-change mitigation, (ii) climate-change adaptation, (iii) sustainable use and protection of water and marine resources, (iv) transition to a circular economy, (v) pollution prevention and control, and (vi) restoration of biodiversity and ecosystems.

According to the Taxonomy Regulation, an activity can be considered environmentally sustainable if: (i) it *“contributes substantially”* to one or more of the objectives; (ii) it *“does not significantly harm”* (DNSH) any of the objectives; (iii) it is carried out in accordance with minimum social safeguards; and (iv) it complies with technical screening criteria. Listed companies and large companies (even if non-listed) must disclose the extent to which their activities qualify as environmentally sustainable – ie. are ‘taxonomy aligned’. An environmentally sustainable investment is defined as *“investment in one or several economic activities that qualify as environmentally sustainable”* as per the taxonomy.

The Sustainable Finance Disclosure Regulation (SFDR) – applicable since 2021 – introduces disclosure requirements for financial market participants (FMPs) on the sustainability of the investment products they offer in the EU. FMPs must indicate in particular whether products *“promote environmental or social characteristics”* (so-called Article 8 products) or have *“a sustainable investment objective”* (Article 9 products).

The latter are required to invest only in *“sustainable investment”*, defined in SFDR as an investment *“in an economic activity that (i) contributes to an environmental or social objective; where (ii) the investment does not significantly harm any environmental or social objective; and where (iii) investee companies follow good governance practices.”*

The SFDR definition of ‘sustainable investment’ is thus broader than the taxonomy definition of ‘environmentally sustainable investment’, and the European Commission has clarified that sustainable investment under the SFDR can be measured at company level – not just at the level of single activities¹.

Article 8 and Article 9 products must disclose the share of taxonomy-aligned investments they perform, and the share of sustainable investments beyond what is taxonomy-aligned. They can also (but are not required to) commit to allocate a pre-defined minimum share of their assets specifically to taxonomy-aligned investments.

The European Commission's promised simplification could also affect other laws including the Corporate Sustainability Reporting Directive (CSRD, Directive (EU) 2022/2464), which requires companies to publish social and environmental risk reports, and the Corporate Sustainability Due Diligence Directive (CSDDD, Directive (EU) 2024/1760), which requires companies to assess human rights and environmental risks in their operations and supply chains.

This simplification drive should not turn into an opportunity to kill the EU's past legislative efforts around sustainability, and there should be no compromise on the EU's climate ambitions nor the means to achieve them². However, there are weaknesses in the sustainable finance framework that have become clear over time and these should be addressed.

2 Re-aligning financial incentives

The EU sustainable finance framework's objective of putting the allocative function of financial markets at the service of climate goals assumes implicitly that regulation can alter the basic incentives that underpin financing decisions in the real economy.

Companies typically rely for funding on a combination of debt and equity, and in a world with no sustainability considerations, the appeal of different funding options ultimately depends on how the choice impacts the companies' weighted average cost of capital (an average rate paid by a firm).

When deciding to provide money to companies, FMPs in turn evaluate the risk-return trade-offs of different types of funding.

EU rules aim at altering incentives on the two sides of these funding decisions. The Taxonomy Regulation's classification system creates an opportunity for companies to issue funding instruments for which the use of proceeds is tied directly to sustainable activities. The most obvious example is green bonds: the use of proceeds must be earmarked for green projects, which can be defined in terms of taxonomy-aligned operating and capital expenses.

If sustainability has a value for investors – because it enhances the investee companies' performance or reduces risks – then transparency on it is expected to result in a 'greenium,' ie. lower funding costs for companies that are more sustainable (or that turn to funding instruments with embedded sustainability).

However, if FMPs do not intrinsically care about sustainability, increased transparency is unlikely to be enough to alter incentives in their financing decisions. This is where the other components of the sustainable finance framework come into play.

Under the so-called MiFID II Directive (2014/65/EU; Markets in Financial Instruments Directive), firms that provide financial advisory or portfolio management services must ask their clients if they have a preference for sustainable investment and must follow those preferences in advisory and allocation³.

The combination of sustainability preferences rules with SFDR disclosure requirements aims at ensuring that if there is a preference for sustainability⁴ among final consumers of financial products, that preference is made visible to FMPs and FMPs are held accountable against it.

The implicit assumption is that greater client demand for sustainable investment plus stricter disclosure requirements can alter incentives for FMPs, making it more appealing for them to invest in companies or instruments that can be disclosed as sustainable investments under SFDR and thus matched with the sustainability preferences of final clients (Figure 2).

If this chain of transparency and accountability is working as intended, two important changes should have been triggered. First, there should be increased issuance of sustainability-labelled corporate funding instruments as companies try to benefit from signalling sustainability in a regulatory environment in which that has higher value.

Second, more investment should flow to sustainable financial products as investors seize opportunities that can be matched with clients' sustainability preferences. In the next section, we assess whether this is happening.

3 Does the EU sustainable finance framework work as intended?

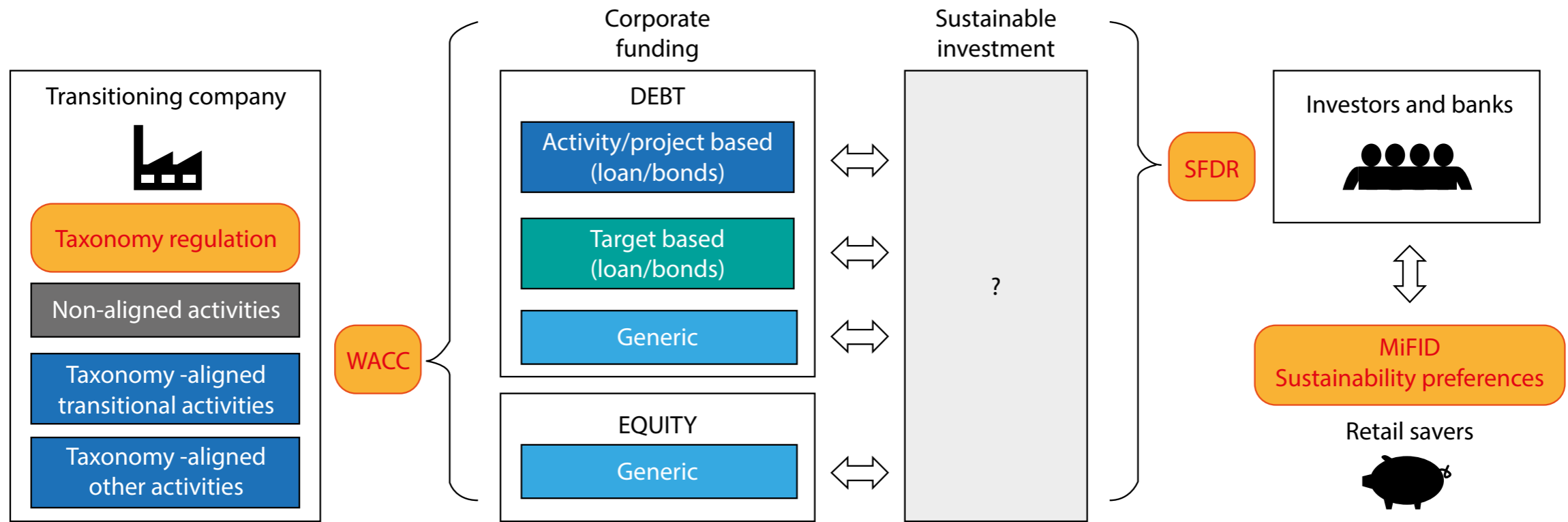
Notwithstanding the European Commission's stated intentions⁵, financial market data does not yet seem to indicate widespread success of the taxonomy as an anchor for corporate funding strategies, nor as a framework for sustainable investing. This is especially visible when examining two market segments where the taxonomy would in principle find natural application: green bond issuance and investment funds with environmentally sustainable investment objectives.

3.1 The taxonomy is not yet the standard in green bond issuance

Green bonds are funding instruments whose proceeds can only be used to finance 'green projects'. As the taxonomy outlines a sustainability classification of economic activities, it would seem natural for it to become the reference framework for EU corporate green bond issuance.

Figure 2. A simplified financing decision with sustainability considerations

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Source: Bruegel.

Examination of the evolution of taxonomy-aligned green bond issuance over time can thus be taken as an indication of whether the Taxonomy Regulation has been successful in driving larger capital flows towards environmentally sustainable economic activities.

Green bonds accounted for 6.5 percent of all bonds issued by EU companies in 2023 (PSF, 2024). Yet only a small share of these were linked to the taxonomy. An end-2024 Bloomberg search returned 2,362 outstanding green bonds issued by EU companies since the entry into force of the Taxonomy Regulation. Bloomberg marked 163 of these as funding taxonomy-aligned activities, corresponding to a total amount at issuance of approximately €111 billion.

There is no strong evidence of a structural increase in taxonomy-aligned green bond issuance since 2021 (Table 1). Taxonomy-aligned bonds account annually for up to approximately 10 percent of all EU corporate green bonds. As green bonds in turn represent about 6.5 percent of all EU corporate bonds, taxonomy-aligned bonds constitute an estimated 0.5 percent to 0.7 percent of all EU corporate bond issuance.

The EU Green Bond Standard (Regulation (EU) 2023/2631) that started to apply at the end of 2024 requires issuers to commit at least 85 percent of proceeds to fund taxonomy-aligned activities, if they want to use the EU Green Bond label.

Whether this will succeed in boosting the role of the taxonomy in corporate bond issuance remains to be seen as the standard is voluntary and future uptake will likely hinge on resolution of usability issues that have so far limited the appeal of the taxonomy as a framework for corporate issuance.

Table 1. Green bonds issued by EU companies, as of end-2024

Number of bonds	2021	2022	2023	2024
GBs issued by companies incorporated in the EU	618	547	515	682
of which, taxonomy-aligned	13	56	52	42
	(2%)	(10%)	(10%)	(6%)
Amount issued (€ billions)	2021	2022	2023	2024
GBs issued by companies incorporated in the EU	852	402	339	399
of which, taxonomy-aligned	8	40	34	29
	(1%)	(10%)	(10%)	(7%)

Note: data for 2021, 2022 and 2023 as of 29 September 2024; data for 2024 as of 2 January 2025. Note: taxonomy-aligned bonds are identified as those having a share of taxonomy-aligned use of proceeds greater than 0 percent.

Source: Bruegel based on data from Bloomberg.

As the EU economy remains heavily bank-based, loans predominate in corporate funding, especially for smaller companies. The availability of granular data on the taxonomy-alignment of bank loans is very limited, but anecdotal evidence suggests the volume of taxonomy-linked loans to be small.

According to PSF (2024), based on a sample of 4000 SMEs, “over the last two years, 9–10% of SMEs have obtained a green or sustainability-linked loan from a bank.” PSF (2024) also noted that the share of sustainable loans provided by banks to SMEs is estimated to be less than 5 percent to 6 percent of banks’ SME lending portfolios.

3.2 Investors are not embracing the taxonomy in sustainable investing

Another area in which the taxonomy would in principle be expected to find natural application is that of sustainable investment funds. Collective investment funds allow individuals to invest in a variety of assets without buying them directly.

Such funds can play an important role in mobilising savings for sustainable investment. Anacki *et al* (2024) showed that as of June 2024 investment funds accounted for over 13 percent of the total financial assets of European households – probably more, once indirect exposure via pension funds and life insurance is factored in.

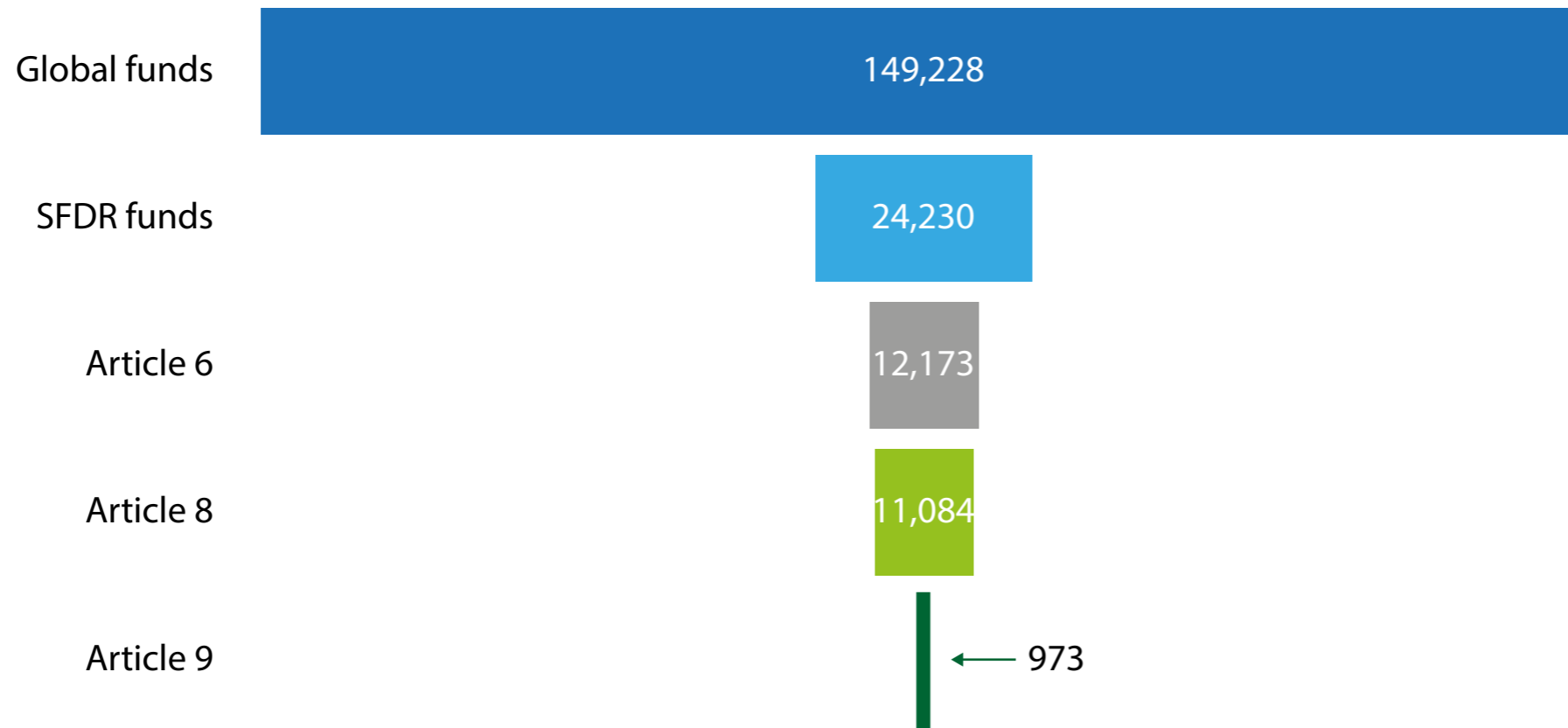
The EU asset management industry counts more than 66,000 investment funds, managing €22 trillion in assets (EFAMA, 2024), with approximately 60 percent in the form of UCITS funds⁶, which are easily accessible to retail investors. The SFDR requires investment funds offered in the EU to be classified based on the sustainability commitments in their offering documents (as either ‘Article 6’, ‘Article 8’ or ‘Article 9’).

Article 9 funds must have a sustainable investment objective and can invest only in ‘sustainable investments’. These products represent a niche within the broader investment funds market (Figure 3).

Under the SFDR, Article 9 investment funds must state in their offering documents what share of their assets they commit – as a minimum – to sustainable investments with an environmental objective. Within this share, Article 9 funds must also disclose whether they pre-commit to make any investments in taxonomy-aligned activities.

To gauge the impact of the taxonomy in sustainable investing, we look at the extent of taxonomy application by Article 9 funds that commit to environmentally sustainable investments. Out of 973 Article 9 funds (Figure 3), 363 (37 percent) commit to invest at least some of their assets in sustainable investments with an environmental objective.

Figure 3. SFDR-classified funds out of all investment funds



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*Note: As of 30 September 2024.
Source: Bruegel based on Bloomberg.*

On average, however, these funds only commit to invest 3 percent of their assets in taxonomy-aligned activities, and the median commitment is zero (Figure 4, right panel). Among Article 9 funds that commit to invest more than half of their assets in environmentally sustainable investments, the average taxonomy commitment rises to 5 percent, but the median commitment remains at zero⁷.

4 Why is the framework not working as intended?

4.1 Regulatory uncertainty

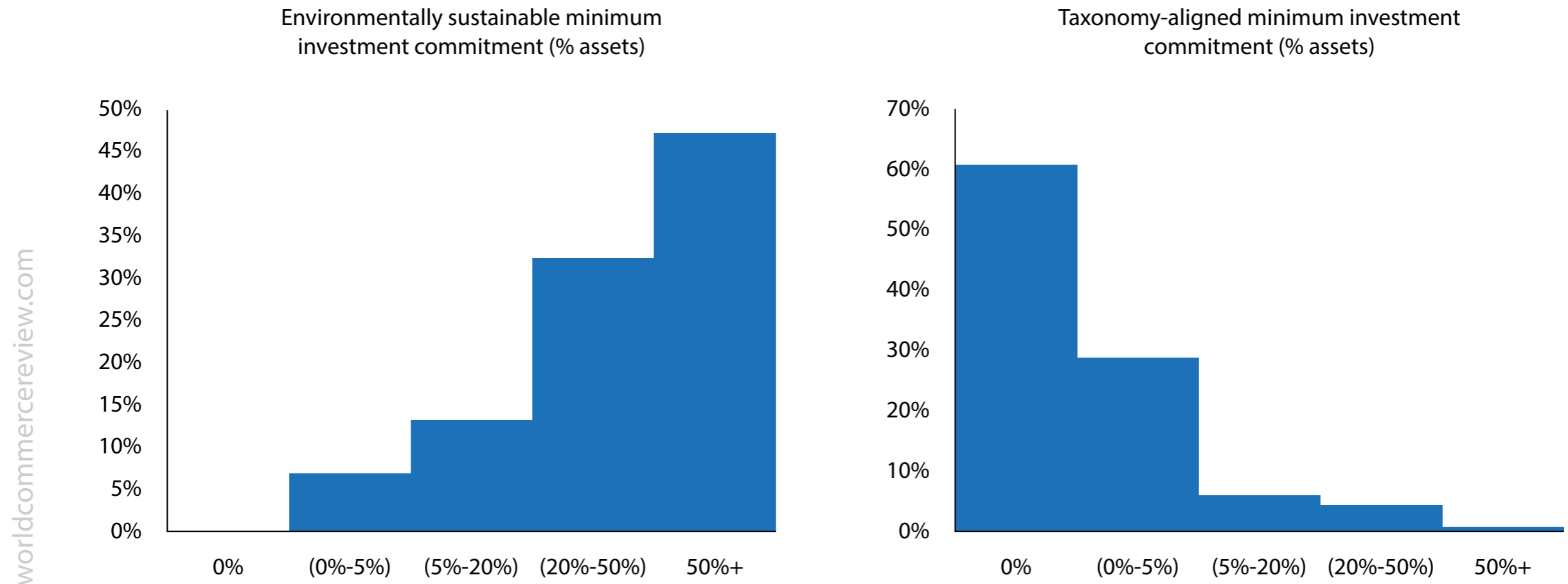
It is clear that uptake of the taxonomy in corporate issuance has been slow. In part, this is likely explained by legislative delays. The Taxonomy Regulation entered into force in 2020, but criteria for evaluating the alignment of economic activities were defined subsequently. Rules to do this in relation to climate change mitigation and adaptation were finalised in December 2021, then amended in July 2022 (to include energy from gas and nuclear as sustainable).

Rules for other objectives were approved in summer 2023. Uncertainty around how to calculate eligible and aligned activities may have acted as a disincentive to a broader uptake of the taxonomy in corporate funding and bond issuance.

Delays and regulatory uncertainty also help explain why the taxonomy so far has not been very successful as a reference framework for sustainable investment in the EU. Originally, the Taxonomy Regulation was supposed to be followed by other sustainability information disclosure requirements for non-financial companies (including listed SMEs) via the Corporate Sustainability Reporting Directive (CSRD). But taxonomy-related delays led to these being delayed as well, with the first round of CSRD reporting due only in 2025.

As a result, FMPs have found themselves facing requirements to report on the sustainability of their investments before non-financial companies were required to disclose information on the sustainability of their activities. This

Figure 4. Article 9 fund, minimum taxonomy-aligned investment commitment (% total investments)



Note: As of 17 October 2024.
Source: Bruegel based Bloomberg.

partly explains why FMPs have been cautious in making formal commitments in relation to taxonomy-aligned investments.

4.2 The Taxonomy is not a natural framework for transition finance

Yet, regulatory uncertainty is not the whole story. In the Strategy for Financing the Transition to a Sustainable Economy (European Commission, 2021), the Commission said it wanted to ensure that actors across all sectors will be able to finance their transitions “*regardless of their starting point.*” Achieving this goal requires scaling-up financing for activities that are already green, but also crucially financing activities that need to transition to sustainability.

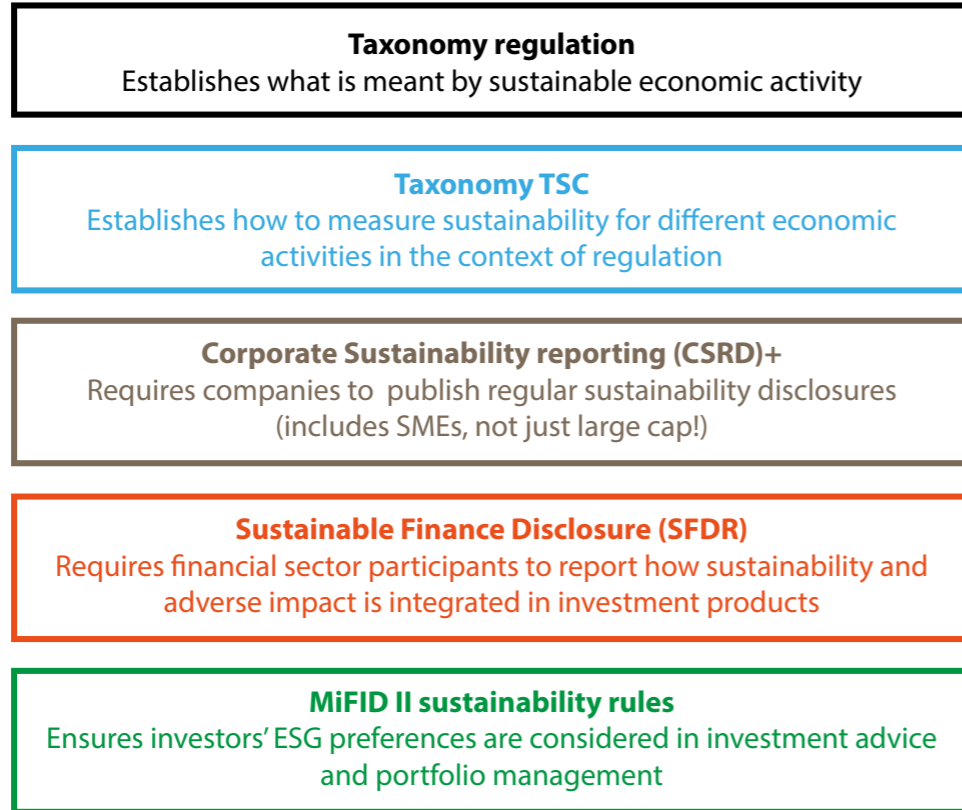
The taxonomy is designed to identify what is already sustainable: activities can only be classified as ‘aligned’ or ‘not aligned’. The Taxonomy Regulation tries to cater for the more complex nature of the transition by identifying also what it calls “*transition activities*” and “*enabling activities*”, which are deemed to be taxonomy-aligned despite not meeting fully the taxonomy test.

By conflating the different concepts of ‘alignment with’ and ‘transition to’ sustainability into a single framework, the regulation creates confusion on what the taxonomy really measures. The binary nature of the taxonomy also makes it challenging to use the framework for transition finance.

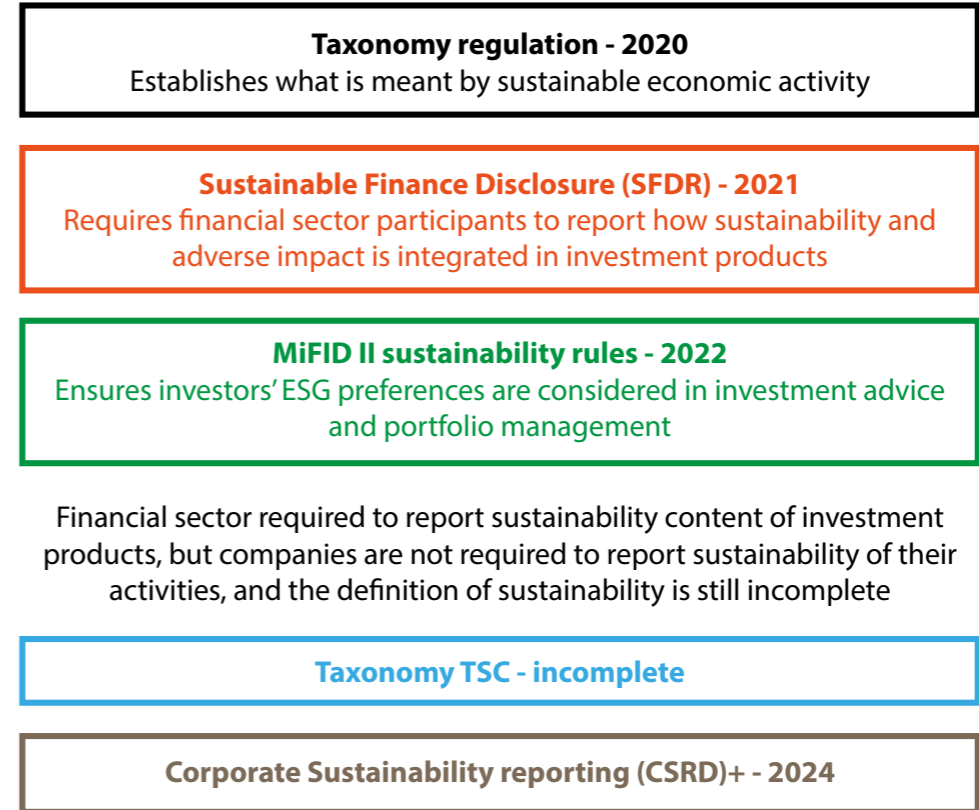
At present, 79 percent of all taxonomy-aligned green bonds are issued by utilities companies (Figure 6). This share is larger than the share of utilities in broader green-bond issuance (52 percent) and significantly larger than the share of utilities in the EU economy (around 5 percent of output and 3 percent of gross value added (GVA)⁸ in 2022).

Figure 5. EU sustainable finance rules, planned and actual

HOW IT STARTED



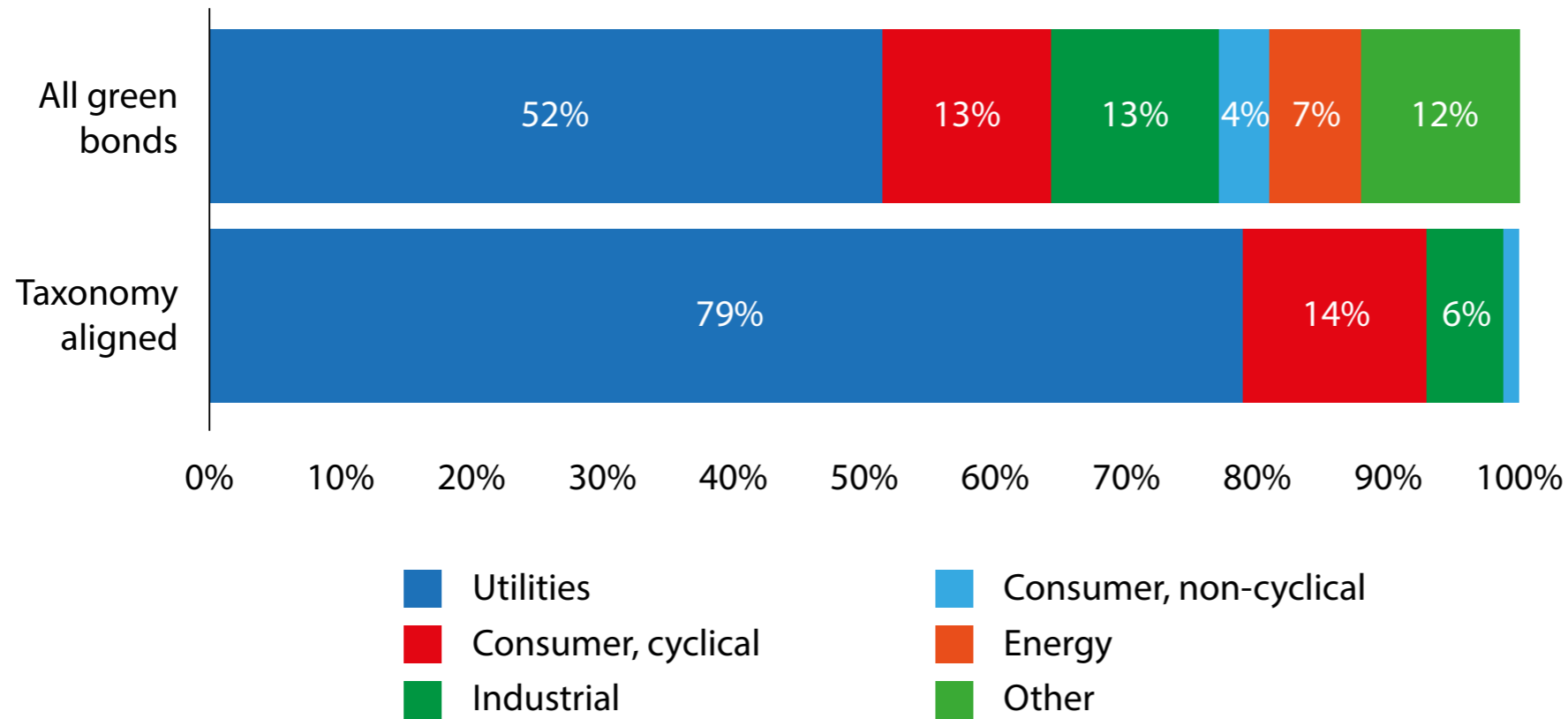
HOW IT'S GOING



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Source: Bruegel.

Figure 6. Sector breakdown of taxonomy-aligned EU corporate green bonds



Note: the chart excludes green bonds issued by companies in the financial sector; if these were included, they would account for 60 percent of all green bonds and 21 percent of all taxonomy-aligned green bonds. The shares of other sectors would be adjusted accordingly.
Source: Bruegel based on data from Bloomberg as of 30 September 2024.

The dominance of utilities in taxonomy-aligned green-bond issuance is due to the relatively fewer requirements on the sector to demonstrate green credentials, compared to sectors – such as industrials – in which showing alignment and meeting the do no significant harm (DNSH) requirement is significantly more complex.

Figure 7 shows gaps between sectors' taxonomy-eligible and taxonomy-aligned turnover, which can be interpreted as a proxy for the difficulty of demonstrating alignment across different economic activities. The utilities sector is already the most-aligned sector with the largest share of taxonomy-eligible turnover. Of the utilities that have issued taxonomy-aligned green bonds, more than half (53 percent) already have a renewable energy capacity above 80 percent of total capacity⁹.

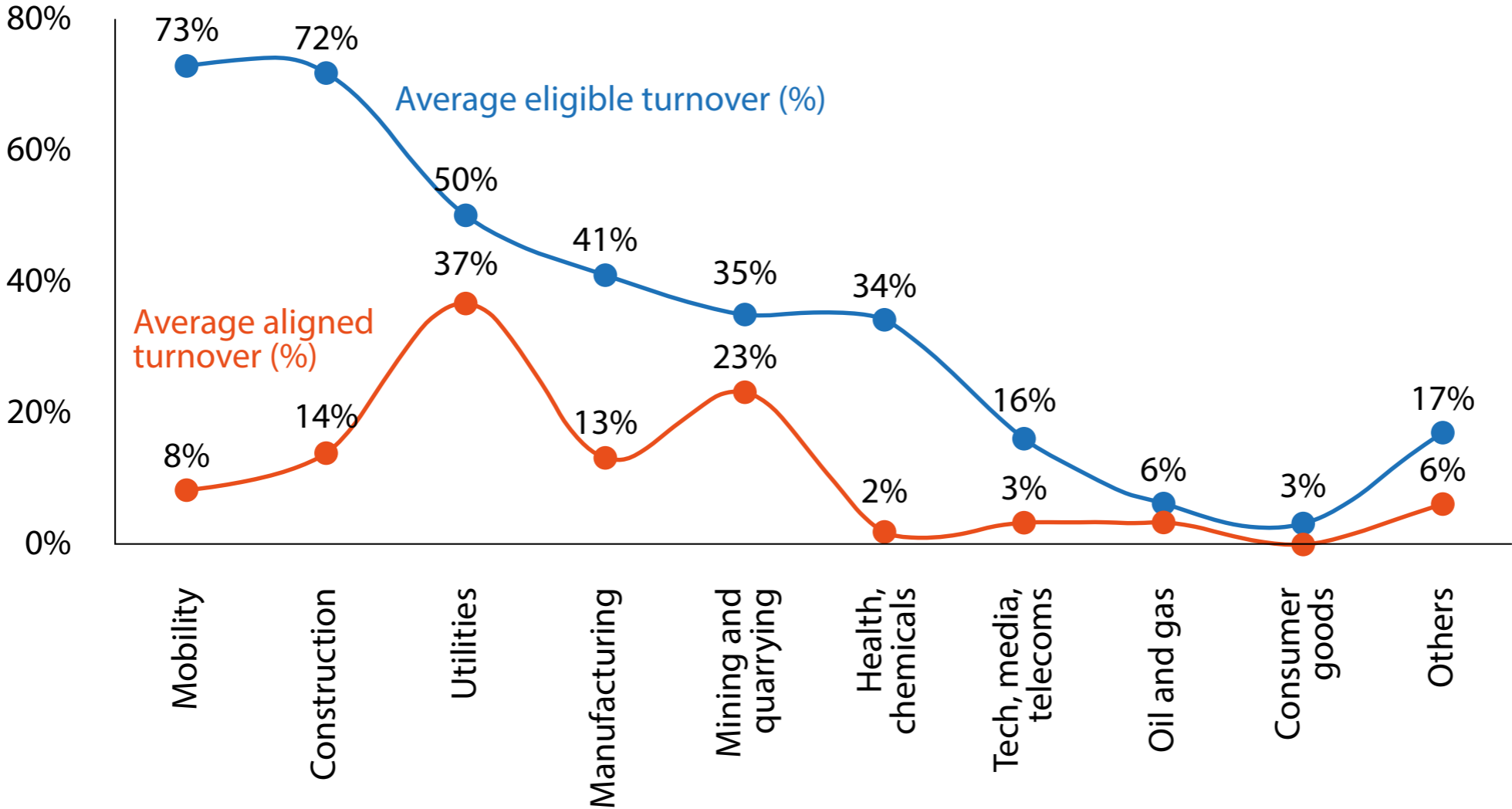
Thus, taxonomy-aligned green bonds so far have been mostly issued by companies that are already green, in a sector in which demonstrating greenness is relatively easy. While this is coherent with the taxonomy being designed to identify sustainable activities, it shows its limits as a framework for transition finance, helping explain why massive volume growth has not yet been seen in this market segment.

Statistical considerations also play a part. Economic activities are identified in the taxonomy based on the NACE industrial classification, which forms the basis for GDP statistics produced by Eurostat¹⁰. But it is challenging to match green bonds projects to NACE activities (ICMA, 2022).

Green-bond projects often involve numerous activities with individual components relating to different environmental objectives, and NACE codes may sometimes encompass multiple activities, while in other cases corporate activities may have no reference NACE, making it impossible to classify projects for taxonomy purposes¹¹. While an alternate NACE mapping has been published, usability issues persist (ICMA, 2023).

Figure 7. Taxonomy-aligned and taxonomy-eligible turnover by sector (%)

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Source: Bruegel based on data from Niewold (2024).

4.3 Taxonomy-aligned investing trades off low diversification

Regulatory uncertainty helps explain the scepticism of financial market participants (FMPs) about committing to taxonomy-aligned investment (section 4.1). As long as corporates remain reluctant to embrace the taxonomy, investors will likely remain cautious on their taxonomy commitments. But there are other reasons why the framework may remain unappealing for investors in the immediate future.

The real economy is currently not highly aligned with the EU taxonomy. The average taxonomy revenue alignment of companies in the Euro STOXX 600 Index – which represents 90 percent of European market capitalisation – is a mere 10.5 percent. Only 27 percent of these companies have at least some taxonomy-aligned revenues (Figure 8).

Among these, average alignment is 21 percent. Accordingly, the ex-post exposure to taxonomy-aligned activities for most Article 9 funds is also very low – 15 percent or less of total revenues at the end of 2024 (Figure 9).

Almost half the companies in the Euro STOXX Index derive 80 percent or more of their revenues from activities that are eligible under the taxonomy, so the average alignment across the European stock market will increase as these companies transition. But that will take time. In the meantime, investors aiming to achieve high ex-post taxonomy alignment in their portfolios are left to pick from a small set and must accept high levels of concentration¹².

For investors, this is a problem. Less diversification means more risk. This trade-off became painfully evident in 2023. As central banks embarked on fast rate hikes, renewable energy companies faced an unanticipated spike in funding costs and were forced to undertake sizeable impairments.

As a result, the iShares Global Clean Energy UCITS ETF, whose portfolio has an average taxonomy-alignment of 66 percent, recorded a return of negative 23 percent for 2023. The iShares MSCI World Paris-Aligned Climate UCITS ETF,

which tracks an index that is prevented from investing companies with high fossil fuel exposure but has only 17 percent average taxonomy-alignment, was up 21 percent in the same period.

Until a higher degree of taxonomy-alignment is reached across the real economy, this concentration risk will likely remain a disincentive for investors to commit to substantial taxonomy-aligned investment.

4.4 Reaching taxonomy alignment is harder for equity investors than fixed-income investors

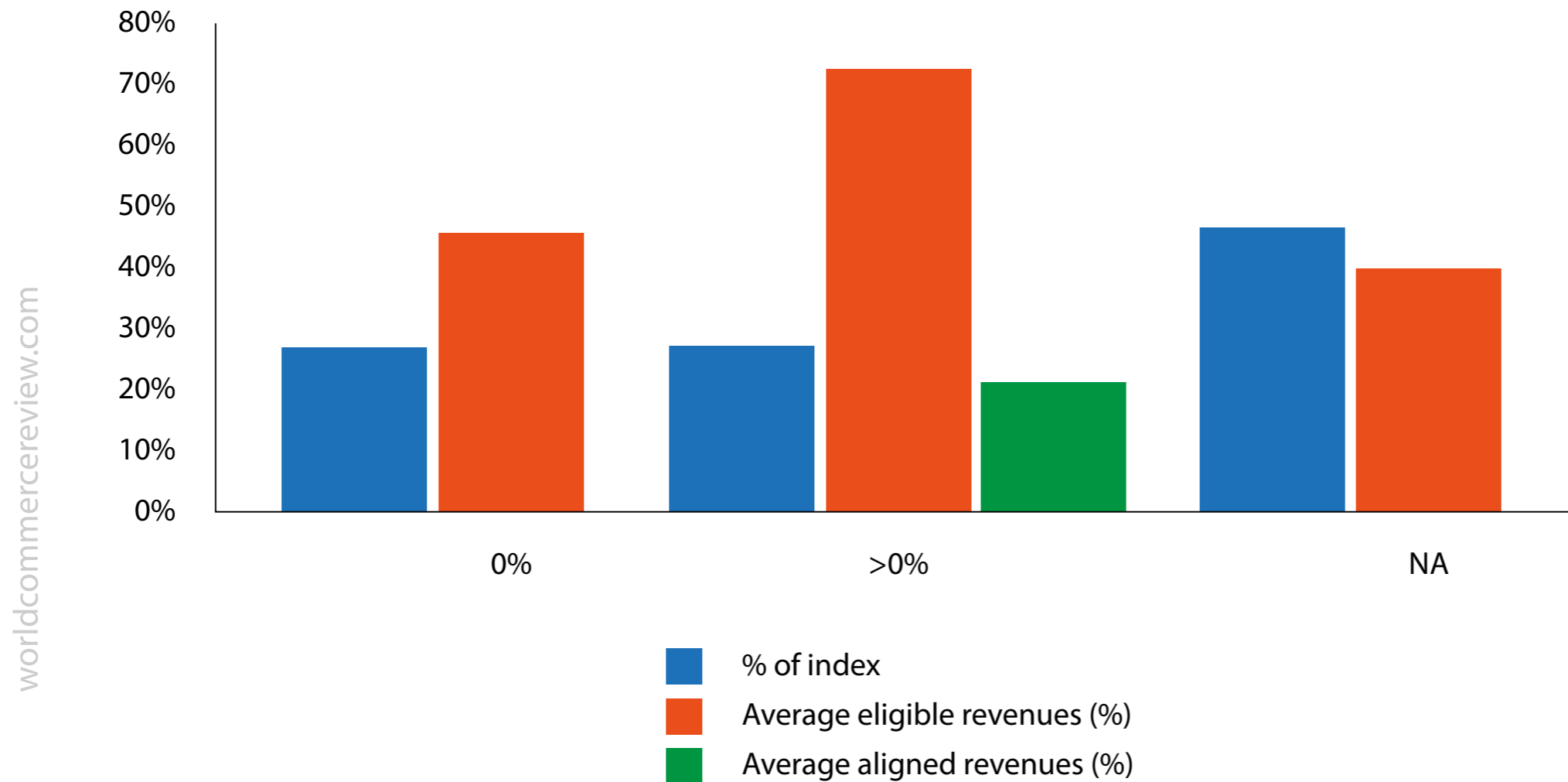
The problems we highlighted in the previous sections are especially problematic for equity investors. Fixed-income investors could in theory reach a high level of taxonomy alignment in their portfolios by selecting taxonomy-aligned bonds, even if these are issued by companies with low or no taxonomy alignment.

As long as the proceeds from the bonds are used for taxonomy-aligned activities, the entire bond investment would be considered aligned and would automatically qualify as sustainable investment under the SFDR. Equity investors do not have this option, because equity is a general funding instrument.

As such, the taxonomy-alignment of a listed equity portfolio will inevitably be tied to the overall alignment of the investees' business. Table 2 shows how the same portfolio can yield different taxonomy alignment when the investment is in the form of listed equity versus green bonds¹³, and how an investment in an EU green bond issued by a company that has only a minimal share of its revenues or capex aligned with the taxonomy is worth 'more' – in sustainability terms – than an equity investment in a company that has a high level of (but not full) taxonomy alignment. This seems to be a paradoxical result.

This helps highlight an implicit assumption in the sustainable finance framework: in the early stages of transition – when companies are not yet highly taxonomy-aligned – sustainability-minded investors should only invest via

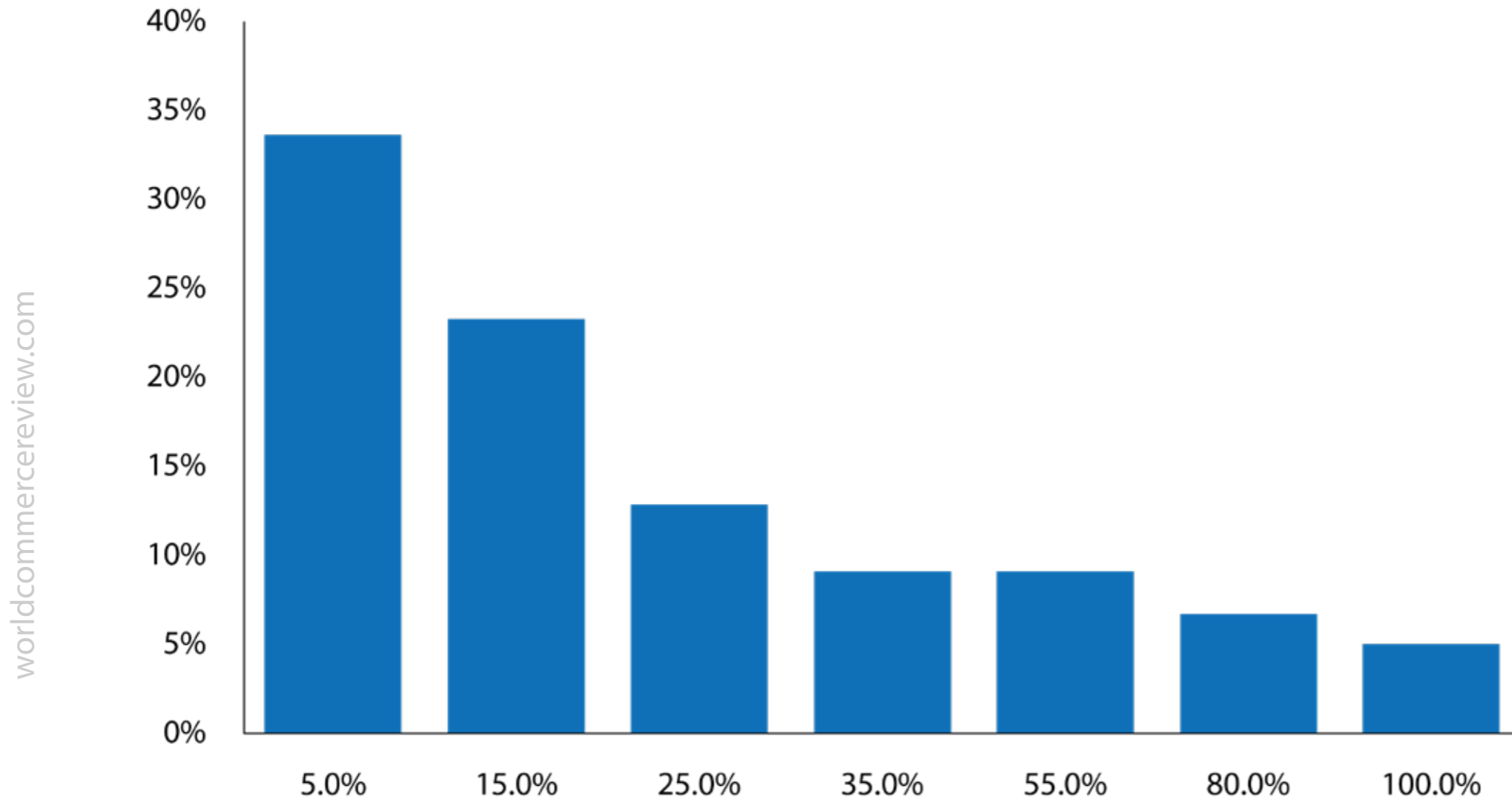
Figure 8. Taxonomy-eligible and aligned revenues of Euro STOXX 600 (% companies)



Note: NA indicates companies for which the share of taxonomy-aligned revenues is not known.

Source: Bruegel based on data from Bloomberg, as of November 2024.

Figure 9. Average taxonomy-aligned % of revenues for Article 9 portfolio companies



Source: Bruegel based on data from Bloomberg, as of 4 November 2024.

instruments that segregate the use of proceeds for taxonomy-aligned activities, if they want their investment to be deemed 'sustainable'.

Only in later stages of the transition, when the overall taxonomy-alignment at company level has increased, will investing in general funding instruments such as equity qualify as sustainable investment¹⁴.

Yet, the SFDR definition of 'sustainable investment' remains vague and stops short of setting minimum requirements for what a 'significant contribution' is or for when an investment poses 'significant harm'. FMPs must carry out their own assessments and disclose their assumptions, which can result in confusion – for example, that asset managers had been led *"to adopt different approaches to the calculation of sustainable investment exposure and taxonomy alignment, rendering it impossible to compare products directly"*¹⁵.

In a European Commission public consultation on the SFDR in 2023, a majority (62 percent) of respondents argued that the regulation has not strengthened protection for end investors or made it easier for them to compare products with sustainability claims¹⁶.

The problem with the approach described above is twofold. The activity-level focus of the taxonomy risks introducing an implicit sustainability hierarchy across funding instruments, in which it is easier for fixed-income portfolios than for equity portfolios to achieve a high taxonomy-alignment (and meet sustainable investment requirements under the SFDR).

This in turn may bias corporate funding strategies towards debt, where use-of-proceeds rules can be easily embedded. But in practice, debt and equity capital are both needed and serve different purposes. Equity capital bears higher risk and is essential to finance the radical innovation in which Europe invests too little.

By making it inherently harder for equity investors to demonstrate the sustainability of their portfolios, the current framework risks dissuading sustainability-minded investors from providing equity capital to companies that need to transition.

4.5 The EU lacks a standard for target-based transition finance

One market segment that has seen a sizeable increase over the past few years is that of sustainability-linked bonds (SLBs) or loans. The funds raised with SLBs can be used for any purpose (in that they are general funding instruments) but the cost of that funding increases if the company misses some pre-determined sustainability targets.

These instruments can be a powerful driver of the transition, but their effectiveness depends on the level of ambition of their targets and the size of the penalty for missing them. Between 2021 and 2024, companies incorporated in the EU issued a total of €118 billion in SLBs, 62 percent of which had at least one greenhouse-gas emission reduction target. For the majority of greenhouse-gas-linked SLBs, targets covered only part of the companies' emissions and the penalty for missing targets tended to be small (Merler, 2024).

In a still non-standardised and relatively opaque market segment, the risk is significant that companies will lower the ambition of SLBs targets to reduce the likelihood of being caught off guard. Europe is the largest market for behaviour-based debt instruments and the most advanced jurisdiction when it comes to regulating corporate transition targets, so it should reap the potential of an efficient SLB market by introducing an EU standard for SLBs, similarly to what it did with the EU Green Bond Standard.

4.6 It is unclear whether transition finance qualifies as sustainable investment

In June 2023, the Commission published a recommendation on *“facilitating finance for the transition to a sustainable economy”*, in which it stated that transition finance should be understood as *“financing of climate and environmental*

Table 2. Example of portfolio taxonomy-alignment calculations (equity vs green debt)

Portfolio	Company taxonomy-aligned revenues (%)	Portfolio weight (% total investment)
Company A	80%	25%
Company B	5%	25%
Company C	20%	25%
Company D	40%	25%
Green bond portfolio alignment	$\sum_i (\text{portfolio weight}_i * \text{bond alignment}_i)$ $(25%*100\%)+(25%*100\%)+(25%*100\%)+(25%*100\%)=100\%$	
Listed equity portfolio alignment	$\sum_i (\text{portfolio weight}_i * \text{company alignment}_i)$ $(25%*80\%)+(25%*5\%)+(25%*20\%)+(25%*40\%)=36\%$	

Source: Bruegel.

performance improvements to transition towards a sustainable economy, at a pace that is compatible with the climate and environmental objectives of the EU” (European Commission, 2023).

The recommendation also listed four examples of investments compatible with this definition:

- a. Investments in portfolios tracking EU climate benchmarks;
- b. Investments in taxonomy-aligned economic activities;
- c. Investments in undertakings or economic activities with a credible transition plan at the level of the undertaking or at activity level;
- d. Investments in undertakings or economic activities with credible science-based targets, where proportionate, which are supported by information ensuring integrity, transparency, and accountability.

The recommendation stated that *“sustainable finance is about financing both what is already environment-friendly and what is transitioning to such performance level over time.”* This seems to suggest that transition finance is to be understood as part of sustainable investment, not separate from it. But EU regulation does not treat the four types of transition finance listed in the recommendation in the same way, when it comes to assessing whether they qualify as sustainable investment under the SFDR.

While investments under (a) and (b) are automatically considered to be ‘sustainable investment’, (c) and (d) are not. When it comes to transition-plan and target-based investments – points (c) and (d) in the recommendation – EU regulation is unclear.

The European Commission has suggested that investments in companies that have climate targets may not qualify as sustainable investment solely by virtue of having such targets, but FMPs need to also demonstrate that the transitioning assets meet the SFDR DNSH test already at the time of investment¹⁷. This might be difficult for companies at an early stage of transition.

5 How to fix it

Adjustments can be made to the EU sustainable finance framework to make it more effective at delivering the desired alignment of incentives. At the core of our recommendations is therefore the creation of a clear, transparent and dedicated framework for transition finance – which is currently not properly defined in the EU legal framework.

5.1 Complete and clarify the taxonomy framework

As discussed in section 4.2, the binary nature of the taxonomy (sustainable/not sustainable) makes it complex to use the taxonomy as a tool for transition finance, likely explaining why the taxonomy does not yet appear to be widely used by corporates in bond issuances, or by investors for sustainable investing.

European Commission (2023) stressed that the taxonomy should be used not just as a reporting tool, but as a planning and strategy framework. For this to happen, the taxonomy should be completed to add all economic activities that can contribute, even marginally, to environmental sustainability.

In addition, introducing a ‘traffic light’ structure, with an amber category for transitional activities and a red category for harmful ones, would increase transparency and boost the usability of the taxonomy as a transition-finance framework (High Level Group, 2023).

5.2 Toughen the SFDR definition of sustainable investment

As highlighted in section 1, confusion persists on what 'sustainable investment' means under EU law. The Taxonomy Regulation and SFDR define it differently, prompting ESMA (2023a) to issue a clarification. Yet, the reasons for concern over the definition remain unaddressed – and uncertainty is problematic for both companies and FMPs in terms of their own sustainability disclosures and planning, as well as for the final consumers of financial products.

The Commission has outlined two types of investment that qualify automatically as sustainable investments under SFDR: passive funds tracking EU climate benchmarks and investments in taxonomy-aligned activities. But the regulation sets no minimum criteria for how sustainability should be evaluated in other cases.

The SFDR definition of sustainable investment should thus be reviewed. The concepts of 'substantial contribution' and 'significant harm' should be made prescriptive (as suggested by eg. ESAs, 2024). In 2020, the EU introduced climate benchmarks, which are subject to environmental investment restrictions.

The EU Paris Aligned Benchmarks (PABs) must align the carbon emissions of their underlying portfolio with the Paris Agreement targets, and are subject to environmental investment policy restrictions. In particular, PABs cannot include in their underlying portfolios companies that are involved in specific social and/or environmentally harmful activities (eg. fossil fuels).

This approach should be incorporated in the definition of 'sustainable investment' under SFDR. To be considered 'sustainable' under SFDR, an investment should need to meet the same environmental investment restrictions that are applicable to the EU PABs. For investments that do not meet PAB criteria but that meet the less-stringent Climate Transition Benchmarks criteria, a new category labelled 'transitional investments' should be created within the SFDR framework.

Guidance should also be provided on how the SFDR 'contribution' to sustainability objectives should be defined and quantified. ESAs (2024) leaned towards relying on the EU taxonomy as the default framework for assessing this contribution to taxonomy-eligible activities, and stated that other non-specified "*appropriate sustainability metrics and minimum requirements*" should be used for activities that are not taxonomy-eligible.

However, as long as the taxonomy remains incomplete and the usability issues we have described remain unaddressed, this two-tier approach risks replicating the inconsistencies we have highlighted.

5.3 Ensure neutrality across capital-market instruments

As discussed in section 4.4, the mismatch between the definition of sustainable investment under SFDR and under the taxonomy risks introducing an implicit bias against equity capital – because the taxonomy alignment of an equity investment necessarily depends on the entity-level taxonomy alignment of the investee company, rather than on the alignment of specific projects being funded. To be truly effective, the EU sustainable-finance framework should be applicable in a neutral way across all capital-market instruments.

One option to achieve this would be to rescale the taxonomy-alignment of green bonds by a measure of the overall taxonomy alignment of the company, in order to avoid the paradox that we describe in section 4.4 and to preserve neutrality of the framework across capital market instruments. However, this would completely defeat the purpose of green bonds, which is to allow companies to raise funding at a discount by earmarking the funds for green projects.

An alternative could be to assess sustainability using a top-down/entity-level approach while clarifying the difference between sustainability and transition. To determine whether providing funding (of whatever kind) to a company qualifies as sustainable investment, the starting point could be an evaluation of whether the company's

revenues and/or capex – taxonomy-eligible or not – align with the environmental objectives of the European Green Deal. A model for this could be the mapping framework being developed by the PSF (2024b) to evaluate sustainable capital flows for which taxonomy alignment cannot be established.

If that option is chosen, then a Green Deal alignment threshold could be set – out of total company revenues and/or capex – to determine whether investing in a company would meet the substantial contribution requirement.

If the company clears the threshold and meets the stricter PAB-aligned minimum SFDR exclusions we recommend in section 5.2, then any type of investment in the company, including via general debt or equity, should be fully eligible as sustainable investment.

If the company does not clear the threshold, then only investments by means of use-of-proceeds instruments, or Paris-aligned sustainability-linked (see below) instruments, should be deemed sustainable investment.

This approach would help solve a number of issues. First, it would be immediately applicable to all companies – including those operating in activities that are not yet eligible under the taxonomy.

Second, it would be applicable to non-EU companies – which are not bound to report taxonomy-alignment but report revenue breakdowns that can be used for this assessment.

Third, it would be neutral across capital-market instruments, regardless of whether or not they limit the use of proceeds, because it would be based on an assessment of sustainability at the company level.

Lastly, it could be extended easily into a framework that more clearly and transparently caters for both transition finance and sustainable finance.

5.4 Develop a dedicated framework for transition finance

While scaling-up finance for already sustainable activities is important to meet EU climate goals, financing the transition of what can become sustainable is equally important. Yet, the EU has neither a proper legal definition of transition finance nor a dedicated framework. The 2023 Commission recommendation on transition finance stated that *“sustainable finance is about financing both what is already environment-friendly and what is transitioning to such performance level over time”* (European Commission, 2023).

This seems to suggest that transition finance is to be understood as part of sustainable investment, not separate from it. But, as discussed in section 4.6, there are inconsistencies and confusion across EU regulation on this point, and they should be reconciled.

The process that we propose above would make it easier to frame transition finance more coherently across EU law. Companies that are not yet at a stage of clearing the sustainable investment threshold could be evaluated for whether they qualify as transitioning by looking at whether they have credible science-based transition plans and targets (in line with CSRD and CSDDD requirements). Investing in those companies would then qualify as *“transition investment”*, as these companies would be on a science-based path towards sustainability.

This approach would be applicable neutrally across capital market instruments and would have the benefit of incentivising companies to set science-based climate transition targets as a way to signal a credible transition, potentially benefitting from a transition premium.

The EU should also consider pushing for the concepts of ‘sustainability’ and ‘transition’ to be more properly reflected in the sustainability ratings (or ESG ratings) sold in the EU. ESG ratings are used by most FMPs as a synthetic measure of corporate sustainability, but well-known flaws exist in terms of how these ratings are built, which makes them a poor proxy for corporate sustainability (Esposito and Merler, 2024)¹⁸.

EU regulation strongly embeds in reporting obligations the concept of double materiality – ie. the idea of measuring both the impact of a company’s products and operations on the environment and society, and the impact of environmental and social factors on the company’s financials. Many ESG ratings providers, however, do not apply a double-materiality approach to their ratings.

In our view, ESG ratings providers – while retaining full ownership of their methodologies – should be required to use a double-materiality approach for ESG ratings sold in Europe. This would align the ratings with the approach to corporate sustainability that the EU is taking in the CSRD and the SFDR.

Lastly, the EU framework for transition finance should include a dedicated EU standard for sustainability-linked funding instruments, similarly to the EU Green Bond Standard. As discussed in section 4.5, Europe is the largest market for behaviour-based debt instruments and the most advanced jurisdiction when it comes to regulating corporate transition targets, so it should act to reap the potential of an efficient and ambitious SLB market.

Whether these instruments should be qualified as ‘sustainable’ or ‘transition’ investment could be linked to the level of ambition of their targets, thus creating an incentive for companies to set ambitious goals. For example, SLBs linked to Paris-aligned and validated science-based targets (ie. the ‘gold standard’ in terms of target setting) could be considered sustainable, although a provision should be included under which the bonds would lose sustainable status if targets are missed.

5.5 Introduce formal sustainable and transition-finance labels

Clearer definitions should be extended into a transparent labelling system for financial products. SFDR Articles 8 and 9 categories were not supposed to be used as sustainability labels – but in practice they have been. We recommend creating instead two proper labels, for ‘sustainable’ and ‘transition’ financial products respectively.

Products aiming for the ‘sustainable’ label should invest in assets that are already sustainable. To be deemed sustainable, individual investments should meet the revised prescriptive DNSH under the SFDR that we call for in section 5.2, and the substantial contributions threshold proposed in section 5.3.

ESAs (2024) proposed that for environmentally sustainable products, the threshold should be based on taxonomy-aligned investments, but we would caution against this approach. Reaching a high degree of ex-post taxonomy alignment at present requires accepting low diversification (section 4.3), and this is likely one of the reasons for the very low observed ex-ante commitments to taxonomy-aligned investing. As long as this remains the case, and the taxonomy remains incomplete, there could be value in considering a broader definition of sustainability, for example as proposed in section 5.3.

Investment products aiming for the ‘transition’ label should be able to invest in assets that do not yet clear the sustainability threshold, but for which there is a demonstrated science-based and credible path to sustainability. If a red category is added to the taxonomy, transitional products could also be required to publish and pursue a transparent phase-out plan for exposure to red activities within their portfolio (eg. via engagement).

ESAs (2024) seemed to suggest these two categories should be mutually exclusive, but this does not have to be the case. As the whole economy transitions, companies in the portfolios of transition investment products should

be expected to become progressively more sustainable over time, and it would be natural for the portion of the portfolio that clears the sustainability threshold to increase as a consequence.

There would seem to be no obvious reason to 'force' transition products to divest from companies that have switched from transitioning to sustainable. Sustainable and transition investments should rather be allowed to coexist within the portfolios of transition products, as long as transparent disclosure rules are set around respective shares in the portfolio.

6 Conclusion

Over the past decade, the EU has set ambitious climate goals, which will require massive investment. Sustainable finance must play a major role and much regulatory activity has gone into building a framework to reorient capital flows in line with climate goals.

However, this effort is not yet delivering the desired results. The core pillar of the EU sustainable finance framework – the taxonomy – has not established itself as a reference framework in corporate funding or sustainable investing.

While legislative uncertainty has played a role in this, and takeup of the taxonomy may improve in the future, there are also structural reasons to be sceptical that this will happen. The most compelling of these is the lack of a coherent EU framework for transition finance.

The EU sustainable finance framework should be made more easily operational and more effective at delivering the desired alignment of incentives across the real economy and the financial sector. The changes we propose in this *Policy Brief* would be instrumental in achieving that result.

The framework we propose would have the benefit of being applicable to all companies, but most importantly, it would be neutrally applicable across all capital-market instruments and easily extendable into a framework for transition finance and a transparent labelling regime. ■

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Endnotes

1. Answer provided by the European Commission on the interpretation of the SFDR; see ESAs (2024a).
2. Silvia Merler, [‘How should the EU react to the US attack on corporate sustainability?’](#) First Glance, 6 February 2025, Bruegel.
3. ‘Sustainability preferences’ in this context means a client’s choice as to where, and to what extent, they would like to invest in: (i) financial instruments that pursue a minimum proportion of sustainable investments in taxonomy-aligned economic activities; or (ii) financial instruments that pursue a minimum proportion of sustainable investments, as defined in the SFDR; or (iii) financial instruments that consider principal adverse impacts on sustainability factors.
4. It is not clear if the final consumers of investment products do have sustainability preferences. Kölber and Weder (2024) surveyed wealth managers in Liechtenstein and Switzerland and found that on average only 5 percent of their clients expressed a preference for sustainability in the MiFID assessment. But they also found that the share of clients who actually invested in sustainable products was a much higher 40 percent. They suggested data from MiFID questionnaires may be biased towards understating sustainability preferences, as clients want to retain access to a broader range of opportunities. Academic surveys suggest that between 50 percent and 75 percent of investors prefer sustainable investments. See eg. Gutsche et al (2023), Anderson and Robinson (2022), Bauer et al (2021), Engler et al (2024), Heeb et al (2023). Industry research shows sustainable investing is especially strong among younger people. See Bank of America, [‘Will the ‘Great Wealth Transfer’ transform the markets?’](#) undated.
5. See https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en.
6. Undertakings for Collective Investments in Transferable Securities. UCITS are collective investment products easily accessible to retail investors, that can be registered and sold in any country in the European Union using unified regulatory and investor protection requirements. See [here](#) for a summary.
7. Mahmood et al (2023) surveyed €7 trillion of Article 8 and Article 9 funds domiciled in the EU and found that 88 percent of Article 8 funds and 63 percent of Article 9 funds stated no intent to achieve EU taxonomy alignment.

8. Shares have been calculated for the EU economy net of the financial sector, to be comparable with the data shown in Figure 7.
9. Own calculation based on Bloomberg data as of 30 September 2024.
10. See <https://ec.europa.eu/eurostat/web/nace>.
11. In its Common Ground Taxonomy, the IPSF stated that “although EU Taxonomy is based largely on NACE, there is no possibility of directly using single NACE codes in all cases. Many activities cut across several NACE codes, some NACE codes have multiple activities under them and some, such as building construction, are actually applicable across almost any NACE codes sector... Some mitigation activities have no NACE codes” (IPSF, 2022, page 20, footnote).
12. In line with these findings, Mahmood et al (2023) found that only 12 of all EU-domiciled funds invested in companies with aligned revenue of over 60 percent and of these, 10 had a focus on clean technologies and renewable energy.
13. A similar example is available on page 50 of TEG (2020).
14. In a clarification on the definition of ‘sustainable investments’ under the SFDR, the Commission seems to take this view, stating that for investments in companies with some degree of alignment through instruments that do not specify the use of proceeds, FMPs need to check whether the rest of the economic activities of the company comply with environmental elements of DNSH principles. See ESMA (2023b).
15. Catherine Elliot, ‘[SFDR is an IFA Headache, so How Are Advisers Getting on?](#)’ Morningstar, 2 November 2022.
16. See European Commission, ‘[Summary Report of the Open and Targeted Consultations on the SFDR Assessment, 14 September 2023 - 22 December 2023](#)’, undated.
17. See European Securities and Markets Authority, ‘[Answers to questions on the interpretation of Regulation \(EU\) 2019/2088, submitted by the European Supervisory Authorities on 9 September 2022](#)’, undated.
18. In November 2024, the Council of the EU greenlighted a regulation on the transparency and integrity of ESG ratings, but this fails to address the flaws in ratings. See [here](#).

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Disclosures: Silvia is the author of [High Level Group \(2023\)](#), which is referenced in this paper. She works at Algebris Investments, a global asset management firm that is subject to EU sustainable finance regulation. This article is based on [Bruegel Policy Brief Issue n°05/25](#) | February 2025.

Acta, non verba

Alberto Di Iorio, Emilie Fitzgerald, Thomas Lammer, Antonio Perrella, Tara Rice, Federico Semorile and Stefano Siviero call to focus on tangible results interlinking fast payment systems to enhance crossborder payments

Introduction

Safe and efficient crossborder payments can offer benefits to all, through lower costs, faster speed, greater transparency and improved access. These enhancements could be especially beneficial for emerging markets and developing economies (EMDEs), for example, through improved international remittance services or in reducing frictions to further encourage regional trade.

In 2023, the G20 endorsed a prioritised crossborder payments roadmap, building on the foundations laid by the public sector through analyses, stocktakes and guidance in the first years of the programme. As part of the prioritised roadmap, three priority themes have been put forward: payment system interoperability and extension; data exchange and message standards; and legal, regulatory and supervisory frameworks (FSB (2023)).

Improving crossborder payments and reducing the risk of fragmentation through greater integration of payment infrastructures was identified as a key priority of the Italian G7 Presidency in 2024. G7 members discussed and welcomed initiatives to take forward the G20 roadmap and have reaffirmed their support for international cooperation within the G7 and beyond, in particular with EMDEs¹. The support from jurisdictions beyond the G20 is a critical success factor in enhancing crossborder payments for all, particularly those that depend on remittances from family and friends.

Improving crossborder payments should contribute to financial integration and counter the risk of market fragmentation. The G7 supports responsible innovation that enables interoperability among new and existing crossborder payment systems, a level playing field for private sector competition and innovation, and the observance of relevant international standards.

As such, the G7 has emphasised that such solutions should embed values that are widely shared across the international monetary and financial system, including appropriate transparency, the rule of law and sound economic governance.

Among those solutions, payment system interlinking arrangements may deliver significant improvements in a relatively short time. Interlinking arrangements allow banks and other payment service providers (PSPs) of different jurisdictions to transact safely and efficiently with each other, without requiring them to participate in the same payment system, and they can reduce the need to use intermediaries (eg. correspondent banks).

The CPMI is committed to delivering on its roadmap actions and will focus on those actions that can support end users that are most disproportionately affected by inefficient crossborder payments

Such arrangements can shorten transaction chains, reduce overall costs and increase the transparency and speed of payments. Building on the findings from engagement with public and private sector stakeholders, the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI), together with the G7 Presidency, organised a conference to expedite the interlinking of fast payment systems (FPS) in July 2024. This CPMI Brief summarises the high-level findings of the conference.

Current state of FPS interlinking

Linking FPS has been identified as a priority action to enhance crossborder payments by the G20 and a number of FPS operators have shown interest in establishing links. Progress on technical interoperability and governance are paving the way to establish safe and efficient links among FPS at scale.

Successful FPS links have certain design principles in common, including commercial viability and scalability. Additionally, taking a long-run view of possible technological advancements and the future requirements of a digital economy is deemed equally important (CPMI (2023a)).

Several FPS already have a crossborder interlinking arrangement, and these links are predominantly intraregional, such as within the Asia-Pacific region or Europe². Around half of FPS plan to have at least a first or additional link established by the end of the year. Those FPS that currently do not have any plans to establish interlinking arrangements often want to first prioritise promoting greater adoption of fast payments domestically to reap the benefits of interlinking initiatives in the longer term.

The interlinking model chosen often depends on business case considerations, and the types of currencies and legacy systems involved³. For example, a hub and spoke model may be beneficial to connect regional blocks,

whereas common platforms may work well for jurisdictions that want to transact in a common currency. Most of the current interlinking initiatives are through bilateral links.

In the medium term, multilateral arrangements such as hub and spoke arrangements or common platform solutions are likely to gain more traction. However, there is likely to be a continued and important role for bilateral links in facilitating trade over particular high-volume corridors or payment use cases.

Domestic and regional fast payment systems

Designing, implementing and operating an FPS is a complex but surmountable task. The number of FPS continues to grow, but countries have taken different approaches to designing FPS, depending on central bank mandates, societal preferences and technological developments. For example, in some jurisdictions, the public sector – typically led by central banks – plays a more active role by owning and operating the FPS.

In others, the private sector operates the FPS. Some FPS allow non-bank PSPs to be a participant, but others do not. Many interlinking arrangements, for the time being, rely on correspondent banks as providers of foreign exchange (FX) services.

Multi-currency arrangements, which process more than one currency in parallel, or cross-currency arrangements providing FX conversion, are still the exception. This variety of options is also present in the settlement procedures, ranging from deferred net to real-time gross settlement – the type of use cases supported also varies.

The impressive fast payments adoption in many EMDEs can be explained by their service design as a low-cost, user-friendly alternative to cash. Fast payment systems have become an important tool to increase financial inclusion and are a key component of domestic payment system reforms in many jurisdictions.

These developments have the potential to bring many people into the formal financial system, particularly when complemented by broad financial capacity-building initiatives. Learning from the success stories of EMDEs and understanding their requirements will help to raise the bar for crossborder payments overall.

Several regional payment infrastructures are in operation or under development, many of which form part of a broader regional economic strategy. A key success factor has been leveraging the support of central banks and other public authorities and creating trust among participating PSPs by demonstrating consistent performance and reliability.

Some overlaps currently exist between regional initiatives, and others will emerge with increasing integration of payment systems across borders. In many cases, this offers an opportunity to bridge gaps between different regions or cover different use cases and/or corridors. However, overlapping regional initiatives may also present several challenges, such as competing for participation and volumes, or leading to inefficiencies in terms interoperability and liquidity management.

While a certain level of fragmentation is unavoidable due to geopolitical and other reasons, the challenges of regional integration can be minimised by setting up interlinking arrangements that are not restricted to possible further international expansion.

Interoperability as a facilitator for interlinking

Updating domestic payment systems is also an investment in enhanced crossborder payments, since the first and last mile of these payments is typically processed domestically. Enhancing the safety and efficiency of domestic FPS, in terms of their functionality, use of messaging standards and alignment with compliance requirements, will also contribute to their readiness to join multilateral arrangements if, and when, the opportunities arise.

The growing global adoption of the international financial messaging standard ISO 20022 by payment systems and financial institutions offers the prospect of greater interoperability, with benefits for crossborder payments. Inconsistencies in the implementation and use of ISO 20022 for crossborder payments risks undercutting some of its benefits.

To address this fragmentation, the CPMI published harmonised data requirements for ISO 20022 messages for crossborder payments. These data requirements establish a consistent minimum set of data to be used in a crossborder payment transaction end to end (CPMI (2023b)). Given the rapid transition to ISO 20022 messaging under way, the coming years will be crucial for harmonising its use to fully leverage its potential for crossborder payments.

Application programming interface (API) protocols are arguably even less harmonised than ISO 20022 data models, impeding interoperability and reducing the potential benefits of their implementation. Supporting greater harmonisation of APIs has thus been identified as a priority for achieving cheaper, faster, more transparent and accessible crossborder payments. The CPMI, together with market stakeholders, has developed recommendations for greater API harmonisation (CPMI (2024a)).

Issues of compliance screening and fraud prevention are highly relevant in the realm of crossborder payments. FPS interlinking could potentially reduce the complexity of the payment chain, due to reducing the number of intermediaries required to complete a payment.

However, the real-time nature of FPS interlinking arrangements may heighten the pressure of compliance processing. There are opportunities to leverage new technologies such as artificial intelligence and network

analytics for fraud detection, and harmonised data and messaging frameworks to improve transparency in crossborder payment arrangements.

Interoperability can also be achieved by leveraging existing solutions, thus reducing regional and global fragmentation. A notable case is the implementation of a 'clone' of the Eurosystem FPS TARGET Instant Payment Settlement (TIPS) by several Western Balkan jurisdictions as their domestic FPS, rather than developing a solution from scratch⁴.

'Cloning' could allow jurisdictions to benefit from a 'service approach' without having to technically operate the platform themselves, while maintaining full control of the business side and benefiting from any future enhancements. Due to jurisdiction-specific regulations, technology and other factors, 'cloning' may not be feasible in many other cases, but the concept of reusing modules or the functionality of other payment systems could be applied more broadly.

Technical assistance and funding support

Technical assistance and capacity-building play a critical role in helping to achieve the G20 targets and are important to support the development of fast payment systems that would pave the way for future interlinking. The International Monetary Fund (IMF) and the World Bank have developed a multi-year strategy to provide technical assistance and are committed to coordinating and collaborating on initiatives for enhancing crossborder payments wherever possible and appropriate (IMF and World Bank (2023)).

Recent and ongoing technical assistance by the IMF and the World Bank supports the three interconnected priority themes of the G20 roadmap. Having complete and reliable data is important to identify which frictions are most

relevant in each jurisdiction, as there can be significant variation in the cost and speed of payments. These data can also assist with attracting the necessary funding, requesting technical assistance and prioritisation by policymakers.

The African continent has been identified as a region for additional focus and support from international organisations. Recent technical assistance has focused on domestic enhancements, mainly on legal and regulatory frameworks, implementing standardised messaging and opening payment systems to non-bank players. These enhancements at a domestic level should lay the foundations for later improvements to crossborder payments.

Roles for the public and private sectors

Public and private sector commitment and recent advancements in technology can help address some of the risks, barriers and challenges. Especially in the start-up phase, integrating payment systems across borders will require decisive leadership. Decision-makers have a variety of options for the development and integration of payment infrastructure and should consider the roles that the public and private sectors can play.

Current initiatives typically involve only a small number of stakeholders. Actions that require more significant coordination, investment and effort have yet to start in many cases. The reasons for this can be resourcing and budget constraints resulting from competing priorities in the payments landscape.

Further, the consultation and outreach required to secure industry buy-in for major initiatives can be slow and require significant effort. The difficulty of finding jurisdictions with which to partner on multinational initiatives and dependency on regulatory and supervisory reforms should not be underestimated.

A strong role for the public sector and cooperation with private sector actors that share the objectives, could be a key enabler for crossborder payment system integration. Central banks are positioned to examine which projects will help to enhance crossborder payments, taking into consideration the initial conditions and constraints.

Central banks may act as a catalyst for development and innovation, and step in when there are gaps or coordination failures in the market, as is done for domestic payments. This role for the public sector is likely to become even more important for crossborder payments due to the number of stakeholders involved.

Cooperation with the private sector is also critical to fast payments adoption and the success of FPS interlinking arrangements. As a prerequisite, there must be adequate market demand for the arrangements. In some jurisdictions, the private sector may lead the development of the infrastructure for a crossborder arrangement, either for its own benefit or due to incentives. If this is not the case and the public sector steps in, maintaining a role for the private sector, such as in FX settlement, can help to ensure the commercial viability and adoption of the arrangement.

Conclusion

As the number of domestic FPS grows, opportunities are emerging to facilitate the crossborder interlinking of safe and efficient FPS. Work is under way in many jurisdictions to enhance FPS readiness to participate in such links, particularly to improve their functionality and align with messaging and compliance standards. Successful links to date have prioritised interoperability and smoothly managed coordination between the public and private sectors and among jurisdictions.

It is expected that FPS links in the near term will continue to be based on bilateral links, while over the longer term, these may coexist with more open and future-proof multilateral arrangements. Over time, the market will likely evolve to link between regional groupings.

High-quality data at the jurisdictional level can help to gain useful insights for the planning and establishment of interlinking arrangements. Having complete and reliable data allows for attracting necessary funds, requesting

technical assistance by international organisations and prioritising projects with the greatest potential. Also, learning from the experience of first movers will help jurisdictions to navigate the complexity of establishing interlinking arrangements, particularly while they continue to manage other priorities.

In recent years there has been extensive progress towards interoperability, through the definition of harmonised data requirements for ISO 20022 messages (CPMI (2023b)) and the forthcoming recommendations for greater API harmonisation (CPMI (2024a)).

Similarly, substantial progress has been made to define recommendations that, if implemented, would help to build a sound governance framework as well as applying the right oversight approaches in a multi-jurisdictional scenario (CPMI (2024b)).

This work, together with technical assistance provided by the IMF and World Bank, will allow further development and greater interoperability in the payment system landscape and contribute to the readiness of FPS for future interlinking arrangements.

Over 2025, the CPMI is committed to delivering on its roadmap actions – and will focus on those actions that can support end users that are most disproportionately affected by inefficient crossborder payments. The CPMI will redouble its efforts to promote implementation at the jurisdictional level.

In addition, the CPMI will emphasise two strategic initiatives, particularly for regions furthest away from the targets, especially in sub-Saharan Africa. The first initiative will focus on safety and transparency. Confirming the payee before a payment is initiated contributes to transparency and can avoid many challenges down the road. APIs offer

the potential to roll out confirmation of payee solutions broadly. The CPMI and the South African G20 Presidency will bring existing initiatives together and identify their commonalities.

The second initiative will seek to gain insights into crossborder payment flows in sub-Saharan Africa, their performance (eg. cost and speed) and underlying frictions (eg. access and transparency), which might also be relevant to other regions. The aim is to identify implementable actions to improve the data quality of crossborder payments. ■

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Endnotes

1. G7 Finance Ministers and Central Bank Governors (2024).
2. Based on the results of the 2023 CPMI crossborder payments monitoring survey, which covered 45 FPS, 30% of FPS have some form of interlinking arrangement in place (Fitzgerald et al (2024)).
3. The interlinking model can be categorised into four stylised models: single access point, bilateral link, hub and spoke, and common platform (CPMI (2022)).
4. On 7 June 2024 the European Central Bank Governing Council approved the Bank of Italy, acting on behalf of the service-providing Eurosystem central banks, to provide a clone of the Eurosystem TIPS platform to the central banks of Albania, Bosnia and Herzegovina, Kosovo, Montenegro and North Macedonia.

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GVCs in an uncertain world

After a long period of rapid globalisation, the openness of the world economy has stagnated. Marius Faber, Gleb Kozliakov and Dalia Marin argue that increased uncertainty, coupled with ever more capable automation technologies, has likely contributed to this trend break

Globalisation has come to a halt since the global financial crisis (GFC) in 2008 (Figure 1, black line). Trade as a share of GDP rose by more than one percentage point per year in the period of hyper-globalisation between 1990 and 2008, but has since entered a period of stagnation. This slowdown can, in large part, be attributed to a halt in the growth of intermediate goods trade between the developed and developing world.

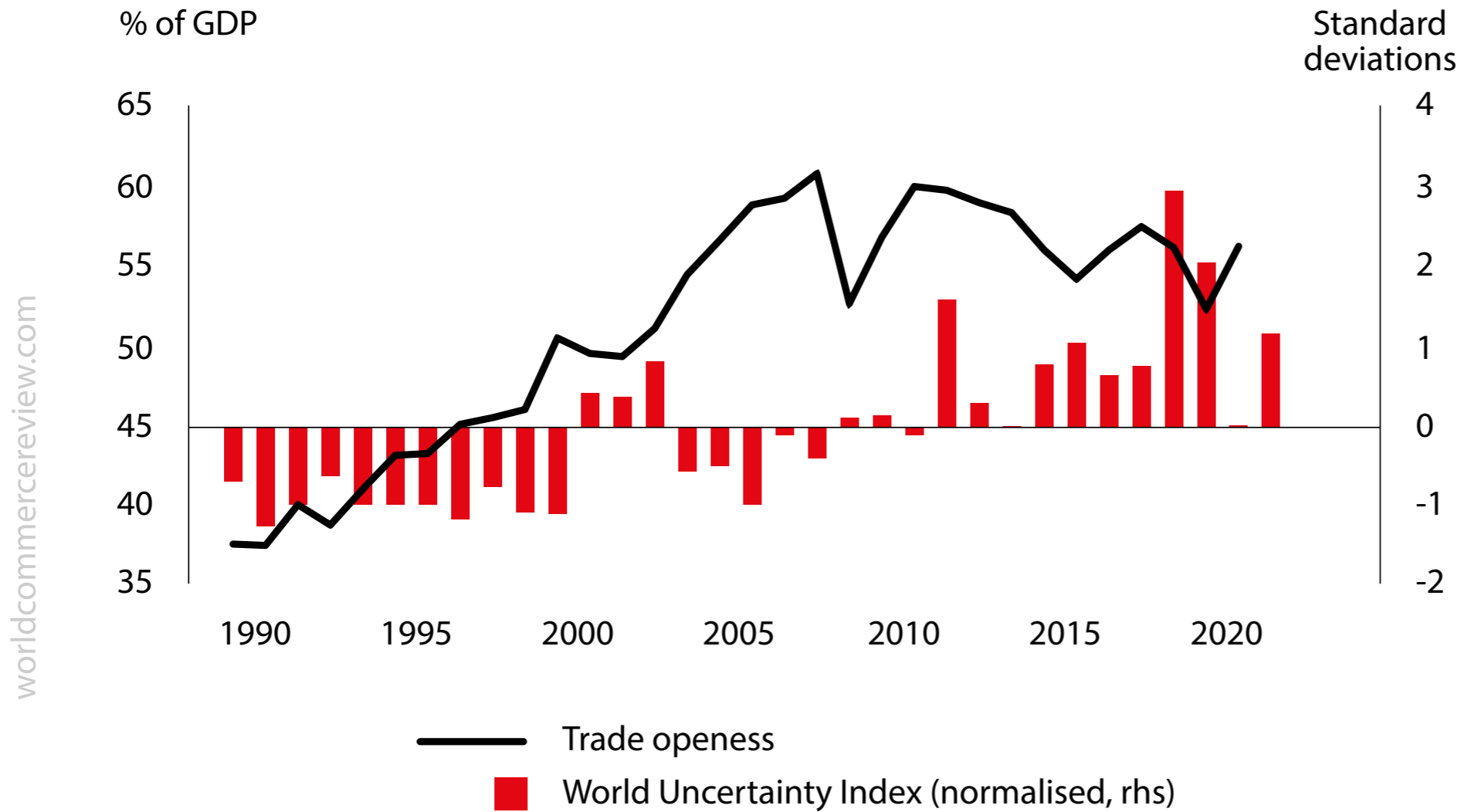
Between 2000 and 2007, the share of total inputs sourced from developing countries has almost tripled, corresponding to an average annual growth rate of about 15%. But with the GFC, this rapid expansion ended abruptly, followed by a period of decline.

While many factors may have been at play (Baldwin 2022), two major developments have likely contributed to the declining globalisation since the GFC.

First, economic uncertainty shocks have become larger and more frequent, partly owing to stronger international trade linkages. Examples are the European debt crisis from 2011 to 2014, Brexit in 2016, the US-China trade war since 2018, and the COVID-19 crisis starting in 2020 (Figure 1, red bars). After experiencing the risks associated with high exposure to trade, firms may have started to reconsider their relationships.

Second, automation technologies have made substantial advances and can now perform a range of tasks that were previously offshored. Moreover, in their effort to fight low inflation, central banks have ensured extraordinarily favourable financing conditions after the GFC, effectively lowering the cost of capital relative to labour (Marin and Kilic 2020). This has made it especially attractive for firms to invest in ever more capable, domestically installed automation technologies rather than employing foreign labour as a means of production.

Figure 1. Trade openness and World Uncertainty Index since 1990



Notes: Trade openness is measured as the sum of exports and imports as a share of GDP. The World Uncertainty Index (WUI) is computed by counting the share of words that are either 'uncertain' or a variant of it in the Economist Intelligence Unit country reports.
Sources: World Bank; Ahir et al (2022).

While it seems plausible to assume that uncertainty and automation reduce globalisation, their impacts are, in fact, theoretically ambiguous. Regarding uncertainty, the direction of the effect depends partly on whether firms view the domestic or the foreign economy as more prone to shocks (Grossman *et al* 2023). Regarding automation, the direction of the effect depends largely on the relative strength of the (negative) displacement and the (positive) productivity effect (Acemoglu and Restrepo 2020, Artuç *et al* 2023).

The slowdown in globalisation has been intensified by uncertainty shocks, on the one hand, and the option to automate production on the other

Empirical strategy

Because of this theoretical ambiguity, in a recent paper (Faber *et al* 2024) we empirically estimate the effect of uncertainty on reshoring – and the role played by automation in facilitating it. We consider 18 developed countries, 17 developing countries, and 19 industries in the period between 2000 and 2014.

In our empirical strategy, we exploit the fact that country-industry pairs were differentially exposed to uncertainty shocks in the developing world between 2000 and 2014 because of their pre-existing trade relationships in 2000¹.

We argue that our (shift-share) measure of exposure to developing countries' uncertainty induces plausibly exogenous variation in uncertainty as (1) uncertainty shocks in developing countries are unlikely to be caused by reshoring decisions in the developed world; and (2) it is based on pre-determined country-industry-level trade patterns, alleviating concerns related to simultaneity. To explore the role played by automation, we ask whether this relationship differs by the degree to which tasks in each industry are replaceable by industrial robots².

Main results

Higher uncertainty leads to more reshoring, but only in highly robotised industries. Our results show that higher uncertainty in developing countries increases the relative use of domestic inputs, but only in highly robotised industries. This suggests that reshoring in response to uncertainty in developing countries seems to become economically feasible if tasks can be performed (at relatively low cost) by a domestically installed robot. Our point estimate implies that an uncertainty shock of one standard deviation in connected developing countries increases the relative use of domestic inputs by about 7%.

Firms appear to move production in-house, rather than rely more on domestic suppliers. Next, we want to know whether our measure of reshoring (domestic inputs/imported inputs from developing countries) increases

as a result of more domestic inputs, fewer imported inputs, or both. Results show that the reshoring response to an uncertainty shock comes entirely from fewer imported inputs from the developing world and not from more domestic inputs.

This suggests that firms reorganise and move input production in-house, instead of relying on other domestic input suppliers when faced with higher uncertainty. One possible reason for this reshoring response is that firms want more control in uncertain times. Another is that it is costly to find new suppliers if firms need to invest in a supplier relationship, and moving production in-house may be the less costly alternative (Antràs and Helpman 2008).

The reshoring response triples after the GFC. To examine whether reshoring occurred in particular after the GFC, we rerun our preferred specification but split the sample into two subperiods: the pre-GFC and post-GFC periods. Results show that the reshoring response to uncertainty more than triples after the GFC.

Possible reasons are higher risk aversion following the traumatic experience after the GFC, advances in automation making robots more efficient, and the low interest rate environment making investment in robots more attractive relative to hiring workers.

Reshoring response is not driven by single countries or industries. Next, we want to examine whether our results are dominated by a single hub of global value chains (GVCs) like the US or Germany. Our results do not change when we individually exclude each high-income country or each industry. Moreover, the results do not appear to be solely driven by the automobile sector as has been often argued (Freund 2022).

Higher uncertainty does not lead to more diversification. In theory, it may be optimal for firms to respond to higher uncertainty also by diversification, ie. to import inputs from a larger set of locations, to ensure that supplies are still available even if one location is shocked.

To test for this possibility, we construct a Hirsch-Herfindahl measure of foreign supplier concentration. Results show, however, no significant impact of developing countries' uncertainty on diversification, suggesting again that the cost of finding new suppliers may be quite high.

Major threats to identification

Our results are robust to several threats to identification, including reverse causality and the most important ones arising from shift-share instruments. We address concerns about reverse causality first. Reshoring by developed countries may affect uncertainty in developing countries rather than the other way around. We use two alternative identification strategies to tackle this concern.

First, in a 'narrative approach', we use only locally generated spikes in uncertainty, for which the narrative for why the spikes happened suggests that the event was plausibly exogenous to reshoring decisions in developed countries. We then use only uncertainty changes for which we have identified a plausibly exogenous spike in uncertainty and set all other changes to zero when constructing the exposure to uncertainty in developing countries variable. Our estimates remain virtually unchanged, suggesting that our results are not biased by reverse causality.

Second, in a 'small open economy approach', we exclude the five largest developed country destinations for developing countries' inputs (the US, Germany, South Korea, France, Italy). These account for almost 70% of all imported inputs from developing countries. The idea is that small developed countries have a lower potential to cause substantial uncertainty in developing countries than large ones.

We then rerun our preferred specification with data excluding these large developed countries. Reassuringly, results remain unchanged. Overall, this reinforces our view that our results are unlikely to be driven by reverse causality.

Finally, we test for threats to identification in shift-share designs. Following Borusyak and Hull (2023) and Adão *et al* (2019), we show that our uncertainty shocks are as good as randomly assigned and not driven by noise.

Conclusion

Our research shows that the slowdown in globalisation has been intensified by uncertainty shocks, on the one hand, and the option to automate production on the other. Cost savings from offshoring to low-wage countries have become smaller as various uncertainty shocks have increased the risk of default of input delivery.

Sectors able to substitute the tasks of developing countries by domestic robots reshore production to their home countries. Reshoring in-house rather than to domestic input suppliers in other industries appears to dominate among the different reshoring strategies.

Having control appears to become more valuable when firms realise that the world has become an ever-riskier place. An important implication of our results is that major forces weighing on globalisation had already started well before the re-election of Donald Trump, suggesting that the slowdown of globalisation is not simply due to recent geopolitical events. ■

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Endnotes

1. We measure uncertainty using the World Uncertainty Index (WUI) by Ahir et al (2022). The WUI counts the share of the word 'uncertain' (or its variants) in the Economist Intelligence Unit country reports.
2. Our measure of automation is based on robot replaceability developed by Graetz and Michaels (2018). It is defined by whether an industry can be classified as requiring tasks that may be performed by robots.

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A man in a blue jacket and jeans is riding a bicycle with a basket full of items. He is in a city with heavily damaged, multi-story apartment buildings in the background. The scene is dark and somber, reflecting the aftermath of conflict.

Completing Ukraine's reconstruction architecture

The Russia-Ukraine war may end this year and reinforces the necessity of planning Ukraine's post-war reconstruction. Barry Eichengreen and Vladyslav Rashkovan take stock of what has been accomplished so far and what still needs to be done

There is an increasing flow of news that the brutal Russian war in Ukraine may end this year, which reopens discussion on the necessity of planning Ukraine's post-war reconstruction. Indeed, planning for reconstruction, to be effective, should get underway even before the conclusion of hostilities.

With this in mind, in 2022 we wrote a Vox column on how to organise aid for Ukraine (Eichengreen and Rashkovan 2022). So, it is time to take stock of what has been accomplished and sketch a way forward, especially considering that later this year several meetings on this topic are planned – from the Wilton Park conference in London in March to the Ukraine Recovery Conference (URC) in Rome in July.

Our 2022 column offered four specific proposals: (1) establish an agency to coordinate reconstruction efforts; (2) create a master multi-donor trust fund; (3) establish priorities for reconstruction; and (4) create a donor coordination mechanism.

Despite continued Russian aggression, multiple developments relevant to Ukraine's reconstruction have occurred since then, some in line with our recommendations.

For one, an agency for restoration was [created](#) in January 2023, shortly after our column. This was a Ukrainian agency, however, not a joint EU-Ukraine effort as we recommended. In addition, it was not a brand-new organisation but based instead on an old government agency responsible for building roads. Yet, despite this limited expertise, it started playing an important role in the effort to repair war damages and plan for reconstruction.

Following the [G7 leaders' decision](#) taken on 12 December 2022, a multi-agency donor coordination platform to support Ukraine's reconstruction (now formally the [Ukraine Donor Platform](#), or UDP) was established in January

2023. The UDP platform has brought together 23 permanent and temporary members and observers, with seven international financial institutions and organizations participating in its work. It has a [secretariat](#) in Brussels and Kyiv.

Its Steering Committee has already [met 12 times](#). While the platform organisation and work are far from superb, it is very positive fact that a dedicated group of experts meets regularly to discuss the organisation of support for Ukraine in a structured, institutionalized, coordinated way.

We believe that the Ukraine Development Bank could initially function as a trust fund, operating for example under the umbrella of the World Bank but as a separate legal entity (effectively, a financial intermediary fund) with its own governance steered by key donors

The Ukraine Co-Investment Platform, established by the development finance institutions (DFIs) of the G7 countries and the European Bank for Reconstruction and Development (EBRD) in May 2023, is another good example of coordination in support of Ukraine's reconstruction.

In June 2023 the platform was [enlarged to 19 members](#) via the addition of the European DFIs, thereby creating the EBRD-G7 DFI-EDFI Ukraine Investment Platform. It has been agreed that the EBRD, as the largest institutional investor in Ukraine, will act as the lead institution responsible for underwriting of financing under this platform.

Ukraine's IMF programme, [approved in March 2023](#), acts as a catalyst for international budget aid and provides a framework for reconciling reconstruction spending with macroeconomic stability. The programme, [supported by US\\$148 billion in financing assurances](#) from the G7, the EU and other donors, has been designed to solve Ukraine's balance-of-payment problem and restore medium term external viability. This is important insofar as macrofinancial stability is a vital prerequisite for reconstruction.

The IMF programme's conditionalities are also aligned with Ukraine's own aim of EU accession. Indeed, Ukraine has already made progress on this accession agenda. The country received candidate status in June 2022. The European Council decided to open [accession negotiations](#) with the country in December 2023, and the first intergovernmental conference marking the [formal launch](#) of the accession negotiations was held on 25 June 2024. Given the pace of progress, the Ukrainian authorities are [eyeing entry into the EU](#) by 2030.

In all, over the first three years of the war Ukraine received budget support from international partners of nearly US\$120 billion. US\$78 billion of this has come since the start of the IMF programme in 2023. The €50 billion EU facility for Ukraine [approved in February 2024](#) and US\$50 billion [Extraordinary Revenue Acceleration](#) (ERA) mechanism to be financed using revenues from immobilised Russian assets, agreed by the G7 leaders during the

Apulia summit in June 2024, are byproducts of the three aforementioned developments: the donor coordination platform, the IMF programme, and Ukraine's path to EU accession.

Finally, in 2022, in preparation for the IMF programme, Ukraine with support from the World Bank undertook a [comprehensive assessment](#) of its public investment management framework (a PIMA assessment) (Shcherbyna *et al* 2023). The PIMA became the basis for set of recommendations under the [IMF programme](#), including building a robust screening process for the investment projects, creating a formal framework for prioritising capital spending items, establishing a [single projects pipeline](#) (SPP) for investment projects, and creating a [Strategic Investment Council](#) for their approval and integration into medium-term budgeting planning.

These are all steps towards a more transparent and thoughtful approach to reconstruction. Further steps should include the creation of project preparation facilities (PPFs) and project implementation units (PIUs) to improve the quality of the projects proposals and their implementation.

The latest Rapid Damage and Needs Assessment (RDNA4) report (World Bank 2024) has provided estimates of direct war damages (\$176 billion) and overall reconstruction needs over the next ten years (\$524 billion). Unfortunately, such numbers are moving targets; they will have to be updated as the war proceeds.

In addition, the reconstruction needs assessment should be a function of more than wartime damages, it should be based on the country's vision of post-war Ukraine. Such a vision should assume not only 'building back better' but also 'building back differently', reflecting closer future ties to the EU, more clarity on the location of controlled borders, and pragmatic estimation of the country's postwar population.

Disappointingly, recent donor conferences in [Lugano](#) (2022), [London](#) (2023), and [Berlin](#) (2024) have not encouraged such a vision or elicited much actual aid for reconstruction. So, the next major donor conference in [Rome](#) in July should be an occasion introducing these and other missing elements.

First, Ukraine needs a more transparent and coherent tracking system for reconstruction aid. The Kiel Institute has stepped into the breach, building the [Ukraine Support Tracker](#) currently used by media sources. But this system tracks aid commitments only in military, budgetary and humanitarian areas, and doesn't focus on reconstruction.

The tracker relies on open-source news; its estimates are not reconciled either by donors or the Government of Ukraine. With a proper, certified support tracker, it would be possible to avoid disputes like the recent one on US aid to Ukraine.

Establishing a robust system of reporting, performance metrics, and regular auditing could help sustain donor trust and ensure efficiency for the reconstruction process. A [proper digital system](#) could be built by the UDP based on the Kiel Institute database and methodology and merged with a project-based monitoring system in Ukraine (Fengler and Rashkovan 2024), such as the already existing [Digital Restoration Ecosystem for Accountable Management](#) (DREAM).

Done properly, a centralised data and information-sharing platform accessible to donors, stakeholders, and implementing entities would enable effective tracking of projects, financial flows, and impact assessments, while enhancing quality of further reconstruction decisions.

Second, over time, the UDP itself could evolve into an Economic Cooperation Administration-type institution – the ECA having been the administrator of the Marshall Plan (Eichengreen 2022). Instead of periodic ad-hoc meetings

of donors, with a hundred plus attendees, better would be to create a permanent institution with centres in Europe and Kyiv, with a permanent staff focused on developing a vision and strategy for reconstruction.

Aid is essential, but ownership of the reconstruction process should be in hands of Ukraine. Only Ukraine itself can determine its future and define a vision of the country it wants to build after the war (Berglöf and Rashkovan 2023). But an institution (perhaps named the Ukraine Reconstruction and Modernisation Agency, or URMA), jointly owned, overseen, and co-led by donor governments and representatives of the government of Ukraine, could serve as a final coordinator of all financial aid, technical assistance, and expertise in support of reconstruction.

URMA could relax capacity constraints by providing international experts and training local counterparts for standing PPFs and PIUs, providing information from individuals on the ground at the regional level to those responsible for the SPP.

After WWII, the ECA administered the financial flows of the Marshall Plan through a coordinated funding and procurement mechanism. URMA could similarly oversee dedicated financial instruments (such as trust funds, guarantees, loans, grants, and blended finance) managed in partnership with multilateral banks and bilateral donor agencies and platforms, such as the EBRD-G7 DFI-EDFI Ukraine Investment Platform.

Similar to the role played by ECA 80 years ago, URMA could develop strategic initiatives specifically targeting private sector development, encouraging foreign direct investment, and improving Ukraine's postwar market access.

Mirroring the experience of another institution built to facilitate the Marshall Plan implementation – the Organization for European Economic Cooperation (OEEC) – URMA could create specialised technical working

groups in key sectors such as housing, transport, energy, digital infrastructure, and agriculture, each staffed jointly by international and local experts.

These groups would facilitate detailed planning, knowledge transfer, and synchronisation across reconstruction projects. OEEC's model of combining high-level policy coordination with detailed operational committees should be followed.

A clear division between strategic oversight (policy, funding approval) and operational management (implementation, technical assistance, day-to-day oversight) would streamline decision-making and improve efficiency in the course of a long reconstruction process.

Finally, a CEPR report issued in 2024 (Carletti *et al* 2024) proposed the creation of a Ukraine Development Bank (UDB). We believe that the UDB could initially function as a trust fund, operating for example under the umbrella of the World Bank but as a separate legal entity (effectively, a financial intermediary fund) with its own governance steered by key donors.

Its primary role would be to mobilise, allocate, and manage financial resources aimed at accelerating Ukraine's economic reconstruction and modernisation. A 'coalition of the willing' – predominantly EU and G7 countries – could provide the initial capital for UDB.

On top of that, UDB could be jointly co-financed by the major DFIs involved in the Ukraine's reconstruction, for example, by the members of the EBRD-G7 DFI-EDFI Ukraine Investment Platform. Proceeds from confiscated Russian sovereign assets could be another source of its capital and funding.

Beyond initial shareholder contributions, additional capitalisation could come through innovative financing mechanisms, including borrowing against anticipated revenues from Ukraine's substantial reserves of rare earth minerals and other critical raw materials.

Recent international interest in Ukraine's resource potential underscores the feasibility of such an approach. This forward-looking financial strategy would enable Ukraine to leverage future resource extraction to immediately support critical infrastructure and economic projects.

The UDB's governance structure should balance efficiency, transparency, and accountability, involving management and oversight from international donors and partners and Ukrainian authorities and. Close coordination with the URMA would be essential to ensure that funded projects align closely with national reconstruction vision and priorities, and broader development objectives.

Furthermore, the UDB could serve as a catalyst for private sector investment, providing guarantees and co-financing instruments that lower risks and encourage private capital inflows into strategic sectors. Clearly, there is much to do, and it is past-due time to do it. ■

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The compliance challenges to come

The imposition of concerted sanctions against Russia has changed the global sanctions landscape. Henrietta Worthington examines the impact of a peace deal, and says companies will need to watch closely to ensure compliance

The imposition of concerted sanctions against Russia has changed the global sanctions landscape and the interconnection of the global economy. The sheer scale and breadth of the sanctions imposed is striking, and has been described as a 'modern form of economic and technological warfare', with the measures taken by the sanctioning nations coordinated, novel and unprecedented.

The complexities of unpicking Russia's integration in the global economy cannot be overstated. Companies have spent considerable resources over the past three years updating their internal processes and amending their business practices to ensure compliance. The real question now is what a peace deal may mean for companies caught between the swathes of sanctions restrictions.

The EU, UK, US and other allies have acted to impose coordinated sanctions on Russia in a way that has never been seen before, with the intention of allowing the sanctions to have a powerful 'bite', reducing the ability to 'jurisdiction shop' and creating a noteworthy impact on the Russian economy.

The approach was complex and considered. Europe's reliance on Russian energy; the opposing geopolitical considerations of the sanctioning nations; and Russia's position as a significant global economy with substantial oil, gas and critical metal reserves meant that the task of imposing the layers of sanctions was challenging. Lawmakers had to strike the balance between a sanctions package that had sufficient bite, whilst not triggering economic chaos.

Coordinated approach

The response against Russia's actions was the largest ever coordinated use of sanctions as a coercive economic weapon. Achieving consensus on these measures was no mean feat. Each sanctioning nation had its own foreign

policy objectives and legal framework to contend with. They also had to consider the stability of the global economy and whether some of the more significant measures might unsettle the markets.

Indeed, the measures have taken much of the blame for spikes in global oil and gas prices, and the imposition of a total embargo was not possible due to the integration of Russia in the global economy, and therefore some exceptions were required whilst still delivering a substantial blow.

The sanctions imposed against Russia in response to its invasion of Ukraine represent a coordinated allied economic force that has not been seen before

Each jurisdiction had its own agenda. The UK had become home to a sizable amount of illicit Russian wealth. Germany had announced that it was phasing out nuclear power and was increasing its reliance on Russian gas. At the time of the Ukraine invasion, Germany relied on Russia for almost half of its gas imports. Canada had the world's second largest Ukrainian diaspora after Russia.

However, the G7 nations were largely able to agree upon waves and waves of coordinated sanctions against Russia. Naturally, whilst there was largely alignment on the measures imposed, the nature of the distinct legal frameworks led to a level of fragmentation in implementation and effect. Companies active across the various jurisdictions have to pore through the minutiae of the restrictions to ensure strict compliance.

New measures

The sanctioning nations also acted to introduce novel restrictions, which often left companies grappling to understand the measures and how to adhere to their compliance requirements. Tools such as the designation of sanctioned individuals and entities are well-established as a coercive economic measure.

Whilst this has never been used to sanction so many targets in a particular jurisdiction - currently almost 2,400 individuals and entities are sanctioned under the EU's Russian sanctions regime - its effect and how to comply is understood. It undoubtedly has its own complexities in terms of compliance, with issues such as determining ownership and control in often murky ownership structures, coupled with the nuanced tests between jurisdictions, but ultimately compliance teams are aware of the steps that need to be taken.

As the war raged on, the EU in particular began considering new tactics to bolster its existing sanctions packages, with a focus on anti-circumvention. In recognition that there was still significant leakage of high priority items into

Russia, the EU introduced a requirement for EU exporters of specified items such as aircraft and jet fuel to include a 'no re-export to Russia' clause in their contracts: the so called 'No Russia clause'.

This new legal requirement also applies retrospectively, meaning that EU operators were required to amend existing in-scope export contracts. This created a sizeable administrative burden on companies that had to re-open existing contracts to ensure legal compliance.

The EU's efforts also included the development of two new sanctions regimes relating to Russia. In May 2024, it introduced a standalone sanctions regime aimed at targeting those responsible for human rights violations in Russia. Whilst this measure is not specifically related to Russia's actions in Ukraine, it provides broad powers for the EU to make designations and restrict the transfer of equipment and associated technology that may be used for internal repression activities.

It is intended to complement the EU's existing human rights regime, and is significant in the fact that it is the first country-specific framework of this kind. Further bolstering its arsenal against Russia, in October 2024, the EU imposed another new sanctions regime relating to Russian hybrid threats. The new regime allows the bloc to target companies and individuals engaged in destabilising activities, including undermining democratic political processes, and malicious cyber activities.

Old measures, new muscle

Measures such as the disconnection of the largest Russian banks from the SWIFT international financial messaging system had been used before. SWIFT is used to facilitate international payments, so the banning of strategic banks makes it harder to move money in and out of Russia. This measure had also been deployed against Iranian banks

in 2012, but its impact is undoubtedly greater in the context of Russia due to its integration in the global financial system. SWIFT is a Belgian entity, and therefore it was the EU who had to impose this measure.

However, given European reliance on Russian gas, certain smaller Russian banks were allowed to continue to operate on SWIFT to facilitate payments for gas supplies. The EU also later banned the use of the 'System for Transfer of Financial Messages' (SPFS) of the Central Bank of Russia.

The coordinated immobilisation of Russia's Central Bank reserve holdings is significant. It is estimated that €210 billion worth of assets is currently frozen in the EU. Again, this measure had been used before, for example by the US against Afghanistan in 2021.

Russia's position in the global economy and the aligned approach taken by the G7 nations has given this tool considerable bite. No major central bank has ever been blocked in this way. The ramifications are hard to predict in terms of their effect on the global economy, but the impact of this coordinated measure is substantial. However, as was the case for many of the measures taken, this action is not without its drawbacks.

Critics of the action claim that it may undermine the significance of the dollar, euro, pound and yen in the global economy, creating uncertainty about the safety of these currencies and provoking nations to reconsider the risks of economic interdependence.

What could a peace deal mean for sanctions?

Current signs indicate that there is appetite in the US to roll back on at least some of its sanctions against Russia. It has been reported that the US is already reviewing its current sanctions package with a view to what relief it can provide to Russia.

It is more likely that Europe will maintain its firm position. Where companies have been impacted by the nuances between the different sanctions regimes in response to Russia's invasion of Ukraine, a US withdrawal from the sanctions block would have far more severe compliance challenges. Companies caught between regimes would have to carefully balance the value of doing business in Russia against the legal [and reputational] challenges.

The only real comparable scenario is the conception of the Joint Comprehensive Plan of Action (JCPOA) which provided for the coordinated easing of sanctions against Iran, followed by the subsequent US withdrawal from the plan during President Trump's first presidency. Whilst the US reinstated many of its previous sanctions restrictions against Iran, which 'snapped-back' in 2018, the EU and other nations tried to uphold the integrity of the agreement.

The continuing nations maintained their negotiations with Iran and attempted to assist companies navigating the diverging positions. The EU (including the UK at the time) attempted to facilitate adherence to the terms of the JCPOA through use of its Blocking Statute, and the creation of a special purpose financing channel known as INSTEX.

In general, companies caught between the diverging sanctions requirements chose to adhere to the more stringent and better enforced US sanctions, despite the facilitation tools provided by the EU. This acted to undermine the JCPOA and reflects the strength of the US position in the global economy. INSTEX was used to process one payment and was liquidated in 2023.

Still, the possible sanctions outcome based on current indications would create the inverse effect: a position where the US permits a level of engagement with Russia which is prohibited in the other sanctioning jurisdictions. The US sanctions system is arguably more established, better enforced and more feared than its European counterparts. However, the European nations have stepped up their enforcement measures in the past years. In May 2024, the EU

introduced a new directive ensuring enforcement harmonisation across member states by setting out minimum penalties for sanctions breaches and criminalising certain sanctions violations.

It remains to be seen what would happen in the case of a divergence between Russian sanctions regimes. There has been considerable coverage regarding the imposition of the oil price cap and the coordinated measures taken against Russia's 'shadow fleet'. Any roll back on the US position would likely undermine the position of the rest of the sanctioning group.

Nevertheless, many have lauded the EU's actions against Russia as having the most significant effect on the Russian economy. Of the sanctioning nations, the EU is Russia's largest trading partner, holding the greatest amount of (now frozen) Russian central bank reserves, and is home to SWIFT.

In theory, a strong Europe could still present an effective economic threat to the Russian regime. However, it's not clear how this would work in practice and what it would mean for businesses operating on both sides of the Atlantic.

The EU's recent focus on anticircumvention measures means that a US withdrawal from the coordinated approach may have considerable compliance implications. Taking the example of the 'No Russia' clause in aviation contracts, the US is currently a 'partner country' in the regulation, meaning that aviation contracts between US and EU counterparties are exempt from the requirement to include a No Russia clause.

The list of 'partner countries' in the EU regulation is made up of jurisdictions with substantively similar sanctions restrictions in place against Russia, meaning that the EU is less concerned that there may be leakage of high priority

items. Yet, in a situation where the US rolls back on its restrictions, there is a theoretical risk that the US could become a channel for Russian exports, thus undermining the EU's measures.

The sanctions imposed against Russia in response to its invasion of Ukraine represent a coordinated allied economic force that has not been seen before. As former President Joe Biden noted in an address, 'taken together, these economic sanctions are a new kind of economic statecraft with the power to inflict damage that rivals military might'.

The power of the bite of the sanctions against Russia is in their coordination: shutting Russia off from a significant chunk of the world's economy. At the time of writing, it appears that any unwinding of sanctions will not be coordinated. It is currently unclear exactly what President Trump's intentions are, but companies will need to watch closely to ensure compliance. ■

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The rising tide of climate action



Climate change is affecting weather and climate extremes. Caspar Siegert and James Talbot review some prominent examples of central banks having adjusted their monetary policy operations to account for climate factors

Climate change is affecting weather and climate extremes in every region across the globe, with the adverse economic impacts becoming increasingly clear (IPCC 2023). So it is not surprising that academics, think tanks, and central bankers continue to discuss how central banks could adjust monetary policy operations in light of climate change (eg. Landau and Brunnermeier 2020, Van't Klooster and van Tilburg 2020, Schoenmaker 2021, Dafermos *et al* 2022, Schnabel 2023).

This discussion has typically focused on whether central banks should take action and what types of adjustments they could make. There has been comparably less focus on the practical challenges in making such adjustments – including questions around prioritisation, calibration, or data.

In a [recent report](#) (NGFS 2024), the Network for Greening the Financial System (NGFS), a group of over 140 central banks and supervisors, reviewed eight prominent examples of central banks having adjusted their monetary policy operations to account for climate factors (complementing its earlier, conceptual work on this topic, see NGFS 2021). This analysis, set out below, focuses on the practical aspects of those actions and shines a light on three areas:

First, it examines *why* central banks have taken action. Some central banks have adjusted their monetary policy operations to support the economy-wide transition to a low-carbon world, while others have taken action to protect their own balance sheet.

Second, it explores *which types of measures* have been implemented. The diversity of approaches we see suggests that central banks are willing to experiment with new measures, and that operational challenges can often be overcome.

Third, it identifies cross-cutting *operational challenges* and discusses *how* central banks have addressed these. This allows policymakers to learn from peers.

Central banks have already made significant progress in incorporating climate-related factors into their monetary policy operations. And while there are a range of practical challenges, the experience to date suggests that none of these are insurmountable

Why have central banks decided to take action?

Every central bank needs to manage financial risks to their own balance sheet – which includes climate-related financial risks. For example, if a central bank is concerned that fossil fuel-related assets might lose value in the transition to a low-carbon economy, it may want to reduce its exposure to such assets. We refer to this as the ‘risk protection’ objective of climate action.

Some central banks have legal mandates that go further and that require (or allow) them to take measures that are intended to support the economy’s transition towards a low-carbon economy. For example, a central bank may try to increase the relative funding cost of coal companies to discourage investment in this sector. We refer to this as the ‘climate change mitigation’ objective.

Six of the eight case studies the NGFS identified were motivated by a ‘climate change mitigation’ objective and did not appear to be accompanied by any risk-based measures. This may reflect several factors.

First, relevant central banks may have chosen not to highlight any risk-based actions publicly. This would not be particularly unusual – central banks rarely discuss all aspects of their internal risk management processes publicly. But it would explain why the NGFS failed to identify these actions.

Second, the relevant central banks may have judged that they did not have to take additional action to protect their balance sheets. As part of their regular monetary policy operations, central banks already take measures that protect their balance sheets against a wide range of tail risks. For example, they only lend against high-quality collateral and apply conservative haircuts to this collateral. Central banks may have judged that these measures were sufficient to protect them from any climate-related risks.

Figure 1. Central bank objectives in connection with climate change



Financial Risk Protection
Central banks seek to manage their exposure to external, climate-related risks



Climate Change Mitigation
Some central banks also have an objective to support their governments' transition policies

Third, methodological challenges may have stopped these central banks from also adjusting their risk management frameworks. Accurately measuring and quantifying climate-related financial risks in a comprehensive manner and integrating these findings into traditional risk management tools is difficult and can take time. This is particularly true for central banks, which typically want to limit the role of purely qualitative assessments in their risk management frameworks. However, we would expect this to change over time.

Which elements of their monetary policy operations have central banks adjusted?

The assets that central banks hold for monetary policy purposes typically involve collateralised lending to eligible financial institutions, and outright purchases of financial assets ('quantitative easing'). Hence, adjustments can focus on three broad areas shown in Table 1.

First, central banks can adjust the terms under which they are willing to lend. This includes (i) adjusting pricing to reflect counterparties' climate-related lending; (ii) adjusting pricing to reflect the composition of pledged collateral; and (iii) adjusting counterparties' eligibility.

The case studies suggest that the focus has been on the first of these options. This could be because pricing adjustments are less likely to interfere with central banks' core monetary policy objectives than adjustments to counterparty eligibility (NGFS 2021).

Second, central banks can adjust what collateral they accept as part of their lending operations. Options include (i) changing the 'haircuts' that are applied to specific types of collateral (eg. only lending \$0.90 against each \$1 of carbon-intensive collateral); (ii) making some types of collateral entirely ineligible ('negative screening'); (iii) requiring all collateral to have certain characteristics ('positive screening'); or (iv) imposing aggregate 'pool level'

Table 1. A taxonomy of actions that central banks have taken, and number of case studies that fall into each category

		Credit operations			Collateral				Asset purchases		
		Adjusting pricing based on type of lending	Adjusting pricing to collateral	Adjusting counterparties' eligibility	Haircut adjustments	Negative screening	Positive screening	Aligning collateral pools	Negative screening	Negative screening	Positive screening
Objective	Climate change mitigation	3			1				1		1
	Financial risk protection					1					
	Both								1		

Note: 'Credit operations' include measures taken by the Magyar Nemzeti Bank, the People's Bank of China, and the Bank of Japan; 'collateral' includes measures taken by the Magyar Nemzeti Bank and European Central Bank; 'asset purchases' includes measures taken by the Magyar Nemzeti Bank, the European Central Bank, and the Bank of England.

requirements (eg. only up to 10% of assets in the collateral pool that a financial institution provides can be linked to fossil fuels). Measures implemented so far have focused on the first two approaches.

Third, central banks can adjust their asset purchase programmes – by increasing their allocation to climate-friendly assets and reducing their allocations to carbon-intensive assets ('tilting'), or by including or excluding assets from asset purchases based on their climate characteristics (positive or negative screening). Most central banks, including the Bank of England, have focused on the less radical option of tilting their asset purchases.

How have central banks overcome practical challenges?

Central banks' practical experiences have highlighted several implementation challenges, as well as ways of overcoming them.

Determining what operations to focus on

Many central banks are still building up in-house climate expertise and are yet to identify areas of strategic focus that reflect their local circumstances. For example, in countries with more bank-based financial systems and small capital markets, focusing on the treatment of publicly traded securities may have a smaller impact than in countries with deep and liquid capital markets.

Central banks have typically addressed this by initially focusing on the asset classes that are most material (either from the perspective of the wider economy and/or their balance sheet) and, within that, on those asset classes where climate-related metrics are more readily available.

Deciding on the appropriate calibration of any climate measures

Even where supporting the transition to a low-carbon economy is within a central bank's legal mandate, the

mandate would not typically specify how much weight central banks should put on climate-related factors relative to other considerations.

For instance, their mandates would not tell central banks how aggressively to tilt asset purchases towards low-carbon issuers, or the preferential lending rate that they should offer as part of any green lending operations. The answer to this may depend on the specific trade-offs that a given measure would generate. But accurately quantifying these trade-offs can be challenging, if not outright impossible.

Central banks have addressed this challenge by initially taking a cautious approach, while signalling that they may 'escalate' actions over time. This allows them to learn about any trade-offs and potential unintended consequences over time, before considering ratcheting up any adjustments at a later stage.

Overcoming challenges around data availability

Central banks need granular data to assess whether an asset they are exposed to via their monetary policy operations is supporting the transition to a low-carbon economy and/or is exposed to material climate-related financial risks.

This includes, for example, data on an issuer's greenhouse gas emissions, green bond labels, or energy efficiency ratings for residential properties. While emissions are now widely disclosed, there are still notable gaps and data will not be available for every single issuer or asset.

Central banks have deployed pragmatic solutions for dealing with missing data, such as filling in gaps in the emissions of corporate issuers through using estimates or data from previous years. Where central banks were

unable to obtain emissions data for an entire asset class, they have used third-party assessments (such as green bond labels) or self-assessments by their counterparty instead.

Central banks are also using their monetary policy operations to actively help build better data. For example, the publication of climate disclosures is a common requirement for entities to be eligible as part of green lending operations, asset purchase programmes, or collateral frameworks.

Conclusion

Central banks have already made significant progress in incorporating climate-related factors into their monetary policy operations. And while there are a range of practical challenges, the experience to date suggests that none of these are insurmountable.

That said, there is clearly more work to do here. Much of this entails central banks learning from each other and understanding best practices. But some practices will also need to evolve in light of the current monetary policy environment and the wind-down of asset purchase schemes. This is why the NGFS will continue its work in this area. ■

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Understanding the impact of the green transition



Governments across the world are transitioning their economies to net zero. Solveig Erlandsen, Sui-Jade Ho, Danae Kyriakopoulou, Arjun Mahalingam and James Talbot introduce a framework to assist central banks to understand the effects of the green transition

As economic agents increasingly respond to intensifying climate change, the short-term macroeconomic implications of this adjustment are becoming apparent. As the climate transition affects output and inflation over policy-relevant horizons, it becomes a salient factor for central banks to consider in their monetary policy deliberations. The impacts of government policies such as taxes and subsidies, and changes to regulation can be studied by central banks.

In addition, over the longer term, the climate transition is also likely to affect other key variables of interest to central banks such as the growth potential of the economy and the natural rate of interest. A recent report by the Network for Greening the Financial System develops a framework to assist central banks to understand the macroeconomic effects of the green transition (NGFS 2024a).

Transition impacts across economic agents

The shift towards a lower-carbon economy affects how firms produce, how households consume, and how governments spend and raise taxes. It also affects banks' and investors' behaviour, particularly through their management of transition-related risks and opportunities, and it has international spillover effects.

For firms, the green transition necessitates increased investment in low-carbon technologies and reallocation of existing investment to transition-relevant activities. Changes in government policy and regulation, consumer demand trends, and the introduction of new technologies will all affect firms' costs, productivity, production, and profit patterns, and their credit and financing operations.

For households, changes in consumer prices, wages, and asset prices associated with the transition will affect income, wealth, and saving patterns. For example, carbon pricing policies can raise energy prices in the short term but lower prices in the longer term through the shift to cheaper renewable energy sources. Changing preferences can further shift behaviour in terms of saving, spending, and labour market choices.

For governments, the green transition also directly impacts fiscal balances, particularly when delivered through measures such as carbon taxes and green subsidies. Countries reliant on fossil fuel revenues may see lower tax revenues, while fossil fuel importers and economies endowed with critical minerals can benefit from new opportunities as they switch away from fossil fuels.

The green transition is increasingly impacting macroeconomic outcomes over the shorter-term horizon which is most relevant for monetary policy

Economies are also exposed to international spillover effects from transition developments in trading partners, including through the effects on global value chains and patterns of comparative advantage.

Figure 1 shows how impacts from different types of transition drivers can propagate through the economy. Such impacts can be further amplified through financial channels and feedback effects, as expectations for the pace and effectiveness of the green transition influence consumer, firm, and investor behaviour.

These will be particularly relevant for central banks as they can affect market interest rates and credit conditions, influencing borrowing costs and investment decisions across the economy.

Overall, the nature of the green transition – whether orderly or disorderly – will play a crucial role in determining its macroeconomic impact. An early and orderly transition offers the potential to minimise any economic costs. In contrast, a disorderly or delayed transition with unanticipated changes for economic agents will have more pronounced negative macroeconomic effects (IMF 2022, Mehrhoff 2023, Hassler *et al* 2024).

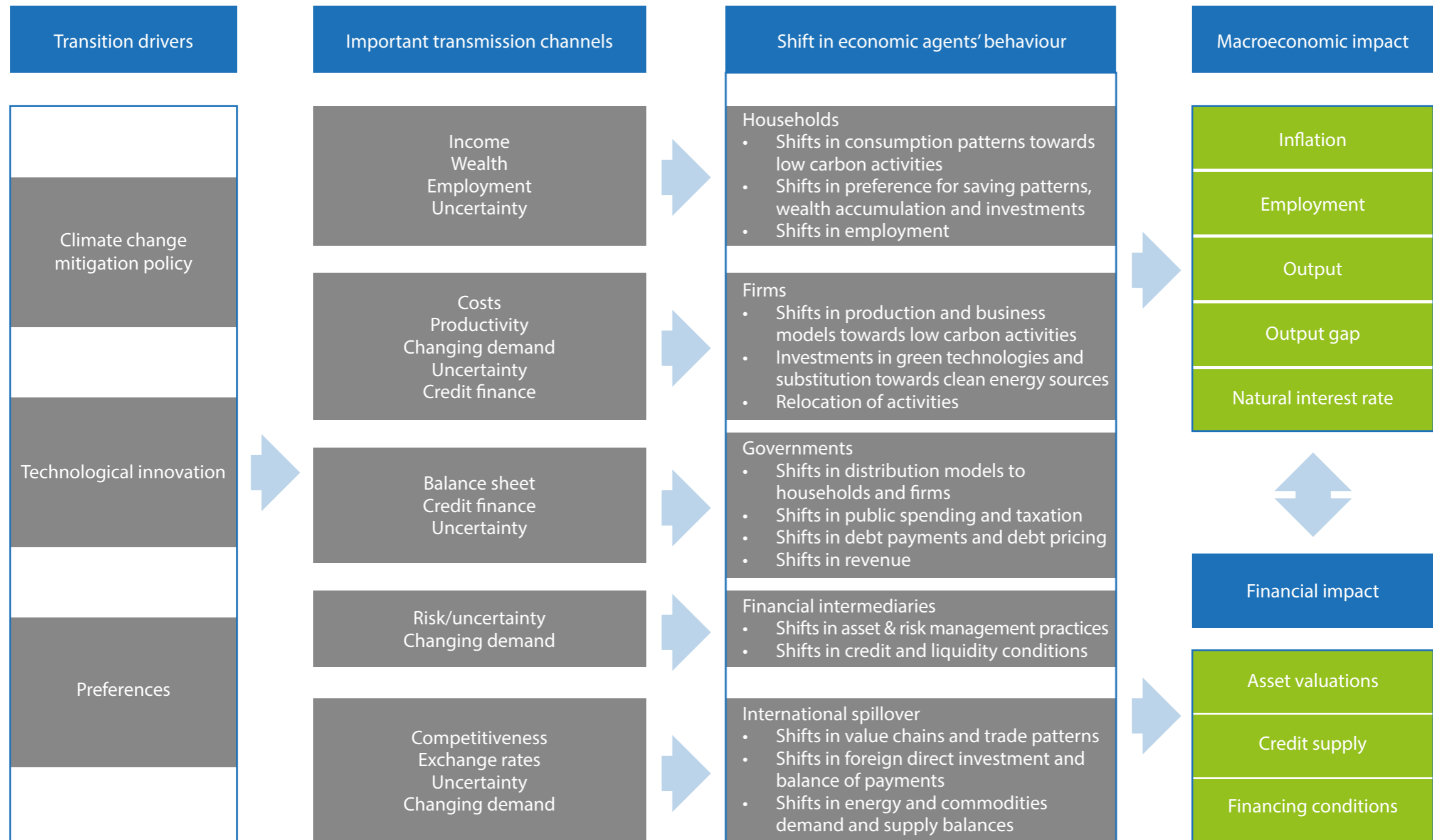
Climate mitigation policies

Transition policies broadly fit into three buckets: (i) carbon pricing; (ii) government subsidies and government investment; and (iii) non-market-based climate policies such as regulations, and standards. The aggregate macroeconomic impacts of these policies will vary depending on the design, pace, stringency, and implementation of such policies, including their transparency, predictability, and degree of coordination across countries (Pinheiro de Matos and Gili 2022).

Even if these policies affect inflation and output in the short-term, their intention is to avoid the negative consequences of unmitigated climate change in the longer run (NGFS 2024b).

Figure 1. Propagation of effects from transition drivers to the macroeconomy

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Source: NGFS (2024a).

In the short term, carbon pricing policies may look like a negative supply-side shock, increasing firms' costs and prices for consumers and putting upward pressure on inflation (Breckenfelder *et al* 2023, Känzig 2023). But their impact on output will also depend on how revenues are recycled back to the economy. Over time, achieving the intended reduction in emissions helps support the economy compared with scenarios of unmitigated climate change.

For subsidies, the macroeconomic impacts will depend on their design and on who receives them: a subsidy to the price of green energy could reduce inflation in the short run, but boost output through increased demand (Schnabel 2022). Conversely, an investment subsidy may directly push up inflation alongside aggregate demand. In the longer run, the funding arrangements for the subsidy will be a key determinant of its impact.

Non-market-based interventions (such as regulatory standards, production quotas or bans, and disclosure requirements) can be contractionary and inflationary in the short run as they introduce compliance requirements, but may be expansionary over time as their intended effects materialise.

Structural transition dynamics: innovation in green technologies and changes in preferences

The climate transition will also lead to more gradual changes to the economy. These can occur through market forces or shifts in preferences as firms and consumers adjust their expectations and behaviour to climate change. Some of these may not currently fall within the monetary policy horizon or take the form of a cyclical shock that monetary policy may be called to react to. Still, they will be increasingly relevant for central banks' understanding of the longer-term productive capacity of the economy.

Increased green investment will affect aggregate output. These impacts will depend on whether investments are additional or merely redirected from other sectors and on the multiplier effects on economic activity. Generally,

green investments generate larger investment multipliers than carbon-intensive investments but face higher upfront costs (Batini *et al* 2022).

Inflation is most likely to be impacted by the effect of these investments on energy supply, which could lead to an increase in inflationary pressures in the short term, giving way to more deflationary medium- and long-term dynamics.

Impacts on monetary policy

As with other shocks, the overall macroeconomic impacts of climate transition policies will determine the response of monetary policy. While the effects of these policies have been estimated to be modest so far, these are likely to increase in the future as governments take further action to meet net-zero targets. Monetary policymakers may therefore face a prolonged relative price shock to manage.

Uncertainty about the shape of the transition – including the policy credibility, technological developments, the behavioural response of economic agents, and the lack of forward-looking data to estimate price elasticities and substitution effects – could also complicate central banks' understanding of how different transition drivers impact the economy.

Conclusion

The green transition is increasingly impacting macroeconomic outcomes over the shorter-term horizon which is most relevant for monetary policy. It is likely to affect the behaviour of all agents, sectors and countries, albeit in different ways.

The transition will also result in deeper, structural changes that monetary policymakers will need to understand.

We have made a start in estimating these macroeconomic impacts through the work of the NGFS and its members, but more work will be needed to understand the effects on both our economies and how monetary policy should respond to them. ■

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Financial impacts of climate change

Climate change is intensifying, generating more frequent and severe extreme weather events. Lukasz Krebel, Danae Kyriakopoulou and James Talbot examine the implications of severe weather events for the economy and monetary policy

As severe weather events (acute physical hazards) intensify, becoming more frequent and more geographically widespread (IPCC 2023), their macroeconomic effects will intensify in both the short and long run. Global damages from weather-related hazards have continued to rise in recent decades.

These impacts are increasingly affecting the path of output and inflation, making them a relevant consideration for monetary policymakers. A [recent report](#) by the Network for Greening the Financial System (NGFS 2024a) sets out a framework to assist central banks in assessing and understanding the macroeconomic effects of acute physical impacts from climate change.

No two events will affect the economy in the same way

As the global climate changes, we are increasingly seeing severe weather events such as heatwaves, landslides, floods, wildfires, and storms, and chronic climate events such as rising sea levels and higher average temperatures.

Modelling the economic impacts of climate change is challenging, requiring the integration of two disciplines: climate science and economics. This requires us to link our assessment of physical hazards to macroeconomic outcomes¹.

The extent to which physical damages translate into economic and financial impacts depends on several factors:

- First, the nature and type of the hazard. Some hazards, like storms and floods, are of short duration but can cause widespread and long-lasting physical destruction. Other hazards, like droughts, are slow to unfold and the true extent of the damages may take months to be fully visible.

- Second, the level of economic activity at the location where it occurs. This includes the total value of assets (such as productive capital, infrastructure, and housing) and socioeconomic elements (such as population and jobs) that are exposed to a hazard.

Extreme weather events tend to result in increased volatility and lower output in the short run, while the impact on inflation will depend on how supply and demand are affected and the response of monetary policy to the event

- Third, the vulnerability of assets and economic activity to physical events, reflecting construction quality, disaster preparedness, and response capacity. For example, a tropical cyclone in an advanced economy may end up having a smaller economic impact than a similar event in a less developed economy if reconstruction efforts in the aftermath of that event are better and more rapid.

The availability of private insurance and a government's ability and willingness to provide fiscal support are important determinants of overall economic outcomes. Indeed, more frequent and severe weather events can diminish fiscal capacity and impair insurance provision, which can further increase the impact of shocks, particularly in emerging market and developing economies (Noy 2009).

Negative impacts from severe weather events can affect the economy with supply, demand, and financial channels amplifying and propagating the effects of the initial shock.

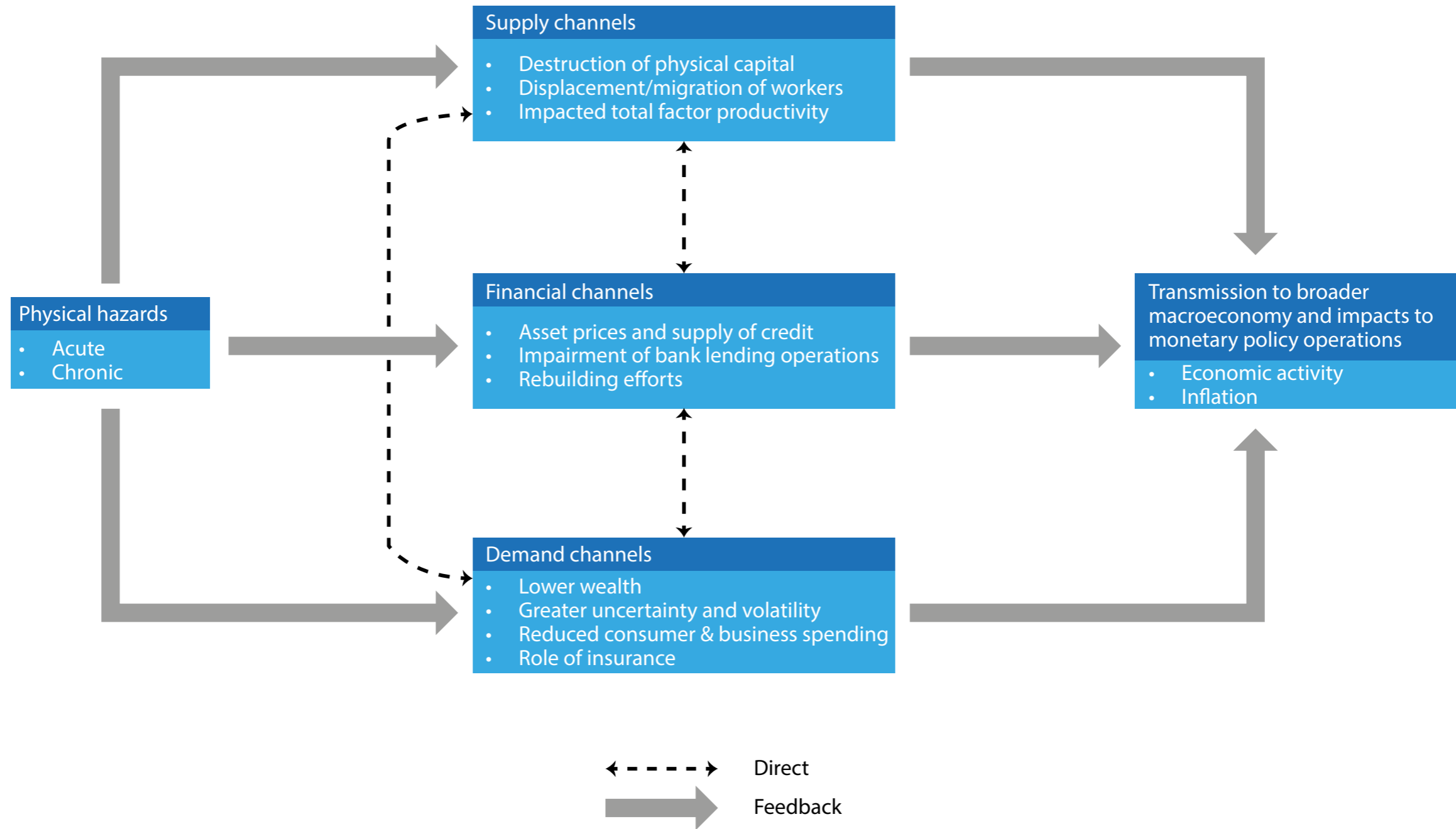
Impacts on supply

The *supply side* of the economy is often where the immediate impact of physical hazards is first experienced as goods, productive capital, and real estate and infrastructure are physically destroyed. The extent and persistence of the decline in output partly depends on how the physical hazard impairs the use of the physical capital in the affected area.

For example, a hurricane may damage a factory, such that reconstruction is needed for it to be brought back into use, while a drought that limits access to needed water impedes production for the duration of the hazard but not beyond.

Figure 1. Flow chart of potential channels

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Source: NGFS (2024a).

Impacts on labour include the displacement of workers and job losses that can result from the destruction of housing or physical capital which can reduce labour supply or productivity. Physical hazards can also affect total factor productivity (TFP), although this is harder to measure.

Disasters can also impact national and international *supply chains and trade* beyond the reduction in current and future output produced in the affected area. For instance, the Rhine River in Europe experienced extremely low water levels in recent summer droughts, with Ademmer *et al* (2020) finding that in a month with 30 days of low water, industrial production in Germany declines by about 1%.

This is because shipping on inland waterways in Germany, while a small share of total transportation, accounts for a significant share of transportation of industrial goods such as coal and chemicals, with impacts cascading upstream in the production chain.

Impacts on demand

Severe weather events and the associated destruction and loss of assets can also negatively impact the *demand side* of the economy. The destruction of housing and disruption of wage payments or business income can hit households' disposable income and wealth. And greater uncertainty about growth and income prospects may affect expectations and depress consumer and business confidence, reducing investment and increasing precautionary savings.

Effective insurance mechanisms with fast and predictable payouts can limit the economic fallout from severe weather events and speed up the recovery process. However, insurance protection gaps (the share of uninsured losses) remain a major challenge.

In advanced economies, the protection gap is generally below the global average, rarely falling below 40%. In emerging market and developing economies, protection gaps are significantly larger, as high as 95% according to some studies.

Financial channels can amplify effects through asset prices as well as via credit conditions and credit volumes. Tighter financial conditions and reduced access to finance can slow down the recovery and may result in spillovers to initially unaffected areas of the economy.

A reduction in asset prices associated with the destruction of physical assets can negatively impact the value of the collateral that borrowers can pledge to secure a loan, which in turn weakens the balance sheet of financial intermediaries.

If banks' balance sheets are adversely affected, it can affect their willingness and ability to lend, which can be particularly problematic given the increased demand for recovery loans in the aftermath of a disaster.

Most studies find negative impacts from severe hazards on GDP both in the short and long term. In the immediate aftermath of severe weather events, studies tend to find that both the level and the growth rate of GDP drop. On average, per capita GDP growth rates decline by more than 0.5 percentage points in the year of the shock for very severe events and reach significantly higher values for the worst events (Felbermayr and Gröschl 2014).

Over time, GDP growth recovers, but for very severe disasters, GDP can remain significantly below its pre-shock level 20 years later (Hsiang and Jina 2014).

Further, international spillovers from severe weather events can be of considerable magnitude and mainly occur through commodity prices. In a panel of 75 countries, de Winne and Peersman (2021) show that a 10% increase in global food commodity prices stemming from weather shocks lowers GDP by 0.5% after six quarters.

The effects on inflation of a specific severe weather event depend on whether the demand or the supply effects of the event dominate, as well as the type of the disaster, the sectors exposed, the structure and maturity of the economy, location, seasonality, and the time horizon. For example, in the short term, storms increase food price inflation, while floods increase headline inflation (Parker 2018).

The inflationary effects can also be nonlinear, as documented in the case of heatwaves. Even if the shock originated abroad, it can spill over into domestic inflation, for example through international food prices (Peersman 2022).

Conclusion

Climate change poses an increasing threat to the global economy. Severe weather events such as droughts, floods, and storms destroy crops, production facilities, housing and critical infrastructure, and can disrupt global supply chains. Damages are likely to increase in future as climate change progresses.

Targeted government support measures play a key role in helping households and businesses to navigate the impacts of such shocks. But as these impacts can also affect the paths for output and inflation, they may be relevant for monetary policymakers too as will be discussed in the forthcoming column.

While the literature offers many insights on the links between severe weather events and the economy, these links are dynamic and subject to change. This will also cause greater uncertainty about the economic environment in which monetary policy operates.

The Network for Greening the Financial System will continue its work to assist central banks in understanding these effects and their monetary policy implications. ■

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Endnote

1. For an in-depth survey of the literature and assessment of the relative strengths and use cases of different approaches and uncertainty involved with assessing climate-related impacts, see NGFS (2024b).

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Climate Minsky moments

Climate policies could affect financial stability if they lead to large changes in asset returns. Matthias Kaldorf and Matthias Rottner study the financial stability and welfare effects of such 'climate Minsky moments' using a novel quantitative macroeconomic model

Mitigating climate change is one of the greatest challenges facing economic policy over the coming decades. Achieving a path of carbon emissions that is consistent with the Paris Agreement of keeping the global temperature increase below 2°C requires a large-scale shift to emission-free technologies.

Since many of these technologies are either less productive than their fossil-dependent alternatives or involve substantial adoption costs, the net zero transition is characterised by a reduction in aggregate asset returns. If the resulting losses of the financial sector are substantial enough, they might trigger a systemic financial crisis – a ‘climate Minsky moment’ in the words of Mark Carney (2015).

Assessing the financial stability implications of climate policy is necessary to appropriately account for all benefits and costs of the net zero transition. However, the current debate on the financial sector’s role during the net zero transition largely focuses on banks’ credit supply (Sastry *et al* 2024, Hale *et al* 2024) and the stress-testing of individual institutions (Alessi *et al* 2023, Reinders *et al* 2023).

Thus, the discussions overlook the wider systemic dimension embodied by climate Minsky moments. Against this background, in a recent paper (Kaldorf and Rottner 2024) we develop a nonlinear quantitative macroeconomic model with endogenous financial crises and climate policy. Employing our novel framework, we evaluate how climate policy consistent with the Paris Agreement affects financial stability, macroeconomic aggregates, and welfare, both in the short and long run.

Financial stability decreases in the short run when the economy shifts unexpectedly to an ambitious carbon tax path aligned with the Paris Agreement. In response to such a negative shock, financial intermediaries face deleveraging pressure which induces them to sell assets quickly, potentially at fire sale prices. The likelihood of a systemic financial crisis increases.

However, climate policy is not detrimental to financial stability in the long run. Climate policy reduces long-run capital accumulation and the accumulation of excessive financial sector leverage, which makes systemic financial crises less likely. Thus, the net financial stability effect depends on the social discount rate.

Importantly, our framework also speaks to the quantitative relevance of climate Minsky moments in comparison to the real costs and benefits of a transition to net zero. Specifically, we demonstrate that the welfare losses associated with climate Minsky moments are at most second-order when compared with the welfare cost of adopting clean

Our results challenge the notion that financial stability concerns justify delaying the net zero transition

technologies. Our results suggest that financial stability considerations do not decisively alter the basic climate policy trade-off: productivity losses due to stringent carbon taxes versus gains from reducing global surface temperatures.

Financial stability along the transition to net zero

We develop a nonlinear quantitative macroeconomic model with two key features. First, the financial sector is run-prone in the spirit of Diamond and Dybvig (1983). Specifically, the possibility of a systemic run on the financial system is fully endogenous and depends on the macro-financial environment.

Based on the seminal work by Nordhaus (2008), the production sector generates carbon dioxide emissions, which are subject to carbon taxes, and can invest into emission abatement. We then evaluate how climate policy consistent with the Paris Agreement affects financial stability, macroeconomic aggregates, and welfare, both in the short and long run.

To quantify the financial stability effects of the transition, we compare the current climate policy trajectory to a stringent scenario aligned with the Paris Agreement. The current trajectory extrapolates the historical reduction in global emission intensities observed between 1990 and 2023.

Under this trajectory, net zero would be reached in 2090 with a carbon tax of around \$140 per ton of carbon dioxide (\$/tCO₂) and global temperatures would exceed 2°C by the end of the century. In contrast, the Paris-aligned transition assumes that climate policy suddenly shifts in 2025 to a steep tax path that reaches the full abatement carbon tax of 140 \$/tCO₂ already in 2050. As an additional reference point, we also consider a scenario in which the tax is frozen at its current level.

These different carbon paths have substantial implications for emissions and temperature increases (Figure 1). The Paris-aligned path limits the temperature increase to 1.6°C, while they would increase by 2.1°C and 3.0°C on the current trajectory and the policy freeze, respectively.

Importantly, the different paths have a distinct impact on financial stability (lower right panel of Figure 1). The Paris-aligned transition comes with an elevated crisis probability in the early stages of the transition. The gradual but permanent increase in carbon taxes can render the initial financial sector leverage and size unsustainable.

Specifically, the annualised crisis probability initially rises to slightly more than 2.8% in the Paris-aligned transition, up from 2.1% on the current trajectory. Thus, we observe a substantial increase in financial fragility at the outset.

The crisis probability then gradually declines to its new long-run level around 2050 for the Paris-aligned scenario, while the current trajectory converges around 2090. When assessing the implications for the long run, we show that permanently higher carbon taxes enhance financial stability.

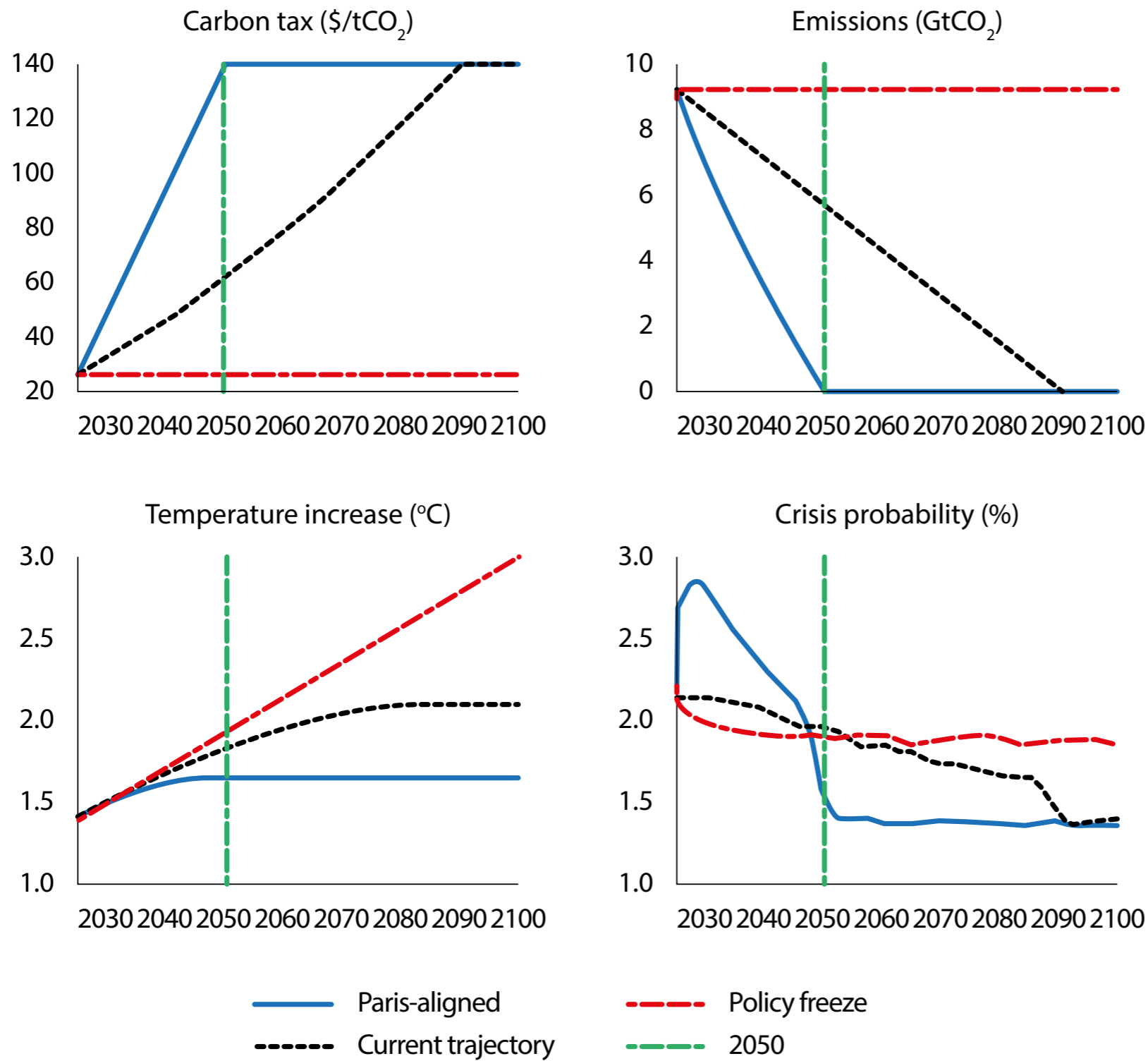
The reason behind this perhaps surprising result is that there is less capital accumulation in the long-run due to the carbon taxes. The financial sector is smaller overall and accumulates less excessive leverage, reflecting a positive relationship between capital accumulation and the demand for financial intermediation services.

Net financial stability effect

To determine the net financial stability effect of these opposing mechanisms, we introduce a metric of financial stability that summarises the crisis probability along different transition paths. The excess crisis probability is defined as the discounted difference between the crisis probability under the Paris-aligned transition and the current trajectory.

Figure 1. Transition dynamics: carbon taxes and crisis probability

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As customary in the evaluation of climate policies, we allow for different social discount rates. The possibility of discounting future financial stability gains via the social discount factor puts different weights on the elevated crises probability at the outset versus the long-run stability gains.

The excess crisis probability is positive for sufficiently high social discount rates, as the elevated crisis probability in the short run triggered by increased carbon taxes dominates (see left panel of Figure 2). The turning point, where the excess crisis probability turns negative, occurs at a social discount rate of around 1.5% per annum.

We identify a trade-off between climate policy and financial stability only for relatively impatient policymakers. Put differently, our analysis rejects the notion of an unambiguous trade-off between financial stability and climate policy objectives.

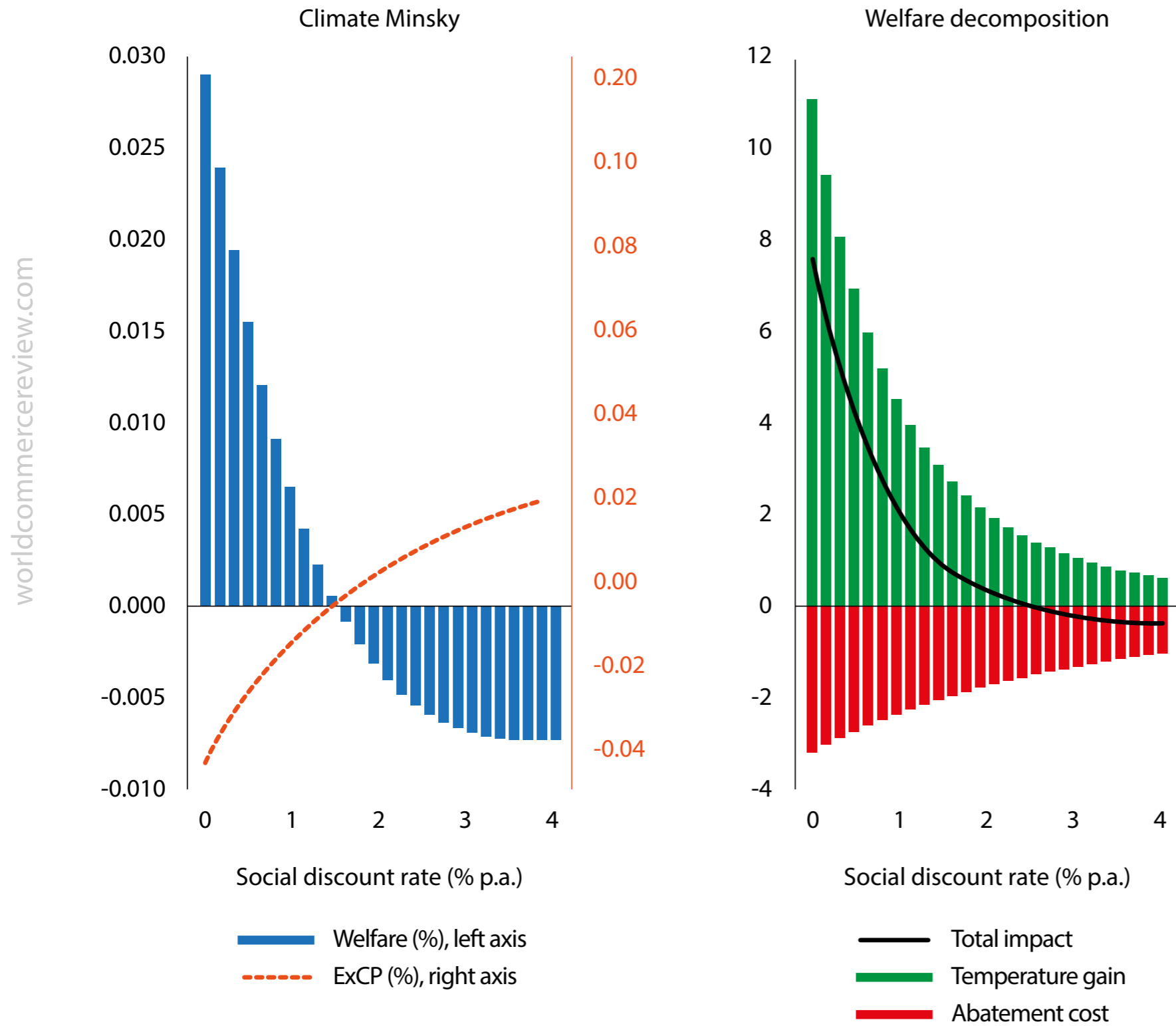
Our non-linear model further reveals that the financial cycle is a crucial driver for climate Minsky moments. The build-up of macroprudential space or the implementation of climate policies during a period of strong financial fundamentals allows policymakers to substantially mitigate the risk of climate Minsky moments.

The reason is that a resilient financial sector is better equipped to absorb the impact of a sudden shift to an ambitious climate policy path. This result informs the ongoing debate on macroprudential policy (Hiebert 2024) and bank capital regulation (Van Tilburg *et al* 2022) in the context of transition risk.

The welfare relevance of climate Minsky moments

Using our structural model, we assess the welfare relevance of climate Minsky moments in comparison to the welfare effects associated with abatement costs and temperature increases. Note that the welfare gains of climate Minsky moments are inversely related to the excess crisis probability: a larger crisis probability is associated with welfare losses (left panel of Figure 2).

Figure 2. Welfare



However, our model suggests that the welfare effects of climate Minsky moments are dwarfed by the costs of switching to emission-free technologies and the benefits of curbing global warming. The right panel of Figure 2 highlights that the basic climate policy trade-off between short-run productivity losses associated with stringent carbon taxes (red bars) and long-run gains from a reduction of global surface temperatures (green bars) dominates. The welfare effects of climate Minsky moments (blue bars) are barely visible due to their small impact.

The effect of Paris-consistent climate policy on financial stability and welfare is robust across various modifications and extensions of our baseline model. These include technological change, alterations in the design of climate policy, and different assumptions regarding welfare losses from global warming.

Conclusion

In this column, we argue that climate policy is not necessarily detrimental to financial stability. Using a quantitative nonlinear macroeconomic model, we show that climate policy consistent with the Paris Agreement increases financial fragility in the short run but has a positive effect on financial stability in the longer run.

Furthermore, the welfare effects of climate Minsky moments are at most second-order relative to the real costs and benefits of an accelerated transition. Our results challenge the notion that financial stability concerns justify delaying the net zero transition. ■

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Carbon leakage through firms' supply chain adaptation

Carbon taxes incentivise substitution toward cleaner energy.
Pierre Coster, Julian Di Giovanni and Isabelle Mejean discuss
carbon leakage in the context of European policies

The implementation of a carbon tax to disincentivise the use of fossil fuels has been advocated by numerous economists and implemented in several countries. By increasing the cost of using fossil fuels, a carbon tax should in theory lead firms to substitute towards cleaner energy sources and technological innovations to cut back 'dirty' production.

Costs may also rise for firms down the supply chain that use dirty input goods in production, so the total impact of a carbon tax can in theory be large. In practice, however, carbon taxes are unilateral policies, whose effectiveness in decreasing global emissions is questionable, given firms' ability to adapt to an increase in carbon prices.

Unilateral carbon prices may shift production and thus emissions across borders, a problem that is commonly referred to as carbon leakage (eg. Dechezleprêtre and Sato 2017, Naegele and Zaklan 2019).

In Coster *et al* (2024), we study carbon leakage in the context of European policies. The EU has been at the forefront of carbon policies, with the introduction of the EU Emissions Trading System (EU ETS) in 2005. This scheme is meant to set a common price for carbon across the EU and applies to a set of firms in high-emission industries, such as the production of steel, chemicals, cement, or ceramic goods. By increasing the cost of emission-intensive production, the system incentivises producers to invest into cleaner technologies (Colmer *et al* 2024).

The policy, however, creates leakage opportunities in downstream sectors, as products taxed within the EU can be sourced from outside the Union. To eliminate the remaining leakage and incentivise foreign firms to produce low-carbon intensive goods, the EU just extended the ETS to importers of high-emission products through the Carbon Border Adjustment Mechanism (CBAM), which will take effect in 2026.

We provide novel evidence of carbon leakage observed in firm-level import data during the 2010s, when the EU ETS system was becoming increasingly binding. We first construct a new dataset that classifies 'clean' and 'dirty' manufacturing goods by leveraging information about the scope of the European policies.

The distinction between clean and dirty inputs makes it possible to simulate various carbon price policies that mimic the EU ETS – a carbon tax on all inputs produced by regulated sectors in ETS member states – and the EU ETS + CBAM system, in which inputs imported from non-ETS countries that belong to the coverage of CBAM are also taxed

Given our focus on the supply chains, we define a list of dirty inputs based on whether these goods are produced in a sector covered by the EU ETS. We merge the list of dirty goods to French firms' balance sheet and import data to study where firms source clean and dirty goods, and how this behaviour has changed over time. By focusing on firms' input usage, we capture the indirect impact of the policy on downstream customer firms.

The use of a dataset with detailed firm-level information further allows us to control for common trends and other economic forces that may be driving patterns observed in aggregate French imports, and which would make it difficult to clearly identify the impact of the EU ETS on carbon leakage.

Specifically, we use the firm-source country-product level dimension of our dataset to identify how firms have changed their relative sourcing of dirty versus clean inputs from non-ETS countries, over time.

Results are summarised in Figure 1, with the left panel comparing the import share of dirty versus clean inputs sourced from non-ETS countries, while the right panel focuses on firms' propensity to source inputs from these countries. In both cases, the firm-level panel is balanced in the product times sourcing country dimension and the coefficients recovered from a Poisson-pseudo maximum likelihood (PPML) estimator.

Prior to the introduction of the EU ETS, the relative share of dirty inputs sourced from non-ETS countries is slightly decreasing, compared to clean inputs. The trend is reversed from the first phase of the EU ETS (2005-2007) and becomes significantly positive at the end of the second phase (2008-2012). By 2019, the share of dirty inputs sourced from non-ETS countries has increased by 15% relative to the share of clean inputs sourced from the same area, compared to 2004. As illustrated by the right panel in Figure 1, this shift in input sourcing strategies is largely driven by the *extensive* margin.

The estimated probability of a firm importing dirty goods from non-ETS countries has risen dramatically relative to the probability of importing a clean good – up to almost 30% by 2019. We show that results are robust to further controlling for firm-product-country, sector-year, and country-year fixed effects, thus suggesting the diverging trends in sourcing strategies is driven by changes in the relative propensity to source regulated and non-regulated inputs from non-ETS countries.

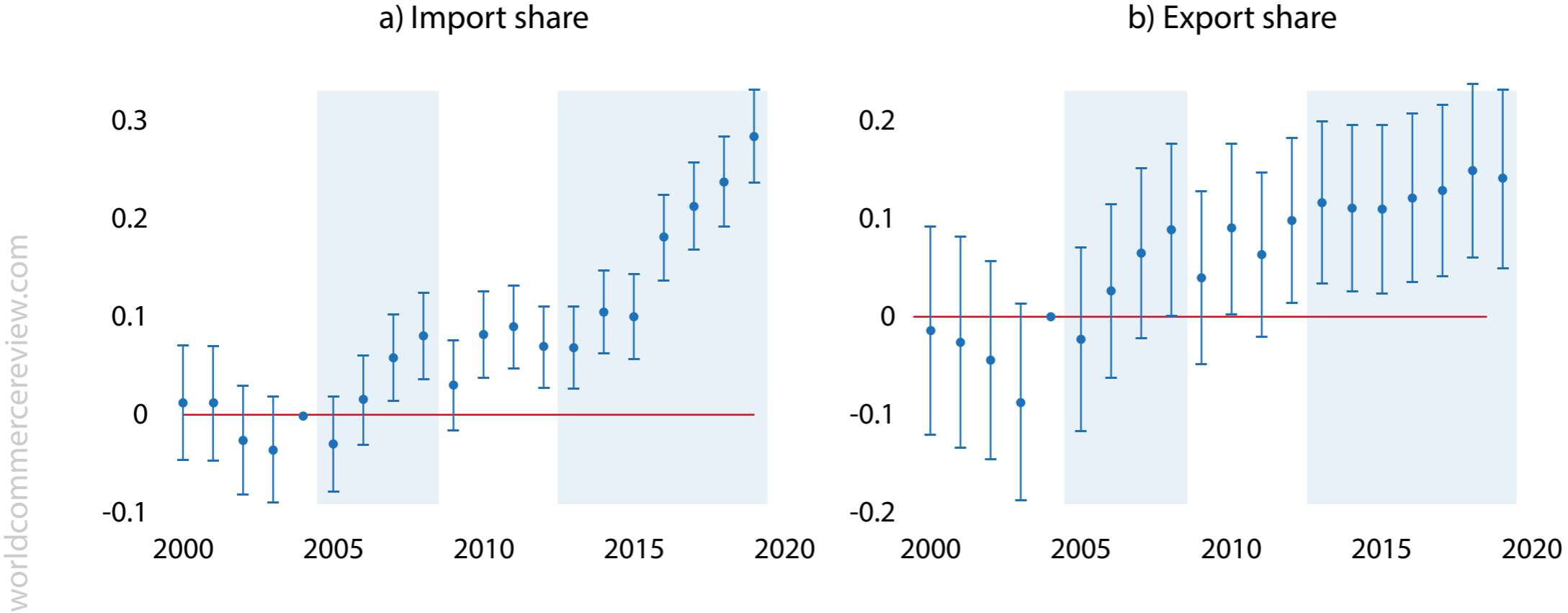
Finally, we also show that the positive trend is entirely driven by non-regulated firms, ie. firms are not directly exposed to EU ETS regulation but use the regulated products as an input in production. We interpret these findings as indicative of carbon leakage, a tendency of French firms belonging to sectors that are downstream regulated sectors to adapt their sourcing to avoid paying the carbon tax. These are typical behaviours which the carbon border adjustment mechanism is meant to target.

We rationalise these results using a heterogeneous firm model of sourcing decisions, estimated on pre-ETS firm-level data. The model extends Antras *et al* (2017) to a nested CES structure in which firms choose where and how much to source of each variety of two categories of inputs, clean and dirty.

The distinction between clean and dirty inputs makes it possible to simulate various carbon price policies that mimic the EU ETS – a carbon tax on all inputs produced by regulated sectors in ETS member states – and the EU ETS + CBAM system, in which inputs imported from non-ETS countries that belong to the coverage of CBAM are also taxed.

Under the EU ETS only scenario and applying a €100/ton of CO₂ carbon tax, global emissions fall by 1.8 million tons of CO₂, but at the cost of a moderate increase in the price of French manufacturing products, of 0.05%. The small impact of the tax is driven by the ability for French firms to avoid paying the cost of the tax by switching input sourcing away from regulated countries, most notably Russia and China in our simulations.

Figure 1. Evolution of firm-level imports from non-ETS countries: dirty versus clean inputs



Note: This figure shows the evolution of the relative import share (panel (a)) and the relative import probability (panel (b)) of dirty inputs sourced from non-ETS countries, compared to clean inputs sourced from there. All coefficients are normalised to zero in 2004, one year before the beginning of ETS. The regression controls for product-country and year fixed effects. The blue areas correspond to Phases 1 and 3 of ETS. The confidence intervals are defined at the 95% level.

The model thus replicates 80% of the carbon leakage estimated in the data. When we simulate an extension of the EU ETS to include imported products, thus mimicking the future CBAM, the global reduction in emissions increases fourfold while the manufacturing price level rises by a factor of ten. The combined EU ETS + CBAM tax is far more powerful than the EU ETS alone as the CBAM eliminates carbon leakage incentives.

Therefore, firms not only reshore input sourcing away from the most polluting EU ETS countries, like Romania and Bulgaria, but now also shift sourcing from countries like Russia and China outside of the regulated area, towards less polluting countries, such as France. The resulting cut in emissions comes with a cost, however, as prices faced by French consumers rise quite a bit given the higher cost of inputs.

The results underscore the importance of considering the indirect impacts of climate policy through supply chain linkages. Firms can adapt along multiple dimensions to minimise the cost of carbon policies. These adaptation strategies can be welfare-improving when incentivising clean technology investment, but they can also induce undesirable carbon leakage effects when firms adapt their sourcing strategy.

While firms in our model reshore dirty inputs locally under the EU ETS + CBAM policy, this also reduces their international competitiveness which leads to higher prices faced by domestic households. Moreover, under a partial sectoral coverage of these carbon policies, the system generates carbon leakage incentives further down the value chain. ■

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