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Executive summary

The vast environmental subsidies that may be required for the transition to net zero greenhouse gas emissions are starting to generate international trade and political frictions between the world's largest economies. This puts (supra-)national industrial decarbonisation efforts on a collision course with international subsidies rules and national countervailing duty (ie. anti-foreign subsidy) laws and regulations.

International cooperation will be essential to defuse such tensions before they escalate and impede effective climate policy rollouts, and before they lead to economic countermeasures that create new barriers to trade in environmental goods. This requires agreement on permissible environmental subsidy practices that minimise distortions.

Meanwhile, it will be crucial to provide financial transfers to assist poorer economies with industrial decarbonisation at the same time as those poorer economies are suffering from the crossborder negative economic impacts of otherwise net-global-welfare enhancing environmental subsidies paid out by wealthy countries.

Various forums can host the technical and political negotiations necessary to set the parameters of net global-welfare enhancing subsidies. These include the G7, the G20, the Organisation for Economic Co-operation and Development, the World Trade Organisation's Trade and Environment Committee and WTO Trade and Environmental Sustainability Structured Discussions, and the Coalition of Trade Ministers on Climate.

1 Introduction

The greater the benefit conferred on domestic industries, the more likely subsidies will alter competitive conditions in the international marketplace

Environmental subsidies are typically conceptualised as public spending (including governmental revenue foregone and in-kind contributions) that supports the attainment of environmental objectives that would remain elusive if left to market forces (Charnovitz, 2014).

The greater the benefit conferred on domestic industries, the more likely it is that such subsidies will alter competitive conditions in the international marketplace in favour of the companies on which the benefit is conferred

There is a strong economic argument that subsidies are an essential instrument in the transformation towards the net zero global economy. While taxation can address the negative environmental externalities of emissions (reflecting the polluter-pays principle), it cannot simultaneously correct the externalities associated with green innovation.

As the United Nations Environment Programme (UNEP) pointed out in 2003: *"public financing is essential for the transition to a green economy and more than justified by the positive externalities that would be generated"* (UNEP, 2003). Environmental subsidies could also be justified when emissions taxation (carbon prices) is not feasible or is insufficient due to political economy constraints. In such cases, decarbonisation may require consumer incentives to purchase low-carbon goods and services, and/or producer incentives to invest in the decarbonisation of industrial production processes or increase renewable energy production capacity.

However, this category of subsidies may – proportional to their volume – impact international trade and investment. First, public investment directly linked to the decarbonisation of energy generation and other industrial processes, as well as government incentives for purchases of low-carbon goods and services, will enhance national economies' international competitiveness in decarbonised merchandise trade.

For instance, government funding for the replacement of blast furnaces with electric arc furnaces for steel-making, or incentives for the use of clean hydrogen as an input to steel production, will give a competitive edge to producers of clean steel.

This distortion of competitive conditions will be even greater in jurisdictions that disincentivise high-carbon steel consumption and production through taxation and enforceable carbon intensity standards. In turn, certain subsidy

schemes that are geared towards industrial decarbonisation are likely to distort the distribution across countries of benefits derived from international trade.

The greater the benefit conferred on domestic industries, the more likely it is that such subsidies will alter competitive conditions in the international marketplace in favour of the companies on which the benefit is conferred.

These circumstances can be expected to generate political tensions. Transatlantic tensions have already surfaced over the United States Inflation Reduction Act (IRA), which subsidises production and investment in renewable technology in the US[1].

Depending on how the US's trading partners react, this could trigger a global subsidies race to attract investments in clean technology and production. This would be particularly problematic in a world in which governments have widely diverging access to the public resources needed to finance national decarbonisation efforts.

Economies characterised by public-resource scarcity could be expected to be hit particularly hard by a subsidised race in clean-technology innovation and industrial decarbonisation. Trade and investment effects could be reinforced by carbon border adjustment mechanisms and other border measures that restrict imports on the basis of the carbon intensity of traded goods, resulting in further market segmentation.

Crucially, however, the negative crossborder economic impacts of environmental subsidies may be outweighed by positive crossborder effects that arise from the same policies. The potential benefits include trade-induced technology transfers, domestic emission abatement and the cost-effective supply of environmental goods.

In other words, environmental subsidies that alter crossborder competitive conditions may not be all bad. They may tackle market failures in a net-global-welfare enhancing manner and may therefore be entirely appropriate.

Public financing of this category, however, leaves policymakers with a distributional challenge: they must mitigate immediate negative crossborder impacts through least-trade-distortive policy design and/or provide crossborder transfers to finance industrial decarbonisation in public resource-poor jurisdictions, with the goal of ensuring a just net zero transition for all countries and their citizens.

1.1 Governance failures and domestic-content requirements

Environmental subsidies could also create economic damage if mixed with protectionist policies. Such policies often take the shape of local-content requirements that give domestic producers a competitive edge over foreign suppliers, eliminate benefits of competition and therefore frequently result in higher prices, lower quality, less variety and, overall, less availability of undersupplied clean technologies and environmental goods: *"such trade restrictions cannot possibly enhance global welfare, and are also dubious policies for any user country because of the higher costs to domestic consumers and the loss of export opportunities from mimetic foreign practices"* (Charnovitz, 2014).

The applicable World Trade Organisation rules on subsidies – embodied in the WTO Agreement on Subsidies and Countervailing Measures (ASCM) – prohibit the making of subsidies contingent on local-content requirements (WTO, 1994a).

The ASCM was designed precisely to reign in governments' beggar-thy-neighbour public financing schemes by tying their hands when tempted to give in to political siren calls. In this respect, the ASCM retains a clear and functional legal rule disciplining the actions of WTO members.

1.2 Towards an enabling international regulatory framework for environmental subsidies

The ASCM was not, however, drafted to accommodate net-global-welfare enhancing public investments in the transition to net zero. The ASCM does not provide for a legal shelter for environmental subsidies that may be needed in order to mend the market failure they seek to address, but which also exert negative crossborder trade effects.

The ASCM is biased towards limiting crossborder economic spillovers, even if they are outweighed by positive economic and environmental impacts and the reduction of negative environmental externalities of production.

Three decades after the ASCM was drafted, this omission creates an international regulatory challenge as the governments of the world's economies have begun to disperse hundreds of billions of euros as core elements of climate legislation.

Certain types of public investments that are needed to achieve the transition, however, are likely to be caught up in WTO dispute settlement proceedings or will become subject to national countervailing duties, which the ASCM regulates and explicitly allows for.

These frictions can and should be avoided by all means (section 4). What is needed – beyond enhanced transparency of public financing and empirical analysis thereof – is political convergence among governments on permissible environmental subsidies that minimise negative crossborder economic externalities while maximising positive economic and environmental spillovers.

Beyond the interests of high-income country governments and their taxpayers in limiting the cost to the public accounts of subsidy races, political convergence among a broad set of actors could be facilitated by linking the

signature and ratification of an agreement on subsidies to credible and specific commitments to financially support poor economies in their national industrial decarbonisation efforts.

2 WTO rules applicable to environmental subsidies

Under the ASCM, a subsidy is deemed to exist if a public body provides a financial contribution in the form of a direct transfer, revenue forgone (eg. tax breaks) or in-kind contributions, and if such a contribution confers a benefit.

A benefit is deemed to be conferred if the financial contribution alters the competitive conditions in the marketplace in favour of the receiving economic operator (Article 1 ASCM; WTO, 1994b).

Yet, the ASCM only restricts subsidies if they are made specific to an enterprise or industry, group of enterprises or industries (Article 2 ASCM), for instance to certain energy-intensive trade-exposed industries (WTO, 1994b).

2.1 Prohibited subsidies

Specific subsidies are outright prohibited if they are made contingent on export performance or the use of domestic over imported goods. Article 3 ASCM thereby gives justice to the notion that export subsidies and subsidies that are subject to local content requirements are a priori considered to be trade distortive (WTO, 1994b).

In WTO dispute-settlement proceedings, a finding of a prohibited subsidy will result in the obligation to immediately remove the subsidy, and the authorisation of countermeasures if the measure is not removed within a reasonable period (Article 4 ASCM).

Subsidies contingent on the use of local content would also violate the General Agreement on Tariffs and Trade's (GATT) national treatment provision provided for in GATT Article III:4 (WTO, 1994b).

2.2 Actionable subsidies

Specific subsidies that are neither contingent on exports nor the use of local content are merely considered to be 'actionable' under the ASCM. Actionable subsidies are only found to be inconsistent with the ASCM if it can be demonstrated that they distort trade generally, or in relation to the complainant WTO member specifically (Articles 5, 6 and 7 ASCM).

The ASCM provides for legal remedies in case a subsidy is found to cause adverse effects to the domestic industry of another WTO member (as evident from observable effects of the subsidy on bilateral trade volumes, price, revenue, sales, profits, productivity, etc), to nullify the benefits otherwise accruing to that member under the WTO covered agreements, or to cause serious prejudice to the interests of that member (including by displacing or impeding exports or imports that would otherwise occur, undercutting, suppressing or depressing prices, or increasing world market shares of the subsidising member's exports).

If a subsidy is found to cause adverse effects as a result of a finding of injury, nullification or serious prejudice, the subsidy must be withdrawn or the adverse effects removed.

The notable difference between 'injury to the domestic industry' and 'serious prejudice' is that the latter spans a wider set of circumstances than the former, taking into account the effects on international trade generally. The scope of the former concept, in contrast, permits an investigation into, and positive findings, of a subsidy's effect on bilateral trade only.

2.3 The main threat to environmental subsidies: national countervailing (anti-subsidy) duty laws and regulations

An industry on the receiving end of an actionable subsidy may ultimately be subject to countervailing duties (CVD) imposed by a third country government.

The imposition of countervailing (anti-subsidy) duties requires an investigation by a government agency – conducted in accordance with ASCM provisions – and a finding of injury to the domestic industry producing the like product, measured as effects on bilateral trade volume, price, revenue, sales, profits, productivity and capacity utilisation (Part V ASCM).

Governments frequently employ countervailing duties to address foreign subsidies, compared to relatively rare use of WTO dispute-settlement proceedings.

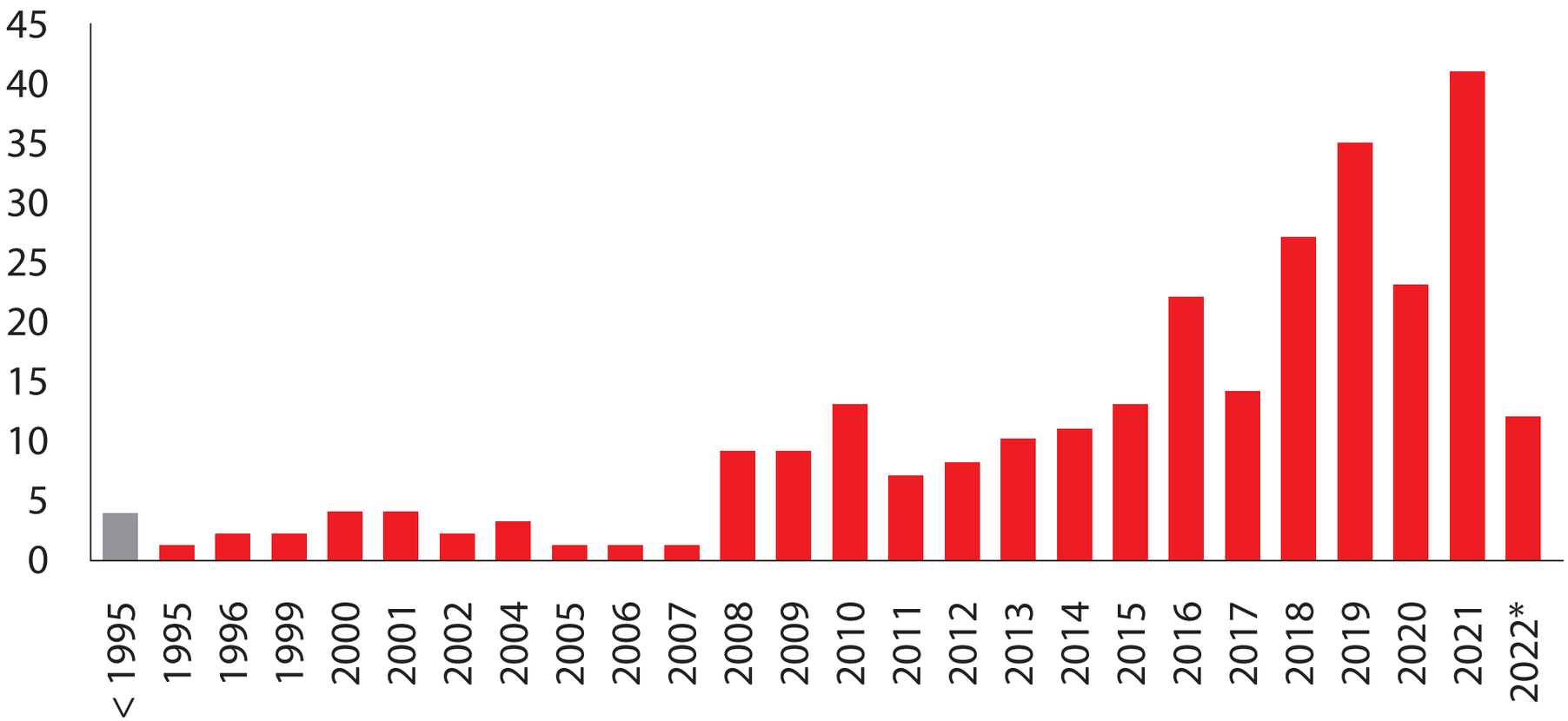
Given this, the most significant action countering arguably net-global-welfare enhancing environmental subsidies should be expected to take the form of CVDs. In 2022, 291 CVD measures were in force globally, with a sharply increasing trend over the past decade (Figure 1).

About two thirds of all measures in force globally in 2022 were taken by the United States, with Canada (12 percent), and the European Union (8 percent) making for distant second and third places.

Currently, developing countries and China and India are the main targets of North American and European CVD measures. However, US CVDs targeting climate-related subsidies in EU countries have begun to surface recent years (Figure 3).

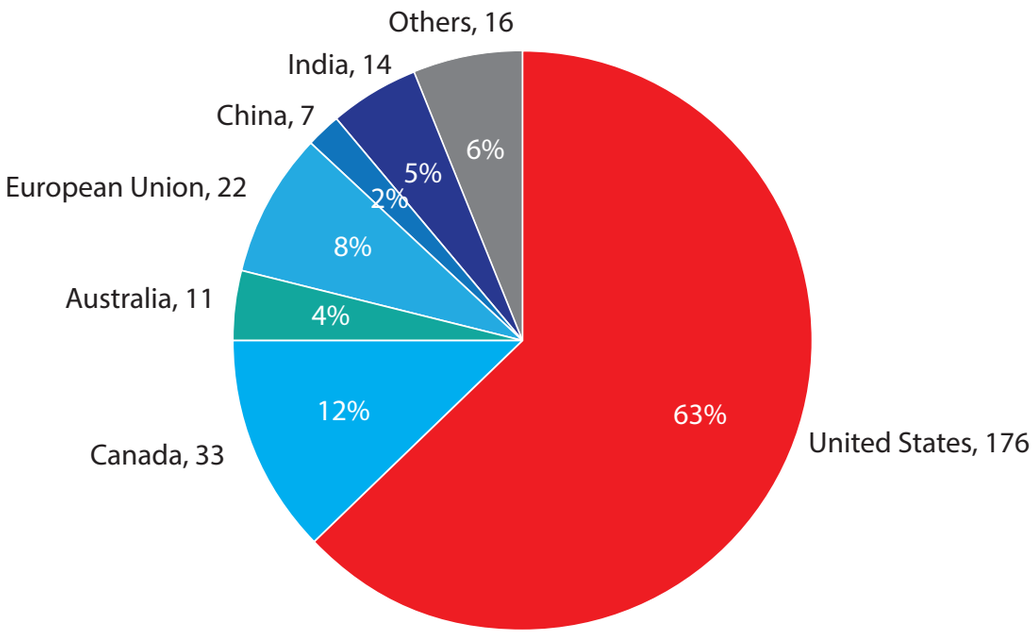
In sum, WTO subsidy disciplines may be invoked via WTO dispute settlement or national countervailing duty statutes that mirror WTO CVD rules codified in Part V of the ASCM, if the existence of trade effects can be causally linked to public financing that may, nonetheless, have net-welfare enhancing effects.

Figure 1. Countervailing duty measures in force on or after 01/01/2022 by year of application



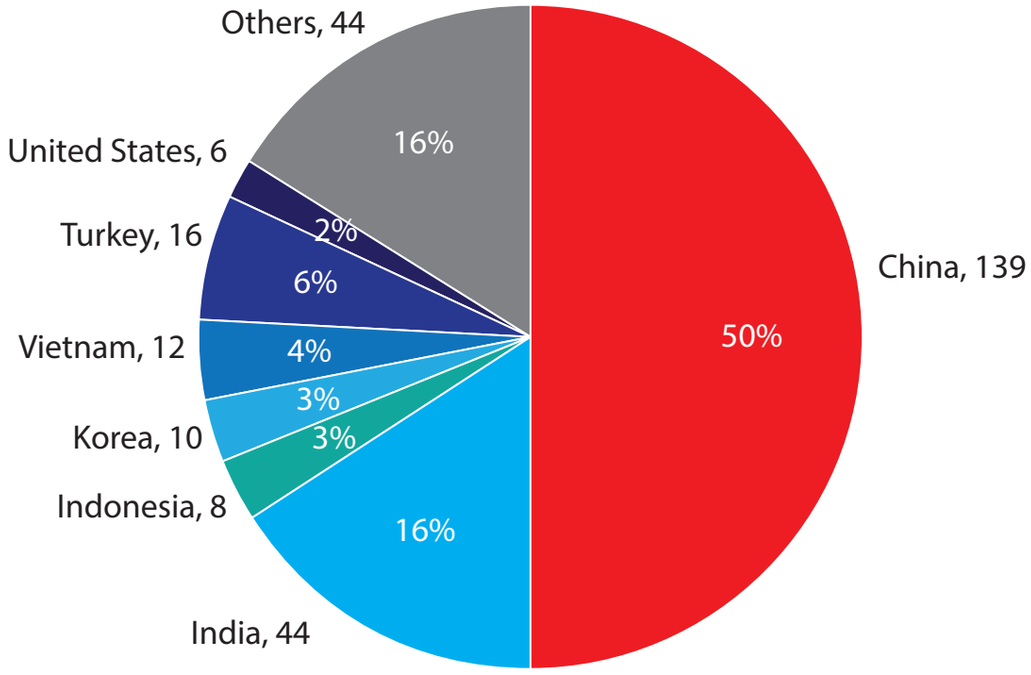
*Source: Bruegel based on WTO. *Data relates to the January to June period only.*

Figure 2. Countervailing duty measures in force on or after 01/01/2022 by reporting member



Source: Bruegel based on WTO.

Figure 3. Countervailing duty measures in force on or after 01/01/2022, by exporter



Source: Bruegel based on WTO.

2.4 No exceptions for environmental subsidies in international economic law

It is noteworthy, in this context, that the ASCM included a category of 'non-actionable' subsidies covering up to 20 percent of existing facilities' costs of adapting to new environmental regulations or requirements, as well as assistance covering not more than 75 percent of industrial research (Article 8 ASCM). Even this rather limited (and for current purposes insufficient) carve-out expired in 2000, while the rest of the agreement remains in force.

Moreover, unlike the GATT, the ASCM lacks general exceptions of the kind codified in GATT Article XX, which include the protection of legitimate policy objectives such as *"the conservation of exhaustible natural resources"* (WTO, 1994b).

While the question of the applicability of Article XX GATT to the ASCM has not been concluded in WTO dispute-settlement proceedings, the prevalent legal opinion leans strongly towards a negative answer (Rubini, 2012).

This would, crucially, prevent access to legal justifications for net-global-welfare enhancing environmental subsidies that otherwise generate negative economic externalities.

3 Contemporary environmental subsidies in the context of the ASCM and national countervailing duty statutes

As noted in the previous section, environmental subsidies may distort international trade even if they aim at, and result in, decarbonisation and do not feature a priori prohibited regulatory qualifications, such as domestic content requirements.

The likelihood that subsidies will have such effects increases commensurately to the extent that transfers, concessional loans, tax incentives or in-kind contributions directly support the decarbonisation of domestic

production capacities, or are coupled to domestic per-unit production (in contrast to, for instance, consumption subsidies, the financing of research and development, or of public infrastructure for technological innovation).

Trade effects that can be linked to otherwise net global welfare maximising – and therefore entirely appropriate – environmental subsidy schemes render such financing vulnerable to legal challenges under the WTO dispute-settlement mechanism.

A faster and therefore far more frequently employed alternative is offered by national trade defence instruments (so-called trade remedies)[2] in general, and by countervailing-duty ('anti-subsidy') statutes in particular. These national laws and regulations frequently mirror WTO members' rights and obligations, as codified in Part V of the ASCM.

They allow WTO members to adopt duties to counter third country subsidies[3] that cause or threaten to cause injury to their domestic industries (WTO, 1994b), as long as they – de jure and as applied – comply with the rights and obligations set out in Part V of the ASCM.

Most government agencies tasked with countervailing duty investigations (ie. to determine whether the domestic industry suffers from injury caused by a foreign subsidy) and the adoption of countervailing-duty measures retain discretion in their final decisions, even if the result of the investigation is positive. European Union institutions, for instance, must take into account the 'Union interest'[4].

In sharp contrast, in the United States, the legally defined process applying to the investigation of third-country subsidies and adoption of countervailing duties is quasi-automatic and compulsory once an industry petition to investigate reaches the US Department of Commerce (Department of Commerce, 1994).

This circumstance may explain partly why the United States remains – with 175 out of 291 countervailing measures currently in force globally – by far the most frequent user of CVDs.

As a 2022 episode around US solar panel imports from four southeast Asian (ASEAN member) economies demonstrated, the inflexibility of the US countervailing-duty statute may not only create a barrier to subsidised (and therefore commercially cheaper) environmental goods, but also harms US companies engaged in processing and installing the goods (in this case, solar panels).

In this case, the industrial self-harm expected to result from the effect of the countervailing duties requested by a single US company (Auxin Solar Inc.), forced US President Joe Biden, in an unprecedented course of action, to adopt an executive order pausing the adoption of respective measures for two years, while employing a highly questionable 90-year old legal basis providing the president with emergency powers (White and Case, 2022).

Several other (quasi-) legislative acts exemplify the tensions between potentially legitimate domestic industrial interests, the imperative to support the development of environmental technologies and the urgency of decarbonising industrial capacities.

First, the 2022 European Commission Guidelines on State Aid for Climate, Environmental Protection and Energy provide EU national authorities with a framework for permissible financing of – inter alia – environmental technology development and the decarbonisation of energy supply and current industrial production processes, for up to 100 percent of the funding gap (European Commission, 2022).

With respect to current industrial production, the Commission guidelines mirror the rationale of the now-expired Article 8 ASCM. While it is widely acknowledged that non-discriminatory subsidies to incentivise environment-

related R&D and energy supply are part of the first-best policy response to the given market failure, the decarbonisation of industrial production capacities (eg. steel or cement production plants) would, in theory, arguably be dealt with more efficiently by imposing levies on industrial emissions only, eg. via the EU emissions trading system (ETS), including to give effect to the polluter-pays principle.

The Commission guidelines implicitly acknowledge this dissonance (paragraph 93). The Commission argues, however, that *"State aid can, in principle, be an appropriate measure in achieving decarbonisation goals, given that other policy instruments are typically not sufficient to achieve those goals (…). Given the scale and urgency of the decarbonisation challenge, a variety of instruments, including direct grants, may be used."*

From an economic and environmental perspective, decarbonisation subsidies aimed at maintaining existing domestic industrial capacities may be, at least partially, justifiable. But, be that as it may, public financing of the decarbonisation of industrial production capacities makes exports that benefit from such support a clear target for the standard third-country national countervailing-duty statute.

Second, transitional free emission allowances provided to energy-intensive trade-exposed sectors allocated under emissions trading systems, are already subject to US countervailing duties with respect to allowances provided under the EU ETS and South Korea's ETS, as upheld for Korea by the US Court of International Trade[5]. This is despite those allowances only conferring a benefit in context of domestic regulatory restrictions applicable to other sectors.

While these countervailing duties offer a political side-effect of incentivising the phase-out of free allowances provided to the highest emitting industries in the EU and Korea, they disincentivise third-country regulatory pilot projects of a nature similar to the ETS, where free allowances are provided during a transition until the effect of carbon pricing on potentially strategic sectors is more discernible.

In the case of US CVDs against EU steel exports, in addition, the US also imposes duties against certain German climate and energy-efficiency related tax breaks[6].

It is noteworthy, in this context, that the 2020 EU ETS state aid guidelines (European Commission, 2020) enable a budget of more than €60 billion to compensate for ETS-induced energy costs of energy-intensive, trade-exposed sectors such as steel, aluminium and certain chemicals, to prevent companies in these sectors from relocating carbon-intensive production to 'polluter havens' outside of the EU.

These subsidies, which are an important element of the European Green Deal, would similarly fall within the scope of the US CVD statute, which knows no environmental exceptions.

Third the currently unfolding EU subsidy response to the US Inflation Reduction Act, too, will likely result in US business petitions to the US Department of Commerce requesting CVD investigations against EU industries that export goods benefitting from EU funds and state aid[7].

Fourth, in 2026, the European Commission will review the possibility of a WTO-compatible modus operandi for the adoption of export refunds for domestic carbon costs. The purpose of such export refunds is to level the playing field for carbon-priced EU exports and third-country exports that are not subject to carbon pricing in their home jurisdictions.

As a result, export refunds help mitigate the risk that carbon-intensive EU production migrates to 'polluter havens' outside of the EU. Moreover, export refunds are arguably a crucial element of a prospective international CBAM network, with a view to effectively pricing carbon embedded in internationally traded goods.

Export refunds for domestic regulatory charges, however, are likely to fall within the scope of the ASCM export-subsidy prohibition, and would not be exempted by footnote 1 of the ASCM, which otherwise provides an exception to the export-subsidy prohibition for the reimbursement of indirect taxes at the border upon export.

In another example, an uncapped amount of US federal tax credits allocated to suppliers of clean hydrogen contingent on domestic production has drawn considerable criticism from EU officials (Internal Revenue Service, 2006).

This includes demands that the scheme, which is provided for in the 2022 US Inflation Reduction Act, be transformed into a non-discriminatory consumption subsidy, which would render the instrument less distortive to trade and investment that may otherwise lead to a CVD response from third-country governments.

The arguable climate and net-global-welfare benefits of the above-mentioned policies clearly distinguish these instruments, however, from the inherently discriminatory domestic content requirements that are embedded throughout the US Inflation Reduction Act (CRS, 2022), and which led – in addition to substantive criticism from European Commission (Internal Revenue Service, 2022), Japanese and South Korean officials – French finance and economy minister Bruno Le Maire to call for a response in kind[8].

Such a response could be achieved by making EU countries' environmental state-aid payouts conditional on local content shares, constituting the welfare-reducing mimicry predicted by Charnovitz (2014; see section 1). Environmental subsidy nationalism and respective subsidy races must be considered the least-best policy option.

As noted above, domestic sourcing requirements attached to otherwise environmentally beneficial payouts render such financing less efficient from an economic point of view, and less effective from a climate point of view.

It is in this regard, specifically, that WTO subsidy rules and national trade remedy laws and regulations remain functional and appropriate, because they are sufficiently restrictive as in: a priori prohibitive.

4 The challenge: creating an enabling international framework for environmental subsidies

WTO litigation and national trade-remedy laws and regulations place stumbling blocks in the way of urgently needed government climate-policy rollouts. Mending this unfortunate situation is as urgent as it is difficult.

A 2022 IMF, OECD, World Bank, and WTO report on subsidies, trade and international cooperation noted that: *"better understanding of the objectives and effects of various types of subsidies will further the development of rules and norms. Fact-based dialogue among governments—drawing on high-quality impartial inputs that elucidate the effects of particular subsidies on trade and investment and identifying subsidy designs that reduce negative international spillovers—will lay the critical groundwork for improved or expanded international rules"* (IMF, OECD, World Bank, and WTO, 2022).

With this, the international governmental organisations have not only identified the priorities for themselves, but also for non-governmental organisations with respective capacities:

1. Data collection to generate transparency of public financing of the transition to net zero in G20 economies; conduct analysis of the immediate environmental and economic impacts of subsidies, and of the crossborder positive and negative externalities;

2. Draft proposals for categories of permissible first-best, legitimate second-best and impermissible green-subsidy practices;

3. Raising political awareness among key constituencies and stakeholders, foster public and private dialogue, and inform bilateral, plurilateral and multilateral exchanges and negotiations.

4.1 Transparency and analysis of G20 public financing of the green transition

Private non-profit organisations may be necessary to support international organisations in the tasks of generating subsidy transparency and providing analysis.

Indeed, private bodies should be considered as complementary collectors and analysts of subsidy data in general, and in relation to environmental subsidies in particular.

From a WTO perspective, the urgency for research NGOs to step in arises because subsidy analysis falls outside of the organisation's remit, while data collection has fallen victim to dysfunctional subsidy notification requirements and unreliable member government notifications.

As the Chair of the WTO Subsidies and Countervailing Measures Committee reported in October 2022, 89 members — more than half the WTO membership — had still not submitted their 2021 subsidy notifications. In addition, 76 members had still not submitted their 2019 subsidy notifications, while 65 had failed to submit their 2017 notifications (WTO, 2022).

The OECD, on the other hand, has done exceptionally valuable work on agricultural, fisheries and fossil-fuel subsidies over the past decades[9]. The organisation has only begun to collect and analyse sector and value-chain-specific data in the field of industrial subsidies with an – at this point – anecdotal focus on environmental impacts relative to crossborder market distortions (Sauvage and Garsous, 2022).

These efforts require cooperative complementation through private initiatives. Private organisations such as the Global Trade Alert (GTA), for instance, have conducted impartial data collection and analysis on new barriers to international trade since the global financial crisis of 2007-08 in order to monitor protectionist developments[10].

A similar initiative should take monitor and analyse the economic and environmental impacts of G20 public financing of the decarbonisation of industrial production, power generation and respective vulnerabilities under current and prospective international subsidy disciplines, benefitting from the experience and methods of OECD and GTA researchers.

4.2 Drafting an informed set of reform proposals and policy recommendations

In parallel with the process of data collection and analysis, there is currently an absence of proposals on draft best practices and on international subsidy rules reform.

Ideally, such proposals would carve out more than the currently existing policy space for environmental subsidies that are appropriate to rapidly expedite the decarbonisation of industrial production and power generation and, in their positive global-net-welfare effects, outweigh immediate negative economic externalities.

Such proposals could take the form of an expanded Article 8 ASCM carve-out for the decarbonisation of existing production capacities, a set of technical guidelines for subsidy best practices, recommendations for national trade remedies reform, draft political agreements among the governments of the 20 largest economies not to impose countervailing duties (and not to challenge in WTO dispute settlement), certain types of 'green-light category' environmental subsidies of third countries, or all of the above.

These proposals should – last but not least – include suggestions for crossborder transfers and project-specific funding for the industrial decarbonisation of economies located in public-resource-poor jurisdictions that suffer from short term negative spillovers caused by the public investments of OECD and G20 countries.

4.3 Political process, forums and communication

It may seem elusive to tackle the challenge of environmental subsidy agreement negotiation via a multilateral negotiations track and respective forums – ie. the WTO Subsidies and Countervailing Measures Committee and WTO Trade and Environment Committee.

However, it makes for the necessary – because inclusive – starting point with a view to gathering government support for both the reform process and substantive proposals.

Beyond the multilateral track, the most recent wave of WTO plurilateral initiatives in general, and the Joint Statement Initiative regarding the Trade and Environment Sustainability Structured Discussions (TESSD) in particular11, could host a useful process and forum with a view to jump-starting urgently needed exchanges and inspiring like-minded governments that desire political convergence.

Having already formed an initial Informal Working Group on Subsidies, the TESSD provides a space in which research NGOs could inject valuable analysis and policy proposals to work towards political convergence on evidence-based policy proposals.

At the same time, climate NGOs can be instrumental in communicating problem statements and proposing solutions to policymakers and stakeholders in key political constituencies around the world, with a view to generating a critical mass of political support among G20 and OECD governments.

In addition, the recent inception of a Coalition of Trade Ministers for Climate may – depending on the agenda that is currently in development – provide for useful forum for discussions and even negotiations of an urgently needed international agreement on environmental subsidies[12]. ■

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Endnotes

1. For background on the Inflation Reduction Act's implications for the EU see Maria Demertzis, 'The EU response to the United States Inflation Reduction Act', Bruegel, 1 February 2023.

2. See the WTO's Trade Remedies Data Portal.

3. See the WTO's database of Countervailing Measures.

4. As specified in Article 31 of EU Regulation 2016/1037 on protection against subsidised imports from non-EU countries.

5. On the EU ETS, see Jesse Kreier, 'Countervailing the EU's Emissions Trading Scheme, Part 2', International Economic Law and Policy Blog, 17 December 2022. For court proceedings on South Korea's ETS, see https://www.courtlistener.com/docket/63128503/50/dongkuk-steel-mill-co-ltd-v-united-states/.

6. For court proceedings, see: https://www.courtlistener.com/docket/63175250/48/1/bgh-edelstahl-siegen-gmbh-v-united-states/.

7. See Samual Stolton, 'Vestager proposes 'urgent' state aid reforms to keep business in EU', Politico, 13 January 2023.

8. William Horobin and Albertina Torsoli, 'France Says EU Should Respond in Kind to Biden's EV Subsidies', Bloomberg, 26 September 2022.

9. See https://www.oecd.org/subsidies/.

10. See https://www.globaltradealert.org/.

11. See https://www.wto.org/english/tratop_e/tessd_e/tessd_e.htm.

12. For details on the Coalition of Trade Ministers on Climate, see Jonny Peters and Ignacio Arróniz Velasco, 'Where next for the Coalition of Trade Ministers on Climate?' E3G, 19 January 2023.

References

Charnovitz, S (2014) 'Green Subsidies and the WTO,' Research Paper No. RSCAS 2014/93, Robert Schuman Centre for Advanced Studies, available at https://scholarship.law.gwu.edu/cgi/viewcontent.cgi?article=2341&context=faculty_publications

CRS (2022) Tax Provisions in the Inflation Reduction Act of 2022 (HR 5376), Report R47202, Congressional Research Service, available at https://crsreports.congress.gov/product/pdf/R/R47202

Department of Commerce (1994) 'Antidumping Duties and Countervailing Duties,' OAS Foreign Trade Information System, Organisation of American States

European Commission (2020) 'Guidelines on certain State aid measures in the context of the system for greenhouse gas emission allowance trading post-2021,' 2020/C 317/04, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020XC0925%2801%29

European Commission (2022) 'Guidelines on State Aid for Climate, Environmental Protection and Energy 2022,' 2022/C 80/01, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022XC0218(03)

IMF, OECD, World Bank & WTO (2022) Subsidies, Trade, and International Cooperation, International Monetary Fund, Organisation for Economic Co-operation and Development, World Bank, and World Trade Organisation, available at https://www.wto.org/english/res_e/booksp_e/repintcoosub22_e.pdf

Internal Revenue Service (2022) 'Comment from Delegation of the European Union to the United States of America: Submission by the European Union on the Inflation Reduction Act,' 7 November, available at https://www.regulations.gov/comment/IRS-2022-0020-0774

Rubini, L (2012) 'Ain't Wastin' Time No More: Subsidies for Renewable Energy, the SCM Agreement, Policy Space, and Law Reform,' Journal of International Economic Law 15(2): 525-579

UNEP (2003) Energy Subsidies: Lessons Learned in Assessing their Impact and Designing Policy Reforms, United Nations Environment Programme

White & Case (2022) 'President Biden Invokes Emergency Authority to Waive Antidumping and Countervailing Duties on Solar Imports from Southeast Asia for Two Years,' Alert, 8 June.
WTO (2022) 'Members still falling behind on subsidy notifications, committee hears,' WTO News, 25 October, available at https://www.wto.org/english/news_e/news22_e/scm_25oct22_e.htm
WTO (1994a) Agreement on Subsidies and Countervailing Measures, Marrakesh Agreement Establishing the World Trade Organisation
WTO (1994b) 'WTO Analytical Index,' Agreement on Subsidies and Countervailing Measures, World Trade Organisation

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Monetary policy tightening and the green transition

Isabel Schnabel argues that unprecedented investments are needed in technical innovations and renewable energy to protect our planet

The green transition will fundamentally transform our societies[1]. Protecting our planet requires unprecedented large-scale investments in technical innovations and renewable energies to bring our economies on a path towards net zero greenhouse gas emissions.

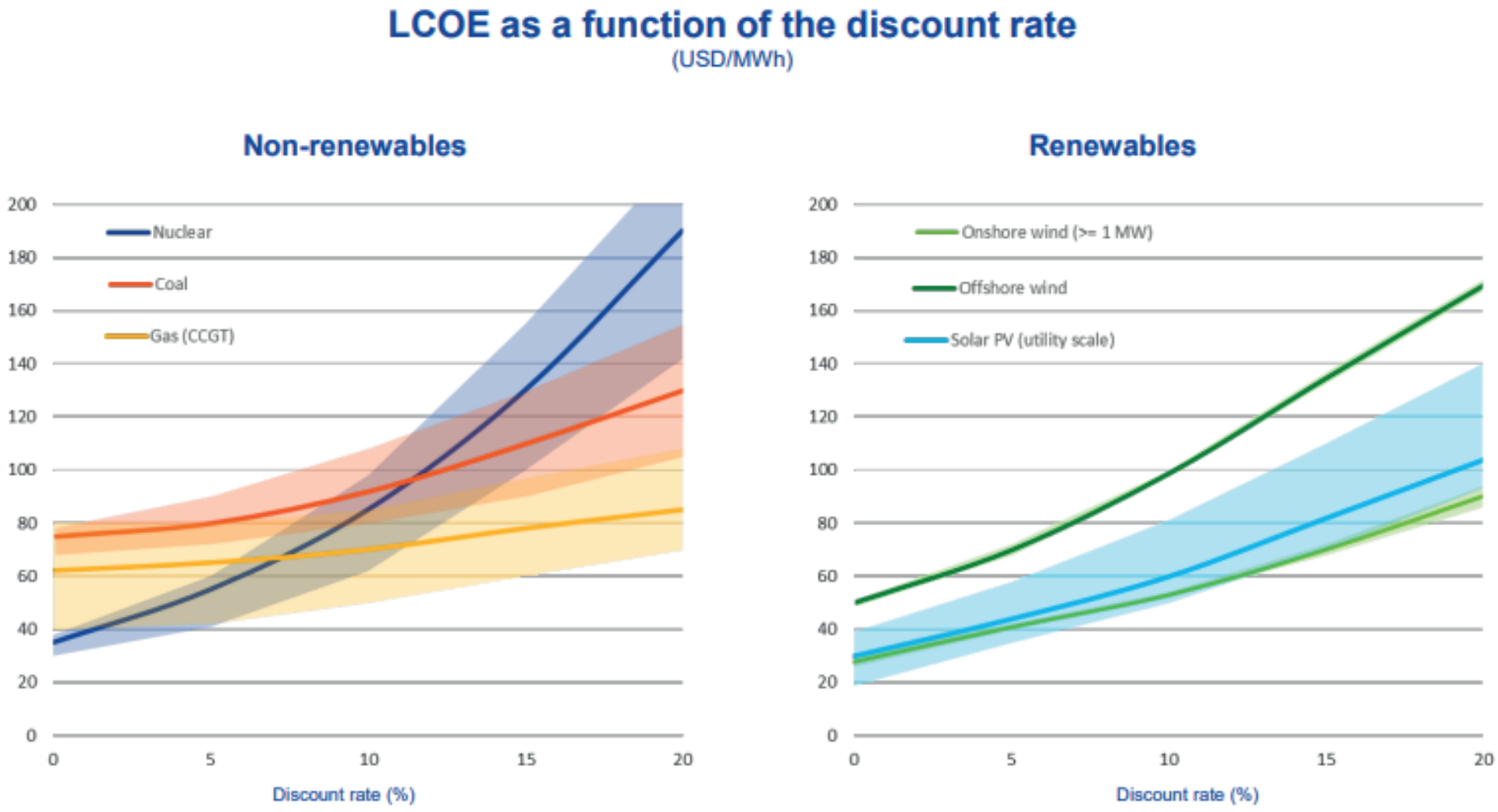
As our experience over the past two decades demonstrates, the relatively large upfront costs incurred in these capital-intensive expenditures are particularly susceptible to changes in the cost of credit. Low and declining interest rates have measurably contributed to the fall in the 'levelised cost of electricity', or LCOE, of renewable energies[2]. As a result, the cost of electricity from renewable sources is now comparable to, or lower than, that of conventional power plants[3].

These developments now risk being reversed by the marked rise in global interest rates over the past year. Since fossil fuel-based power plants have comparably low upfront costs, a persistent rise in the cost of capital may discourage efforts to decarbonise our economies rapidly.

Put simply, renewable energies are more competitive when interest rates are low[4]. While simulations suggest that the LCOE of a gas-fired power plant would change only marginally if discount rates were to double, that of offshore wind could rise by nearly 45% (Slide 1)[5]. Widening credit spreads may exacerbate these effects in many developing and emerging economies.

The insight that the effects of interest rate changes are not symmetric across economic sectors is not new and it is empirically well-documented[6]. The exceptionally high stakes involved in the green transition, however, have sparked a controversial public debate about whether the current monetary policy tightening may ultimately slow down the pace of decarbonisation.

Slide 1. Higher interest rates weigh on price competitiveness of renewable energies



Notes: Lines indicate median values, areas the 50% (20% for renewables) central region.
Source: International Energy Agency, Projected Costs of Generating Electricity 2020.

Some argue that such tightening may even be inconsistent with the objective of price stability: unless greenhouse gas emissions are cut rapidly, our economies will remain exposed to the risks of 'climateflation' and 'fossilflation' – that is, persistent inflationary pressures associated with more frequent natural disasters and a continued dependency on gas, oil and coal[7].

These concerns must be taken seriously. As they expose a potential dilemma directly relating to central banks' primary mandate of price stability, we cannot ignore them on legal grounds.

Fiscal policy needs to remain in the driving seat and accelerate the green transition

It is therefore no surprise that climate change features prominently in a symposium on central bank independence. Independence grants central banks significant leeway in their actions. But it also requires central banks to be held accountable – a point that Stefan Ingves highlighted in a speech last year[8]. We need to justify the course of action that we consider as most appropriate in achieving our mandate.

This is what I intend to do in my remarks. I will argue that failing to arrest high inflation in a timely manner would jeopardise the green transition more fundamentally, and that a restrictive monetary policy stance today will benefit society over the medium to long run by restoring price stability.

I will also stress that fiscal policy needs to remain in the driving seat and accelerate the green transition, and that the decline in the ECB's balance sheet as part of our monetary policy tightening requires us to make additional efforts to align our actions with the objectives of the Paris Agreement.

Green transition can only thrive with price stability

Over the past year, we have moved forcefully to contain inflation by first stopping net asset purchases and then by raising our key policy rates by a cumulative two and a half percentage points. We have also announced that the Eurosystem will no longer reinvest all of the principal payments from maturing securities in the asset purchase programme (APP).

We judge that interest rates will still have to rise significantly at a steady pace to reach levels that are sufficiently restrictive to ensure a timely return of inflation to our 2% medium-term target.

As interest rates rise, financing investments in green technologies will become more expensive, generating the risk that higher costs of capital may slow down the pace of decarbonisation. There are, however, three interrelated reasons why tighter financing conditions are the appropriate response to the challenges we are facing today.

First, current high inflation is a tax on investment. In many countries, it raises the user cost of capital by raising the effective tax rate on business investment[9]. High inflation also increases uncertainty and distorts relative price signals relevant for investment decisions. And it may slow down productivity growth, as occurred in the United States in the 1970s[10].

Therefore, the green transition would not thrive in a high inflation environment. Price stability is a precondition for the sustainable transformation of our economy.

Second, inflation will not subside by itself.

What started as a relative price shock has gradually morphed into a broad-based increase in the general price level. Preliminary inflation data for December point to a persistent build-up of underlying price pressures even as energy price inflation has started to subside from uncomfortably high levels.

To resolve today's inflation problem, financing conditions will need to become restrictive. Tighter financing conditions will slow growth in aggregate demand, which is needed to reduce the upward pressure on prices that has resulted from the long-lasting damage to the euro area's production capacity inflicted by the energy crisis.

By bringing aggregate supply and demand back into balance, we will accelerate the process by which inflation will fall back to our 2% target and thereby ensure that longer-term inflation expectations remain anchored.

Third, the experience of the 1970s shows that a policy that is falsely calibrated on the assumption that inflation will decline by itself could ultimately put the green transition more fundamentally at risk.

In this case, monetary policy would need to raise interest rates even more forcefully to restore trust in the economy's nominal anchor. In the 1970s, financing conditions tightened to an extent that made capital accumulation prohibitively expensive.

Our current policy is calibrated to avoid such very bad outcomes[11]. A determined reaction to the risk that inflation may become entrenched not only safeguards price stability but also provides the conditions under which the green transition can thrive sustainably.

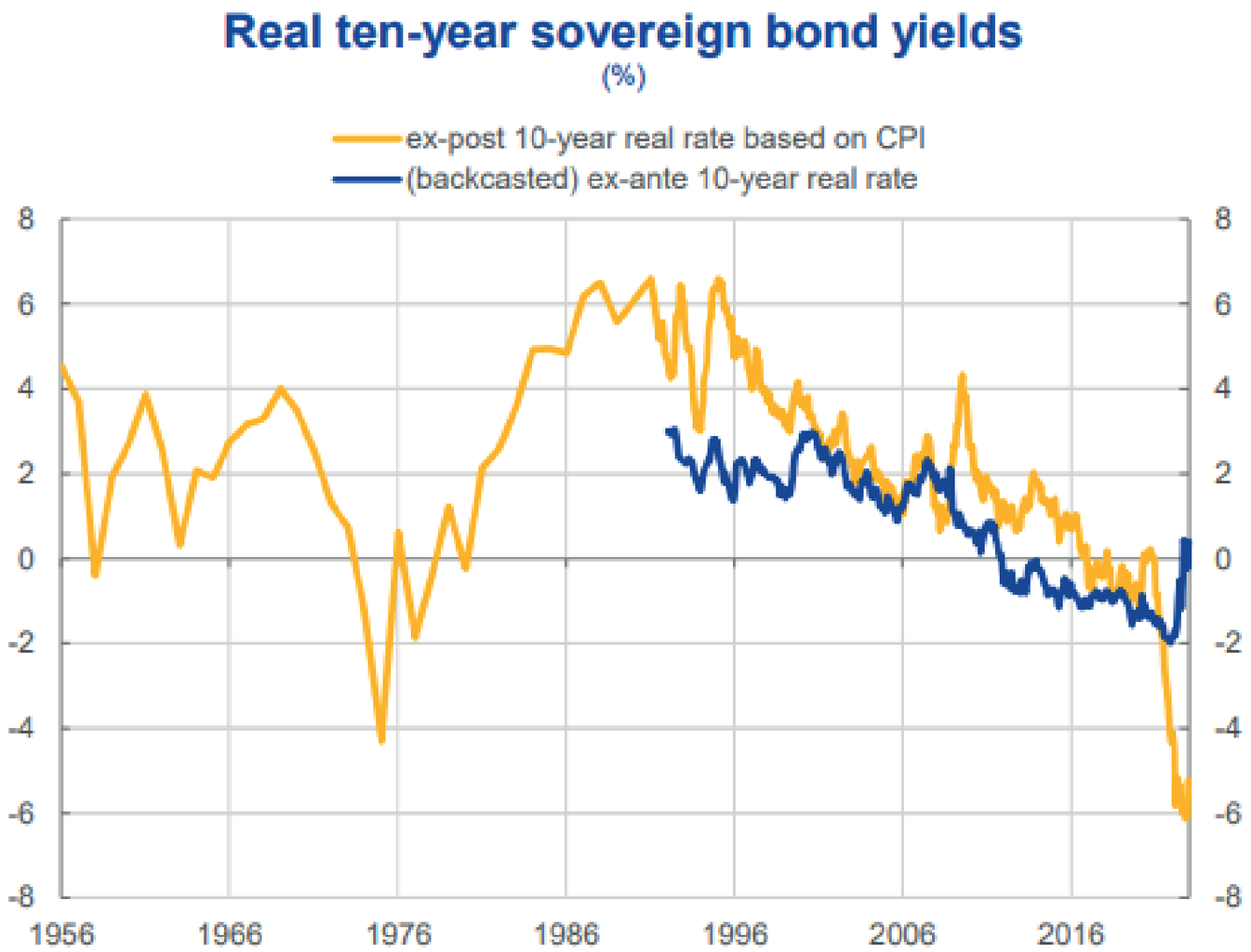
Indeed, while the cost of credit has become more expensive because of our actions, financing conditions remain favourable from a historical perspective. Measures of real long-term interest rates, for example, which matter most for green investments, remain low in historical comparison (Slide 2).

Accordingly, a large majority of leading climate economists polled last year see only a mild or very mild impact of rising borrowing costs on the transition to net zero emissions by 2050[12].

So far, there is also no evidence of funding shortages for green investment projects. While conventional bond and equity funds have experienced a sizeable decline in net inflows in 2022, the same was not true for environmental, social and governance (ESG) funds (Slide 3, left-hand side). ESG equity funds have even seen sustained inflows.

Such portfolio rebalancing has made green investments relatively more attractive from a funding perspective. In the case of German government bonds, for example, the yield of a green bond compared with that of a conventional bond with similar characteristics has declined, implying that the 'greenium' has reached record levels in absolute terms (Slide 3, right-hand side).

Slide 2. Real long-term yields remain low from a historical perspective

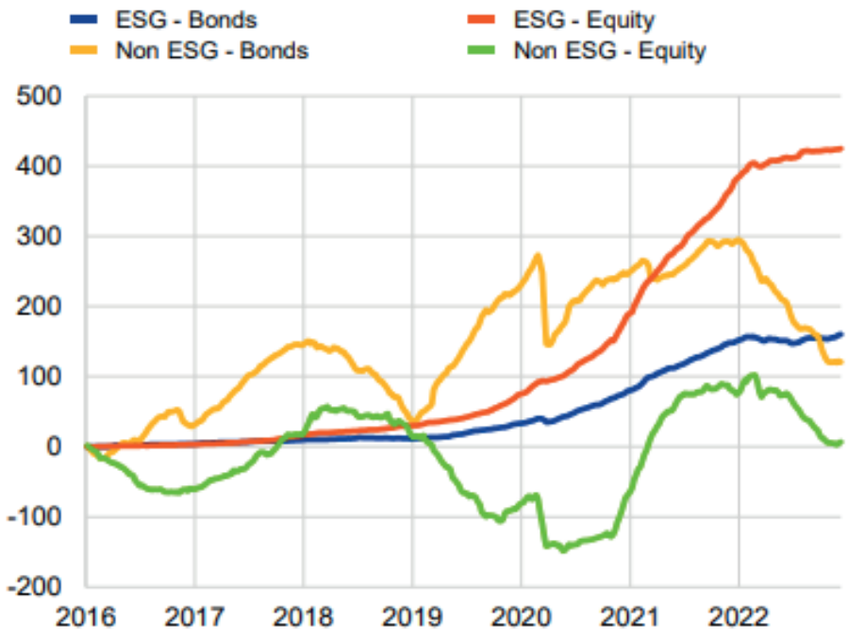


Notes: Real ex-post sovereign bond yields (yellow line) are the difference between the nominal annual yield in year t and realised inflation in year t until 1991 and the difference between the nominal annual yield in month m and realised year-over-year inflation in month m onwards. The real ex-post sovereign yield series is based on GDP-weighted data for Germany, France, Italy and Spain. Data for Italy before 1991, for Spain before 1980 and for Germany and France before 1973 are based on Jordà et al(2019), op. cit. As of August 2005 the ex-ante 10-year real rate (blue line) is computed by subtracting 10-year euro area ILS rates from 10-year OIS rates. Before August 2005 depicted real rates represent 'backcasts' based on a large set of macroeconomic and financial time series going back to 1992. Latest Observation: December 2022.
Sources: Jordà et al (2019), Bloomberg, OECD, Consensus Economics, Eurostat, EPU, Refinitiv, IMF, FRED and ECB calculations.

Slide 3. Flows into ESG funds have proven more resilient, boosting the 'greenium'

Cumulative flows into ESG and non-ESG funds in the euro area since 2016

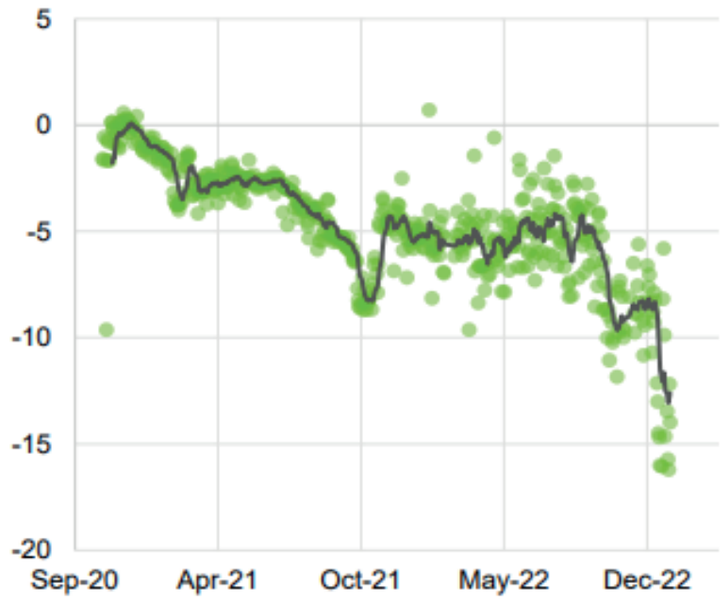
(USD billions)



Notes: The chart shows cumulative flows of euro area domiciled funds covered by EPFR. ESG stands for Environment, Social and Governance. Only funds that are marketed as ESG Funds or indicate that investing in ESGbeingone of their main objectives are included in the EPFR database with the ESG tagging.
Sources: Emerging Portfolio Fund Research (EPFR)

"Greenium" of German twin bond maturing in 2025

(in bps)



Notes: Chart shows the greenium of the German twin government bond maturing in 2025 over time. Dots show daily observations and the green line indicates 10-day moving averages. Last observation: 6 January 2023
Sources: Bloomberg, ECB calculations

Recent research also warns firms not to delay the transition as nominal interest rates rise. ECB staff document a positive relationship between the greenhouse gas emissions resulting from a firm's operations and credit risk estimates[13]. That is, firms that do not actively reduce their carbon footprint will face higher risk premia and hence higher borrowing costs at any level of risk-free interest rates.

All this means that it would be misleading to use tighter financing conditions as a scapegoat for further delays in the green transition. By bringing inflation down in a timely manner, monetary policy restores the conditions that are necessary for the green transition to thrive.

Fiscal policy needs to accelerate the green transition

In this environment, fiscal policy needs to remain in the driving seat when it comes to fighting climate change. Regrettably, many governments failed to use the past years of low interest rates to accelerate investments in greener and more sustainable energy carriers at a pace commensurate with the challenges we are facing.

Hence, the largest impediment to a rapid decarbonisation is not the cost of capital, but rather the considerable lack of progress by governments in implementing prior climate commitments.

The OECD, for example, estimates that global fiscal support for the production and consumption of coal, oil and gas almost doubled in 2021. Russia's invasion of Ukraine has almost certainly led to a further increase in inefficient fossil fuel subsidies to ensure short-term energy security.

Governments must end the reliance on fossil fuels as quickly as possible. They should step up their efforts at a time when average interest costs – thanks to the long period of low interest rates and the extension in bond maturities –

are still projected to remain below growth rates for some time to come, thereby supporting their capacity to foster private and public investments[14].

Viable support schemes for renewable energies and green technologies, such as first-loss guarantees, interest rate subsidies and government-sponsored financing facilities, should be continued and expanded where feasible.

Unlike untargeted, broad-based transfers and fossil fuel subsidies that distort incentives, such measures are welcome from a monetary policy perspective: their positive impact on the economy's productive capacity will help both restore price stability over the medium term and support debt sustainability by boosting potential growth[15].

Several structural measures are equally important.

One is a comprehensive use of carbon prices to spur substitution away from fossil fuels. All else equal, a higher LCOE of renewables requires a higher carbon price to preserve incentives for decarbonisation.

Removing red tape is another area where action is urgently needed. At present, administrative bottlenecks prevent that the rollout of renewables happens at a pace that is consistent with reaching climate neutrality by 2050 at the latest.

Finally, governments should reinforce their efforts to deepen capital markets and create a green Capital Markets Union. ECB research has long shown that stock markets are more effective than banks in supporting the decarbonisation of the economy[16].

Yet, EU equity markets remain fragmented and often illiquid. Reliance on bank lending at a time of rising constraints on banks' balance sheets considerably reduces the set of options for firms to push ahead with their green agenda.

The European Commission's recent package of legislative measures, including the proposed harmonisation of key aspects of corporate insolvency law and the removal of red tape for companies to list and raise capital on public exchanges, is an important step in the right direction[17].

But further decisive steps are needed to fast-track the establishment of a European green capital markets union[18].

The ECB needs to intensify its efforts to support the green transition

While governments need to accelerate their efforts to put the economy on a path towards net zero emissions, the drastic change in the macroeconomic and financial environment over the past year also requires central banks to review the scale and scope of their own contribution to the green transition.

Without prejudice to the ECB's primary mandate of price stability, we are obliged to support the EU's general economic policies in line with our secondary objective. We must therefore ensure that all of the ECB's policies are aligned with the objectives of the Paris Agreement to limit global warming to well below 2 degrees Celsius.

Climate actions are still falling short of the Paris objectives

Over the past few years, we have embarked on a demanding journey to make our monetary policy framework climate change-proof. In 2021, we decided on a comprehensive and ambitious set of measures as part of our first climate change action plan and we have begun to deliver on those commitments[19].

We have started to integrate climate change considerations into our macroeconomic models. We will soon publish new experimental statistical indicators related to climate change. And we will increasingly address climate risks in our risk control and collateral frameworks, including by eventually making climate-related corporate disclosures compulsory for bonds to remain eligible as collateral in our refinancing operations.

The Eurosystem itself will start to disclose the climate change-related exposures of parts of its own balance sheet around the end of the first quarter of this year.

Moreover, we are now tilting our corporate bond portfolio towards issuers with better climate scores, with a view to removing the existing bias towards emission-intensive firms[20].

Although our current actions in relation to climate change are ambitious, they are still falling short of the Paris objectives as they are not sufficient to ensure a decarbonisation trajectory that is consistent with carbon neutrality of our operations by 2050.

Three areas, in particular, require additional efforts.

Greening the stock of corporate bond holdings

First, the ongoing decline in our balance sheet will visibly diminish the effect of some of our actions going forward.

For example, for our corporate bond portfolio we are following a flow-based tilting approach where we adjust our reinvestments of corporate bonds based on a climate score that reflects issuers' carbon intensity, their decarbonisation plans and the quality of their climate-related disclosures.

Our main steering tool in this process is the tilting parameter – that is, the weight we put on the climate score in our benchmark allocation for new purchases. However, the tilting parameter lost part of its punch when we decided to stop net asset purchases (Slide 4). The forthcoming reduction in reinvestments will further significantly constrain the ability of a flow-based approach to decarbonise our corporate bond portfolio at a pace that is consistent with our climate ambitions[21].

The decarbonisation of our corporate bond portfolio depends not only on our tilting parameter but also considerably on the rate at which the firms in our portfolio decarbonise their businesses[22].

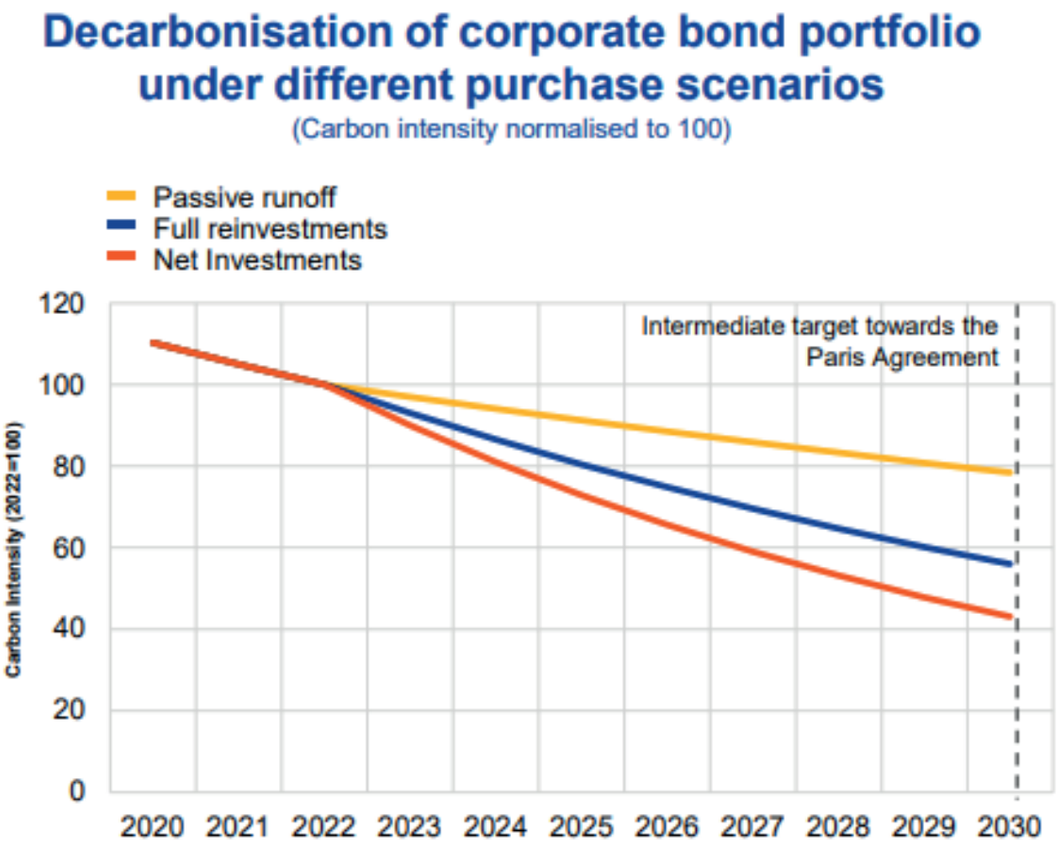
For example, assuming full reinvestment, we would achieve only half of the total decarbonisation of our corporate bond holdings by 2030 if firms were to stop taking steps to decarbonise their activities (Slide 5, left-hand side). This effect depends to a significant extent on the actions of a few high-emitting companies (Slide 5, right-hand side).

Together, this implies that by ending our reinvestments, the speed of decarbonisation of our portfolio would slow down substantially and be largely out of our control.

A flow-based tilting approach is thus insufficient to achieve our goal. The Paris Agreement requires a stable decarbonisation trajectory in our portfolio irrespective of our monetary policy stance or companies' individual actions.

We therefore need to move from a flow-based to a stock-based tilting approach for our corporate bond portfolio. This means that, absent any reinvestments, actively reshuffling the portfolio towards greener issuers would need to be considered.

Slide 4. Ending net asset purchases and reinvestments slows down pace of decarbonisation

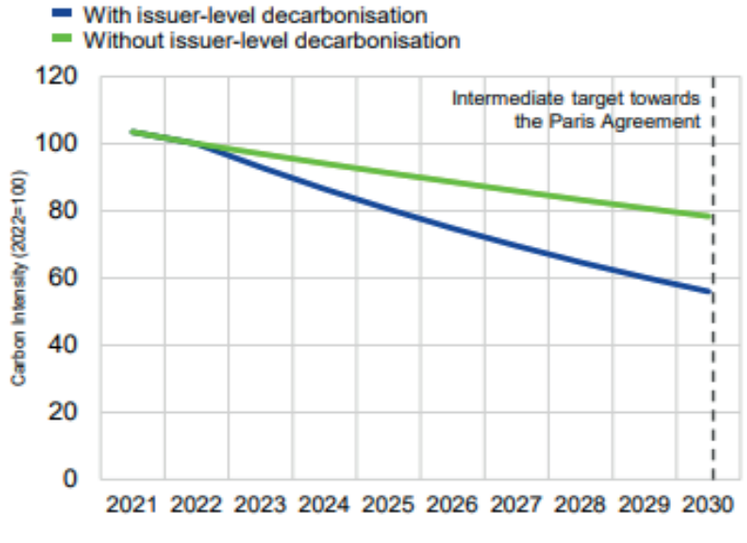


Notes: Chart shows hypothetical decarbonisation pathways of the CSPP and the corporate PEPP portfolio under different purchase scenarios but identical tilting parameters. Net investments refers to a scenario with net purchases of approximately €2 billion per month. A passive runoff indicates a scenario in which maturing bonds are not replaced in the portfolio. All pathways assume a constant decarbonisation pace and abstract from short-run fluctuations due to the concentration of maturing bonds from high or low carbon emitters in particular years.
Sources: ECB calculations.

Slide 5. Pace of portfolio decarbonisation strongly depends on firms' own climate efforts

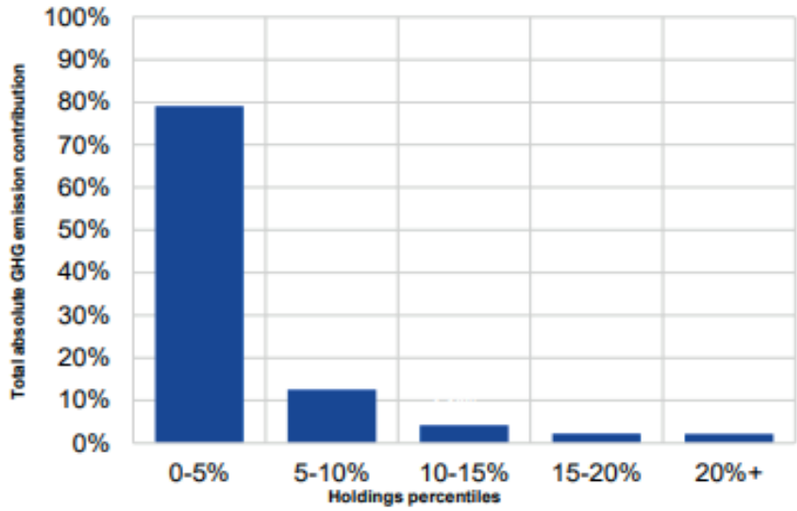
Decarbonisation of corporate bond portfolio under full reinvestment scenario with and without issuer-level decarbonisation

(Carbon intensity normalised to 100 in 2022)



Notes: The analysis simulates a constant annual reinvestment in the CSPP and the corporate PEPP portfolio that prioritises green issuers that are held underrepresented relative to their benchmark allocation. Companies' own decarbonisation efforts are assumed to follow their commitments (7% p.a. for 1.5°C decarbonisation targets, and 3.2% p.a. for well-below 2°C targets, and 0% for all others).
Source: ECB calculations.

Distribution of greenhouse gas emissions by % of corporate bond holdings



Source: ECB calculations. Latest update: 12 December 2022.

At the same time, we should not divest completely, at least not initially, from those companies whose actions are particularly important in managing the green transition, but rather foster incentives for them to reduce emissions further.

The stock-based approach would also have to apply to other private asset classes in our portfolio, namely covered bonds and asset-backed securities. That requires a framework for assessing the climate impact of such exposures.

Greening our public sector bond holdings

The second question is how to put our public sector bond holdings, which currently account for around half of our balance sheet, on a Paris-aligned path.

Aligning our large public sector bond holdings with the objectives of the Paris Agreement is proving challenging for a variety of reasons. First, purchases of sovereign bonds are guided by the capital key, which limits the scope for tilting strategies based on countries' carbon intensities.

Second, there is not yet a reliable framework in place to assess the extent to which sovereign bond portfolios are aligned with the Paris Agreement. And, finally, the amount of green sovereign bonds is still limited, in particular when compared with the size of our current bond portfolio.

Finding options for overcoming these constraints within our mandate is critical: any attempt to green the stock of our bond holdings needs to include a solution for our sovereign bond portfolio, in particular in the light of the review of the ECB's future operational framework, which is likely to imply a larger steady-state balance sheet, potentially including a structural bond portfolio.

At present, there are two options to make our sovereign bond portfolio greener in a timely manner.

One is to increase the share of bonds issued by supranational institutions and agencies. A considerably larger fraction of their outstanding bonds is already green (Slide 6).

Tilting our purchases towards green bonds issued by supranational institutions and agencies would be in line with the objectives of the Paris Agreement and would not conflict with the requirement to be guided by the capital key.

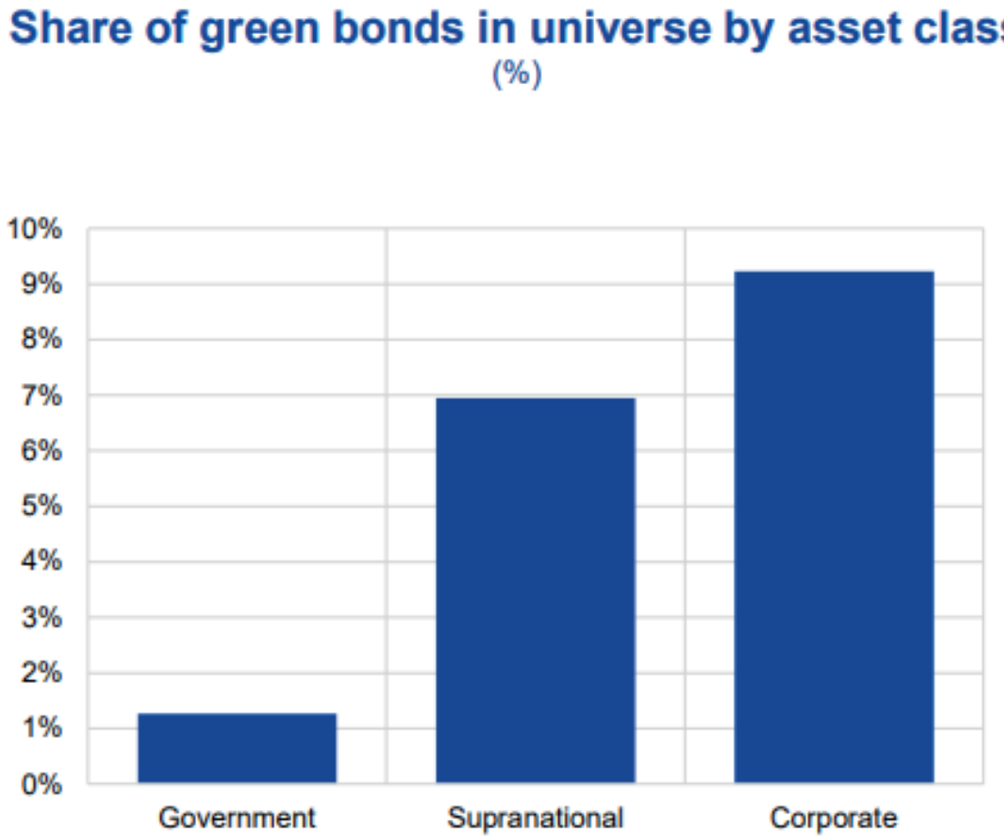
The second, complementary option is to steadily reshuffle our sovereign bond portfolio towards green bonds as governments expand their supply of green bonds over time.

Greening our lending operations

Finally, we need to intensify efforts to green our lending operations, including the collateral framework. As a first step we will limit the share of assets issued by entities with a high carbon footprint that can be pledged as collateral by individual counterparties when they borrow from the Eurosystem. We will also consider climate-related risks when determining haircuts for corporate bonds.

But these measures will have only a small impact on the overall collateral provided by our counterparties. A systematic greening of the ECB's collateral framework is therefore an important tool to ensure that all of our monetary policy actions are aligned with the Paris Agreement, especially in an environment in which we have started shrinking our balance sheet, as this reduces the set of options available to support the green transition during the current tightening cycle.

Slide 6. Green bond universe larger for supranational institutions than for sovereigns



Sources: Bloomberg, ECB calculations. Latest observation: 23 December 2022.

Green targeted lending operations, for example, could be an instrument worth considering in the future when policy needs to become expansionary again, provided the underlying data gaps are resolved. But they are not an option for the immediate future given the current need for a restrictive monetary policy.

Conclusion

Many central banks globally are responding to current high inflation by tightening financing conditions. While a higher cost of credit will make the financing of renewable energies and green technologies more expensive, it would be misleading to use higher interest rates as a scapegoat for a further delay in the green transition, for two main reasons:

First, restoring price stability in a timely manner provides the conditions under which the green transition can thrive sustainably. And second, the largest barrier to a rapid decarbonisation remains the lack of progress by governments in implementing prior climate commitments.

Governments must remain in the lead in accelerating the green transition. By promoting green technologies and renewable energies, they will enhance the productive capacity of the economy and thereby help restore price stability over the medium term.

In line with our mandate, we stand ready to further intensify our efforts to support the fight against climate change, building on the achievements of our climate change action plan.

Our long-term goal is to make sure that all our monetary policy actions are aligned with the objectives of the Paris Agreement. This means greening our stock of bond holdings, including public sector bonds, as well as our lending operations and collateral framework.

Greening monetary policy requires structural changes to our monetary policy framework rather than adjustments to our reaction function.

Restoring price stability through an appropriate monetary policy today will benefit society over the longer run and will facilitate the transition to a greener economy. ■

Isabel Schnabel is a Member of the ECB's Executive Board

Endnotes

1. I would like to thank Benjamin Hartung for his contribution to this speech.

2. See, for example, Egli, F et al (2018), "A dynamic analysis of financing conditions for renewable energy technologies", Nature Energy, Vol. 3, pp. 1084-1092. The "levelised cost of electricity" is a measure of the average net present cost of electricity generation for a generating plant over its lifetime.

3. Fraunhofer Institute for Solar Energy Systems (2021), "Study: Levelized Cost of Electricity – Renewable Energy Technologies", June.

4. Monnin (2015) finds that at interest rate levels above 2%, the average cost of producing electricity is higher for green energy technologies. See Monnin, P (2015), "The Impact of Interest Rates on Electricity Production Costs", CEP Discussion Note, 2015/3, June.

5. International Energy Agency (2020), "Projected Costs of Generating Electricity 2020", December. See also Schmidt, TS et al (2019), "Adverse effects of rising interest rates on sustainable energy transitions", Nature Sustainability, Vol. 2, pp. 879-885.

6. See, for example, Durante, E et al (2022), "Monetary policy, investment and firm heterogeneity", European Economic Review, Vol.148, 104251; and Auer, S et al (2021), "Corporate leverage and monetary policy effectiveness in the euro area", European Economic Review, Vol. 140, No 103943, November.

7. See also Schnabel, I (2022), "A new age of energy inflation: climateflation, fossilflation and greenflation", speech at The ECB and its Watchers XXII Conference, 17 March.

8. Ingves, S (2022), "Inflation targeting for nearly 30 years – a robust framework for all times?", speech before the Swedish Economic Association, 31 May.

9. See, for example, Cohen, D et al (1999), "Inflation and the User Cost of Capital: Does Inflation Still Matter?", in Feldstein, M (ed.), The Costs and Benefits of Price Stability, University of Chicago Press for the NBER; and Andrés, J and Hernando, I (1997), "Does Inflation Harm Economic Growth? Evidence from the OECD", NBER Working Paper, No 6062.

10. See, for example, Clark, P (1982), "Inflation and the Productivity Decline", American Economic Review, Vol. 72(2), Papers and Proceedings of the Ninety-Fourth Annual Meeting of the American Economic Association, pp. 149-154.
11. Schnabel, I (2022), "Monetary policy and the Great Volatility", speech at the Jackson Hole Economic Policy Symposium organised by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 27 August.
12. Poll conducted by Reuters among 68 climate economists between 1 July and 13 September 2022. 50 of these 68 experts said rising borrowing costs would have a mild or very mild impact on reaching net zero carbon emissions by 2050.
13. Carbone, S et al (2021), "The low-carbon transition, climate commitments and firm credit risk", Working Paper Series, No 2631, ECB, December.
14. Schnabel, I (2022), "United in diversity – Challenges for monetary policy in a currency union", commencement speech to the graduates of the Master Program in Money, Banking, Finance and Insurance of the Panthéon-Sorbonne University, Paris, 14 June; and Bouabdallah, O et al (2023), "Fiscal policy: from free to affordable lunch", The ECB Blog, 4 January.
15. Schnabel, I (2022), "Finding the right mix: monetary-fiscal interaction at times of high inflation", keynote speech at the Bank of England Watchers' Conference, London, 24 November.
16. De Haas, R and Popov, A (2019), "Finance and carbon emissions", Working Paper Series, No 2318, ECB, September.
17. European Commission (2022), "Capital markets union: clearing, insolvency and listing package", 7 December.
18. See Lagarde, C (2021), "Towards a green capital markets union for Europe", speech at the European Commission's high-level conference on the proposal for a Corporate Sustainability Reporting Directive, 6 May.
19. See ECB (2021), "ECB presents action plan to include climate change considerations in its monetary policy strategy", 8 July; and ECB (2022), "ECB takes further steps to incorporate climate change into its monetary policy operations", 4 July.
20. Following its decision to decarbonise its corporate bond holdings on 4 July 2022, the ECB provided details on the tilting mechanism that was subsequently implemented as of October 2022 (see press release of 19 September 2022). Already in February 2021, the Eurosystem agreed on a common stance for climate change-related sustainable and responsible investment principles for its euro-denominated non-monetary policy portfolios (see press release of 4 February 2021). Empirical evidence shows that the Eurosystem holdings under the corporate sector purchase programme

(CSPP) are biased towards more carbon-intensive firms as these have larger investment needs and therefore represent a disproportionate share of the investable universe. See also Schnabel, I (2021), "From green neglect to green dominance?", speech at the "Greening Monetary Policy – Central Banking and Climate Change" online seminar, 3 March; and Papoutsi, M, Piazzesi, M and Schneider, M (2021), "How unconventional is green monetary policy?", JEEA-FBBVA Lecture at ASSA, January.

21. The carbon footprint of the stock of corporate bond holdings depends on the net flow of assets, which is determined by not only the amounts of reinvestments following the tilted benchmark allocation, but also the amount and composition of maturing assets in any given month. If there are many redemptions of assets issued by carbon-intensive companies in any given month, this will reduce the overall carbon footprint of the portfolio and vice versa. This may lead to additional fluctuations in the carbon footprint of the portfolio from month to month.

22. The decarbonisation is also affected by conjunctural factors as the drop in absolute emissions during the pandemic has illustrated. At the same time, carbon intensities tend to increase in years with lower economic activity as the numerator (greenhouse gas emissions) falls more sluggishly than the denominator (eg. revenues). A Paris-aligned decarbonisation trajectory would ideally ensure a robust approach that looks through short-run fluctuations in carbon emissions and carbon intensities related to purely conjunctural factors.

This article is a based on a speech delivered at the International Symposium on Central Bank Independence, Sveriges Riksbank, Stockholm, 10 January 2023.

How Europe should answer the US IRA

David Kleimann, Niclas Poitiers, André Sapir, Simone Tagliapietra, Nicolas Véron, Reinhilde Veugelers and Jeromin Zettelmeyer argue that the EU should respond to the Inflation Reduction Act by pursuing broader aims such as a speedy decarbonisation and a broader development policy

Summary

The 2022 United States Inflation Reduction Act (IRA) is a significant and welcome climate law. It also includes trade-distortive subsidies, including local-content requirements prohibited under World Trade Organisation rules – the first time the US has done this and a blow to the international trading system that could trigger protectionism in other countries.

The expected IRA green subsidies are of similar size to those available in the European Union, except in renewable energy production, where EU subsidies remain far larger. However, there are important qualitative differences. Some IRA subsidies discriminate against foreign producers while EU subsidies do not. IRA clean-tech subsidies are simpler and less fragmented, and they focus mainly on mass deployment of green technologies rather than innovation.

The IRA will likely harm Europe through its competitiveness effect, while it will likely benefit climate transition in Europe and most of the rest of the world. However, the magnitude of both effects is very uncertain, partly because the IRA will induce substitution away from Chinese inputs.

By forcing the reorganisation of supply chains, the IRA may make the EU and other economies more competitive relative to China. It may also initially slow the green transition. But in the longer run, this effect should be outweighed by the reduction in the cost of clean tech driven by the IRA.

In responding to the IRA, the EU should not just seek to protect its competitiveness relative to the US but to pursue broader aims, including competitiveness in general, speedy decarbonisation and broad foreign policy and development policy goals.

These aims imply that the EU should not impose local-content requirements of its own, should not loosen state-aid rules and should not mimic the IRA's approach to manufacturing subsidies.

Rather, it should focus on boosting its structural competitiveness, formulate a trade policy response that includes reform of the international subsidies regime, and develop an instrument for EU-level subsidies that focuses on early-stage development and increasing EU resilience to trade disruptions.

The Inflation Reduction Act has exacerbated EU fears that clean-tech companies will shift their production to the United States

1 Introduction

The 2022 United States Inflation Reduction Act (IRA), a legislative package combining large-scale green subsidies with healthcare savings and new revenue measures, is a milestone in US climate policy. While less effective than combining green subsidies with carbon pricing (Roy *et al* 2021), the IRA is expected to close two-thirds of the greenhouse-gas emissions gap between current policy and the US 2030 climate target. By driving down the cost of developing and deploying clean energy, the IRA would also make it easier to close the remaining gap (Jenkins *et al* 2022).

However, the IRA contains protectionist elements. These include subsidies conditional on local-content requirements that are prohibited under World Trade Organisation rules, and large-scale manufacturing subsidies that are likely to be market- and trade-distortive.

The IRA has exacerbated European Union fears that clean-tech manufacturers and adopters will shift their production to the United States, in search of an attractive mix of subsidies and low energy costs.

This policy brief explains what is in the IRA, how it compares to EU green industrial policies, what the IRA's impact on the EU and other economies might be, and how the EU should react. Our analysis has four main conclusions.

First, EU and expected IRA green subsidies are of about similar size, except in renewable energy production, where EU subsidies remain far larger. However, there are significant qualitative differences.

Some IRA subsidies discriminate against foreign producers while EU subsidies do not. IRA clean tech subsidies are simpler and less fragmented. The also focuses mainly on mass deployment of green technologies, whereas EU-level support tends to be more focused on innovation and new technologies.

Second, the IRA will likely harm Europe through its competitiveness effect, while it will likely benefit climate transition in Europe and most of the rest of the world. This said, the magnitude of both effects is very uncertain.

Some IRA local content requirements could be circumvented. Demand for clean-tech products in Europe and elsewhere could rise both in the face of US capacity constraints and because the IRA induces substitution away from Chinese inputs.

By forcing the reorganisation of supply chains and diverting resources to the US, the IRA, may initially slow the green transition outside the US. But in the longer run, the reduction in the cost of clean tech induced by the IRA should outweigh these costs.

Third, to our knowledge, the IRA marks the first time that the US has enacted WTO-inconsistent local-content requirements. This is a further blow to the international trading system, both as a signal that the system's historically most powerful sponsor no longer cares, and because it may trigger protectionist responses in other countries, rendering international trade in green technology more fragmented and less efficient, and hence less effective in supporting the net zero transition.

Fourth, in responding to the IRA, the EU should not just seek to protect its competitiveness relative to the US but should pursue broader aims, including competitiveness in general, speedy decarbonisation and broad foreign policy and development policy goals.

These aims imply that the EU should not impose local-content requirements of its own, should not loosen state-aid rules and should not mimic the IRA's approach to manufacturing subsidies.

Rather, it should focus on boosting its structural competitiveness and accelerating its green transition, through better regulation, green procurement rules, faster roll-out of renewables to reduce electricity costs, green and digital skills, and banking and capital markets union.

In addition, it should seek both WTO remedies against the IRA subsidies and reform of the international subsidies regime. Finally, it should develop an instrument for EU-level subsidies that support early-stage development and deployment of green technology in areas of EU comparative advantage, and that would make the EU more resilient to trade disruptions.

2 Unpacking the Inflation Reduction Act

2.1 What's in it?

The IRA consists of three sets of measures: a tax reform, a healthcare reform, and energy and climate legislation, including climate-related spending in the order of $400 billion over 10 years[1].

The measures most relevant to the IRA's international impact are energy and climate subsidies[2]. These fall into three categories, and some subsidies can be cumulated[3]:

1. Subsidies for vehicle purchases, including a $7,500 consumer tax credit for electric cars and a tax credit for companies, including leasing companies, that buy clean vehicles.

2. Production and investment subsidies for manufacturers of clean-tech products, including batteries and components used in renewable electricity generation.

3. Subsidies for producers of carbon-neutral electricity, as well as hydrogen and other 'clean' fuels (Box 1).

Box 1. The IRA's green subsidies

Electric vehicles

The IRA introduces a $7,500 tax credit for every consumer purchase of an electric car that complies with several conditions, including local content requirements and conditions that are meant to ensure that the tax credit does not mainly benefit the rich (IRA Title 26 USC §30D)[4]. The IRA also includes a subsidy for 'clean' commercial vehicles which provides tax credits for up to 30 percent of the cost of an electric (or fuel cell) vehicle which is not subject to LCRs (26 USC §45W).

Clean-tech production and investment

These include production subsidies for batteries, wind turbine parts and solar technology components, as well as for critical materials like aluminium, cobalt and graphite (26 USC §45X). Manufacturers of these products receive a dollar amount of tax credits per unit (or energy unit) of the respective product (Annex II). Producers of eligible critical materials would receive 10 percent of their production cost as tax credits. A mid-sized 75kWh battery for an EV would receive $3,375 in subsidies, equivalent to roughly 30 percent of its 2022 price[5].

Producers can also qualify for allocation of investment subsidies of 30 percent in tax credits when their investment is selected as part of an 'qualifying advanced energy project' programme[6]. However, a facility that received investment subsidies is excluded from the production tax credit described above (26 USC §45X (c)(1)(B)).

Electricity, hydrogen and clean fuels.

Producers of carbon neutral electricity are eligible for a $0.015/kWh production subsidy, which can be higher under certain conditions[7]. Alternatively, electricity producers can benefit from investment tax credits of up 30 percent of the investment value[8]. These incentives are complemented by support for rural and residential green electricity production, as well as support for nuclear energy production. The production of hydrogen and clean fuels (such as renewable natural gas) is also eligible for subsidies[9].

Several, but not all, of these subsidies are conditional on content produced in the US and/or North America (local-content requirements, LCRs):

- The $7,500 consumer tax credit applies only to electric cars with 'final assembly' in North America (the US, Canada or Mexico). In addition, half of the tax credit is linked to the origin of batteries and the other half to that of raw materials used in the electric cars.

  To obtain either half, a minimum share of the value of battery components (presently 50 percent) or critical minerals (presently 40 percent) needs to come from the US or countries with which the US has a free trade agreement (presently 20 countries[10]).

  These thresholds will increase by about 10 percentage points per year. In addition, from 2024 and 2025, any use of batteries and critical minerals from China, Russia, Iran and North Korea will make a vehicle ineligible for the tax credit.

- Renewable energy producers are eligible for a 'bonus' subsidy linked to LCRs. If the steel and iron used in an energy production facility is 100% US-produced and manufactured products meet a minimum local-content share, the subsidy increases by 10 percent, with the required local-content share rising over time[11]. A similar bonus scheme conditional on local-content shares applies to investment subsidies for energy producers.

There are no LCRs for subsidies for commercial electric vehicles, used electric vehicles or clean-tech production and investment (other than that these need to take place in the US).

Figure 1 shows total values of IRA subsidies broken down into subsidies targeting consumption, production or investment, and indicating whether subsidies are likely to be trade distortive (throughout this section, for IRA subsidy values, we use US Congressional Budget Office estimates; CBO, 2022).

Trade-distortive subsidies include subsidies with LCRs (or bonuses) and subsidies that do not contain LCRs but are 'actionable' under WTO rules (see Annex I). Trade distortive subsidies include the consumer electric car tax credit conditional on LCRs ($7.5 billion), most spending on clean-tech manufacturing support ($32 billion of the total $37 billion), the bulk of the clean-fuel and emissions-reduction subsidies ($16 billion), and the share of subsidies for green-energy production and investment expected to include local content bonuses.

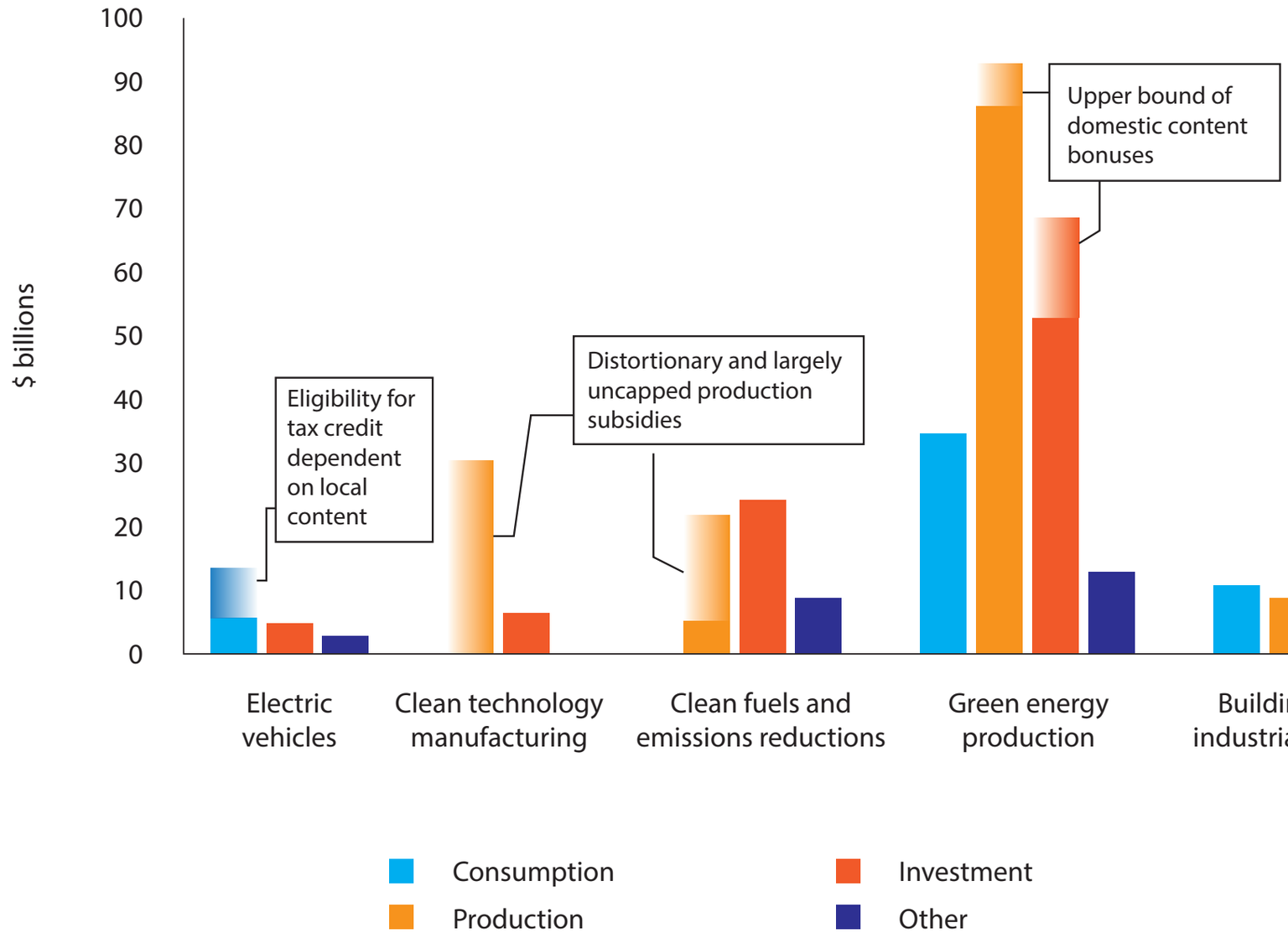
The latter could be anywhere between zero (if no producer meets the qualification criteria for the local content bonus) and $21.9 billion (if all producers meet the qualification criteria)[12].

These estimates need to be treated cautiously, as most measures are not capped in overall volume or value terms, and hence depend on uptake assumptions. If the uptake of uncapped subsidies – such as the clean-tech manufacturing tax credit – is higher than expected, the subsidy volumes could be much higher than current estimates[13].

2.2 Comparing IRA and EU green subsidies

While the EU has no flagship green subsidy scheme comparable to the IRA, it has a multitude of initiatives at EU and national levels that use subsidies for broadly similar purposes (see Annex III for details):

Figure 1. Breakdown of IRA subsidies



Note: The shaded area signifies spending on provisions that are trade distortive. This includes prohibited local content requirements for the consumer electric vehicle tax credit, the domestic content bonus in the green energy production subsidies, and production subsidies for clean-tech manufacturing and clean fuel that are actionable under WTO rules. For the domestic content bonus, the shaded area represents how much would be spent on domestic content bonuses if all relevant projects qualified for them.
Source: Bruegel based on CBO (2022).

- Almost every EU country subsidises the purchase of electric vehicles. While incentives differ widely in form and value, these subsidies added up to almost €6 billion and averaged around €6,000 per vehicle in 2022. Unlike IRA tax credits, they typically do not discriminate between different producers.

- Clean-tech manufacturing is supported through a variety of instruments. These include:

  EU Important Projects of Common European Interest (IPCEIs), crossborder projects that include support for battery and hydrogen manufacturing,

  The EU Innovation Fund, established under the EU emissions trading system (ETS), that supports the demonstration and early deployment of clean technologies and processes in energy-intensive industries,

  The European Innovation Council's EIC Accelerator, which aims at scaling-up breakthrough technologies,

  European Investment Bank (EIB) loans to clean technology projects,

  EU guarantees under the InvestEU programme, most of which are administered by the EIB.

- Most EU member states subsidise energy production from renewables. These subsidies amounted to about €80 billion (0.57 percent of EU GDP) in 2020, with Germany leading the ranking (€33 billion, or 0.94 percent of German GDP).

Table 1 compares the three main categories of IRA green subsidies with EU subsidies that serve broadly similar purposes. The comparison is fraught with difficulties.

First, estimates for EU clean-tech manufacturing support and renewable energy subsidies are based on approved aid volumes and on the extrapolation of recent aid, while the IRA estimates are based on the take-up assumptions in CBO (2022).

Second, support items are missing on both the EU and the US sides. Estimates for clean-tech manufacturing support exclude national-level state aid (except for the IPCEIs). IRA figures obviously exclude state- and local-level support, and federal programmes outside the IRA. Given these uncertainties, the numbers in the table should be interpreted as illustrative.

Table 1. Illustrative projected US and EU green subsidy levels, 2022-2031

Category	IRA	EU
Electric car purchases	$7,500/car	€6,000/car
Clean-tech manufacturing	$37 billion	€35 billion
Renewable energy subsidies	$208 billion	€800 billion

Note. For comparability reasons, the table focuses on aid (grant, grant-equivalents and tax credits); EIB loans are excluded. For the EU, the category 'clean-tech manufacturing' refers only to non-EIB EU-level programmes, ie. state aid is excluded, except for the IPCEIs. EU figures are based on the extrapolation of recent annual figures (see table in Annex III).
Sources: Bruegel; see notes to table in Annex III, and CBO (2022).

The takeaway from the table is that IRA and EU subsidies for electric vehicle purchases and clean-tech manufacturing are of a similar size, while renewable energy subsidies would still be much higher in the EU, assuming that the EU and its members continue to subsidise at the same rate as in recent years[14].

The main difference between the US and EU may therefore not be in the total expected volume of green subsidies (except on renewable energy, where the US is expected to continue to lag the EU), but rather on the qualitative side.

First, IRA subsidies discriminate against foreign producers in a way that EU subsidies do not. Second, the IRA provides its clean-tech manufacturing support in a particularly simple way – via tax credits covering 10 years – while comparable EU support is more fragmented, generally viewed as slower and more bureaucratic (see section 3), and sometimes shorter-term. Third, in the clean-tech area, the IRA focuses mostly on mass deployment of current generation technologies, whereas EU level support tends to be more focused on innovation and early-stage deployment of new technologies.

3 The global and European impact of the IRA

The IRA will have an impact beyond US borders by accelerating global decarbonisation, through direct effects on trade and investment, and by affecting the global trading system.

3.1 Acceleration of global decarbonisation

The IRA will significantly accelerate decarbonisation in the US (though not as must as it would if combined with carbon pricing). On decarbonisation in other countries, the IRA may initially have counterproductive effects by forcing the inefficient restructuring of supply chains into the US to meet IRA origin requirements, and by drawing to the US resources needed for decarbonisation elsewhere[15].

However, it should overall cut the global costs of clean-tech, because IRA renewable subsidies will add to the scale of global clean-tech demand[16], and because IRA subsidies for US clean-tech production will benefit the rest of the world indirectly through knowledge spillovers.

In the long run, these benefits should outweigh the costs, as supply chains and critical mineral production adapt[17]. In addition, the IRA will likely benefit the global politics and diplomacy of decarbonisation, as it has finally brought the US into the family of countries that are serious about emissions reductions[18].

3.2 Direct trade and investment effects

The IRA could through several channels have a direct impact on trade and decisions to locate production.

Consumer tax credit for electric cars

The IRA's $7,500 consumer tax credit on electric cars could reduce the cost of an eligible vehicle of average price by about one fifth, to the detriment of electric vehicles presently excluded from the credits[19]. This could have a substantial impact on the ability of foreign automotive producers to maintain their present shares in the US market. For the EU, the consequence could be large losses of exports to the US[20].

That said, electric vehicles that are leased rather than sold to consumers will benefit from subsidies for 'clean commercial vehicles', as electric cars purchased by leasing companies are considered commercial vehicles that are not subject to domestic content restrictions[21].

Also, the LCRs for batteries and critical minerals do not apply to countries with which the US has a 'free trade agreement.' As this term is not defined in the legislation, it may be possible to eventually include the EU, the United Kingdom and other US allies[22].

In that case, electric vehicles with batteries and critical materials from those countries could qualify for the tax credit – but only if they are assembled in North America.

Production and investment tax credits
IRA subsidies for clean-tech production and investment in the US are high relative to the current prices of these products, varying between 10 percent for critical minerals to about 26 percent for solar panels[23, 24].

As the subsidies are linked to production units rather values, their impact could increase further if the prices of the goods that they subsidise continue to fall[25]. Investment credits are also substantial: most of these incentives are set at around 30 percent of investment, with additional bonuses for domestic content[26].

But again, significant offsetting factors make the net effect hard to predict. First, the rise in global demand for clean tech resulting from IRA renewable energy subsidies could benefit producers not just in the US, but also abroad, while US capacity remains constrained. While the EU does not have a large solar-panel manufacturing industry, it does produce and export wind turbines.

Second, countries with a 'free trade agreement' with the US (which may in the future include the EU and other US allies) will benefit from the condition that to be eligible for tax credits, electric vehicles must exclude Chinese batteries and critical minerals. This could benefit the EU's fledgling battery manufacturing efforts (such as the facilities supported by IPCEI Batteries[27]).

Third, while the IRA's green-tech investment credits are high, EU IPCEI project funding is in about the same ballpark[28].

Energy prices

Even before the COVID-19 pandemic and Russia's invasion of Ukraine, industrial electricity prices were lower in the US than in the EU (in 2019, by about 30 percent). The war has led to a surge in European industrial electricity prices, which are now about twice as high as in the US[29].

These differences might be further magnified by IRA support for green electricity production, some of which has virtually zero marginal costs. This said, green energy production subsidies do not translate directly into the prices that (industrial) consumers pay[30], and the duration of the energy crisis and the domestic roll-out of clean electricity generation will be more important than IRA subsidies for the competitiveness of energy-intensive industries in Europe.

It is unclear whether IRA subsidies have already led to a diversion of investment from the EU to the US. While a number of projects have been announced since the IRA passed in mid-2022[31], some may have happened anyway. Evidence on whether these projects have been implemented to the detriment of competing investments elsewhere is so far lacking. An empirical analysis of the effects of the IRA on investments in the EU will therefore have to wait until a clearer picture emerges.

Historical precedents for such a competitiveness shock point in different directions. Fracking in the mid-2000s turned the US from an oil and gas importer into an exporter and led to fears over the competitiveness of European manufacturing.

However, while the shale revolution has led to a global fall in energy prices, the feared migration of energy-intensive industries did not materialise.

The accession of China to the WTO provides another example. Advanced economies benefitted from specialisation in high value-added industries and from cheap inputs and consumer goods from China.

However, the distribution of costs and benefits was uneven, and regions specialised in goods in which China proved competitive suffered (see Autor *et al* 2021).

3.3 Impact on the multilateral trading system

The use of both actionable and prohibited subsidies (Annex I) puts the IRA clearly at odds with multilateral trade rules that the US helped shape.

While the adoption of WTO-inconsistent policies is hardly rare or even new[32], the incremental effect of the IRA in undermining the multilateral trading system could be very serious, for three reasons.

First, the IRA adds to a number of blatant and broadly applicable WTO-inconsistent policies advanced by the Trump administration, and continued (and more recently, also justified) by the Biden administration. These include US Section 232 tariffs on steel and aluminium imports and US Section 301 tariffs against a wide range of imports from China.

The IRA thus contributes to the international perception that the Biden administration is keeping on the disruptive trade policy path chartered by President Donald Trump.

Second, the US has never before, to our knowledge, made WTO-prohibited subsidies contingent on local-content requirements. This could send a powerful signal that such LCRs can be applied even in advanced countries.

For example, French President Emmanuel Macron has publicly called for reciprocal EU requirements: *"We need a Buy European Act like the Americans, we need to reserve [our subsidies] for our European manufacturers"*[33]. Broad adoption of sourcing restrictions would render international trade more fragmented, less efficient and hence less effective in supporting the net zero transition.

Third, the increasing disregard for WTO rules by the system's historically most powerful sponsor comes at a moment when the WTO is already weak. The US continues to block the operation of the WTO Appellate Body, and negotiations over WTO institutional reform (as de facto chaired by the United States) have so far not resulted in any discernible progress.

An ineffective WTO is bad news for global trade and prosperity, particularly for developing countries for which trade has been, and should continue to be, a powerful source of growth and technological catch-up.

4. How Europe should respond to the IRA

The EU's objectives in responding to the IRA should be informed by its external competitiveness, but also by the need to maintain a level playing field inside the EU, speedy decarbonisation both in the EU and the rest of the world, and broader foreign policy and development policy goals. The latter include relationships with countries that have not aligned themselves with either China (let alone Russia) or the West.

4.1 What not to do

This broad definition of EU objectives has some immediate implications, notably, by helping to identify what the EU should not do in reaction to the IRA:

Local-content requirements. The EU should not reciprocate the IRA's local-content requirements. While LCRs might help with EU competitiveness in the short run, by redirecting demand to EU producers, they would hurt the EU on several other fronts: by harming the critical objectives of accelerating the global climate transition, by harming EU export interests, as trading partners might reciprocate, and by harming the EUs credibility as a global actor committed to multilateral cooperation.

The latter is essential for EU foreign policy interests. The EU's ability to persuade other countries to respect internationally agreed norms – and to align themselves with the EU against countries, like Russia, that violate such norms – would suffer a severe blow if the EU was viewed as applying a double standard.

Loosening of state aid rules. Loosening state aid rules would risk fragmenting the EU single market. This is demonstrated by the large increases in both the level and the cross-country dispersion of subsidies that have occurred as a result of recent crises – COVID-19 and Russia's invasion of Ukraine – which have led to special legal regimes allowing the approval of subsidies that would otherwise have breached the rules (Box 2).

Extending these temporary crisis frameworks in response to the IRA would also likely constitute an abuse of the legal basis underpinning these temporary frameworks, namely Article 107(3)(b) of the Treaty on the Functioning of the European Union.

Even in the darkest interpretation of its effects, the impact of the IRA does not amount to a *"serious disturbance to the economy of a member state"* anywhere near the magnitude of previous economic shocks that have justified this use of the Article, such as the global financial crisis, the pandemic and the energy price shock following Russia's invasion of Ukraine[36].

Box 2. The impact of the COVID-19 state aid temporary framework on EU subsidies

The Treaty on the Functioning of the European Union (TFEU) prohibits provision of state aid by member states to companies, but provides for exceptions, including *"to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest"* (Article 107(3)).

To invoke this exception, EU countries must show *"that any detriment arising from distortions of competition is outweighed by the positive effects of the aid"* (European Commission 2022a). The latter typically requires demonstrating that state aid does not only benefit the recipient firm but reduces market failures (such as externalities).

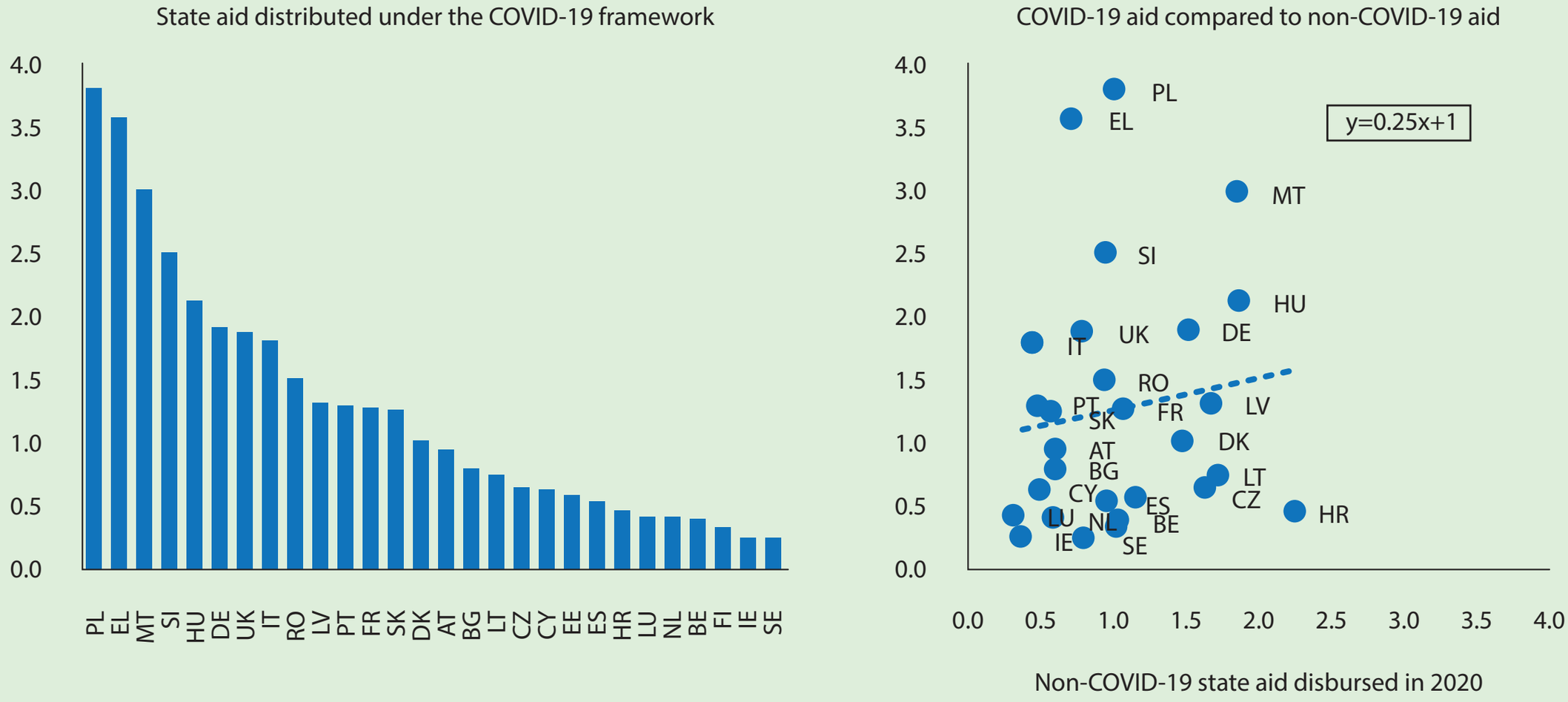
An additional exception to the prohibition of state aid is provided for *"aid to remedy a serious disturbance in the economy of a member state"* (Article 107(3)(b)). How far the remedy can go and what constitutes a serious disturbance can be regulated through guidelines and frameworks adopted by the European Commission and secondary legislation proposed by the European Commission and adopted by the Council of the EU.

Hence, although the exception itself is hard-wired into the Treaty, EU policymakers have considerable control over how to handle the exception.

In March 2020, the EU adopted a temporary framework based on Article 107(3)(b) to regulate state aid in response to the COVID-19 pandemic, undoubtedly a serious disturbance.

This framework has since then been amended and extended several times, most recently in response to the Russian invasion of Ukraine and the ensuing disruptions to energy markets. EU policymakers are debating whether to extend the framework further to allow more state aid in response to the US Inflation Reduction Act.

Figure 2. State aid disbursed in 2020 (aid content, % of GDP)



Source: European Commission.

Figure 2 shows the impact of this temporary crisis framework on the level and distribution of state aid disbursed in 2020[34]. The data in the figure refers to the 'aid content' (ie grants or grant-equivalent guarantees or lending subsidies) of actual aid disbursements (data for aid approved and/or based on nominal volumes would show much larger volumes).

The left panel of Figure 2 shows the distribution of aid disbursed under the COVID-19 temporary framework. The right panel compares this to the aid disbursed under standard, non-COVID-19 rules. Two insights are worth highlighting.

First, the dispersion of state aid disbursed under the COVID-19 temporary framework has been much higher than that of non-COVID-19 (standard) state aid. Disbursements of non-COVID-19 state aid ranged from 0.4 percent of GDP (Italy) to 2.3 percent of GDP; the standard deviation was 0.53 percent of GDP.

For COVID-19 state aid, the smallest disbursements (Ireland and Sweden) were 0.23 percent of GDP, and the largest (Poland) was 3.8 percent of GDP. The standard deviation was 1 percent of GDP. Importantly, this higher dispersion cannot be explained by differences in the magnitude of the COVID-19-related economic shock[35].

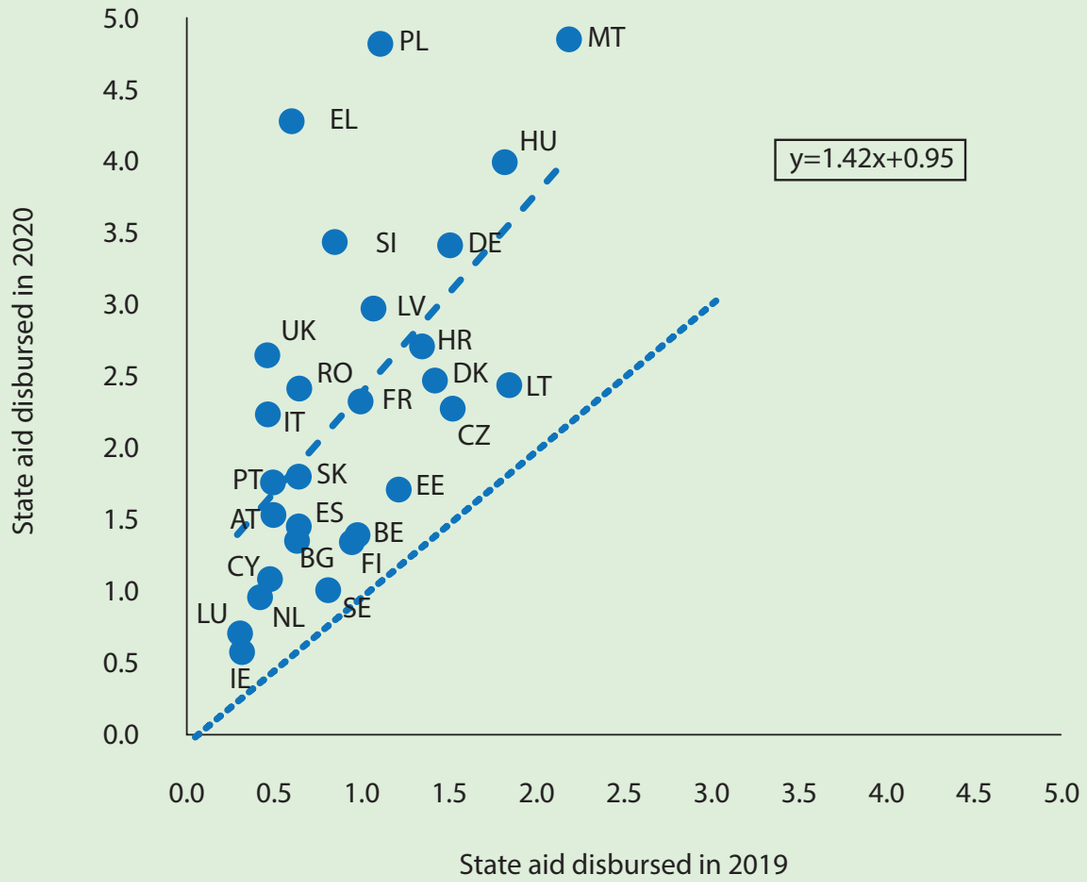
Second, the dispersion of COVID-19-related aid does not offset the dispersion of non-COVID-19 aid; if anything, it magnifies it. This is shown in the right panel, which shows that COVID-19 and non-COVID-19 aid was positively correlated (although the correlation is not statistically significantly different from zero).

To get a sense of the overall impact of COVID-19 aid on aid disbursed, Figure 3 compares total aid disbursed in 2020 with total aid disbursed in 2019. It illustrates, first, the upward shift in aid: all observations are above the 45-degree line.

Second, aid in 2020 was much more dispersed than aid in 2019, with total disbursements ranging from 0.5 percent to about 5 percent of GDP, compared to 0.3 percent to about 2 percent of GDP in 2019.

Third, and perhaps most disturbingly, the trend line is steeper than the 45-degree line (slope coefficient of 1.4). This implies that COVID-19 aid tended to further increase the distance between those that were already subsidising a lot in 2019 and those that were subsidising less.

Figure 3. Total state aid disbursed in 2020 compared to total aid disbursed in 2019 (aid content, % of GDP)



Source: European Commission.

It is also worth recalling that green subsidies, justified by environmental externalities and the fight against climate change, can already be approved under the existing EU legal framework, particularly since the 2022 *Guidelines on State aid for climate, environmental protection and energy* (European Commission, 2022b). Subsidies related to decarbonisation do not require a new or extended crisis framework.

Emulation of the IRA's manufacturing subsidies. The EU should not seek to emulate the IRA's clean manufacturing subsidies, even at the EU level, for two reasons. First, the EU does not in fact lag the IRA in terms of the volume of such subsidies (section 2 and Annex III), only in terms of their simplicity, EU-level consistency and predictability. Second, the IRA mostly subsidises green production that does not match the EU's comparative advantage.

Meanwhile, a strong case can be made for making EU-level and national subsidies that are compatible with EU state aid rules simpler and more predictable, like IRA subsidies.

4.2 What the EU should do

It is easy to say what the EU should not do in response to the IRA, but harder to say what it should do. An EU response can be explored under three main headings: (1) structural competitiveness improvements, (2) EU-level subsidies for green innovation, and (3) trade policy.

Some of our recommendations involve new policy actions: reform of electricity market design, the set-up of a new European fund for quick expansion of renewable energy capacity, the launch of an EU strategy for clean-tech skills and the adoption of a new strategy for green innovation at the EU level.

Other recommendations focus on the removal of obstacles or increased efforts in policy areas that have been long debated. This is the case, for instance, of the further development of single-market regulations favouring clean

technology, the increased use of green public procurement and further development of the banking and capital markets union.

Structural improvements in competitiveness
The EU does not just need to become more competitive relative to the US, it should become more competitive generally. In this respect, the single market is the EU's most important tool, including for providing incentives for private clean-tech investment.

Single market rules can accelerate the roll-out of clean technologies by avoiding regulatory costs associated with fragmentation, uncertainty and bureaucracy. An efficient electricity market design can help to lower energy costs structurally, also for clean-tech manufacturers, with the related competitiveness benefits.

A strategy to develop green skills will help avoid labour shortages and raise productivity in Europe's clean-tech sector. Banking and capital markets union can overcome Europe's highly bank-dominated and fragmented financial system and mobilise private capital for clean tech. In the following, we review these items and outline some proposed policies.

Single market regulations favouring clean technology
The EU has several non-subsidy mechanisms at its disposal to support the development and roll-out of clean-tech manufacturing (European Commission, 2023).

These include regulations aimed at setting time limits for each stage of permitting procedures, a measure that can accelerate developments in areas vital to decarbonisation thus enlarging more quickly markets for clean-tech.

For example, in December 2022 EU countries agreed a temporary emergency regulation to fast-track permits for renewable energy infrastructure and grids (Council Regulation (EU) 2022/2577). Similarly, tighter European standards can foster global competitiveness by demonstrating marketability and attracting investment in firms that comply with standards.

One example, agreed by the EU in December 2022, is the introduction of stronger environmental sustainability requirements for all batteries sold in the EU[37]. Another option could be to develop regulatory sandboxes to allow for quicker development of clean technologies and fast-tracking of the necessary certifications required for placing them in the market[38].

Green public procurement

Public procurement accounts for about 14 percent of EU GDP. The EU should use it more strategically to push European industry to develop green technologies and products through the creation of lead markets and demonstration effects, leading to a spillover effect that will increase demand for greener goods and services.

In particular, greater use of green public procurement would be important in sectors in which public purchasers make up a large share of the market, including transport and construction (Rodriguez Quintero *et al* 2019). In such cases, the purchasing decisions of public authorities can encourage green innovation by giving start-ups access to economies of scale (Mazzucato, 2013).

Green procurement can also have an impact on competitiveness. By introducing sustainability requirements for clean technologies (for instance, by rewarding in tenders the use of electric cars that are produced following certain sustainability criteria, or based on certain innovation or environmental features), the EU could prioritise

the deployment of clean technologies produced to European standards, without having any form of local content requirement[39].

Lowering the cost of electricity through sound market design

The best remedy to deal with high electricity prices driven by high gas prices is to accelerate the deployment of renewables. Expanding renewable energy sources will help reach Europe's decarbonisation targets and will also reduce energy costs for EU electricity consumers, reducing incentives to relocate to the US.

One way to stimulate renewables investment is to create markets for long-term contracts to sell electricity produced by renewables, either between private entities through pre-purchase agreements and forward contracts, or between the state and generators through contracts for difference (Glachant, 2023; Schlecht *et al* 2022)[40].

Such contracts could reduce the cost of capital for renewable investments – by guaranteeing a fixed, stable income – and reduce costs for electricity consumers, by being priced at a level close to the average cost of supplying electricity, rather than the potentially very high marginal cost.

A more direct measure to expand renewable capacity could be to set up a European fund that guarantees a feed-in premium for newly connected wind and solar plants, in addition to the other regular cash flows[41]. The fund could guarantee a premium for 10 years for the first gigawatt produced under the scheme, and a lower premium for any additional gigawatt.

As a first-come first-served scheme, this could encourage the accelerated deployment of renewables needed to lower European industrial energy costs in the medium-term and to drive power-system decarbonisation.

A complementary measure would be to simplify, accelerate and harmonise the regulatory process for infrastructure projects connecting the electricity grid, particularly for crossborder connecting infrastructure.

Skills

The speed of manufacturing and roll-out of clean technologies is correlated closely with the simultaneous development of a qualified workforce to implement clean projects. Ensuring a sufficient capacity of skilled workers is of prime importance for Europe, both to avoid shortages and to ensure a high level of productivity for its clean-tech industry.

This also is a crucial item when it comes to the just transition, as part of the workforce currently employed in carbon-intensive sectors can be re-skilled and re-employed in green-energy projects (IEA, 2022).

Recognising these factors, the EU has put forward a European Skills Agenda (European Commission, 2020) to help individuals and businesses develop more and better skills in these sectors. It has earmarked sizeable funds to support worker training: the €61.5 billion European Social Fund Plus (ESF+), and also the Just Transition Fund (JTF) and the Recovery & Resilience Facility (RFF).

The European Commission (2023) has stressed that the EU and its members can do more. For instance, as Europe seeks to develop pan-European clean-tech supply chains, it would be efficient to have integrated continuous monitoring at EU level of the status of supply and demand in green skills and jobs.

The EU single market for clean skills could be promoted by developing a Europe-wide strategy for clean-tech higher qualifications, and by easing intra-EU mobility of talent, linked also to Erasmus+ funding. Sector-level efforts should also be made through links to European industrial alliances.

The establishment in February 2023 of a large-scale skills partnership for onshore renewable energy under the Pact for Skills[42] is a welcome first step in this direction.

Banking and capital markets union

The cost of accessing finance is an important factor in firms' clean-tech investments. The EU financial system is highly bank-dominated and fragmented along national lines, which makes it ill-suited to enabling the massive investments needed for the green transition through the provision of private capital.

Major policy initiatives have been undertaken to that effect, particularly since 2012 (banking union) and 2014 (capital markets union), but they remain unfinished and have largely stalled in recent years. They must be revived as part of a comprehensive EU response to the IRA.

Banking union and capital markets union are twin projects. The aim is to move decisively from a fragmented collection of national financial systems to a single European financial system that can finance projects on a European scale.

Since European finance is overwhelmingly bank-based, a structural feature that cannot be changed in the short or medium term, banking union is the key to financial-system integration, and it is illusory to think of a capital markets union without completing the banking union at the same time.

Completing the banking union is necessary but not sufficient, and a properly defined set of actions on capital markets union must complement it (Véron, 2014). Completing the banking union is best defined as breaking the vicious circle between banks and sovereigns and improving the EU's governance framework for resolving banks and managing banking crises (Beck *et al* 2022).

Steps already taken, mostly the integration of euro-area banking supervision centred on the European Central Bank, have not been sufficient to achieve this. Negotiations during the last seven years ended in stalemate at a June 2022 Eurogroup meeting[43].

The sequence illustrates the political difficulty of completing the banking union, linked to thorny issues of crossborder risk-sharing through deposit insurance, reform of some aspects of banks' business models through the introduction of general depositor preference, and strengthening of market discipline for sovereign debt issuance through regulatory curbs on banks' concentrated domestic sovereign exposures.

Many entrenched interests resist reform, both in the banking sector and among the public authorities that oversee it. Still, completing the banking union would arguably be less politically challenging than what was achieved in 2012, with the decision to replace national bank supervisory frameworks with European banking supervision.

As for capital markets union, some of the initiatives undertaken since 2014 (the latest announced in December 2022[44]) are significant, including steps towards a European Single Access Point for corporate disclosures and a post-trade consolidated tape, or single dataset of prices and volumes for securities traded in the EU, both proposed in November 2021.

Nevertheless, much more should be done to defragment Europe's capital markets, starting with the supervisory architecture. Major decisions should be centralised in a reformed European Securities and Markets Authority, with a changed governance and funding framework to make it more effective and more independent.

Reform should streamline the jumble of market infrastructures, asset management and auditing frameworks that currently prevent an efficient pan-European allocation of European savings to European projects, including those needed for the green transition.

Given their complexity and political sensitivity, these objectives for banking union and capital markets union cannot be met in the current EU legislative term. But they should be high on the list of priorities for the next EU leadership after the 2024 European Parliament elections.

EU-level subsidies for green innovation
While the EU should not copy the IRA's production subsidies, there is probably a case for more EU subsidies for green R&D, innovation and early-stage deployment of next-generation green technologies, in which EU companies could build and maintain globally competitive positions.

Likewise, there is likely a case for building or maintaining within the EU minimum levels of capacity in certain critical areas for the green transition, to make the EU more resilient to natural or political shocks.

The EU needs to design such subsidies without harming the single market's level playing field. This calls for an EU-level approach to early-stage, high-risk projects. This should deliver far more in terms of synergies, integration of knowledge spillovers and cost and risk sharing, than an approach based on national subsidies.

The EU's current approach, based on the crossborder coordination of national projects through IPCEIs, or projects envisaged by the European Chips Act[45], may not be optimal. Current schemes are bureaucratically heavy and end up mostly supporting a few large incumbent firms that have the ability and experience to propose and manage such projects, which typically take place in the EU countries that have sufficiently deep pockets to support them (Weil and Poitiers, 2022a; 2022b).

While large firms can play an anchor role in such projects, it is important to ensure that smaller players and radically new clean ecosystems can find their place.

Otherwise, the risk is that the IPCEI format will fail to pick 'winning' clean ecosystems, particularly disruptive new green technology solutions, most likely proposed by new young firms.

EU funding should also seek to improve EU strategic resilience. This involves support for new technological solutions for critical components that may make EU clean-tech production vulnerable to supply chain disruption (eg. by funding mission-oriented programmes to develop substitutes for certain critical raw materials today key in green value chains).

For these new early-stage projects, the EU approach should rely on a different instrument to IPCEIs. New support models that provide grants in a relatively non-bureaucratic way are crucial to unleash high risk/high return ideas[46]. Funding such grants could be the main purpose of the EU Sovereignty Fund proposed by the European Commission (2023).

New joint borrowing may not be needed to fund such EU initiatives. As suggested by the European Commission (2023), one option could be to re-shuffle EU budget money. Another option could be to make use of the additional €20 billion in grants that will be devoted to the new REPowerEU facility under the EU Recovery and Resilience Facility, and blend some of this money with EIB loans and guarantees[47, 48].

Public funding can be more efficient when leveraging private investments in clean-tech public-private partnerships, with the size of the multiplier depending on the framework conditions that shape the private incentives for clean-tech investment.

To this end, a green EU subsidy policy should be accompanied by monitoring of the barriers private firms face when investing in clean tech. These barriers can include lack of access to finance, excessive regulatory burdens, lack of access to public (procurement) and private markets, and lack of access to critical skills and components.

Unless these barriers are addressed, additional public funding may not be as efficient. A further complementary policy instrument is carbon pricing. The ETS remains the critical cornerstone of any net zero industry strategy.

WTO rules would not prohibit subsidies of this type. In addition, because the main purpose of such funding would be to strengthen EU resilience and promote early-stage development and adoption, it would be less likely to distort international trade than IRA production subsidies, and hence less likely to attract WTO challenges.

Trade policy
How should the EU respond to the prohibited LCRs and actionable production subsidies (see Annex I) featured in the IRA in view of the near impossibility of a legislative amendment of the IRA in the current Congress?

Bilateral EU-US negotiations have been taking place within the framework of a dedicated 'IRA Taskforce' since October 2022, focusing on the IRA implementing regulations, which were due to be adopted by the US administration before the end of 2022.

This deadline was extended to March 2023, which has been widely interpreted as an effort to accommodate some of the concerns of US trading partners. The IRA regulatory process and the guidelines to be issued by US administration are particularly relevant for the electric vehicle tax credit and associated LCRs for battery and critical mineral components. If exempted, the EU's most pressing commercial and legal concerns about the IRA would reduce substantially.

However, EU intermediate inputs would still be subject to the requirement that final assembly into finished products take place in North America, and domestic production subsidies, such as the clean manufacturing tax credit, will likely be unaffected by the US regulatory process.

If the guidelines issued in March 2023 do not sufficiently address the EU's legitimate commercial interests, it will need to assess its trade policy options.

The EU could immediately initiate a WTO dispute targeting the LCRs attached to the electric vehicle and clean-energy tax credits. Pursuing this option would send an unambiguous political signal that the EU continues to invest in the WTO's rules-based system, values the balance of concessions codified in the WTO agreements, holds the US accountable for breaches of obligations, and seeks leverage for prospective bilateral negotiations with the US Trade Representative (USTR).

Given the obvious breach of WTO rules that prohibit LCRs, the findings of a WTO panel could reasonably be expected within a year. If and once IRA production subsidies evidently harm EU interests, a WTO legal complaint could also target these elements of the legislation.

USTR may appeal the panel report, in which case it would remain unadopted, as the WTO Appellate Body is not operational. However, the EU could retaliate against the in-breach IRA measures under the reformed EU Trade Enforcement Regulation (Regulation (EU) 2021/167).

The European Commission could also launch a countervailing duty investigation to determine whether the US has granted a specific subsidy to a US firm or sector, and if such a subsidy causes or threatens to cause injury to EU industries.

In case of a positive finding, the Commission would propose to the EU countries duties to countervail the US subsidy. However, this remedy is only available if foreign subsidies directly and negatively affect the economic situation of the domestic industry and is limited, in its application, to subsidised exports.

A more desirable but more challenging option would be to start negotiations on a plurilateral or multilateral agreement on permissible environmental subsidies (Kleimann, 2023; Clausing and Wolfram, 2023).

This would be a response not just to the IRA, but to the problem that the design and scale of desirable environmental subsidies is on a collision course with existing international subsidy rules and national trade remedy (ie. anti-foreign-subsidy) regulations, and risks provoking an international subsidy war.

The challenge will be to define, negotiate and agree on permissible environmental subsidy practices that maximise environmental impacts while minimising trade distortions. Various forums could host the technical and political negotiations necessary to generate an enabling and permissible environment for appropriate net global welfare enhancing subsidies[49]. The EU should provide much needed leadership by initiating this process.

In principle, several of the listed options – and in particular litigation through the WTO and bilateral or plurilateral negotiations – could be pursued at the same time. Negotiations might be catalysed and accelerated by an EU legal complaint at the WTO that is credibly looming or proceeds in parallel with these negotiations.

5 Conclusion

The US Inflation Reduction Act is a game changer in several respects.

First, by helping the United States – the second largest CO_2 emitter in the world behind China – meet its 2030 climate target, the IRA will contribute significantly to global efforts to reduce carbon emissions. This positive effect will result both from lower emissions in the US and most likely also from lower emissions in other countries, thanks to reduced costs for green technologies.

Second, the economic effect of IRA could also be substantial for the EU, but whether the effect will be good or bad is uncertain. This is because IRA measures consist mainly of subsidies, some of which are distortionary to the point of even being partly reserved to producers located in North America, in violation of WTO rules that outlaw subsidies conditional on local content.

That the IRA consists mainly of subsidies should not be a problem for EU producers, provided the subsidies are non-discriminatory. EU firms should in principle be well placed to benefit from higher demand for green-tech products generated by IRA subsidies.

However, even if IRA production subsidies were completely non-discriminatory, they would nonetheless improve the attractiveness of the United States compared to other locations, including the EU. This is what is prompting calls for the EU to respond to IRA subsidies with more permissive state-aid rules, a measure which if implemented could jeopardise the EU single market.

The best way for the EU to respond is instead to improve the attractiveness of the EU single market as a location for green investment, with horizontal measures that improve the single market's functioning in key areas (including energy, finance and skills), as well as specific measures in favour of clean technology.

These include better regulation, green procurement rules and EU-level financing supporting new or early-stage clean-tech areas in which EU firms have the potential for sustainable competitive positions. EU funding should also seek to improve EU strategic resilience.

Furthermore, the EU should be mindful of – and react to – IRA subsidies that are distortionary and threaten to displace green-tech production of certain goods and services from the EU to the US.

In particular, the EU should not tolerate the use of LCR subsidies by the US (or any other trading partner) since they blatantly violate WTO rules. The best way to deal with this situation is to continue negotiating with the US administration to obtain an exemption from IRA LCRs, and possibly to launch WTO proceedings to obtain redress.

Finally, the IRA sets a worrying precedent for the global trading system. For the first time, the US has put in place LCR subsidies, in clear violation of WTO rules. This comes in addition to the US's disregard for certain WTO rules and, more broadly, the refusal of major countries to stick to international trade norms.

It is happening when the international community badly needs greater cooperation to tackle perhaps its biggest-ever challenge, climate change. Rather than seeking to maximise their competitive positions through beggar-thy-neighbour climate policies, the largest CO_2 emitters (China, the US, the EU and India, which together account for 60 percent of current emissions) should agree on rules that maximise the impact of their climate policies.

Senior US policymakers often refer to the rules-based international order as if American adherence to it was a self-evident fact (eg. Sherman, 2023). It is not. The EU cannot force the US to correct course but it must demonstrate that adherence to international rules during the green transition is possible, and not a losing position. ■

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Endnotes

1. See Committee for a Responsible Federal Budget, 'CBO Scores IRA with $238 Billion of Deficit Reduction', 7 September 2022. The IRA's name is justified by the fact that it is expected to reduce net public spending, as new expenditures of $499 billion ($391 billion for energy and climate, and $108 billion for healthcare) are expected be offset by $457 billion in tax revenues, and $281 billion in healthcare savings.

2. Other green spending includes support for increased efficiency for buildings and industries (estimated at $20 billion), $20 billion for competitive grants to support greenhouse gas reduction projects, and $3.2 billion for carbon sequestration.

3. For example, an electric vehicle using a US-produced 75kWh battery pack manufactured using US-sourced critical materials could benefit from the 10 percent production cost tax credit for these materials, a $3,375 battery production subsidy, and the electric vehicle consumer tax credit of $7,500. In contrast, clean-tech investment and production tax credits cannot be combined (see Box 1).

4. Vehicles have to have a price below $80,000 for SUVs, vans and pickup trucks, and $55,000 for other passenger vehicles (30D U.S.C. §26 (f) (11)), and only consumers with a household income below $150,000 for singles, $225,000 for 'household heads' and $300,000 for joint filers can claim the tax credit (30D USC §26 (f) (10)). Consumers below a certain income threshold can also receive a tax credit or up to $4000 for the purchase of a used electric vehicle with a value below $25,000.

5. According to BloombergNEF, average battery electric vehicle cell prices were $115/kWh in 2022, which implies that the production tax credit would make up approximately 30 percent of the average cell price. A producer of a 75/kWh battery pack could be entitled to a tax credit of up to $3,375, making up approximately 28 percent of the price of a battery pack in the US in 2022. US battery pack prices averaged at 1.24x$127 = $11,811/kWh in 2022. See https://www.orrick.com/en/Insights/2022/11/Section-45X-of-the-Inflation-Reduction-Act-New-Tax-Credits-Available-to-Battery-Manufacturers.

6. The US Treasury Secretary can allocate up to $2.3 billion as part of such a programme, with selection according to social and environmental benefits. This programme can be extended to up to $10 billion (26 USC §48C).

7. Projects larger than 1 megawatt have to comply with apprenticeship and labour requirements 26 USC §45Y). Under the extended legacy rules, the subsidy for wind projects can be as high as $0.026/kWh. See https://www.epa.gov/lmop/renewable-electricity-production-tax-credit-information.
8. Projects larger than 1 megawatt have to comply with apprenticeship and labour requirements to be eligible for the full credit (26 USC §45E).
9. $0.006/kg of produced hydrogen, depending on the carbon emissions involved in the production; this can rise to up to $3/kg of hydrogen if certain labour conditions are satisfied. Clean fuels can receive up to $1.75/gallon in production subsidies (26 USC §45V).
10. See https://ustr.gov/trade-agreements/free-trade-agreements.
11. For offshore wind, 20 percent in 2025, rising to 55 percent in 2028. For all other renewable energy production facilities, 40 percent in 2025, rising to 55 percent in 2027.
12. The CBO (2022) estimates that for green energy production and investment subsidy that include domestic content, bonuses are $62.3 billion and $64.8 billion, respectively. This can be written as 56.6+56.6/10 for a 10 percent production domestic content bonus and 48.6 + 48.6/3 for the 10 percentage point investment domestic content bonus.
13. For this reason, Credit Suisse (2022) estimated that the budgetary costs of the IRA could be three times higher than projected by the CBO (2022). The discrepancy is particularly large for manufacturing tax credits, which Credit Suisse projects at $250 billion instead of $37 billion. This is based on the assumption that the subsidies will make US producers cost competitive in the manufacturing of wind and solar power equipment, capturing 90 percent of the respective domestic US markets by 2030.
14. How robust would this comparison be to the addition of state-level support on the US side and of (non-IPCEI) state aid on the EU side? With respect to electric vehicle purchases and renewable energy subsidies, the message would be much the same. California provides state-level electric vehicle subsidies of up to $2000 to the federal subsidy, making the average US subsidy level somewhat more generous than that in the EU. Renewable energy support at the state level would also add to the US total, but the overall US level would still appear to be much smaller than that in the EU.

According to a 2020 report by the International Renewable Energy Agency, total renewable energy support amounted to $6.7 billion in the US in 2017, against €78 billion in the EU (Taylor, 2020). With respect to clean-tech manufacturing, we do not know the answer. Allocating both (non-IPCEI) state aid in the EU and state-level subsidies in the US to clean manufacturing requires an extensive data effort.

15. Andrés Vlasco, 'A Subsidy War Without Winners', Project Syndicate, 27 January 2023.

16. This effect is often credited with triggering the collapse in the cost of photovoltaic solar cells in the last 20 years. German subsidies for renewable electricity production in the 1990s and 2000s initially benefitted German producers, but when domestic supply did not meet demand, Chinese producers stepped in by selling their goods to the German market, subsequently increasing their market share and slashing costs worldwide. See Lazard (2021), Gallagher (2017), Hoppmann et al (2014) and Grau et al (2012).

17. See Larsen et al (2022), Jenkins et al (2022) and Joe Lo, 'After finally passing a climate bill, US calls on others to act'.

18. Robinson Meyer, 'The Biggest Thing to Happen in International Climate Diplomacy in Decades', The Atlantic, 31 August 2022.

19. Estimate based on current market prices, which may however increase as a result of the subsidy. The average new vehicle sold in the US in 2021 cost $42,000, for which the $7,500 subsidy would represent an 18 percent reduction. This is the average for all vehicles including premium electric vehicles. Source: https://www.statista.com/statistics/274927/new-vehicle-average-selling-price-in-the-united-states/.

20. EU automotive exports to the US were €26 billion in 2021, 6 percent of all EU exports, according to Eurostat.

21. See https://uscode.house.gov/view.xhtml?req=(title:26%20section:45W%20edition:prelim).

22. According to an undated US Treasury white paper, "Treasury and the IRS expect to propose that the Secretary may identify additional free trade agreements for purposes of the critical minerals requirement going forward and will evaluate any newly negotiated agreements for proposed inclusion during the pendency of the rulemaking process or inclusion after finalization of the rulemaking."

23. The production of raw materials that are can be used in clean tech receives 10 percent of their production cost as tax credits. The production of an electric vehicle battery would receive subsidies equivalent to roughly 30 percent of its 2022 price, while the production of components for a wind turbine can receive $0.15 per watt of capacity. The average price of a wind turbine in 2021 was around $900 per kW, meaning that this production subsidy would amount to 16 percent (see DOE, 2022).
24. At current cost, the $0.07/watt IRA production subsidy for solar panels would amount to 26 percent of the price of a solar panel (see https://ourworldindata.org/grapher/solar-pv-prices), giving a significant boost to US based manufacturing.
25. In the last decade, the price of solar panels has fallen by 95 percent, while the cost of electric vehicle batteries has fallen from $5/watt in 2012 to $0.27/watt in 2022.
26. In the case of clean energy subsidies there is a 10 percentage bonus on the tax credit received if components used come from the US, and an extra 10 percentage points in the case of a 30 percent investment subsidy.
27. See https://www.ipcei-batteries.eu/
28. For the first IPCEI on microelectronics, average funding was 28 percent of eligible project cost. See Poitiers and Weil (2022) for a discussion.
29. Between 2019 and 2022, industrial electricity prices increased from around $0.10/kWh in the EU and $0.07/kWh in the US to around $0.20/kWh in the EU compared to only $0.08/kWh in the US. Between 2019 and 2022, the spread between the EU and the US increased from $0.03/kWh to around $0.12/kWh.
30. In a simple market design ('merit order'), the price of electricity is set by the cost of the most expensive source that is needed to produce sufficient power (gas in many EU markets). The electricity price changes due to a change in the most expensive source still in the market, not by directly lowering the cost of renewable energy generation itself.
31. According to Bloomberg NEF, $27.7 billion in investments in electric vehicle and battery manufacturing in the US has been announced since the passing of the IRA.

32. Since the WTO's inception in 1995, its members have referred more than 600 disputes to the WTO dispute settlement mechanism, with 159 complaints filed against the United States by 29 WTO members, and 116 disputes launched by 30 WTO members against the European Union, its predecessors and member states.
33. Clea Caulcutt, 'Emmanuel Macron calls for "Buy European Act" to protect regional carmakers', Politico, 26 October 2022.
34. 2020 aid disbursed is a more reliable gauge of the potential distortionary impact of the temporary crisis framework than aid approved under the 2022 framework put in place after the Russian invasion of Ukraine. However, Commission Executive Vice-President Margrethe Vestager cited the aid under the 2022 framework in a widely-reported January 2023 letter to EU governments (see for example https://www.ft.com/content/85b55126-e1e6-4b2c-8bb2-753d3cafcbe5), though this refers to approvals of aid which may not in the end be granted by governments; if it is granted, it may be disbursed over several years. The shares of approved aid granted, and the length of the disbursement period may vary greatly between countries. Furthermore, aid approved refers to nominal amounts, mixing loans and grants, rather than to the aid content.
35. To adjust for differences in the magnitude of shocks, we ran a cross-sectional regression of the COVID-19 state aid shown in the left panel of Figure 2 on a measure of the economic shock, namely, the difference between the winter 2020 real growth projections published by the European Commission in February 2020, just before COVID-19, and the 2020 real growth outturns. The residual from that regression can be interpreted as the shock-adjusted level of COVID-19 aid. Consistent with the findings of Cannas et al (2022), the slope coefficient indicates a statistically significant correlation between the size of the shock and the level of COVID-19 aid. However, the regression fit is very low (R2=0.12), indicating that most of the variance of state aid is not explained by differences in the shocks. The difference between lowest and highest shock-adjusted aid level is 4 percentage points of GDP (even higher than in the raw data), and the standard deviation is 0.93 percentage points of GDP, almost as high as that of the raw data.

36. Case law supports a restrictive reading of 107(3)(b) TFEU ("serious disturbances"). The ruling in Freistaat Sachsen and Others v Commission of the European Communities (1999) found that "the disturbance in question must affect the whole of the economy of the Member State concerned, and not merely that of one of its regions or parts of its territory" (see https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61996TJ0132_SUM). Before COVID-19 and Ukraine, 107(3)(b) TFEU was used most extensively during the 2008-09 global financial crisis. We thank Armin Steinbach for pointing us to this case law and Commission practice.

37. See European Parliament press release of 9 December 2022: https://www.europarl.europa.eu/news/en/press-room/20221205IPR60614/batteries-deal-on-new-eu-rules-for-design-production-and-waste-treatment.

38. Such schemes already exist in EU countries, notably in Germany; see https://www.bmwk.de/Redaktion/EN/Dossier/regulatory-sandboxes.html. EU countries endorsed regulatory sandboxes in November 2020: https://www.consilium.europa.eu/media/46822/st13026-en20.pdf.

39. Environmental criteria in public procurement should be handled carefully, as they might expose officials to lobbying and electioneering (for instance, in view of protecting local producers against competition; Blanchard et al 2022). But this risk could be mitigated by using precise and easy-to-verify award criteria (eg. CO_2 emissions of cars or carbon intensity of electricity) rather than imprecise and hard-to-verify criteria (eg. environmental criteria related to the suppliers). This requires a clear categorisation of green criteria, as well as adequate investment in the training of public authorities that have to apply them (Sapir et al 2022).

40. The European Commission has said it will propose electricity market reform early in 2023.

41. Connall Heussaff and Georg Zachmann, 'Buying time for proper electricity market reform,' Euractiv, 21 December 2022.

42. See https://news.industriall-europe.eu/Article/860.

43. See Paola Tamma, 'Eurozone countries kill banking union plan,' Politico, 9 June 2022.

44. See European Commission press release of 7 December 2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7348.

45. See García-Herrero and Poitiers (2022).
46. See Tagliapietra and Veugelers (2021) on how to design such green-subsidy programmes at EU level.
47. This will be financed through the frontloaded sale of emissions trading system allowances (40 percent) and the resources of the Innovation Fund (60 percent). The distribution of these extra resources will take into account cohesion policy, EU countries' dependence on fossil fuels and the increase in investment prices.
48. Any such programme should take lessons past initiatives into account; see Claeys (2015) and Claeys and Leandro (2016).
49. Including the G7 and its climate club initiative, the G20, the Organisation for Economic Co-operation and Development, the WTO Trade and Environment Committee and WTO Trade and Environmental Sustainability Structured Discussions (TESSD), and the recently founded Coalition of Trade Ministers on Climate.
50. Article 107(3)(b) of the Treaty on the Functioning of the European Union states that "aid to promote the execution of an important project of common European interest" is compatible with the internal market.
51. The European Commission reports state aid disbursements in broad policy categories, several of which (including 'Environmental protection including energy savings', 'Regional development', 'Sectoral development', 'SMEs including risk capital' and 'Other') could in principle contain such support. European Commission (2022a), Annex II also lists the largest individual aid items in these categories disbursed in 2020, the most recent year for which this data is available. Except for the IPCEIs (reported in 'Other') we were not able to find any item in this list that specifically reflects clean-tech manufacturing support. However, some of the generic industry support packages reported in the categories 'Regional development' and 'SMEs including risk capital' could reflect disbursements to clean tech producers.

References

Autor, D, D Dorn and G Hanson (2021) 'On the persistence of the China shock', NBER Working Paper w29401, National Bureau of Economic Research

Beck, T, J-P Krahnen, P Martin, FC Mayer, J Pisani-Ferry, T Tröger, N Véron, B Weder di Mauro and J Zettelmeyer (2022) 'Completing the banking union: Economic requirements and legal conditions', Policy Insight 119, Centre for Economic Policy Research

Blanchard, O, C Gollier and J Tirole (2022) 'The Portfolio of Economic Policies Needed to Fight Climate Change', PIIE Working Paper 22-18, Peterson Institute for International Economics.

Cannas, G, S Ferraro, A Mathieu Collin, and K Van de Casteele (2022) 'Looking back at the State aid COVID Temporary Framework: the take-up of measures in the EU', Competition State aid Brief 3/2022, European Commission, available at https://competition-policy.ec.europa.eu/system/files/2022-11/state_aid_brief_3_2022_kdam22003enn_coronavirus.pdf

Claeys, G (2015) 'Juncker plan: the EIB in the driver's seat', Bruegel Blog, 1 July.

Claeys, G and A Leandro (2016) 'Assessing the Juncker Plan after one year', Bruegel Blog, 17 May.

Clausing, K and C Wolfram (2023) 'Asymmetric Climate Policies and International Trade', mimeo

CBO (2022) Estimated Budgetary Effects of Public Law 117-169, to Provide for Reconciliation Pursuant to Title II of S. Con. Res. 14, US Congressional Budget Office, available at https://www.cbo.gov/ publication/58455

Credit Suisse (2022) US Inflation Reduction Act: A catalyst for climate action, Treeprint.

DOE (2022) Land-Based Wind Market Report: 2022 Edition, U.S. Department of Energy.

European Commission (2020) European Skills Agenda for sustainable competitiveness, social fairness and resilience.

European Commission (2022a) State aid Scoreboard 2021.

European Commission (2022b) 'Guidelines on State aid for climate, environmental protection and energy 2022', 2022/C 80/01.

European Commission (2023) 'A Green Deal Industrial Plan for the Net-Zero Age', COM(2023) 62 final.

Gallagher, K (2017) The Globalization of Clean Energy Technology: Lessons from China (Urban and Industrial Environments), MIT Press

García-Herrero A and N Poitiers (2022) 'Europe's promised semiconductor subsidies need to be better targeted', Bruegel Blog, 17 October.
Glachant, JM (2023) 'Reforming the EU internal electricity market in the middle of a huge energy crisis: an absolute short-term emergency or preparation for the future?' Working Paper, Florence School of Regulation.
Grau, T, M Huo, and K Neuhoff (2012) 'Survey of photovoltaic industry and policy in Germany and China', Energy Policy 51: 20–37.
Hoppmann, J, J Huenteler and B Girod (2014) 'Compulsive policy-making—The evolution of the German feed-in tariff system for solar photovoltaic power', Research Policy 43(8): 1422–41.
IEA (2022) Skills development and inclusivity for clean energy transitions, International Energy Agency.
Jenkins, JD, EN Mayfield, J Farbes, R Jones, N Patankar, Q Xu and G Schivley (2022) Preliminary Report: The Climate and Energy Impacts of the Inflation Reduction Act of 2022, Princeton University - Zero Lab.
Kleimann, D (2023) 'Climate versus trade? Reconciling international subsidy rules with industrial decarbonisation', Policy Contribution 03/2023, Bruegel.
Larsen, J, B King, H Kolus, N Dasari, G Hiltbrand and W Herndon (2022) A Turning Point for US Climate Progress: Assessing the Climate and Clean Energy Provisions in the Inflation Reduction Act, Rhodium Group.
Lazard (2021) 'LAZARD's levelized Cost of Energy ('LCOE') Analysis — version 15.0', Lazard.
Leggett, JA and JL Ramseur (2022) Inflation Reduction Act of 2022 (IRA): Provisions Related to Climate Change, CRS Report R47262, Congressional Research Service.
Mazzucato M (2013) The Entrepreneurial State. Debunking Public vs. Private Sector Myths, Anthem Press, London
Poitiers, N and P Weil (2022a) 'Opaque and ill-defined: the problems with Europe's IPCEI subsidy framework', Bruegel Blog, 26 January.
Poitiers, N and P Weil (2022b) 'Is the EU Chips Act the right approach?' Bruegel Blog, 2 June.
Rodriguez Quintero, R, C Vidal Abarca Garrido, H Moons, M De Oliveira Gama Caldas, O Wolf, I Skinner, A Van Grinsven,

M Hoen and H Van Essen (2019) Revision of the EU Green Public Procurement Criteria for Transport, JRC Science for Policy Report, Joint Research Centre
Roy, N, D Burtraw and K Rennert (2021) 'Cost Analysis and Emissions Projections under Power Sector Proposals in Reconciliation', Issue Brief 21-15, Resources for the Future.
Sapir, A, T Schraepen and S Tagliapietra (2022) 'Green Public Procurement: A Neglected Tool in the European Green Deal Toolbox?' Intereconomics 57(3): 175-178.
Schlecht, I, L Hirth and C Maurer (2022) 'Financial Wind CfDs', Working Paper, ZBW – Leibniz Information Centre for Economics.
Sherman, W (2023) 'Remarks at Brookings Global China Event', 15 February.
Tagliapetra, S and R Veugelers (2021) 'Fostering the Industrial Component of the European Green Deal: Key Principles and Policy Options', Intereconomics 56(6): 305-310
Taylor, M (2020) 'Energy subsidies: Evolution in the global energy transformation to 2050', Technical Paper 1/2020, International Renewable Energy Agency.
Véron, N (2014) 'Defining Europe's Capital Markets Union', Policy Contribution 2014/12, Bruegel.

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Annex I: IRA subsidies in the context of WTO law

Prohibited subsidies

The WTO Agreement on Subsidies and Countervailing Measures (ASCM) prohibits subsidies outright if they are made contingent on the use of domestic over imported goods. The agreement thus gives justice to the notion that subsidies subject to local content requirements are a priori considered to be trade distortive. In WTO dispute-settlement proceedings, a finding of a prohibited subsidy will result in an obligation to immediately remove the subsidy, and the authorisation of countermeasures if the measure is not removed within a reasonable time (Article 4 ASCM). Subsidies contingent on the use of local content would also violate the General Agreement on Tariffs and Trade's (GATT) national treatment provision (GATT Article III:4). The outright prohibition of local content requirements renders this category of subsidies particularly vulnerable to WTO legal challenges and makes litigation speedy and straightforward.

The following IRA subsidies contain prohibited local content requirements and are therefore vulnerable to a WTO legal challenge advanced by the EU or other WTO members:

(1) extension and modification of credit for electricity from certain renewable resources; (2) extension and modification of the energy tax credit; (3) clean vehicle tax credit; (4) clean electricity production credit; and (5) clean electricity investment credit.

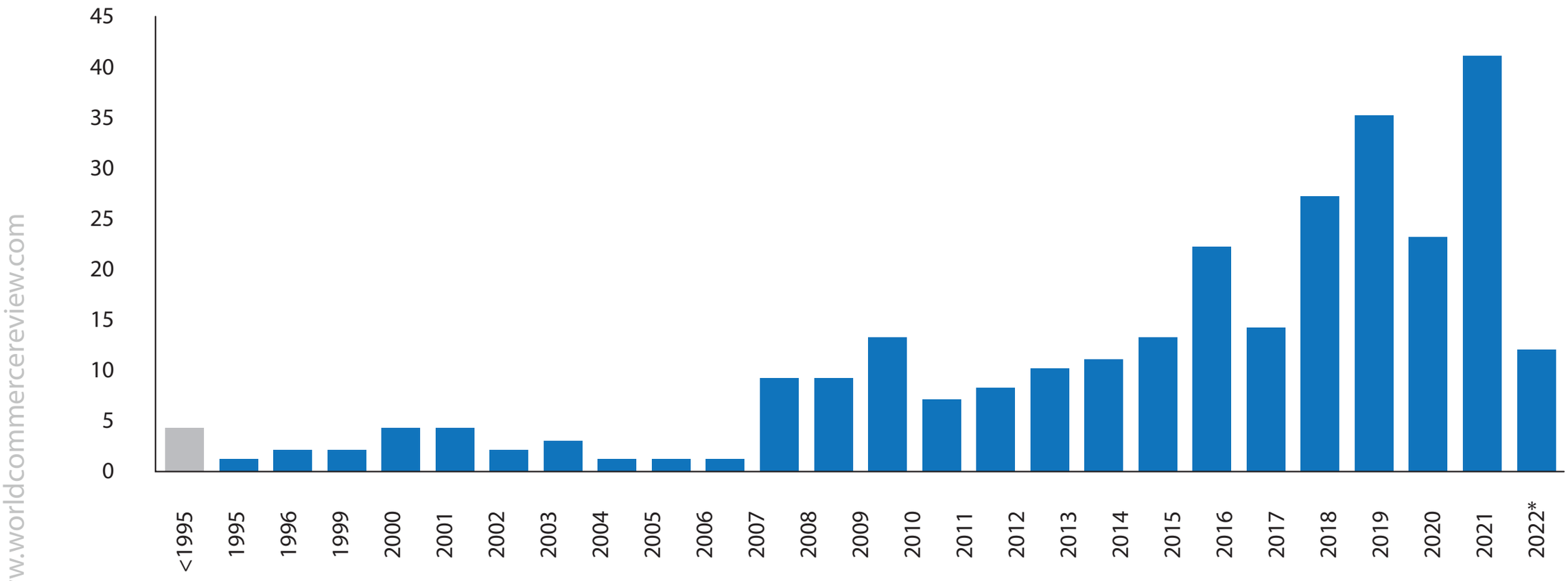
Actionable subsidies

The GATT exempts from its national treatment provisions the payment of subsidies exclusively to domestic producers. In other words, domestic production subsidies are generally permissible (Article 3:8(b) GATT). They are, however, 'actionable' under the ASCM if they confer a benefit and are made to a specific industry, as opposed to all economic operators. Actionable subsidies are only inconsistent with the ASCM if it can be demonstrated that they distort international

trade generally, or in relation to the complaining WTO member specifically (Articles 5, 6 and 7 ASCM). Other than the relatively rare use of WTO dispute-settlement procedures to challenge 'actionable' foreign subsidies, an industry that is on the receiving end of an actionable subsidy may be subject to countervailing duties (CVD) imposed by a third-country government. The imposition of countervailing (anti-subsidy) duties requires a government agency's investigation in accordance with ASCM provisions, and a finding of injury to the domestic industry producing the like product, measured as effects on bilateral trade volume, price, revenue, sales, profits, productivity and capacity utilisation (Part V ASCM). Governments frequently employ countervailing duties against foreign subsidies, with a sharp increase over the past decade.

The following IRA subsidies are vulnerable to national countervailing duty investigations if the above-mentioned market effects can be demonstrated: (1) sustainable aviation fuel tax credit; (2) tax credit for production of clean hydrogen; (3) advanced manufacturing production tax credit; (4) clean fuel production tax credit.

Figure A1: Countervailing measures in force on or after 01/01/2022, by year of application



Note: Figure shows 279 items in total. 2022 data relates to January to June only.
Source: Bruegel based on WTO.

Annex II: IRA advanced manufacturing production tax credits

Product	Tax credit
Solar	
Thin film or crystalline photovoltaic cell	$0.04 per watt
Photovoltaic wafer	$12 per m^2
Polymeric backsheet	$0.4 per m^2
Solar module	$0.07 per watt
Torque tube	$0.87 per kg
Structural fastener	$2.28 per kg
Wind	
Blade	$0.02 per watt
Nacelle	$0.05 per watt
Tower	$0.04 per watt
Fixed offshore wind platform	$0.02 per watt
Floating offshore wind platform	$0.04 per watt
Offshore wind vessel	10% of sales price
Batteries	
Cell	$35 per kWh
Module that does not use battery cells	$45 per kWh
Module that uses battery cells	$10 per kWh
Inverters	
Central inverter	$0.25 per watt
Utility inverter	$0.015 per watt
Commercial inverter	$0.02 per watt
Residential inverter	$0.065 per watt

Macro or distributed wind inverter	$0.11 per watt
Materials	
Solar grade polysilicon	$3 per kg
Electrode active material	10% of production cost
Other critical material	10% of cost

Source: IRA Title 26 USC §45X.

Annex III: Europe's industrial policies for clean-tech deployment

Europe does not have a flagship clean-tech deployment scheme comparable to the IRA. Instead, it has a multitude of policy initiatives and tools at different levels (regional, national, EU), which are generally uncoordinated, if not conflicting (Table A1).

Table A1. Examples of Europe's industrial policy tools for clean-tech deployment

	Deployment policy tools	Overall enabling framework
EU level	Single market rules European alliances IPCEIs NextGenerationEU EU Innovation Fund European Innovation Council European Investment Bank EU Cohesion Funds	Trade and investment policy Competition policy Environmental standards Climate policy (eg. ETS) Energy policy
National level	State aid Investment programmes Incentive programmes Public procurement rules Clean energy standards	Energy policy Environmental standards Environmental taxation
Regional level	'Smart' specialisation strategies Regional investment budgets Implementation of EU cohesion policies	Regional regulations

Note: as the IRA predominantly focuses on clean-tech deployment, for the sake of comparison this table only focuses on Europe's deployment policy tools and overall enabling framework. It does not include pure research and innovation policies (eg. Horizon Europe), as those policies are not a key part of the IRA either.
Source: Bruegel.

This fragmentation makes it difficult to assess how much public support (both national and EU-level) is provided every year to clean tech manufacturing and deployment. Table A2 attempts to provide an overview for the most important spending categories. Spending on green research is not included in this exercise (or indeed the IRA).

In the remainder of this Annex, we seek to identify the EU counterparts to the three green subsidy categories of the IRA highlighted in the main text and Box 1.

Electric vehicles. Almost every EU country has been subsidising the purchase of electric vehicles. Incentives differ widely from country to country, both in form (eg. tax benefits or purchase subsidies) and value. In 2022, purchasing subsidies ranged between €10,000 in Cyprus to €1,250 in Czechia. Across the entire EU, these subsidies added up to almost €6 billion and averaged around €6,000 per vehicle. Unlike the support provided by the IRA, these EU purchasing incentives typically do not discriminate between different producers.

Table A2. Examples of annual support to green tech manufacturing and deployment in the EU

Source of funding	Instruments	Period	Value (€ billions)
EU and national support to clean-tech manufacturing[a]			**6.8**
NGEU - RRF[b]	Loans and grants		
IPCEIs[c]	Loans, grants, guarantees, tax advantages	*per annum*	0.3
EIB[d]	Loans	*per annum*	1.3
EU Innovation Council[e]	Grants and equity	2022	3.3
EU Innovation Fund[f]	Grants	2022	0.7
		2021	1.2
EU and national support for the deployment of renewable energies			
EIB[g]	Loans	2022	84.4
National support schemes[h]	Various (mainly feed-in-tariffs)	2020	4.4 80
National incentives for electric vehicle deployment			
National support scheme	Purchase allowance[i]	2022	€6,000 avg.

Notes: a. Support to clean manufacturing includes support to green hydrogen and batteries. b. This estimate includes the amount of loans and grants approved under the RRF for battery-related projects and divides it by the number of years of its duration (2020-2026). The large share of the funding available for projects related to hydrogen falls under the umbrella of the IPCEIs. Based on data from the Bruegel dataset on European Union countries' recovery and resilience plans. c. The estimate for the IPCEIs includes the overall amount of public funding granted by EU countries for four IPCEIs (two batteries- and two hydrogen-related) divided by the number of years they are expected to run. Based on data provided by European Commission. d. This estimate includes the overall amount of loans granted to industries and transport for projects related to batteries, hydrogen and electric vehicles in 2022. Based on data provided by the European Investment Bank. e. This estimate considers the amounts provided in 2022 for the EIC Accelerator. It notably includes the budget for EIC Challenge (€536 million devoted to technologies for Open Strategic Autonomy and 'Fit for 55', as well as a third of the €630 million budget allocated to open calls – this being just a working assumption. f. This estimate considers the value of support to small- and large-scale projects awarded in the first call for projects. Appraisals for the second call for projects are still ongoing at time of writing. Based on data provided by European Commission – European Innovation Fund. g. This estimate includes the value of loan disbursed for renewable energy-related projects (ie. solar and wind) by the EIB in 2022. h. This estimate includes the amount of support offered by EU countries in the form of direct transfers, tax expenditure, FiT/FiP, RES quotas and others in 2020. Source: European Commission, Directorate-General for Energy. i This estimate is the average subsidy offered for the purchase of a new battery-electric passenger car across EU countries.
Source: Bruegel based on data provided by the European Automobile Manufacturers Association and government websites.

Support for clean tech manufacturing is channelled through several instruments and facilities.

- EU countries have access to loans and grants to support green investments under the Recovery and Resilience Facility (RRF), including for the decarbonisation of industry and strengthening clean-tech supply chains.
- IPCEIs support major crossborder innovation and infrastructure projects To date, the European Commission has approved two IPCEIs related to batteries (€3.2 billion for the period 2019-2031 and €2.9 billion for the period 2021-2028) and two related to hydrogen (€5.4 billion and €5.2 billion, respectively, for 2022-2036), partly covered by funds from the RRF[50].
- The EU Innovation Fund, established under the EU emissions trading system, supports the demonstration and early deployment of clean technologies and processes in energy-intensive industries. In its first call in 2022, the Fund awarded grants amounting to around €1 billion. A hydrogen-specific pilot auction worth €800 million will take place in June 2023 (European Commission, 2023).
- Under Horizon Europe, the European Innovation Council has a deployment leg called EIC Accelerator, which aims at scaling-up breakthrough technologies, including green tech.
- The European Investment Bank (EIB) allocated around €17.5 billion in loans to the transport and industrial sectors in 2022; we estimate that approximately €3.3 billion was targeted at clean-technology projects. The EIB is also responsible for the implementation of around 75 percent of the EU guarantees allocated to the InvestEU programme.

Except for the IPCEIs, the estimates presented in Table A2 do not include state aid, the largest subsidy category (green and not) in the EU by far. The Treaty on the Functioning of the European Union prohibits state aid but allows exceptions, including for IPCEIs, "to remedy a serious disturbance in the economy of a member state", and "to facilitate the

development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest" (Article 107(3); see Box 1).

It is not possible to precisely identify the volume of non-IPCEI state aid for clean-tech manufacturing based on European Commission data; however, this is unlikely to be very large compared to the IPCEIs and particularly compared to renewable energy subsidies[51].

Renewable energy subsidies

In 2020, the latest year for which consolidated figures are available, subsidies given by EU members to electricity production from renewable energy sources (RES) amounted to €80 billion (0.57 percent of EU GDP), with Germany leading the ranking (0.94 percent of GDP, or €33 billion). Feed-in tariffs and feed-in premiums represented 79 percent of total RES subsidies in 2020, for a total of €63 billion.

In terms of technology, solar energy received the largest share of subsidies (€30 billion), followed by wind (€21 billion), and biomass (€18 billion). Renewable energy is also supported by EIB loans (roughly €4.4 billion in 2020).

Is Europe failing on import diversification?

Lennard Welslau and Georg Zachmann find that despite a goal of economic self-reliance, the EU's imports are generally sourced from an increasingly limited set of suppliers

In the discussion on European Union strategic sovereignty – the idea that the EU should not be dependent on other economies – there are broadly two approaches. The first is that a certain degree of self-sufficiency (autarky) is needed, at least in 'strategic' industries. The second is that strategic sovereignty can be achieved by ensuring that strategically important imports from one country can be substituted by imports from another – in other words, through sufficient import diversification.

But to what extent are Europe's imports already diversified, and how has diversification developed over time? The European Commission has published two in-depth reviews of EU strategic dependencies and capacities (2021, 2022), identifying 137 products for which the EU is highly dependent on imports, especially from China. These products are mostly in the energy-intensive, health and tech industries.

Overall, however, the reviews found that extra-EU trade is diversified and the level of import concentration has remained stable over the last decade. While this may be true for aggregate imports, our analysis suggests it underplays the extent to which imports in several sectors have become more concentrated over time.

For a deeper look at current trends, and to draw out the role of China, we examined import data for 6,887 products imported by the EU between 2001 and 2022. We used an indicator of import diversification (the Herfindahl-Hirschman-Index (HHI); see the annex for details) to assess which products are imported from many countries, and which are imported from only a few.

The Commission's in-depth reviews focused on trends for aggregate imports and only carried out a more detailed analysis for a single year and for a limited selection of products.

We provide a more detailed analysis for the entire period, by breaking down the data by industry, technology and end-use, and constructing two alternative indicators to highlight the specific role of China in the concentration of EU imports.

High import concentration threatens resilience and worsens European terms of trade through higher mark-ups; tools that encourage greater import diversification should be employed to reverse the trend

Overall, we see big differences in the extent to which products are concentrated in certain countries. For some products (eg. vegetable seeds in 2022) EU imports are very diversified, while other products are only sourced from one country (eg. 2022 imports of sulphur dichloride from India).

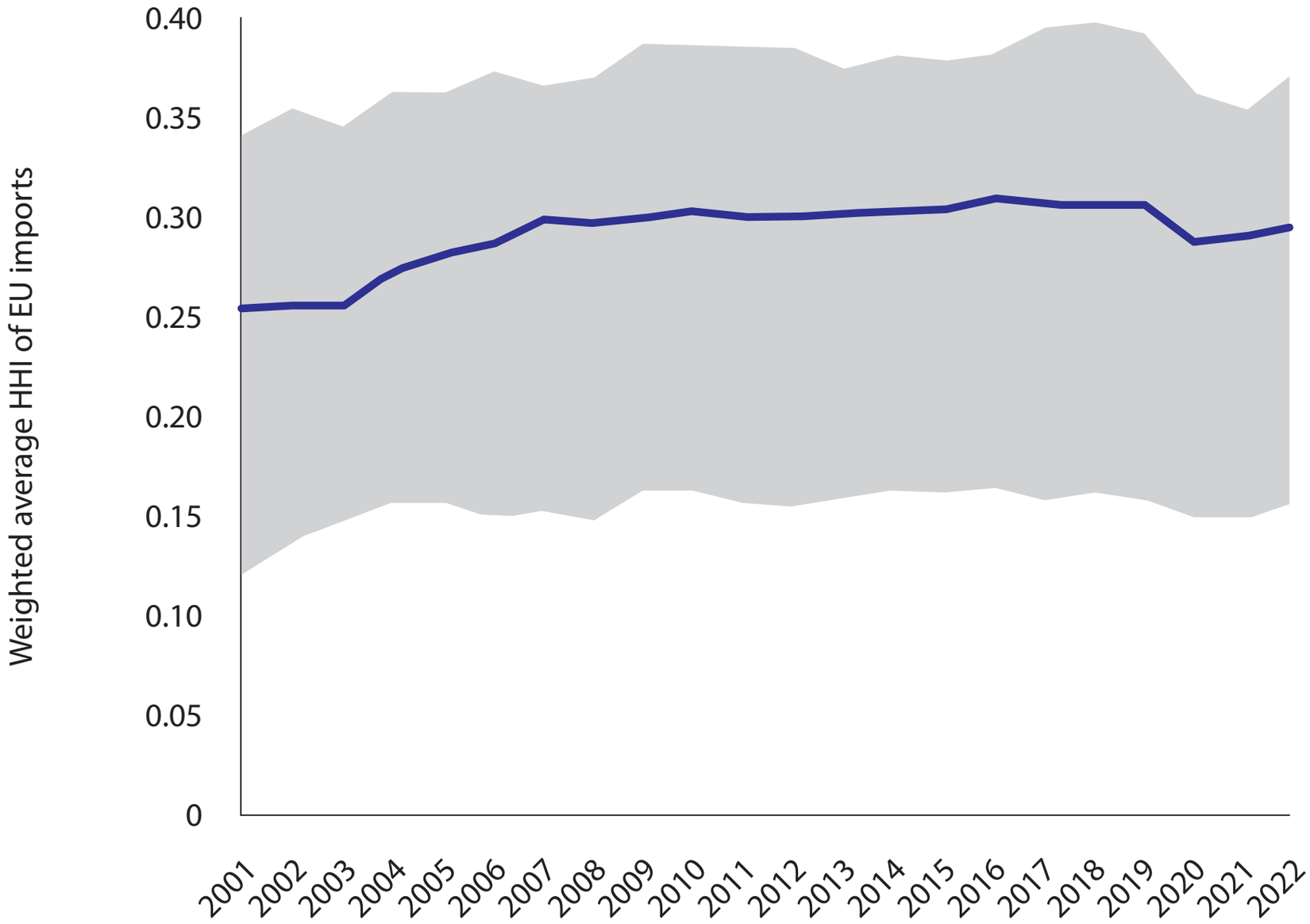
Figure 1 plots the average concentration level for European imports between 2001 and 2022, with a higher number indicating greater concentration of imports among certain exporting countries. Interestingly, despite the surge in globalisation that involved more countries in international trade in the past decades, EU imports became substantially more concentrated in a smaller number of countries between 2001 and 2016, with the level of concentration slightly receding since.

One explanation for the increasing concentration of import sources for many products is that it has been driven by the rise of China. To test this, we calculated two alternative indicators: one in which imports from China are assumed to zero but the overall volume of EU imports is assumed to be the same, with imports from other countries scaled up in line with their current market shares to fill the Chinese gap, and one in which imports from China are ignored completely (ie. Chinese imports are zero while imports of other countries remain unchanged; as a result of the overall smaller import market, the market share of other countries' imports increases).

The actual and alternative concentration indicators start at very similar levels in 2001, but as China's share of European imports increased, concentration increased significantly based on the actual data, but not for the alternative indicators with China stripped out.

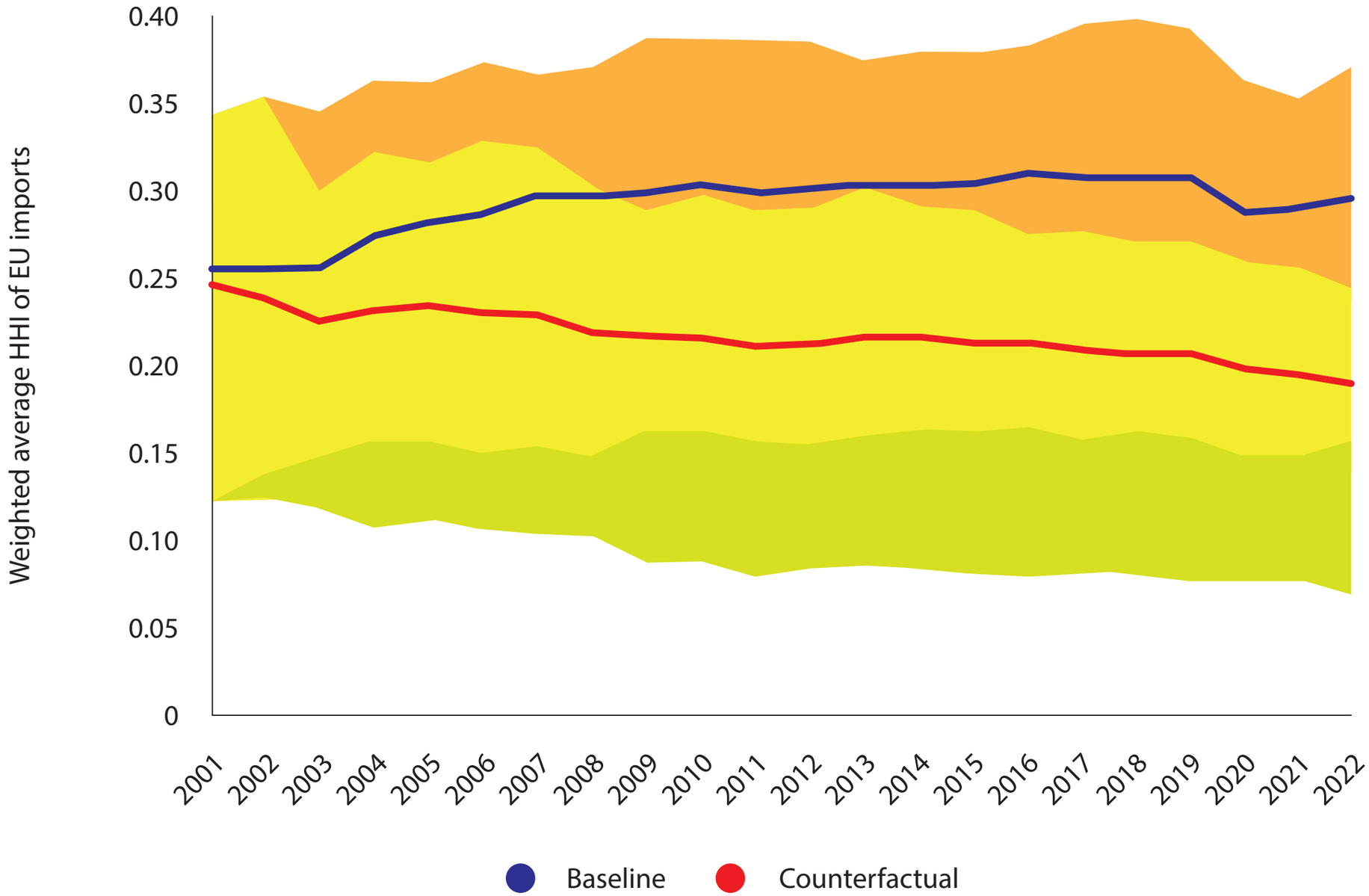
For the first alternative indicator, concentration drops (Figure 2a), because China is assumed to have been replaced as a supplier by an infinite number of small exporters.

Figure 1. Concentration indicator for European imports



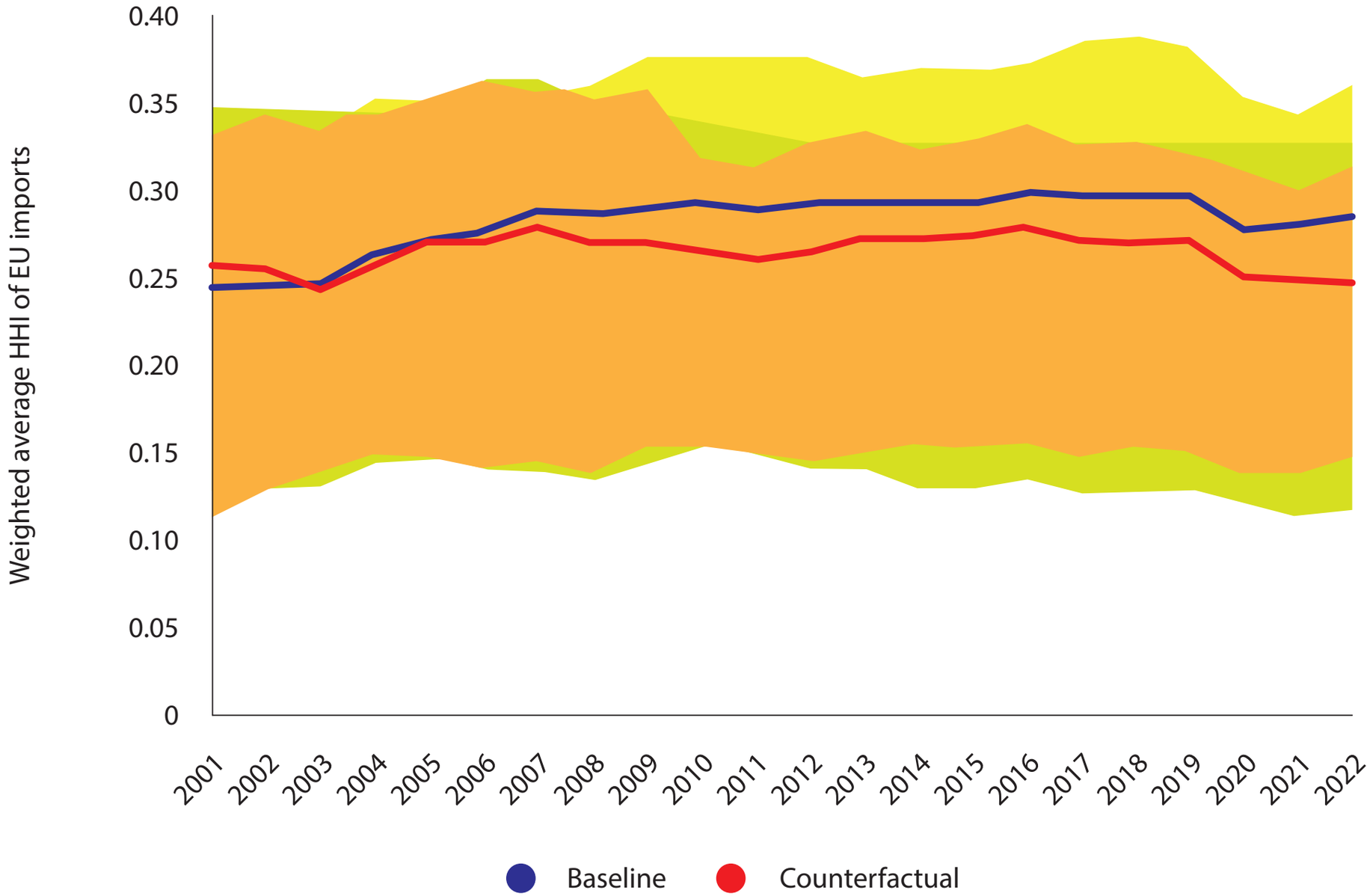
Note: Blue line shows average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level, weighted by respective import volumes for the entire period. Shaded area represents interquartile range. See the annex for an explanation of the indicator.
Source: Bruegel based on Eurostat.

Figure 2a. Concentration of European imports, baseline vs. two alternative scenarios. Counterfactual 1



Note: Blue line shows average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level, weighted by average import volume in respective product categories over the entire period. Red line shows the same index for alternative scenarios where (1) Chinese market shares are zero and other countries' market shares remain unchanged, and (2) Chinese imports are zero and other countries' market shares increase as a result of the reduced total import volume. Shaded areas represent respective interquartile ranges.
Source: Bruegel based on Eurostat.

Figure 2b. Concentration of European imports, baseline vs. two alternative scenarios. Counterfactual 2



Note: Blue line shows average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level, weighted by average import volume in respective product categories over the entire period. Red line shows the same index for alternative scenarios where (1) Chinese market shares are zero and other countries' market shares remain unchanged, and (2) Chinese imports are zero and other countries' market shares increase as a result of the reduced total import volume. Shaded areas represent respective interquartile ranges.
Source: Bruegel based on Eurostat.

Surprisingly, the second alternative indicator (Figure 2b) also shows a lower than actual level of concentration. That is, imports of goods from countries other than China would be more diversified, despite the assumed reduction in market size, possibly as a result of new exporters competing with old exporters for the European market.

Critical resources

The EU discussion on strategic autonomy focuses on specific product categories considered critical for security, safety, health and technology. These are in particular strategic resources and basic materials, and certain high-tech items (especially chips and batteries).

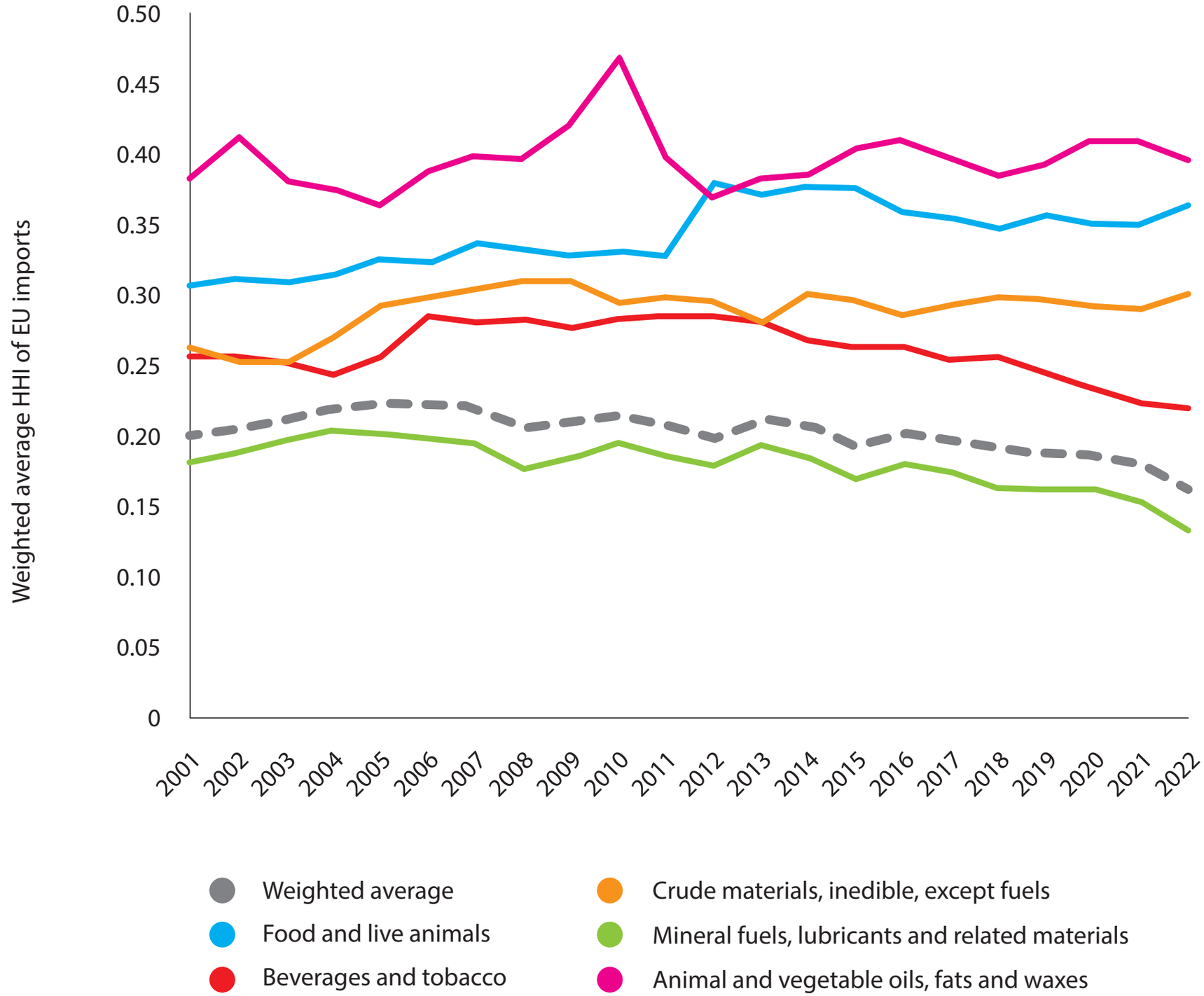
Assessment of the level of import diversification for different product categories shows significantly varying results. The level of diversification is healthy for most resource-based product categories, with the surprising exception of foodstuff (Figure 3a).

For example, imports of fuel products are the most diversified. Imports of manufacturing products, however, are much more concentrated (Figure 3b). Machinery and transport equipment imports seem to drive the overall level of concentration of European imports (Figure 1).

Import diversification has decreased for more technology-intensive manufacturing products. This is especially true in the high-tech sector, where the increase in concentration over the past decade has been greater than for other types of manufacturing products (Figure 4a).

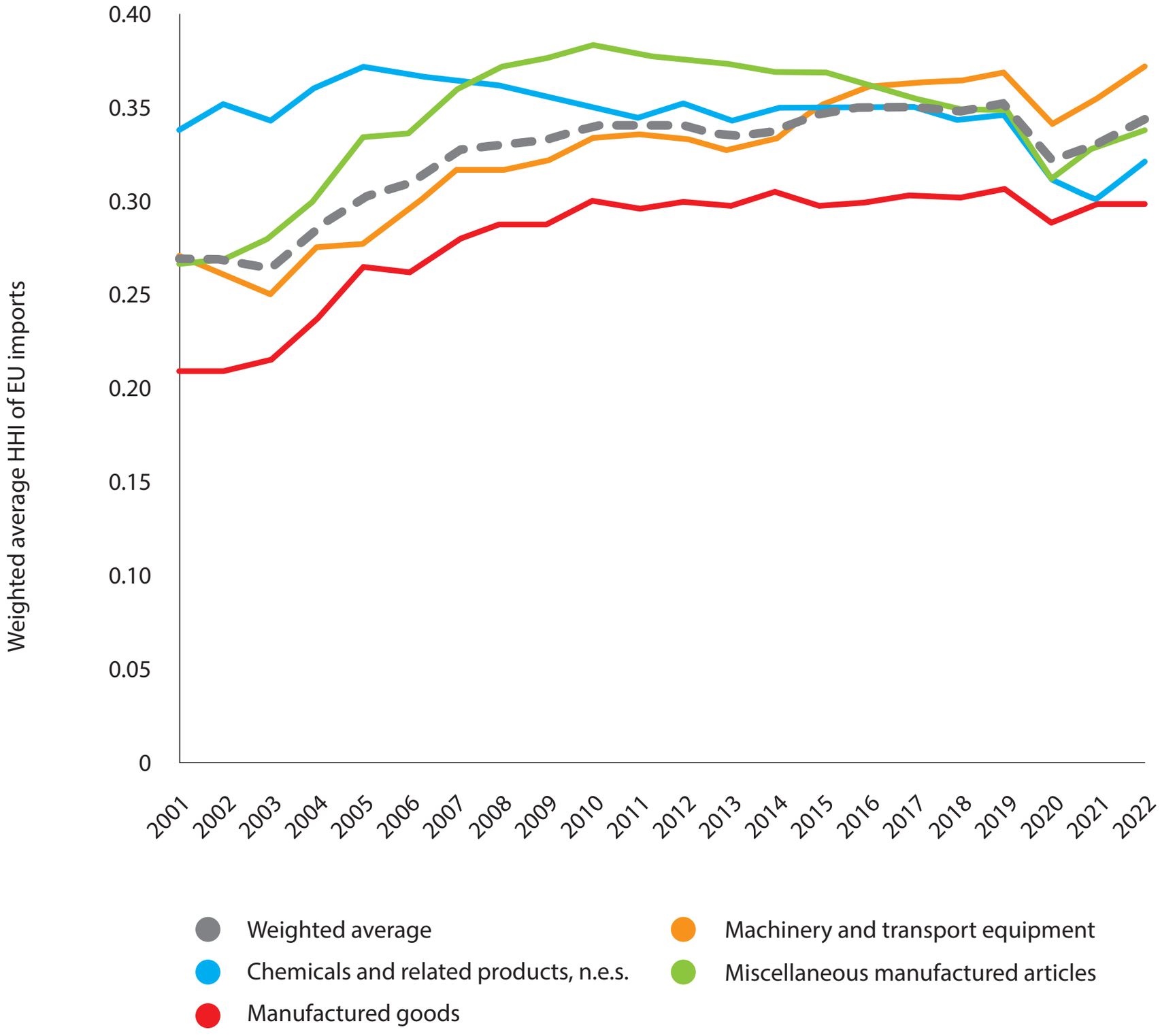
Reliance on a few importers implies less resilience to supply-chain disruptions, and possibly higher mark-ups on imports of potentially crucial components.

Figure 3a. Import diversification, specific product categories. Resource-based products



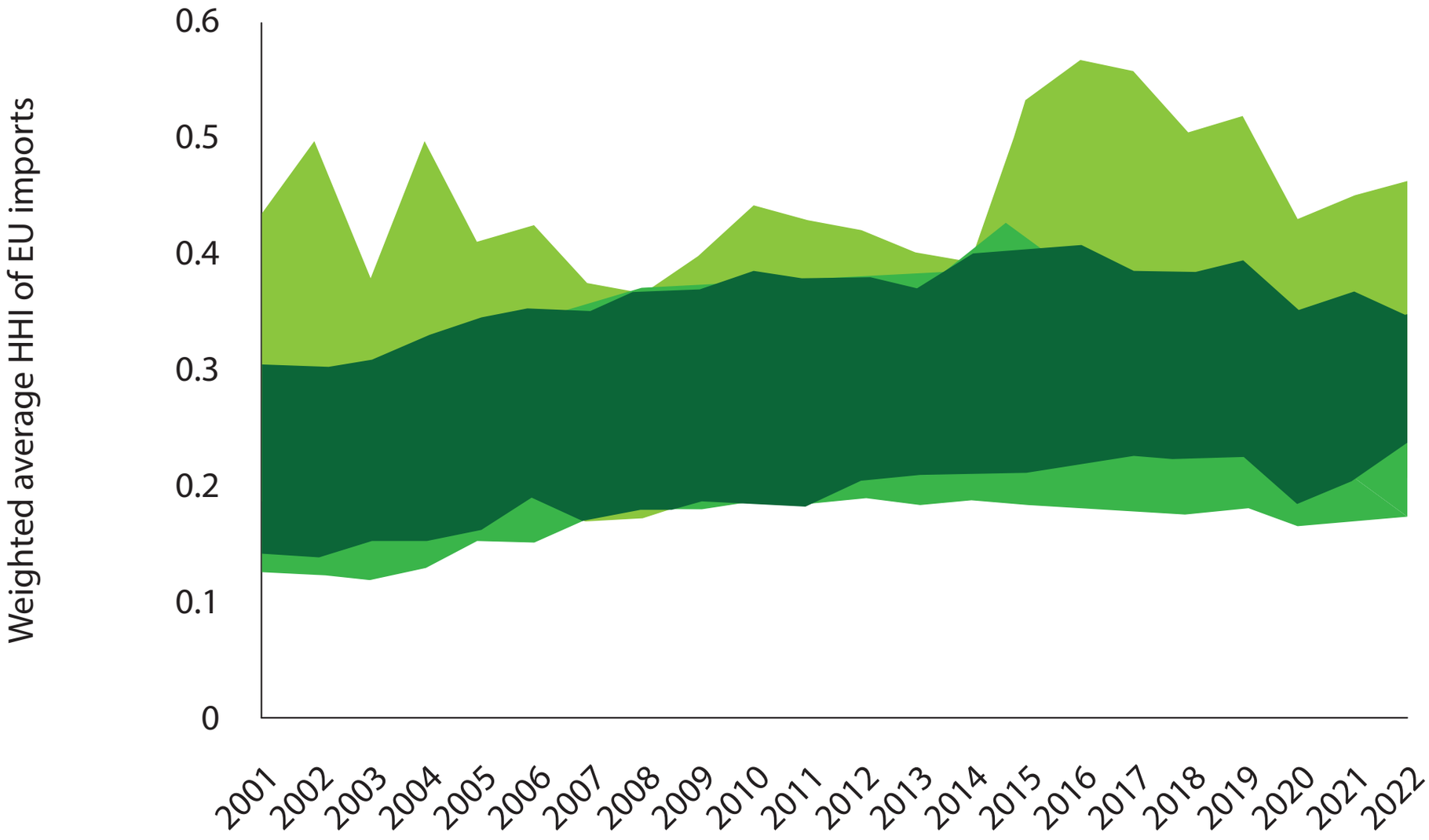
Note: Average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level and SITC sections, weighted by average import volume in respective product categories over the entire period. Dotted grey line represents the average for (1) resource-based and (2) manufacturing products.
Source: Bruegel based on Eurostat.

Figure 3b. Import diversification, specific product categories. Manufacturing-based products



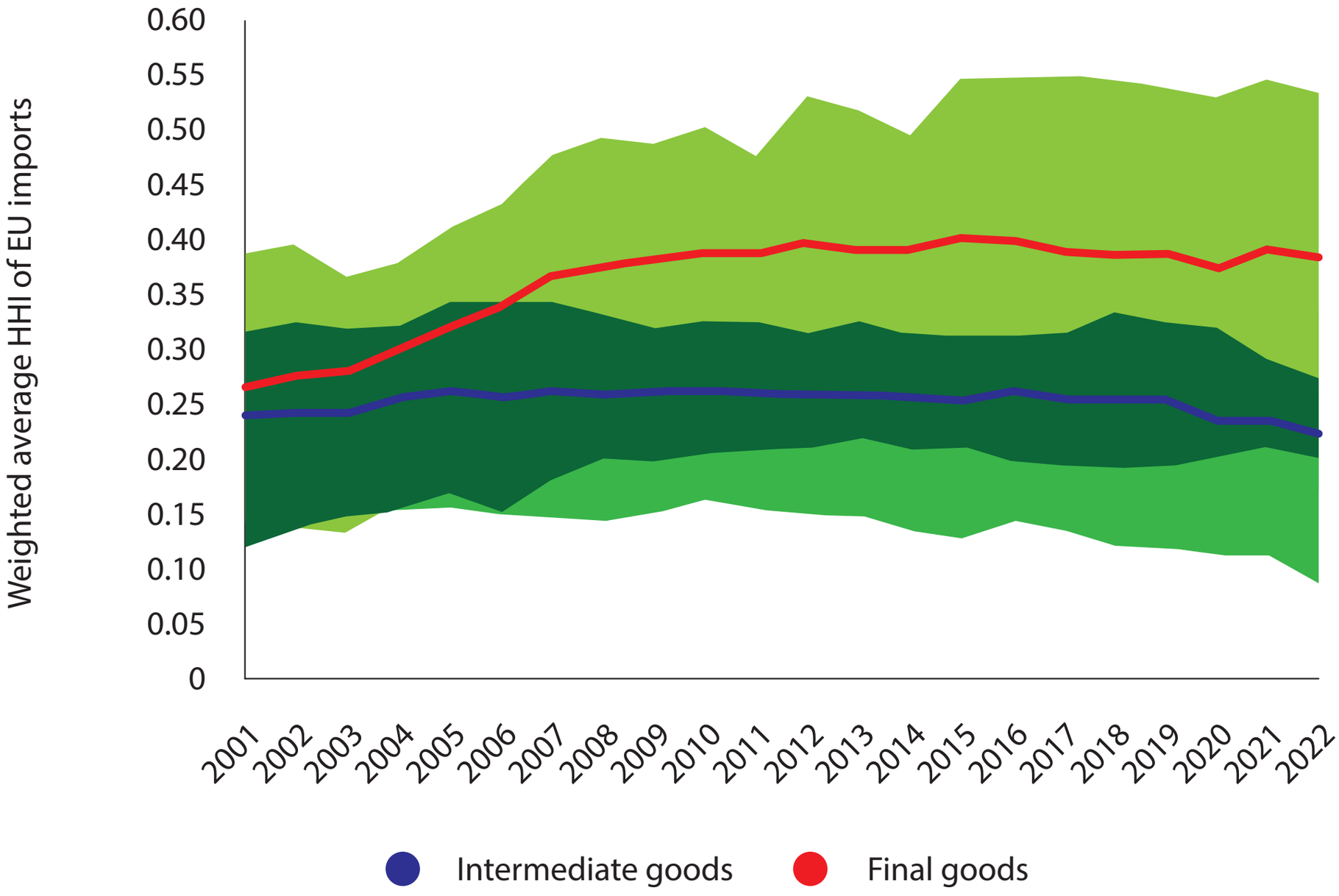
Note: Average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level and SITC sections, weighted by average import volume in respective product categories over the entire period. Dotted grey line represents the average for (1) resource-based and (2) manufacturing products.
Source: Bruegel based on Eurostat.

Figure 4a. Concentration of European imports by technology and end-use categories. High-tech vs. non-high-tech



Note: Solid lines show average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level and by technology (1) and end-use categories (2), weighted by average import volume in respective product categories over the entire period. Shaded areas represent respective interquartile ranges.
Source: Bruegel based on Eurostat.

Figure 4b. Concentration of European imports by technology and end-use categories. Intermediate vs. final goods



Note: Solid lines show average Herfindahl-Hirschman Index (HHI) of EU imports disaggregated at HS 6-digit level and by technology (1) and end-use categories (2), weighted by average import volume in respective product categories over the entire period. Shaded areas represent respective interquartile ranges.
Source: Bruegel based on Eurostat.

Figure 4b shows that import concentration has increased significantly for final goods, while it remained largely stable for intermediate goods, suggesting relative resilience of supply chains for the production of final goods in Europe.

In summary, Europe's imports are generally sourced from an increasingly concentrated set of exporters. China has played a driving role in this development. While this trend has reversed in some industries in recent years, manufacturing imports – especially high-tech imports – remain at a high level of concentration.

This development is driven by final rather than intermediate goods. Since high import concentration threatens resilience and worsens European terms of trade through higher mark-ups, tools that encourage greater import diversification should be employed to reverse the trend. ■

Lennard Welslau is a Research Assistant, and Georg Zachmann a Senior Fellow, at Bruegel

Annex
Our indicator of import concentration is taken from competition policy – the Herfindahl-Hirschman-Index (HHI). This is computed as the sum of squared market shares within a product category, and ranges from zero, signifying perfect competition (in the case of only 150 export countries the minimum is 0.007), to 1, meaning the EU buys a certain product from a single country. An HHI above 0.25 is considered in the economic literature as an indication of high concentration. The European Commission's analysis covered a limited range of products with an HHI higher than 0.4.

The diversity of intra-EU trade does not factor into our analysis. Likewise, product codes declared confidential by individual countries are excluded, as they would present 'artificial' categories for the respective countries and likely bias the results.

The 6,887 products we analysed are at HS 6-digit level. Products categories are based on the SITC and rely on Eurostat conversion tables. End-use categories are based on OECD conversion tables.

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New EU fiscal rules and governance challenges

Guido Lorenzoni, Francesco Giavazzi, Veronica Guerrieri and Leonardo D'Amico argue for a new system of fiscal rules that goes in the direction of a political and fiscal union

In November 2022 the European Commission presented an ambitious plan to overhaul the existing economic governance framework for the EU which includes radical innovations both in the way in which national fiscal plans are formulated and in the governance structure that supports them (for other comments on the proposal, see for example Buti *et al* 2022 and Wyplosz 2022).

This column argues that while the Commission is right to look at NextGenerationEU as a positive model for economic cooperation, a new system of fiscal rules that goes in this direction requires us to think boldly about further steps in the direction of a political and fiscal union.

The existing system of numerical rules is essentially scrapped. It is replaced by a system in which countries make medium-term plans that are assessed using debt sustainability analysis, and in which the single operational objective to achieve debt stability is the path of net primary expenditure (ie. expenditure excluding interest and unemployment benefits).

From the point of view of macroeconomic stabilisation, this is a welcome innovation. An approach based on medium-term plans and on an expenditure rule tends to deliver adjustment paths that are less sensitive to whether the economy is in a boom or a recession.

The adjustment paths are also potentially more responsive to the quality of spending, as the proposal includes the possibility for member states to obtain longer adjustment periods if they make reform and investment plans conducive to long-term growth.

In other words, the approach in the proposal leaves more room to tailor fiscal adjustment to the circumstances of a country, not only the in terms of its cyclical conditions, but also in terms of policy choices that affect future growth[1].

The Commission is clearly influenced in its thinking by the recent experience of the NextGenerationEU recovery plans, as a model of successful economic cooperation in the EU. This influence is visible in the design of the process that produces the four-year plans at the core of the new system. And it's visible in the strong emphasis on investment and reforms.

We believe the Commission is right in looking at NGEU as a positive model for economic cooperation. At the same time, a new system of fiscal rules that goes in this direction requires us to think boldly about further steps in the direction of a political and fiscal union

It is useful to contrast the Stability and Growth Pact (SGP) with NextGenerationEU (NGEU) as different models of joint economic governance. The SGP essentially leaves all strategic economic choices to member states and only imposes on them a uniform set of rules, to ensure that these choices are consistent with a common objective of monetary/financial stability.

NGEU, on the other hand, is strongly driven by the joint definition of common goals (green transition, digitalisation, reducing inequality), combined with considerable discretion in the formulation of national plans and in adapting them to the institutional reality of each member state. The models are also very different in terms of enforcement.

The corrective arm of the SGP has mostly worked through moral suasion. Fines are in principle part of the enforcement mechanism but have never been applied. NGEU, on the other hand, has the advantage that non-compliance with the commitments made in the national plans can be simply punished by suspending financing.

So far in the NGEU experience, this has worked as a credible threat. For example, Italy – the largest beneficiary of NGEU funds – has more than once made changes to proposed legislation to comply with the Commission's requests.

Consider two examples from the Italian experience. Italian teachers are traditionally opposed to individual performance evaluations, and career advancement in the Italian school system only depends on seniority. The Commission, as part of the reform package attached to NGEU – which includes large spending programmes destined to schools – asked that the careers of Italian teachers be based more on evaluations. This has been a point of tension between Italy and the Commission, and it was only solved when Italy accepted to introduce teachers' evaluations.

Another example is in the area of public procurement. Italian municipalities have often created in-house service companies in order to avoid pro-competition EU regulations that require outside services to be tendered. This practice has been severely limited to comply with NGEU requests.

The open question is how to import the successful features of NGEU into a renewed fiscal framework. Overall, we agree that NGEU shows that the Commission and member states can cooperate in the joint design of economic policies, even when that involves a considerable level of detail.

Such cooperation so far has appeared to be more productive than negotiations on the formal compliance with numerical SGP rules we have seen in the past. However, there are important design differences between NGEU and fiscal rules, which in our view raise two critical challenges.

First, NextGenerationEU has the big advantage of starting from well-defined EU-level strategic goals. The negotiated national plans are then designed to pursue those common goals.

In the realm of fiscal rules, this combination of EU goals and national plans is not there. In particular, the definition of the strategic goals of national fiscal policy naturally remains with national governments.

However, once we make the paths for primary spending potentially a function of multi-year commitments on investment and reforms, this effectively gives the Commission more power in important national decisions.

We don’t see this additional power necessarily as a bad thing, but it opens the risk of making the Commission the scapegoat of national political parties who might want to deviate from pre-existing plans, either negotiated by them or, more likely, by a previous government.

Such parties may use the excuse, already used in the past, that the old plans come from negotiations with the Commission, a technocratic non-elected body. Since this argument was used prominently even under numerical rules, enshrined in treaties ratified by national parliaments, it is even more likely that it will be used under this new model.

This would put the Commission in a difficult position, making it the target of political animosity and possibly dampening demands for further European integration.

It is possible that the process of approval of the multi-year plans could be designed to reduce these risks. In particular, as in a recent IMF proposal (Arnold *et al* 2022), more space could be given to National Fiscal Councils, thus keeping within member states the technical evaluation of the effect of reforms and investment plans[2].

It is also possible that giving more space to the European Parliament in the process of approval could give it stronger democratic legitimacy.

The second challenge has to do with enforcement. As just pointed out, it is easier to support a system of rewards in which funds coming from the EU centre are used to finance a member state's project, and this financing can be suspended.

On a pure economic level, what counts is the net value of the transfers implicit in the combination of contributions from member states to the EU and of financing from the EU budget back to member states. However, from both a legal and political perspective, the imposition of fines is different from the suspension of financing, and the latter seems a more credible threat to support multi-year commitments by member states.

The new system of rules could be integrated in programmes like NGEU, and payments can be made conditional on member states being in good standing with the new rules. The Commission's proposal explicitly mentions this possibility[3].

However, given that NGEU is a temporary programme, this conditionality cannot be a structural feature on which to rely in the long run. Creating a more permanent central fiscal capacity for the EU would have the added benefit of strengthening the enforcement of fiscal rules[4].

Summing up, we believe the Commission is right in looking at NGEU as a positive model for economic cooperation. At the same time, a new system of fiscal rules that goes in this direction requires us to think boldly about further steps in the direction of a political and fiscal union. ■

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Endnotes

1. These benefits are the reason why multi-year plans and an expenditure rule have been featured and discussed in many proposals, including those of the European Fiscal Board (2018, 2019, 2020) and D'Amico et al (2022).

2. Strengthening the role of national fiscal councils is also in Blanchard et al (2022).

3. The idea of using conditional financial support to facilitate commitment on reforms is not new and goes back to a proposal in European Commission (2012).

4. As centralised fiscal capacity expands in new areas, it is possible that some more essential forms of spending (eg. income protection programmes like SURE) may be less appropriate for this type of conditionality, relative to others (eg. spending for investment programs).

References

Arnold, N, R Balakrishnan, B Barkbu, H Davoodi, A Lagerborg, W Lam, P Medas, J Otten, L Rabier, C Roehler, A Shahmoradi, M Spector, S Weber and J Zettelmeyer (2022), "Reforming the EU Fiscal Framework: Strengthening the Fiscal Rules and Institutions", IMF Departmental Paper No 2022/014.

Blanchard, O, A Sapir and J Zettelmeyer (2022), "The European Commission's fiscal rules proposal: a bold plan with flaws that can be fixed", Bruegel.org,

Buti, M, J Friis and R Torre (2022) "How to make the EU fiscal framework fit for the challenges of this decade", VoxEU.org, 10 November.

D'Amico, L, F Giavazzi, V Guerrieri, G Lorenzoni, C-H Weymuller (2022), "Revising the European fiscal framework, part 1: Rules", VoxEU.org, 14 January.

European Commission (2012) "A blueprint for a deep and genuine economic and monetary union: Launching a European Debate"

European Fiscal Board (2018), Annual Report.

European Fiscal Board (2019), "Assessment of EU fiscal rules, with a focus on the six and two-pack legislation".

European Fiscal Board (2020), Annual Report.
Wyplosz, C (2022), "Reform of the Stability and Growth Pact: The Commission's proposal could be a missed opportunity", VoxEU.org, 17 November.

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A response to criticisms of proposals to overhaul the EU fiscal framework

The European Commission has proposed an important and ambitious overhaul of EU fiscal rules. Marco Buti, Jakob Friis and Roberta Torre respond to the criticism

The European Commission has proposed an important and ambitious overhaul of EU fiscal rules, which has attracted comments and critiques by economists and policymakers pertaining to the institutional, technical, and economic aspects of the Commission proposals. This column presents the responses to from three of the Commission's leading economists.

The European Commission communication for a reform of the EU economic governance framework aims to provide the basis for convergence across member states on the way forward (European Commission 2022, Buti *et al* 2022). It has drawn lots of attention. Most recognise that the Commission has put forward a far-reaching proposal aiming at finding a balance between different views in the complex debate on how the rules should be changed.

In particular, several elements have been considered as important improvements compared to the current rules, most notably (i) taking a medium-term perspective; (ii) increasing the differentiation across member states based on their debt sustainability; (iii) streamlining the fiscal indicators by focusing on observable net expenditure ceilings; and (iv) integrating better the need for fiscal adjustment with that of supporting investment and reforms (Bordignon 2022, Blanchard *et al* 2022).

Certain other features have been met with some criticism. In broad terms, the critical remarks pertain to the institutional aspects, the economic implications and the technical features of the Commission's approach. Given the attention that stakeholders are paying to the Commission orientations, it appears important to address those misgivings along the three areas just sketched out.

Institutional criticisms

A major criticism that has been emerging concerns the role played by the Commission in the design and assessment of the national fiscal-structural plans (Blanchard *et al* 2022, Lorenzoni *et al* 2023, Wyplosz 2022), which is

considered to lead to a bilateral approach that would undermine transparency and equal treatment. These authors suggest boosting the role of the independent national fiscal councils as a way to ensure national ownership.

There are two main elements to prevent 'bilateralism'. First, the Commission will operate within a common EU framework consisting in common requirements that the fiscal adjustment path of a member state should respect. It is important to stress that, while being common, these requirements would be differentiated on the basis of the member states' debt sustainability challenges, which is a major improvement compared to the current system where the requirements and efforts delivered did not sufficiently reflect the actual fiscal consolidation needs.

It has been encouraging to observe how the Commission orientations have triggered a renewed debate about reforming Europe's economic governance

Moreover, there would be common criteria to assess reforms and investment commitments. Second, the role of the Commission ends with its assessment, while the decision on whether to endorse the plans or not lies with the Council, which is a more direct role than the opinion and recommendations by the Council for Stability and Convergence Programmes in the current setting.

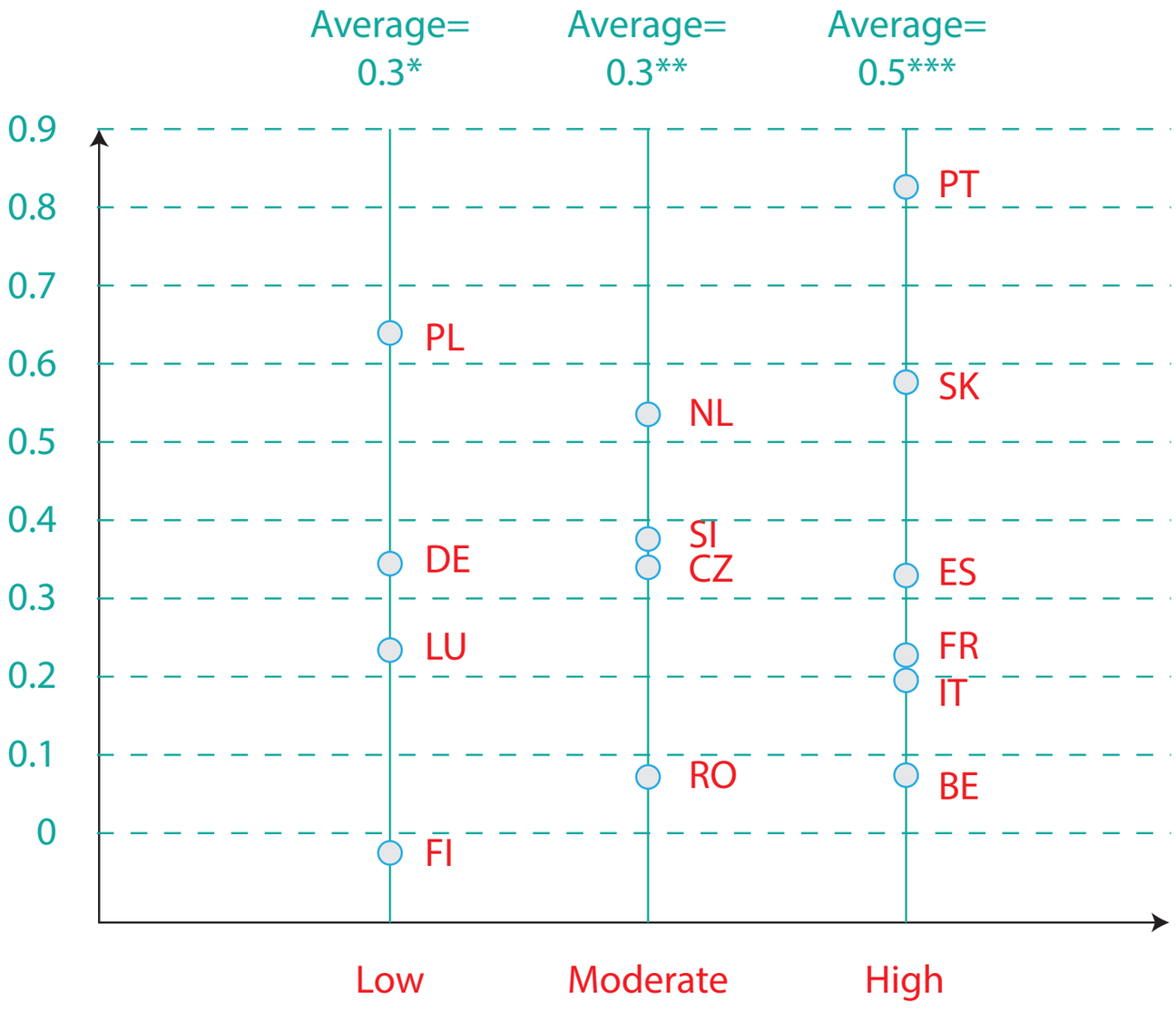
What the Commission proposes is therefore likely to stimulate the engagement of other member states and improve the peer review of member states' policy plans, including the underlying fiscal and structural policy issues that determine overall public debt sustainability challenges.

Gradual and sustained debt reduction is needed, and this will require more fiscal prudence going forward, but as experience shows fiscal consolidation efforts are in themselves not sufficient to ensure a low debt sustainability risk position (see Figure 1).

Still based on the previous criticism, the Commission could also be perceived as too intrusive when it comes to assessing whether reforms and investment are good enough to justify a more gradual adjustment path. This objection is misplaced because it is up to the member states to identify a set of reforms and investment that could underpin a more gradual adjustment.

In fact, the suggested approach takes inspiration from the existing structural reform and investment clauses, whereby it is for the member state to commit and provide solid evidence of their beneficial impact, but would make the criteria clearer: the set of reforms and investments should support growth and debt sustainability (in line with the country-specific recommendations as part of the EU Semester); should respond to common EU priorities; and should be sufficiently detailed, frontloaded, time-bound and verifiable.

Figure 1. Debt sustainability challenge and average past fiscal effort (2011-19), selected countries, simple average



*average of 'low challenges' MS (DK, DE, EE, IE, LV, LT, LU, AT, PL, FI, SE)

**average of 'moderate challenges' MS (BG, CZ, HR, CY, HU, MT, NL, RO, SI)

***average of 'high challenges' MS (BE, EL, ES, FR, IT, PT, SK)

Source: European Commission.

An objection pertains to the role of the reference paths to be put forward by the Commission at the outset of the process, which could be seen as undermining political ownership by member states of their fiscal adjustment strategies. The reference paths should not be seen as quantitative minimum requirements computed and imposed by the Commission. Nor they should be seen as providing a maximum fiscal effort.

They are, instead, a practical translation of the common requirements that is meant to provide concrete guidance to member states before they prepare and submit their own plans. To strengthen the common EU framework and the accountability of the Commission when assessing the plans, the methodology for determining these reference paths would be fully transparent and would be made public.

Finally, the Commission intends to strengthen the role of the independent national fiscal councils which were created via a directive on national fiscal frameworks. These institutions will play a greater role in assessing the assumptions underlying the plans, providing an assessment on the adequacy of the plans with respect to the debt sustainability and the country-specific medium-term goals, and monitoring compliance with the plans.

Technical criticisms

One recurrent objection refers to the complexity and lack of transparency that the use of debt sustainability analysis (DSA) would bring to the framework (Wyplosz 2022). The DSA is a well-known and well-documented methodology that is already widely used by international and national institutions to determine the risks associated to the debt trajectory (European Commission 2022, International Monetary Fund 2021).

Hence, it allows to focus not only on the debt levels but also on the dynamics and risks. In the Commission proposals, this toolkit is set to play a role only at the very beginning of the process, ie. in the identification of the

sustainability challenges and the design and assessment of the adjustment path that member states would put forward as part of their plan.

Once the plan is endorsed by the Council, the focus shifts to monitoring compliance with the endorsed path and assessing any deviations from it, over the four years when the plan is binding.

Another objection concerns the fiscal indicator used to set the fiscal path and monitor compliance, ie. primary expenditure net of discretionary revenue measures and cyclical unemployment spending. Some claim that the structural balance is simpler, well known, and, contrary to net expenditure ceilings, it does not impose any limits to the size of the government sector in the economy.

Such criticisms are misplaced. An indicator based on net primary expenditure is under the direct control of the government, while allowing revenues to fluctuate in line with cyclical conditions. Hence, it is not only more observable than the structural balance, but it is also more counter-cyclical.

Moreover, this indicator would be net of new discretionary revenue measures, so it is neutral vis à vis the public sector share in the economy: a government can decide to increase public spending as long as appropriate financing is found.

Economic criticisms

The economic criticisms mainly pertain to the fiscal rigidity implied by the reformed rules, the implications of not having changed the Treaty's reference values, the limited incentives to improve the quality of public finances, and the absence of a central fiscal capacity.

The Commission orientations envisage that member states' plans should be binding for at least four years, which could be considered too rigid by some. Not only can legislations terminate before their natural lifespan but economic conditions may change significantly, warranting an update of the plan.

The Commission proposal is justified by the need to avoid setting opportunistic behaviour by governments leading to backloading the adjustment effort. Frequent revisions would undermine the credibility of the plans as an anchor for prudent policies.

This is balanced by the possibility to reopen the plan in the event of objective circumstances that make compliance with the plan impossible. While any change of government will not be a reason per se to change the plan, new elections could be one such circumstance leading to a new medium-term plan to be proposed. It would have to undergo the same validation process.

The General Escape Clause (allowing suspension of the rules under severe shocks, as was done at the outset of the pandemic) would also continue to exist to cater for severe economic downturns, together with a country-specific clause for exceptional circumstances at country level.

Some have remarked that not having changed the 3% and 60% reference values for deficit and debt would impose a persistent deflationary bias on the economy. The Commission decided not to call into question the reference values enshrined in a Protocol annexed to the Treaty, which would have required cumbersome and politically controversial ratification procedures.

Moreover, the 3% reference value for the budget deficit has acquired a useful public visibility and 'magnetic power' (Buti and Gaspar 2021). In addition, the net expenditure path would be designed to allow public debt to

continue to decrease beyond the time frame of the fiscal-structural plans (four to seven years) without further fiscal restrictions.

Finally, some observers have criticised the absence of a central fiscal capacity in the Commission proposals, despite such reform having been put forward by international organisations and many economists during the public consultation on the economic governance review.

More specifically, while the revised framework takes inspiration from NextGenerationEU in allowing member states to put forward their own commitments, it does not provide for new common resources, which limits the incentives for member states to abide to their commitments (Bordignon 2022).

In the view of the authors, these observations are well taken: a well-designed central fiscal capacity could help rebalance the policy mix and, if focusing on supply-side oriented European public goods, could help tame the current inflation burst (Buti and Messori 2022).

However, one has to acknowledge that establishing a central fiscal capacity remains politically controversial, so putting it forward as part of the governance reform could have overcharged the boat and made it more difficult to find agreement.

Conclusion

It has been encouraging to observe how the Commission orientations have triggered a renewed debate about reforming Europe's economic governance. Recognising that institutional, technical, and economic issues are all part of striking a balance for the future governance framework, it is only fair that economists and policymakers raise critical questions. We hope to have answered to several of the criticisms put forward.

At the same time, it is now time to move from debate to decisions. We welcome that the ongoing discussions with member states generally recognise that the Commission orientations are a reasonable and coherent basis for making progress towards a common landing zone.

Swift agreement on revising the EU fiscal rules and other elements of the economic governance framework is a pressing priority. Considering the mounting challenges that the EU is facing, there is a need for strong policy coordination and effective surveillance. We should therefore reach a consensus on reform of the economic governance framework ahead of member states' budgetary processes for 2024.

This has also been recognised by the member states of the euro area in their call for swift progress on the review as a priority for enhancing economic policy coordination (Eurogroup 2022).

A thorough reform of the EU economic governance framework would require legislative change. Amending the underlying legislation would allow for clarification and simplification of the framework. It would provide a high degree of legal certainty for how a reformed framework would operate, with the involvement of the Council and the European Parliament. Based on the ongoing discussion, the Commission will consider tabling legislative proposals. ■

Marco Buti is the Head of Cabinet, Jakob Friis is Deputy Head of Cabinet, Roberta Torre is Member of Cabinet of Paolo Gentiloni, Commissioner for Economy European Commission

References

Blanchard, O, A Sapir and J Zettelmeyer (2022), "The European Commission's fiscal rules proposal: a bold plan with flaws that can be fixed", Bruegel Blog post, 30 November.

Bordignon, M (2022), "Europa: ecco le nuove regole fiscali", LaVoce.info, 15 November.

Buti, M and V Gaspar (2021), "Maastricht values", VoxEU.org, 8 July.

Buti, M, J Friis and R Torre (2022), "How to make the EU fiscal framework fit for the challenges of this decade", VoxEU.org, 10 November.

Buti, M and M Messori (2022), "A central fiscal capacity to tackle stagflation", VoxEU.org, 3 October.

Eurogroup (2022) "Eurogroup statement on draft budgetary plans for 2023", 5 December.

European Commission (2022) "Fiscal Sustainability Report 2021", Institutional Paper 171, 25 April.

European Commission (2022) "Communication on orientations for a reform of the EU economic governance framework", COM(2022) 583 final.

International Monetary Fund (2021) "Review of The Debt Sustainability Framework For Market Access Countries", Policy Paper No. 2021/003, 3 February.

Lorenzoni, G, F Giavazzi, V Guerreri and L D'Amico (2023), "New EU fiscal rules and governance challenges", VoxEU.org, 2 January.

Wyplosz, C (2022) "Reform of the Stability and Growth Pact: The Commission's proposal could be a missed opportunity", VoxEU.org, 17 November.

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Achieving a full banking and capital markets union

Don’t look only to Brussels to increase the supply of safe assets in the European Union, Francesco Papadia and Heliodoro Temprano Arroyo argue

Executive summary

A sufficient supply of safe assets denominated in euros is critical if the European Union is to achieve full banking and capital markets union while fostering the euro's international role.

The European debate on developing the supply of safe assets has so far focused on the possible creation of a common safe asset. This has tended to underplay the potential contribution of sovereign assets.

Expanding the supply of national safe assets, notably through the gradual implementation of fiscal and growth-oriented structural policies in euro area countries, leading to upgrading of their sovereign ratings, provides a promising, and perhaps more feasible, option.

An upgrade to triple A of those euro area countries that are currently rated double A could produce substantially more safe assets than most common safe asset proposals, including those based on the development of 'synthetic' safe assets.

There has been a remarkable increase in the share of supranational assets in the stock of euro-based safe assets since 2008, reflecting downgrades in sovereign ratings and the EU's financial responses to the euro area crisis and the pandemic. However, safe assets in euro remain dominated by those issued by euro area governments.

Although common safe assets have certain advantages over national safe assets, reflecting their built-in risk diversification properties, there is currently not much political appetite for such proposals. Meanwhile, sovereign safe assets already offer many of the advantages of common safe assets.

Sound fiscal policies and growth-stimulating reforms, which are in any case desirable, should be implemented to improve the credit ratings of euro area sovereigns. This might not be politically feasible in the short-term, given the difficult economic environment currently faced by the EU, but it should be a key component of the EU's medium-term safe asset strategy.

Should the political consensus be found to create a common safe asset, such an asset could be incorporated into the euro area's existing safe asset system, reinforcing its positive effects.

Substantial progress could be made in addressing the doom loop if the supply of euro area sovereign safe assets was boosted

1 Introduction

Europe's Economic and Monetary Union (EMU) is still in development, meaning it is not perfect yet. One important issue on which further work is needed is ensuring an adequate supply of safe financial assets denominated in euros. This is critical for three important undertakings: completing the banking union, furthering the capital markets union, and strengthening the international role of the euro.

The European debate on developing the supply of safe assets, eg. of high credit-quality bonds (typically those enjoying a triple A or just below credit rating), has so far focused on the possible creation of a new common safe asset. This focus has tended to underplay the potential contribution of sovereign safe assets[1].

We argue that expanding the supply of national safe assets, notably through the gradual implementation of fiscal and growth-oriented structural policies leading to the upgrade of euro area sovereign ratings, provides a promising and perhaps more feasible avenue to increase the supply of European safe assets.

We show, in particular, how upgrading to triple A those EU countries that are currently rated double A could produce substantially more safe assets than most proposals aimed at creating a new a European common safe asset, including those based on the development of 'synthetic' safe assets.

In the current European and global economic context, with debt ratios at historically high levels, interest rates rising sharply and economies drifting towards recession or stagnation, this might sound like wishful thinking. But we argue that there is a realistic path for many countries currently rated double A to reach triple A status over the medium term, if appropriate strategies are put in place.

We discuss first why an adequate supply of safe assets is critical for completing EMU. We then quantify the current supply of euro-denominated safe assets. This quantification distinguishes between safe assets issued by euro area countries and those issued by EU supranational institutions.

We then outline a possible strategy to increase the supply of safe assets in the EU, focusing on the relative contributions that national and supranational/common assets could make, while acknowledging that the two are not perfect substitutes, even when they share the same creditworthiness.

2 An unfinished monetary union: the case of safe assets

The EU's banking union process has resulted so far in the move of supervision and the partial consolidation of resolution from the national to the European level.

However, together with the limited advances made on achieving a common framework guaranteeing bank deposits, the so-called bank-sovereign 'doom loop' still stands in the way of a complete banking union.

Several regulatory proposals have been put forward to deal with the doom loop by reducing the excessive exposure of euro area banks to domestic government debt, but banks still remain heavily biased towards their home sovereigns, thus creating a risk for the whole euro area.

Some proposals are price-based while others are quantity-based (eg. based on exposure limits). Some aim at limiting concentration in a single sovereign; others at reducing credit risk[2]. But, as highlighted by Alogoskoufis and Langfield (2017), these reform proposals may not, in all cases, tackle both concentration and credit risks.

Attempts to reduce concentration might actually increase overall risk, in effect replacing the domestic doom-loop problem by another type of financial instability risk, namely international contagion risk.

Addressing these problems has been one of the main motivations behind proposals to create a European common safe asset. Some of the most recent proposals, notably those of Brunnermeier *et al* (2011 and 2017) and ESRB (2018), which led to the European Commission's sovereign bond-backed securities (SBBS) proposal (European Commission, 2018)[3], have focused on the creation of a synthetic safe asset.

Other common safe-asset proposals have taken different approaches. However, there has been limited political appetite so far for these types of proposal and questions have been raised about their implementation (Claeys, 2018).

While the creation of a common safe asset might provide a first-best solution, substantial progress could already be made in addressing the doom loop if the supply of euro area sovereign safe assets was boosted. This could be achieved by pursuing sound policies conducive to the upgrade to triple A of euro area governments that are already close to that rating category.

If this were accompanied by a more general improvement of ratings among countries that are still far from triple A, the risk of international contagion and sudden stops could also be substantially mitigated.

A second dimension of EMU, where an increased supply of safe assets could play a catalytic role, is the capital markets union, a project underway since 2014. This initiative was partly a response to the euro area crisis, which led to a partial reversal of the crossborder integration that had been achieved in the previous decade.

Some progress has been made since then, but the very fact that the European Commission felt the need to relaunch the process in September 2020 and again in February 2021 shows that a genuine capital markets union still has not been attained.

Indeed, the Commission recognised in its 2020 action plan that *"Europe has for decades struggled to make its capital markets work as one, and to a large degree still has 27 capital markets, some fairly large, and quite a number rather small"* (European Commission, 2020).

The European capital market lags significantly behind that of the United States, both as a share of the total financial system and in terms of indicators of depth, liquidity and efficiency. The United States has a developed securities market that also funds activities that are typically not well served by banks, including innovative enterprises and risky long-term investments.

Compared to the US capital market, another glaring missing element in the euro area has been the lack of an adequate supply of safe assets (Lanoo and Thomadakis, 2019). Treasuries remain, by contrast, the backbone of the US financial market, providing an extremely liquid security, the basis for pricing assets all along the yield curve and a reliable collateral.

A market as sophisticated, liquid and efficient as the one for US government securities remains a distant prospect in Europe. Still, increasing the supply of safe assets denominated in euro could promote financial integration and risk-sharing within the euro area, thus helping to further correct the reversal of integration triggered by the euro area sovereign debt crisis, and support the development of deeper and more liquid security markets in the euro area.

The limited supply of safe assets from EU issuers has negative consequences also beyond EU borders, as it has aggravated the shortage of such assets at global level[4]. The euro accounts for a much lower share of the global supply of triple A assets (both public and private) than the dollar (Figure 1).

More significantly, most of the decline in the global stock of safe assets witnessed since the global financial crisis has been explained by the decline in euro-denominated assets, mainly reflecting the credit downgrades suffered by a number of euro area sovereigns (Temprano Arroyo, 2022, pp. 16-17).

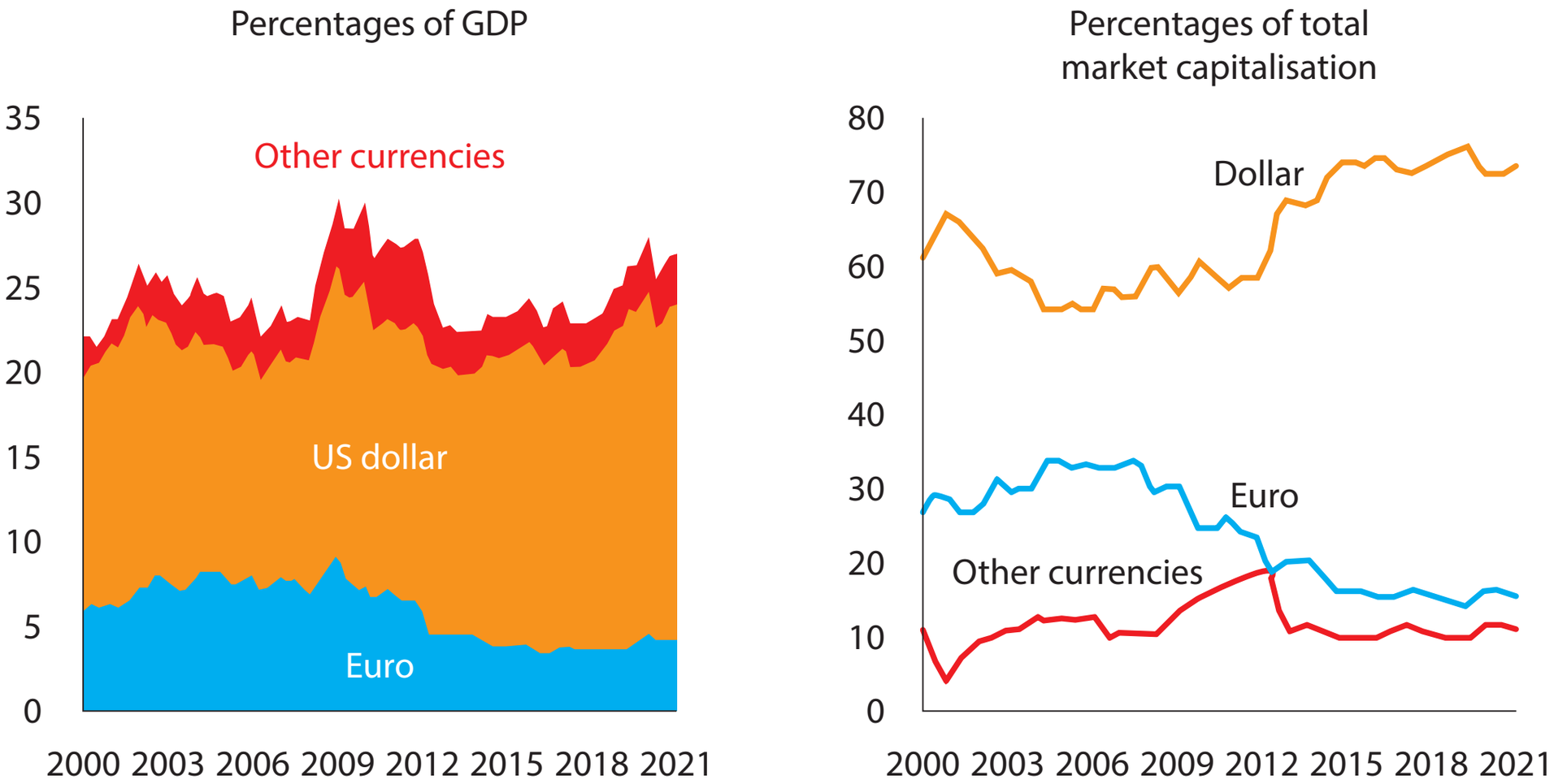
Because the world suffers from such a shortage of safe assets, if the EU managed to supply part of the world's unsatisfied demand for such assets, it could both increase the international attractiveness of the euro and help alleviate the global safe-asset problem.

Since 2008, the attitude of EU authorities towards the international role of the euro has changed from a neutral policy, which was still influenced by the cautious attitude of the Bundesbank (Papadia and Efstathiou, 2018), to one that actively promotes this role.

Of course, the international use of a currency depends on a host of factors, but there is significant consensus that the lack of an adequate supply of euro-denominated safe assets is a key constraint on its international development.

Again, the comparison with the contribution of US safe government securities to the dollar's global role is telling. The increase in safe assets issued at EU level in response to the pandemic, in particular under the NextGenerationEU (NGEU) instrument, goes in the right direction but is not quantitatively sufficient (nor sufficiently durable in time)

Figure 1. Market capitalisation of AAA assets



Note: The Bloomberg Global Aggregate – AAA Index includes a series of triple A fixed-income securities issued by treasuries, other government-relating institutions and corporations. Quarterly data.
Source: Bruegel based on Bloomberg, IMF.

to mark a decisive step in the euro's international status (Claeys and Wolff, 2020; Temprano Arroyo, 2022). A more comprehensive strategy, including the deepening of EMU, is needed.

3 The sources of safe assets: a quantitative assessment

Euro-denominated public safe assets in the EU can be issued by euro area governments and by EU supranational institutions, including the European Commission, the European Investment Bank (EIB) and the European Stability Mechanism (ESM), which has now also integrated the European Financial Stability Facility (EFSF).

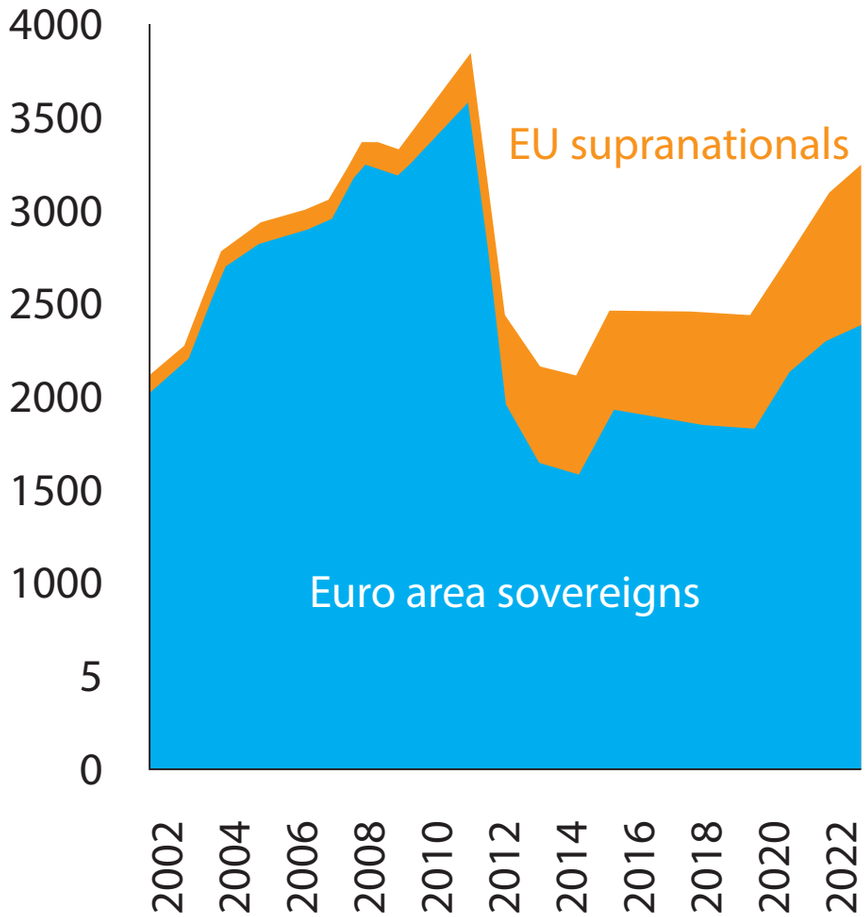
While the supply of euro-denominated safe assets remains dominated by those issued by euro area governments, there has been a remarkable trend towards an increase in the share of supranational assets in the outstanding stock of euro-based public triple A assets.

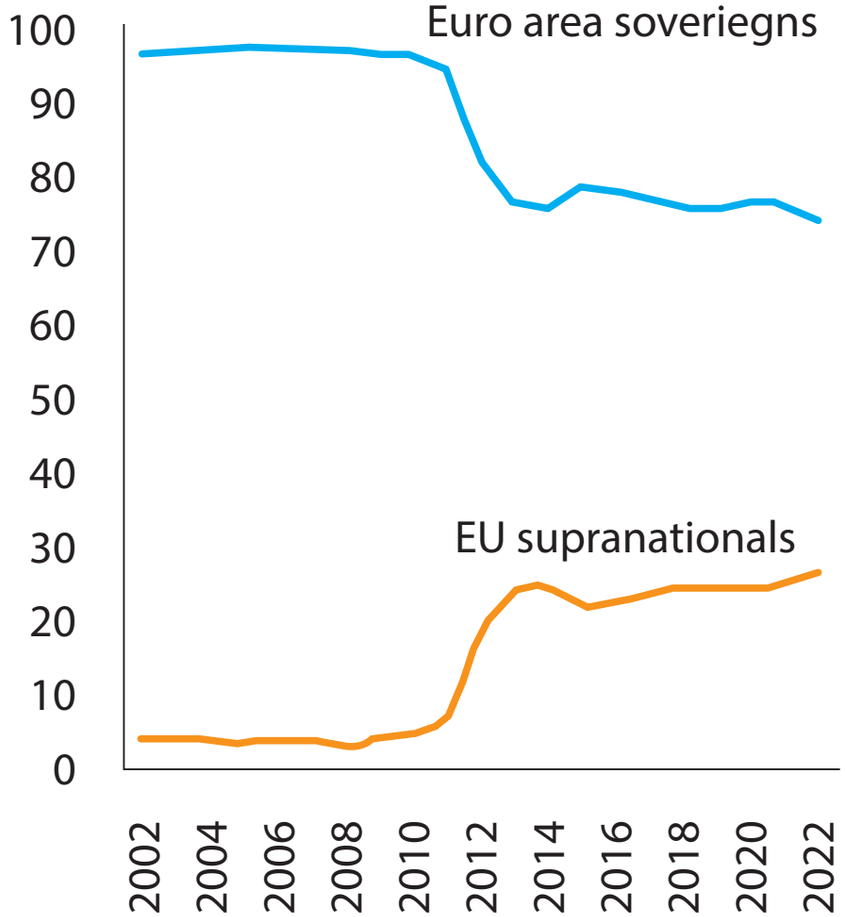
The share of supranational bonds in the stock of euro-denominated safe assets has gone up from only 3 percent in 2008 to 26 percent in August 2022, a phenomenal increase (Figure 2).

This reflects two separate developments. The main factor is that credit downgrades during the euro area crisis reduced the number of triple A-rated euro area treasuries from eight to only three: Germany, Luxembourg and the Netherlands (Table 1). Figure 3 illustrates the overwhelming effect this has had on the supply of sovereign safe securities in euro.

Second, the issuance of supranational bonds increased sharply in response to the euro area crisis, as the Commission and the ESM put in place emergency packages funded by the newly created financial stabilisation facilities, and as the EIB accelerated its international borrowing.

Figure 2. Sovereign versus supranational safe assets in euro, 2002-2022





Note: For 2022, the chart shows: end of August data for supranational assets; and for sovereign assets, projections for end-2022 based on the European Commission medium-term debt projections (European Commission, 2022a).
Source: Bruegel based on European Commission, ESM, EIB.

There has also been, though at a much lower level, a significant increase in the issuance of bonds to fund Macro-Financial Assistance (MFA) operations outside the EU, in particular to support Ukraine after the Russian annexation of Crimea in 2014, and Jordan and Tunisia, following the Arab Spring.

Since 2020, supranational issuance has been boosted again by the EU's response to the COVID-19 pandemic, notably through the issuance of SURE (Support to Mitigate Unemployment Risks in an Emergency)[5] and NGEU bonds. These issuances have amounted to nearly €290 billion between October 2020 and August 2022, and could reach up to €906.9 billion by 2026.

There has also been historically high MFA lending in response to the pandemic and the war in Ukraine. These developments have more than compensated for the fact that, since 2015, there have been no new bail-out programmes under the EU's internal stabilisation facilities, reflecting the successful resolution of the euro area crisis.

Figure 4 shows the trend in the stock of supranational EU securities, most of which enjoy a triple A rating from the main international rating agencies and can therefore be considered safe assets. It shows a big jump in 2011-2013, coinciding with the euro area crisis, and again in 2020-2022, coinciding with the pandemic.

While the trends just described illustrate the potential importance of supranational institutions as a source of euro-denominated safe assets, they are also a reminder of the dominant influence of national issuance and, therefore, underline the huge scope for increasing the availability of high-quality assets in euro through the upgrade of sovereign ratings.

4 Policy options

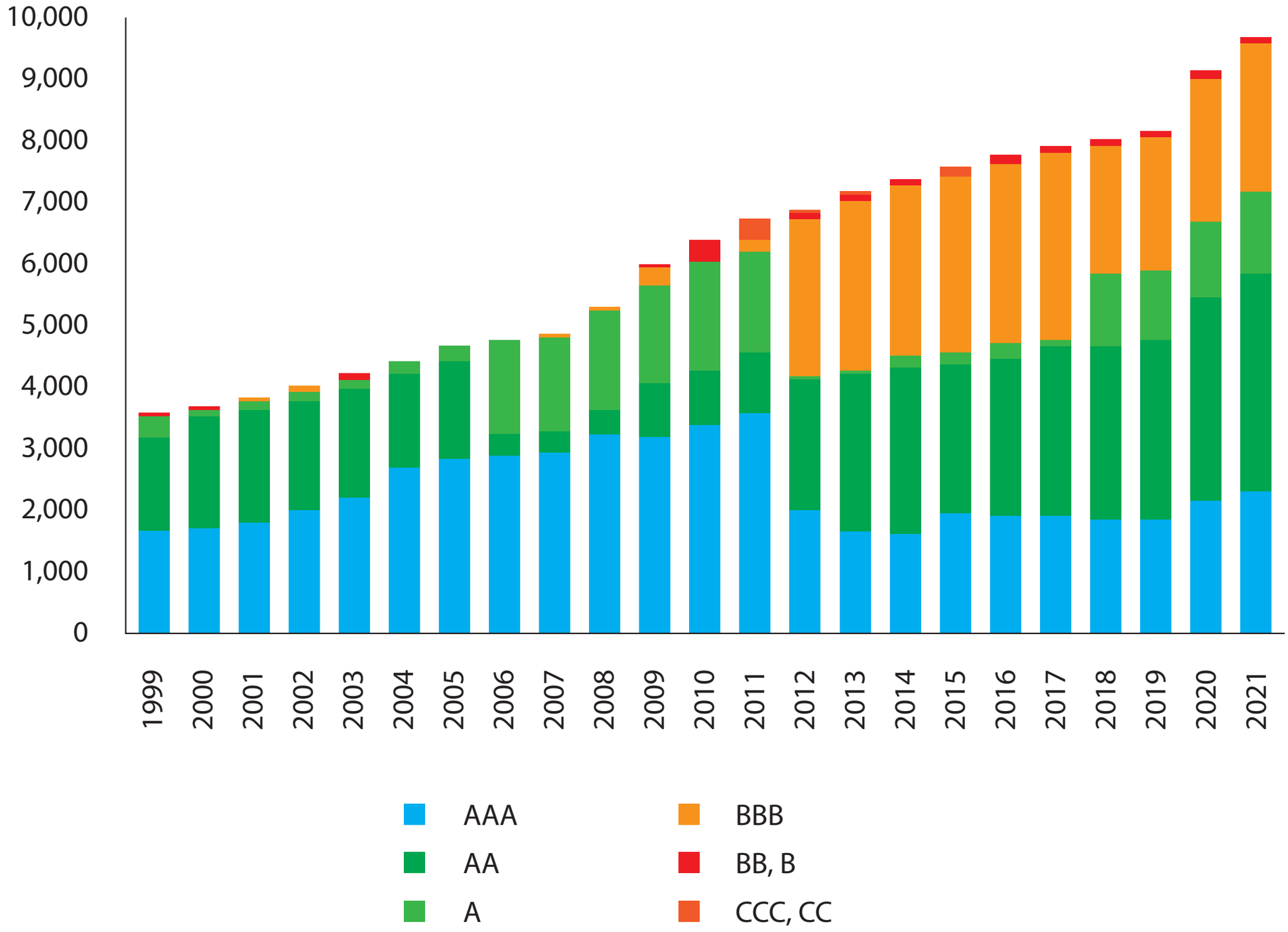
The supply of euro-denominated safe assets can be increased in three main ways[6]:

Table 1. Euro area sovereign credit ratings

	2005			2014			September 2022		
	S&P	Moody's	Fitch	S&P	Moody's	Fitch	S&P	Moody's	Fitch
Germany	AAA	Aaa	AAA	AAA	Aaa	AAA	AAA	Aaa	AAA
Luxembourg	AAA	Aaa	AAA	AAA	Aaa	AAA	AAA	Aaa	AAA
Netherlands	AAA	Aaa	AAA	AA+	Aaa	AAA	AAA	Aaa	AAA
Austria	AAA	Aaa	AAA	AA+	Aaa	AAA	AA+	Aa1	AA+
Finland	AAA	Aaa	AAA	AA+	Aaa	AAA	AA+	Aa1	AA+
France	AAA	Aaa	AAA	AA	Aa1	AA+	AA	Aa2	AA
Ireland	AAA	Aaa	AAA	A	Baa1	BBB+	AA-	A1	AA-
Spain	AAA	Aaa	AAA	BBB	Baa2	BBB+	A	Baa1	A-
Belgium	AA+	Aa1	AA	AA	Aa3	AA	AA	Aa3	AA-
Slovenia	AA-	Aa3	AA-	A-	Ba1	BBB+	AA-	A3	A
Italy	AA-	Aa2	AA	BBB-	Baa2	BBB+	BBB	Baa3	BBB
Portugal	AA-	Aa2	AA	BB	Ba1	BB+	BBB+	Baa2	BBB
Estonia	A	A1	A	AA-	A1	A+	AA-	A1	A
Slovakia	A	A2	A	A	A2	A+	A+	A2	A
Malta	A	A3	A	BBB+	A3	A	A-	A2	A+
Lithuania	A	A3	A	A-	Baa1	A-	A+	A2	A
Latvia	A-	A2	A-	A-	Baa1	A-	A+	A3	A-
Cyprus	A	A2	A+	B+	B3	B-	BBB	Ba1	BBB-
Greece	A	A1	A	B	Caa1	B	BB+	Ba3	BB

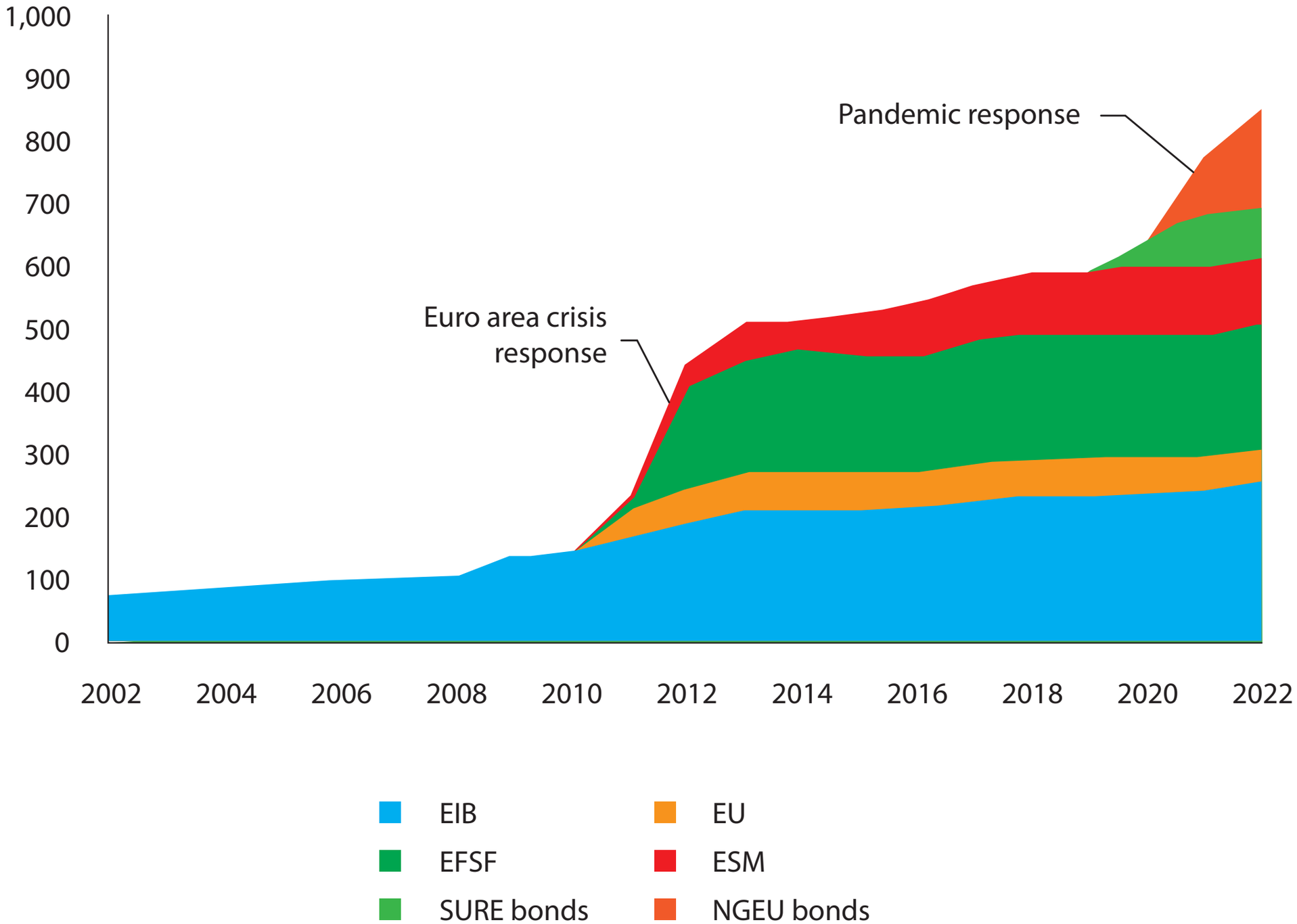
Source: Bruegel based on Standard & Poor's, Moody's, Fitch and Trading Economics.

Figure 3. Stock of euro area sovereign debt securities (€ billions)



Note: Includes securities issued by the current 19 euro area sovereigns.
Sources: Bruegel based on Eurostat, S&P and Trading Economics.

Figure 4. EU supranational debt denominated in euro (€ billions, end-of-year stocks)



Source: Bruegel based on European Commission, ESM, EIB.

- More issuance at EU level, including through the possible creation of a common safe asset;
- More issuance at national level from countries with the highest credit ratings;
- Credit upgrades for countries with sub-triple A ratings.

This section examines the potential contribution of each of these sources of safe assets.

4.1 More issuance at EU level

There are two different approaches to expanding the issuance of safe assets at EU or euro area level. The first and most obvious one is to boost bond issuance by existing EU supranational institutions and facilities, or to create new supranational facilities funded through international borrowing.

The second option brings us back to the academic and policy debate of the past decade on the creation of a European common safe asset. We look at each of these two approaches in turn.

Increased issuance by EU supranational institutions and facilities

The EU increased supranational issuance when it created the EFSF and ESM in response to the euro area crisis, and the SURE and NGEU instruments in reaction to the pandemic.

As noted in section 3, EU supranational borrowing has increased rapidly over the last 10 years and its share in the stock of total euro-denominated assets has risen markedly. The SURE and NGEU facilities, if fully used, could put into the market a volume of new safe assets comparable to those that could be created under some of the best-known common safe asset proposals (Temprano-Arroyo, 2022, pp. 27-29).

But with the euro area sovereign debt crisis over, there is not in the foreseeable future a clear need for new programmes funded under the EU's macroeconomic stabilisation facilities. And with the COVID-19 crisis seemingly under control in Europe, there is currently not much political inclination to make the SURE or the NGEU instruments permanent.

More fundamentally, the expansion of supranational borrowing must be backed by prudent national fiscal policies. All supranational facilities are, in one way or another, ultimately guaranteed by EU countries, requiring tight common control over national fiscal policies.

Without such control, a rapid expansion of supranational borrowing could result in the downgrade of the supranational entities managing those facilities. It is thus of paramount importance to ensure the creditworthiness and high-quality ratings of the sovereign guarantors behind these facilities.

A possible source of increased supranational issuance of safe bonds by the EU stems from the need to provide financial support to Ukraine, which faces huge macroeconomic stabilisation and reconstruction needs. The World Bank, the government of Ukraine and the European Commission (2022), in their needs assessment study published on 9 September 2022, estimated that the cost of the war in terms of reconstruction and recovery needs amounted, as of 1 June 2022, to $349 billion, or more than 1.6 times the GDP of Ukraine.

This estimate is probably on the low side as it does not take into account the impact of Russia's more recent strategy to redouble attacks on energy and other critical civilian infrastructure. But it helps illustrate the orders of magnitude involved.

In response, the Commission has proposed two unprecedented packages of MFA loans – of up to €9 billion and up to €18 billion – to help cover Ukraine's short-term funding needs in 2022 and 2023, respectively, the first of which has already been partly disbursed (European Commission, 2022a and 2022b).

The Commission has also proposed the creation of a new facility, to be called RebuildUkraine, to address Ukraine's longer-term reconstruction needs (European Commission, 2022a). While the details of this new facility remain to be spelled out, it could potentially lead to the issuance of a new type of supranational bonds in euro.

If one adds to this the expected continued issuance of MFA bonds in support of Ukraine and other neighbouring countries affected by the war, and increased bond issuance in euro by the EIB and the EBRD to fund the reconstruction of Ukraine, it is hard to escape the conclusion that addressing the consequences of the war is likely to lead, sooner or later, to a significant increase in EU supranational bond issuance.

However, such an increase in supranational issuance to support Ukraine is unlikely to remedy, on its own, the scarcity of euro-denominated safe assets. Although Ukraine's financing needs are very large in terms of its GDP, their potential implications for the issuance of EU supranational bonds should not be exaggerated.

Even if the EU covered as much as half of Ukraine's currently estimated reconstruction needs (or about €175 billion), this would only amount to a fraction of the maximum net issuance allowed under the NGEU and SURE programmes.

Only a larger EU financial initiative, perhaps aimed at dealing with the economic fallout of the energy crisis, or at ramping up EU defence expenditure, might require the issuance of bonds at an order of magnitude comparable to the NGEU facility, but such initiatives for now are not being discussed[7].

Creation of a 'European common safe asset'

Another approach to increasing the supply of safe assets at EU level would be the creation of a European common safe asset. The academic and policy debate around this intensified after the global crisis and, in particular, the euro area crisis, and was largely motivated, as noted, by the desire to break the doom loop between sovereigns and domestic banks, which had exacerbated the euro area sovereign debt crisis.

The debate, which resulted in a proliferation of plans, has moved over time from proposals involving some degree of debt mutualisation to proposals not requiring the provision of explicit debt guarantees[8].

In recent years, it has focused on the possible creation of a synthetic safe asset by either a European public debt agency or by the private sector under an appropriate regulatory framework.

These proposals, exemplified by the European Safe Bond (ESBies) proposal of Brunnermeier *et al* (2011 and 2017), and the related European Commission SBBS proposal, are based on the pooling by a public entity or by private financial intermediaries of a standardised diversified portfolio of European sovereign bonds and their subsequent tranching into securities of different seniority, with the most senior tranche (the 'ESBies') acting as a safe asset.

These and others, including Bénassy-Quéré *et al* (2018) and Algoskoufis and Langfield (2018), have advocated combining the introduction of a euro area wide safe asset with regulatory reform aimed at stimulating the diversification of bank's sovereign exposures.

But although the Commission's SBBS proposal was endorsed (although in a somewhat modified manner) by the European Parliament (European Parliament, 2019), the EU Council has never discussed it.

And although other safe asset proposals, including the so-called E-bond proposal (see, in particular, Giudice *et al* 2019) are arguably less sensitive to the criticisms that made SBBS unpopular (Claeys, 2018), there is for the time being, as noted, not much political interest in reactivating this debate.

Common safe asset proposals are, therefore, unlikely to provide for some time a realistic means of boosting the supply of euro-denominated safe assets.

4.2 Increased issuance by triple A euro area sovereigns

Triple A euro area countries could in theory provide a significant source of additional euro-denominated safe assets if their borrowing needs were to increase. Indeed, this is exactly what happened because of the national fiscal responses to the COVID-19 crisis.

Temprano Arroyo (2022), using the European Commission's medium-term debt projections, showed that triple-A rated countries will account for more than one third of the cumulative increase in the nominal value of euro area public debt by 2032, compared to pre-pandemic projections.

This is explained by the large size of the German economy, which accounts for about 80 percent of the euro area's triple A sovereign debt and 20 percent of all euro area sovereign debt, and also by the fact that Germany and, to a lesser extent, the Netherlands were among the euro area countries that made stronger counter-cyclical use of fiscal policy during the pandemic, which contributed to a more pronounced deterioration in their fiscal balances and debt dynamics.

By 2026, the last year in which net debt can be issued under the NGEU instrument, the supply of debt assets by the three triple-A euro area governments is expected to be about €1.1 trillion larger than previously projected.

This is somewhat larger than the NGEU and SURE instruments combined, which illustrates the important potential contribution of triple-A countries to efforts to boost the supply of euro area safe assets.

That said, it would obviously be a misguided policy prescription to recommend that triple-A countries increase their deficits and debt issuance simply to boost the supply of euro area safe assets. Their fiscal soundness is a key factor behind their triple-A status and, more generally, behind investor confidence in the stability of the euro area and the strength of the EMU architecture.

Fiscal expansion in top-rated countries could also threaten the triple-A ratings of EU supranational institutions because of the explicit and implicit guarantees these countries provide.

Moreover, excessive reliance on the safe assets of a few euro area countries would create an undesirable concentration of bank exposure on a limited number of sovereigns.

The right way to expand the supply of sovereign safe assets in the euro area is not a shift to fiscal profligacy by the so far fiscally prudent countries but, rather, fiscal consolidation and growth-oriented supply policies by sub-triple A governments. To this third and key potential source of safe assets we now turn.

4.3 Credit upgrades of sub-triple A euro area sovereigns

The most promising approach for expanding the supply of euro-denominated safe assets, particularly for as long as the pre-conditions to develop a common safe asset are not satisfied, is to implement a strategy leading to the upgrade to triple A of countries that are currently immediately below that rating category.

These rating upgrades would require ambitious fiscal-consolidation policies over the medium term, plus structural reform strategies supporting faster GDP growth. Faster growth would contribute to better debt dynamics, both by helping to generate fiscal revenues and by bringing down debt-to-GDP ratios through the denominator effect.

The potential effect of credit upgrades on the supply of safe assets is huge. Figure 5 displays several credit-rating scenarios to illustrate this point, using Commission medium-term debt projections for euro area countries (European Commission, 2022c)[9]. The bottom of the chart shows the baseline scenario, in which only Germany, Luxembourg and the Netherlands continue to enjoy the triple-A credit standing.

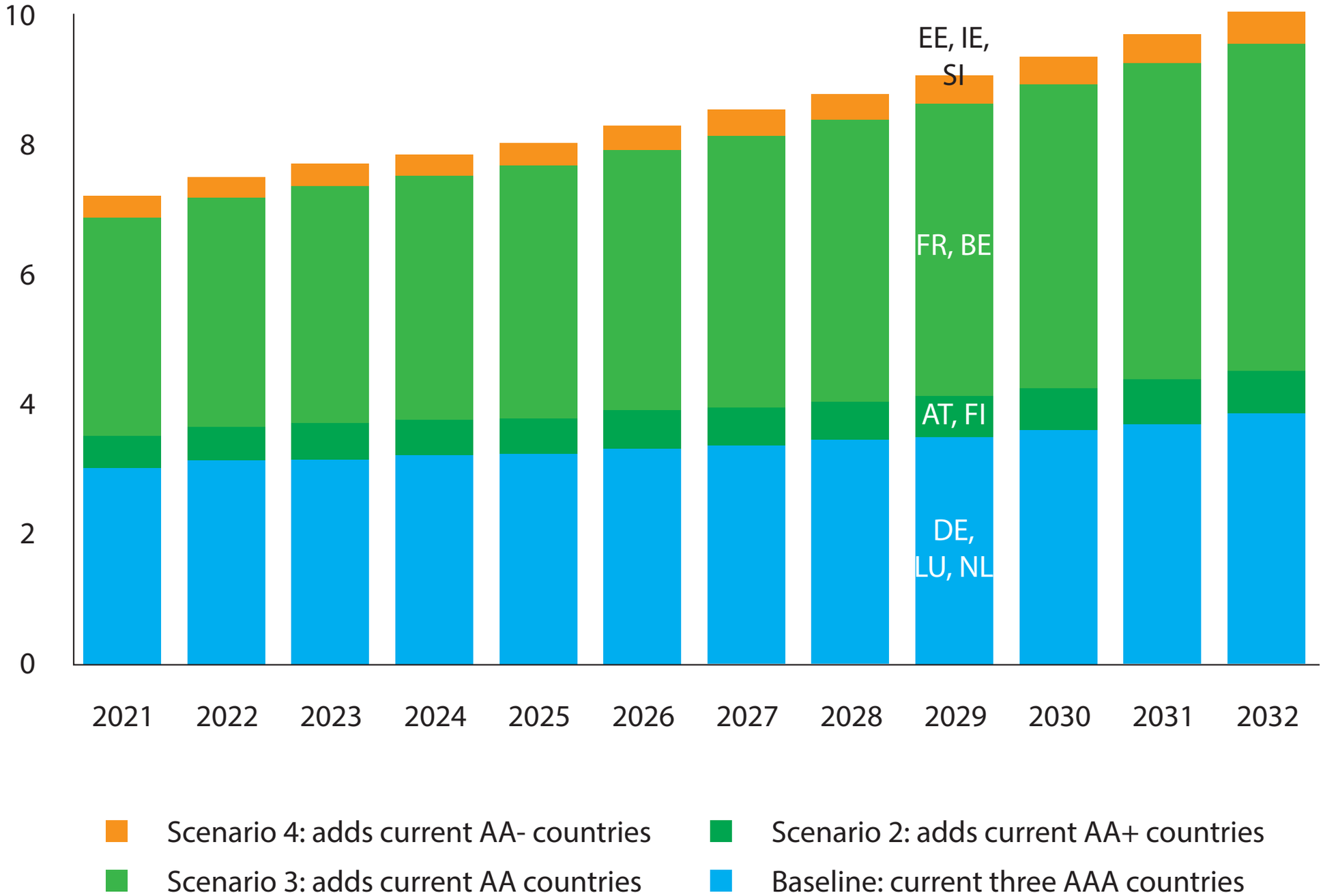
Scenario 2 shows what would happen if Austria and Finland, the two countries that currently have AA+ (or Aa1) ratings, ie. the credit rating that is only one notch below triple A, regained triple-A status. For these two countries, an upgrade to triple A seems within reach.

Scenario 3 further adds Belgium and France, currently rated AA by at least one of the three main rating agencies, to the group of triple-A countries.

Finally, scenario 4 assumes that Estonia, Ireland and Slovenia, currently rated AA- by at least on agency manage to get upgraded to triple A. Given the challenging economic and debt situation currently experienced by euro area countries, none of these upgrades seems easy. But they all look feasible over the foreseeable future, provided the appropriate policies are put in place.

In that respect, it should be recalled that four of these seven countries (Austria, Finland, France and Ireland) already enjoyed triple-A status before the global financial crisis.

Figure 5. Supply of euro area sovereign safe assets under different rating scenarios (€ trillions; end-of-year)



Sources: Bruegel based on European Commission medium-term debt projections (European Commission, 2022c), Standard & Poor's.

Under the most plausible of the scenarios, entailing upgrades of Austria and Finland from AA+ to AAA, safe assets would be €0.6 trillion higher than the baseline by 2026, the last year of net issuance under NGEU, and €0.7 trillion higher than the baseline by 2032.

An amount of €0.6 trillion would equal two thirds of the maximum net issuance allowed under NGEU. The addition of Belgium and France, two AA countries with very large debt stocks, to the triple-A category (scenario 3) would increase safe assets by an extra €4.1 trillion by 2026, and by an extra €5.1 trillion by 2032.

If all other double-A rated euro area countries were also upgraded to the triple-A group, safe assets would be €5 trillion higher by 2026 and €6.2 trillion higher by 2032, compared with the baseline. This is five and seven times larger, respectively, than the maximum issuance of bonds under the NGEU and SURE facilities combined.

If the five countries that are currently rated A+, A or A- by at least two of the main rating agencies, and have not been rated above that level by any of them, were to reach one day the triple-A level, it would inject an additional €2.3 trillion of euro-denominated safe assets by 2032, implying an overall increase of €8.5 trillion in the stock of safe assets compared to the baseline. However, this is a scenario that for now seems distant and improbable, and is not shown in Figure 5.

These potential increases in safe assets also fare well in comparison with those estimated by some of the best-known proposals for a new European common safe asset, which are summarised in Table 2.

These proposals entail an issuance volume of common safe assets, scaled up using the euro area's 2021 GDP, ranging between €0.7 trillion, for certain variants of the SBBS proposal, and €7.3 trillion, for the Blue Bonds proposal

Table 2. Estimated impact on the supply of safe assets of selected common safe asset proposals

		Volume of safe assets issued		
Proposal	Authors	% of GDP	€ trillions (based on 2021 GDP)	% of euro area public debt (2021)
Blue Bonds	Delpla and von Weizsäcker (2010)	60%	7.3	60%
Redemption Fund	German Council of Economic Experts (2011)	40%	4.9	40%
E-bonds	Giudice *et al* (2019)	15%-30%	1.8-3.7	15%-30%
E-bonds	Leandro and Zettelmeyer (2019)	19%-21%	2.3-2.5	19%-21%
SBBS	European Commission (2018)	13%	1.6	13%
SBBS	Leandro and Zettelmeyer (2019)	6%-21%	0.7-2.6	6%-21%

Note: Shares over GDP and over public debt coincide in 2021 because the euro area's debt-to-GDP ratio was exactly 100% in that year. In the European Commission's SBBS proposal, actual issuance depends on the instrument's attractiveness for the market. The table shows the estimate based on steady-state scenario considered in the documentation accompanying the proposal.
Source: Bruegel.

(Delpla and von Weizsäcker 2010), with most proposals yielding a volume of common safe assets within the €1.5 trillion to €3.7 trillion range.

Even the most cautious of the upgrade scenarios mentioned above would be close to the lower bound of this range, while other scenarios would expand the supply of euro-based safe assets well above the upper bound of that range.

The positive effects of an upgrade of some euro area countries to the triple-A level would be enhanced if it was accompanied by an improvement in the ratings of those that are still below the double A credit category (including Italy, Portugal and Spain), even if it is not realistic to assume that they can reach the triple-A notch in the foreseeable future.

Improved ratings among those countries would help reduce the risk that a regulatory reform aimed at decreasing the home bias in banks' portfolios has the unintended consequence of increasing overall credit risk and instability. It would also limit the risk of disruptions within the euro area government bond markets caused by sudden capital flights from vulnerable to safe countries.

Beyond this, the upgrade of sovereign ratings would also have positive spillovers on the quality and attractiveness for investors of the safe assets issued by supranational institutions, through the system of explicit or implicit guarantees from EU countries[10].

Although the potential impact of sovereign credit upgrades on the availability of safe assets is huge, the key question is whether they are realistic in current circumstances.

Fiscal consolidation and growth-promoting structural reforms are key tenets of the EU's economic policy strategy over the medium term, as imbedded in the European Semester process, with the Stability and Growth Pact at its core.

And the institutional framework to achieve those goals is expected to be strengthened by the ongoing review of the EU's economic governance framework[11].

But, it might not be realistic or even advisable to try to redouble fiscal consolidation to produce credit upgrades when euro area economies have been buffeted by the pandemic and the Ukraine war.

The combined impact of these two shocks on growth, inflation and interest rates has derailed previous debt-reduction trajectories, raising concerns about debt sustainability in several countries.

Trying to achieve short-term progress in improving credit ratings in this context would seem unrealistic. In fact, significant efforts might be required just to avoid a deterioration of ratings in some countries.

The analysis above highlights that sovereign credit upgrades have substantial potential to boost the supply of euro-denominated assets. How fast euro area countries can achieve those improvements in ratings is a different matter, and will undoubtedly have to take into account the circumstances they face.

Over the medium term, however, boosting the supply of national safe assets through policies supporting the upgrade of sovereign ratings should be a key part of a strategy to expand the supply of safe assets, and it could actually prove easier to do politically than other options for increasing safe assets examined here.

4.4 National and supranational/common safe assets are not perfect substitutes

It might be argued that reinvigorating the supply of sovereign safe assets is not the best solution because supranational or common safe assets are superior, reflecting their built-in risk diversification properties.

Indeed, supranational or common safe assets offer banks and international investors additional diversification advantages, stemming from the amalgamation of the risks of different euro area economies.

The economic literature has emphasized, as noted, the advantages of common safe assets over national safe assets for addressing the doom-loop problem, especially when combined with appropriate changes in the regulatory treatment of sovereign exposures.

Reducing the excessive home bias in banks' portfolios by simply replacing national government securities with other euro area sovereign securities would address the doom loop but maybe not, as underlined by Alogoskoufis and Langfield (2018), other types of instability, in particular international contagion risk.

A common safe asset would also help mitigate the risk of sudden capital flights within the euro area (Brunnermeier *et al* 2011 and 2017). There might also be transitional advantages: a shift in euro area banks' portfolios towards a supranational or common asset is likely to cause less disruption in national bond markets than a shift towards a few national safe bond markets.

Moreover, an approach in which euro area banks are encouraged to hold massive amounts of the bonds of just a few highly-rated euro area treasuries might not be politically acceptable, as the latter could be seen to benefit disproportionately from efforts to reduce the home bias in banks' portfolios.

Similarly, for international investors, supranational assets in euros might be particularly attractive because they provide them with an exposure to the euro area rather than to individual member countries.

This allows them to diversify risk in a simple manner, reducing the information and transaction costs associated with building a diversified portfolio of euro area national government bonds. This should enhance the positive impact of an increased supply of safe assets on the euro's international role, compared with the effect of an equivalent amount of national safe assets.

That said, an expansion of sovereign safe assets would already bring, as noted, many of the advantages of safe assets. It would facilitate the diversification of banks' portfolios across national jurisdictions, thus lessening the risk of a vicious circle between banks and sovereigns.

And, if accompanied by general improvements in the ratings of sub-triple A euro area countries, any increase in contagion and credit risk that could result from such diversification would be mitigated.

Moreover, as argued by Véron (2017), the diversification of bank holdings of government securities across countries would also facilitate the introduction of a common deposit insurance scheme, another key aspect of the banking union project.

Indeed, for as long as the home-bias problem persists, there will always be the suspicion that deposits protected by a European deposit insurance scheme could be used by banks, under moral suasion by their home-country government, to increase excessively their exposure to domestic public debt.

Increased cross-country investment by financial institutions in sovereign safe assets would also stimulate financial integration, risk-sharing and the development of deeper safe asset markets, thus helping achieve the capital markets union.

In sum, even though national safe assets might be a second-best solution, they would help strengthen the EU's banking and capital markets unions.

Broader and more liquid markets for national safe assets would also help prop up the global role of the euro, especially given that many foreign investors, including central banks, continue to show a preference for national safe assets, some of which are perceived as even safer than supranational ones, which makes them appealing despite their lower yields.

Supranational assets, by contrast, are seen as combining the creditworthiness of all the members of the EU or the euro area and, as such, as a somewhat riskier investment. This is illustrated by their persistent yield spreads over German bunds and by the slight downgrade of credit ratings some EU institutions suffered during the euro area crisis.

Common synthetic assets might also be regarded as less safe than the best-rated euro area sovereign bonds for as long as they do not entail risk sharing among euro area countries (De Grauwe and Ji, 2018).

In sum, while supranational or common safe assets have certain advantages over sovereign assets, the latter can bring many of the benefits of the former and have also certain appeal of their own. Although they are not perfect substitutes, they can be complementary.

There is therefore a case for bolstering the supply of both sovereign and supranational or common safe assets. Should the political consensus be eventually found to create a common safe asset, such an asset could be incorporated into the euro area's existing safe-asset system, reinforcing its positive effects.

5 Conclusions

The expansion of the supply of euro area safe assets remains critical for completing EMU, in particular for achieving full banking and capital markets unions and fostering the euro's global role. The policy options to increase the supply of safe assets examined in section 4 present different quantitative potential and different implementation difficulties.

More issuance at national level from triple-A countries meets an obvious limit in the tension between increasing issuance, which would go hand-in-hand with more expansionary fiscal policies and higher public debt, and the need of issuing countries to maintain their highest credit rating. And of course subjugating fiscal policy to the supply of safe assets would be clearly suboptimal.

More issuance by EU supranational institutions provides an appealing alternative and has in fact become the main source of creation of safe assets in the EU since the euro area crisis. But its prospective size is also limited by insufficient progress towards common control of fiscal policies and towards fiscal consolidation at national level. Large supranational issuance while fiscal positions are weak in several euro area countries risks generating moral-hazard problems and could end up harming the credit ratings of supranational institutions.

The creation of a new common euro area asset could avoid, depending on the proposal chosen, some of the drawbacks of the other options, but there does not seem to be at present political support for this approach, while doubts remain about its implementation.

Finally, rating upgrades of sub-triple A countries are not easy to implement politically because they may require unpopular fiscal measures to cut budget deficits, and structural reforms to enhance sustainable growth.

However, these policies would bring benefits well beyond the rating upgrades that they would produce. Moreover, this third option could well yield the largest increases in the supply of euro-denominated safe assets.

The most promising strategy would be a two-handed approach, consistent with the complementary nature of national and supranational safe assets. First and foremost, sound fiscal policies and ambitious growth-stimulating reforms – which are in any case desirable – should be implemented by euro area sovereigns to improve their credit ratings.

This might not be politically feasible in the short-term, given the difficult economic environment currently faced by the EU, but it should certainly be a key component of a medium-term strategy to foster the supply of safe assets denominated in euros.

Second, the resulting increase in the supply of national safe assets should be complemented with an adequate supply of supranational assets through the existing facilities or through new ones to be created, possibly in the context of the financial response to the Ukraine war and its ramifications for the EU.

While experts and European policy makers have tended to focus in recent years on the second option, and previously on the possible creation of a new common safe asset, the first option has so far received too little attention, notwithstanding its huge potential.

We believe it is time to redirect the debate towards the large contribution that sovereign rating upgrades could make to the supply of euro-denominated safe assets, not least given the additional benefits that the required policies would bring. ■

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Endnotes

1. Claeys (2018) is an exception, arguing that "making all euro area sovereign bonds safe again – and for good – remains the most desirable way to increase the supply of safe assets and avoid intra-euro area flights to safety during bad times."

2. ESRB (2015) and Basel Committee on Banking Supervision (2017) discussed different policy options for regulatory reform aimed at addressing sovereign exposures. Véron (2017) proposed the introduction of sovereign concentration charges (a price-based approach) to encourage the diversification of banks' government bond portfolios across national jurisdictions.

3. SBBS would be backed by a portfolio of euro area government bonds; see https://finance.ec.europa.eu/banking-and-banking-union/banking-union/sovereign-bond-backed-securities-sbbs_en.

4. For the debate on the global shortage of safe assets, see, for example, Caballero et al (2017).

5. SURE and NGEU are both temporary financial facilities created by the EU in 2020 in response to the COVID-19 pandemic. Under SURE, the European Commission can borrow up to €100 billion during 2020-2022 to help EU countries finance short-term work schemes in order to limit the impact of the COVID-19 crisis on jobs and workers' income. Under the NGEU instrument, the Commission can borrow up to €806.9 billion up to 2026 to help EU countries recover from the

pandemic, notably by supporting reforms and investments related to the green and digital transitions. For an assessment of the experience with NGEU borrowing, see Christie et al (2021).

6. Our discussion below does not consider the issuance of euro-denominated securities by triple-A corporations or non-euro area governments, nor the possible contribution of the European Central Bank. But issuance in euro by companies is partly dependent on the depth and liquidity of the euro area's capital markets and on the status of the euro as international currency, both of which would be impacted favourably by an increased availability of public sector-issued safe assets. For the implications of the ECB's asset purchase programmes for the supply of euro area safe assets, see Eichengreen and Gros (2020).

7. On whether the war in Ukraine and its ramifications for energy security, defence expenditure and macroeconomic stabilisation within the EU call for a new NGEU instrument or the partial reallocation of its funds, see Sapir (2022).

8. Good surveys of the literature on creating a common European safe asset are provided by ECB (2020; pp. 103-121) and Leandro and Zettelmeyer (2019), who conducted a comprehensive evaluation of several of the proposals. For the early proposals, see Claessens et al (2012).

9. The use of the Commission's public debt projections overstates somewhat the actual level of tradeable safe assets as it includes not only debt securities but also other types of debt. But the former account on average for about 80 percent of total debt; trends in total public debt are therefore a good approximation to trends in debt securities.

10. This would be welcome given the yield spread between safe assets issued by EU supranational institutions and those issued by Germany (Bonfanti and Garicano, 2022).

11. In November 2022, the Commission proposed an overhaul of the EU's economic governance framework to strengthen debt sustainability while enhancing sustainable and inclusive growth through investment and structural reforms. The new framework, which will emphasise 'net primary expenditure' as the key fiscal indicator, will provide EU countries with greater flexibility in setting their fiscal adjustment paths. The objective is 'to reduce high public debt ratios in a realistic, gradual and sustained manner'. At the same time, the new framework will strengthen the enforcement mechanisms. See European Commission (2022d).

References

Alogoskoufis, S and S Langfield (2018) 'Regulating the Doom Loop', Working Paper Series 74, European Systemic Risk Board.

Basel Committee on Banking Supervision (2017) 'The Regulatory Treatment of Sovereign Exposures', Discussion Paper, Bank for International Settlements.

Bénassy-Quéré, A, MK Brunnermeier, H Enderlein, E Farhi, M Fratzscher, C Fuest and J Zettelmeyer (2018) 'Reconciling Risk Sharing with Market Discipline: A Constructive Approach to Euro Area Reform', CEPR Policy Insight No. 91, Centre for Economic Policy Research.

Bonfanti, G and L Garicano (2022) 'Do financial markets consider European common debt a safe asset?' Bruegel Blog, 8 December.

Brunnermeier, MK, L Garicano, PR Lane, M Pagano, R Reis, T Santos, S Van Nieuwerburgh and D Vayanos (2011) 'ESBies: A Realistic Reform of Europe's Financial Architecture', VoxEU, 25 October.

Brunnermeier, MK, S Langfield, M Pagano, R Reis, S van Nieuwerburgh and D. Vayanos (2017) 'ESBies: Safety in Tranches', Economic Policy 32(9): 175 -219.

Caballero, RJ, E Farhi and PO Gourinchas (2017) 'The Safe Assets Shortage Conundrum', Journal of Economic Perspectives 31(3): 29-46.

Christie, R, G Claeys and P Weil (2021) 'Next Generation EU borrowing: a first assessment', Policy Contribution 22/2021, Bruegel.

Claessens, S, A Mody and S. Vallée (2012) 'Paths to Eurobonds', IMF Working Paper WP/12/172, International Monetary Fund.

Claeys, G (2018) 'Are SBBS Really the Safe Asset the Euro Area is Looking For?' Bruegel Blog, 28 May.

Claeys, G and GB Wolff (2020) 'Is the COVID-19 crisis an opportunity to boost the euro as a global currency?' Policy Contribution 11/2020, Bruegel.

De Grauwe, P and Y Ji (2018) 'How Safe is a Safe Asset?' CEPS Policy Insights 2018-08, Centre for European Policy Studies.

Delpla, J and J von Weizsäcker (2010) 'The Blue Bond Proposal', Policy Brief 2010/03, Bruegel.
Eichengreen, B and D Gros (2020) Post-COVID-19 Global Currency Order: Risks and Opportunities for the Euro, Study for the European Parliament's Economic and Monetary Affairs Committee, Directorate-General for Internal Policies.
ESRB (2015) Report on the Regulatory Treatment of Sovereign Exposures, European Systemic Risk Board.
ESRB (2018) Sovereign Bond-Backed Securities: a Feasibility Study. Volume I: Main Findings, report by the ESRB High-Level Task Force on Safe Assets, European Systemic Risk Board.
European Central Bank (2020) Financial Integration and Structure in the Euro Area.
European Commission (2018) 'Proposal for a Regulation of the European Parliament and of the Council on sovereign bond-backed securities', COM(2018) 339 final.
European Commission (2020) 'A Capital Markets Union for people and businesses – new action plan', COM(2020) 590 final.
European Commission (2022a) 'Ukraine Relief and Reconstruction', COM(2022) 233 final.
European Commission (2022b) 'Proposal of a Regulation of the European Parliament and of the Council establishing an Instrument for providing support to Ukraine for 2023 (macro-financial assistance +)', COM(2022) 597 final.
European Commission (2022c) 'Fiscal Sustainability Report 2021, Volume I and Volume II', Institutional Paper 171, Directorate General for Economic and Financial Affairs.
European Commission (2022d) 'Orientations for a reform of the EU economic governance framework', COM(2022) 583 final.
European Parliament (2019) 'Legislative Resolution of 16 April 2019 on the proposal for a regulation of the European Parliament and the Council on sovereign-backed securities', P8_TA(2019)0373.
German Council of Economic Experts (2011) Assume Responsibility for Europe, Annual Report 2011/2012.
Giudice, G, M de Manuel Aramendía, Z Kontolemis and DP Monteiro (2019) 'A European Safe Asset to Complement National Government Bonds', MPRA Paper No. 95748, Munich Personal RePEc Archive.

Lanoo, K and A Thomadakis (2019) Rebranding Capital Markets Union: A Market Finance Action Plan, CEPS-ECMI Task Force Report, Centre for European Policy Studies.
Leandro, A and J Zettelmeyer (2019) 'Creating a Euro Area Safe Asset without Mutualizing Risk (Much)', Working Paper 19-14, Peterson Institute for International Economics.
Papadia, F and K Efstathiou (2018) 'The Euro as an International Currency', Policy Contribution 25/2018, Bruegel.
Sapir, A (2022) 'Does the War in Ukraine Call for a New Next Generation EU?' Bruegel Blog, 17 May.
Temprano Arroyo, H (2022) 'The EU´s Response to the COVID-19 Crisis: A Game Changer for the International Role of the Euro?' European Economy – Discussion Paper 164, Directorate-General for Economic and Financial Affairs, European Commission.
Véron, N (2017) Sovereign Concentration Charges: A New regime for Banks' Sovereign Exposures, Study for the European Parliament's Economic and Monetary Affairs Committee, European Parliament, Directorate-General for Internal Policies.
World Bank, Government of Ukraine and European Commission (2022) Ukraine: Rapid Damage and Needs Assessment, August.

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The safe asset potential of EU-issued bonds

Tilman Bletzinger, William Greif and Bernd Schwaab evaluate the prospects of EU-issued bonds for becoming a supranational euro-denominated safe asset

Safe assets are a crucial component of modern financial systems. They typically have low default risk, stable value, and high liquidity. This column evaluates the prospects of EU-issued bonds for becoming a supranational euro-denominated safe asset.

Net bond issuance by the EU has increased significantly since 2020, mainly as a response to the COVID-19 pandemic. These EU bonds generally have high quality, but relatively low liquidity relative to German Bunds.

The prospects for becoming a safe asset additionally depend on the long-term issuance of EU bonds as well as their favourable regulatory treatment.

Modern financial systems rely on safe assets. A 'safe asset' is defined by three characteristics (Brunnermeier *et al* 2016, 2017, Brunnermeier and Huang 2018, Gorton and Ordonez 2022). First, it has a low default risk, or high asset 'quality'. Second, like a good friend, a safe asset retains its value during bad times ('robustness'). Third, it can be sold at or near current (robust) market prices in most market conditions ('liquidity').

Safe assets facilitate financial transactions, which often entail a contractual requirement to pledge such assets as collateral (eg. Brunnermeier *et al* 2017). In addition, they allow market participants to transfer risks, including liquidity and market risks, without in turn creating new ones, such as counterparty and credit risks. To comply with liquidity regulations, banks need to hold safe assets to meet their funding needs in a stress scenario.

Finally, central banks rely on safe assets in order to implement monetary policy – they exchange central bank liquidity against non-cash safe assets (eg. Brunnermeier and Sannikov 2016).

In Bletzinger *et al* (2022), we study the quickly growing market for bonds issued by the EU and assess their prospects for ultimately becoming a genuine supranational euro-denominated safe asset.

The need for euro-denominated safe assets

Policymakers generally agree that the euro area suffers from a relative lack of euro-denominated safe assets, particularly when compared with the US (eg. Juncker *et al* 2015, Brunnermeier *et al* 2016, 2017, Gossé and Mourjane 2021).

EU bonds' prospects for becoming a genuine euro-denominated safe asset could potentially be hampered by the fact that both the SURE and the NGEU programmes are foreseen to be one-off, time-limited pandemic emergency responses

For example, Gossé and Mourjane (2021) estimate that in 2019 the supply of sovereign bonds with a credit rating of AA or higher amounted to just 37% of GDP in EU member states, compared with 89% of GDP in the US. In addition, the EU sovereign bond market is fragmented, with different sub-markets, and market participants' perceptions about the relative risks of these sub-markets can change over time.

The lack of euro-denominated safe assets and the fragmentation of the market are problematic. Both factors can raise the risk of bank-sovereign 'doom loops' (where problems in the banking sector spill over to the public sector, and vice versa), high public sector borrowing costs in bad times, and flights to safety (where investors sell off riskier assets and buy safer assets) that increase financial fragmentation (Brunnermeier *et al* 2017).

In the absence of a supranational euro-denominated safe asset, a flight to safety would entail capital flowing out of vulnerable countries and into safe havens. In addition, doom loops can be a consequence of weak banks holding a disproportionate share of flighty assets (eg. Leonello 2018).

A big new player on Europe's bond markets

Almost all of the EU's net bond issuance in 2020 and 2021 was closely connected to two policy initiatives – the 'temporary Support to mitigate Unemployment Risks in an Emergency' (SURE) and the NextGenerationEU (NGEU) programmes.

Both initiatives were proposed in the context of the EU's response to the recession in the wake of the coronavirus (COVID-19) pandemic. Financial assistance of up to €100 billion can be provided under SURE in the form of loans from the EU to affected member states, mainly to address sudden increases in public expenditure to preserve employment.

In July 2020 the European Commission was authorised to borrow up to €750 billion (in 2018 prices – adjusted for inflation this is now over €800 billion), to fund COVID-19 repair and recovery work through its NGEU instrument.

The implementation of SURE and the NGEU programmes marked a watershed in the EU's common fiscal policy, in terms of both the sizeable volumes and the independent funding structures.

Historically, European Commission borrowing has occurred since the early 1980s. These funding activities are organised on a back-to-back basis, meaning that funds raised on the market are lent on by the Commission to beneficiary countries under the same terms and conditions (coupon, maturity, nominal amount) as those received by the Commission.

The much larger SURE and NGEU-related volumes have required more active liquidity management of the EU's balance sheet. In April 2021 the practice of back-to-back lending was therefore not made a requirement for the NGEU initiative, allowing instead for a more flexible management of EU funds.

As of December 2021, the amount of outstanding EU bonds had grown to €215 billion in total. The first SURE bonds were issued in October 2020, while the first NGEU bonds were issued in June 2021. By December 2021 SURE and NGEU-related bonds accounted for three-quarters of all outstanding EU bonds. By 2028 NGEU volumes are foreseen to reach €800 billion, more than 12 times the level in December 2021.

Including the approved funding for other smaller programmes, the total available amount of EU bonds is set to exceed €1 trillion by 2028. This amount corresponds to approximately 43% of Germany's public debt in 2020 and approximately 65% of Spain's.

Creditworthy and robust, but are EU bonds liquid enough?

In bond markets, investors demand additional compensation relative to the safest assets for a range of risks, with default risk (ie. the risk that the issuer might not repay its obligations) often being the most important. Several institutional layers of debt-service protection mean that EU-issued bonds, including SURE and NGEU-related bonds, have a low default risk.

Credit rating agencies, however, are not in complete agreement on the extent to which EU bonds are free of default risk. Moody's rating agency keeps its best long-term issuer rating (Aaa) for the EU, while Standard and Poor's provides a long-term issuer rating from its second-best rating bracket (AA).

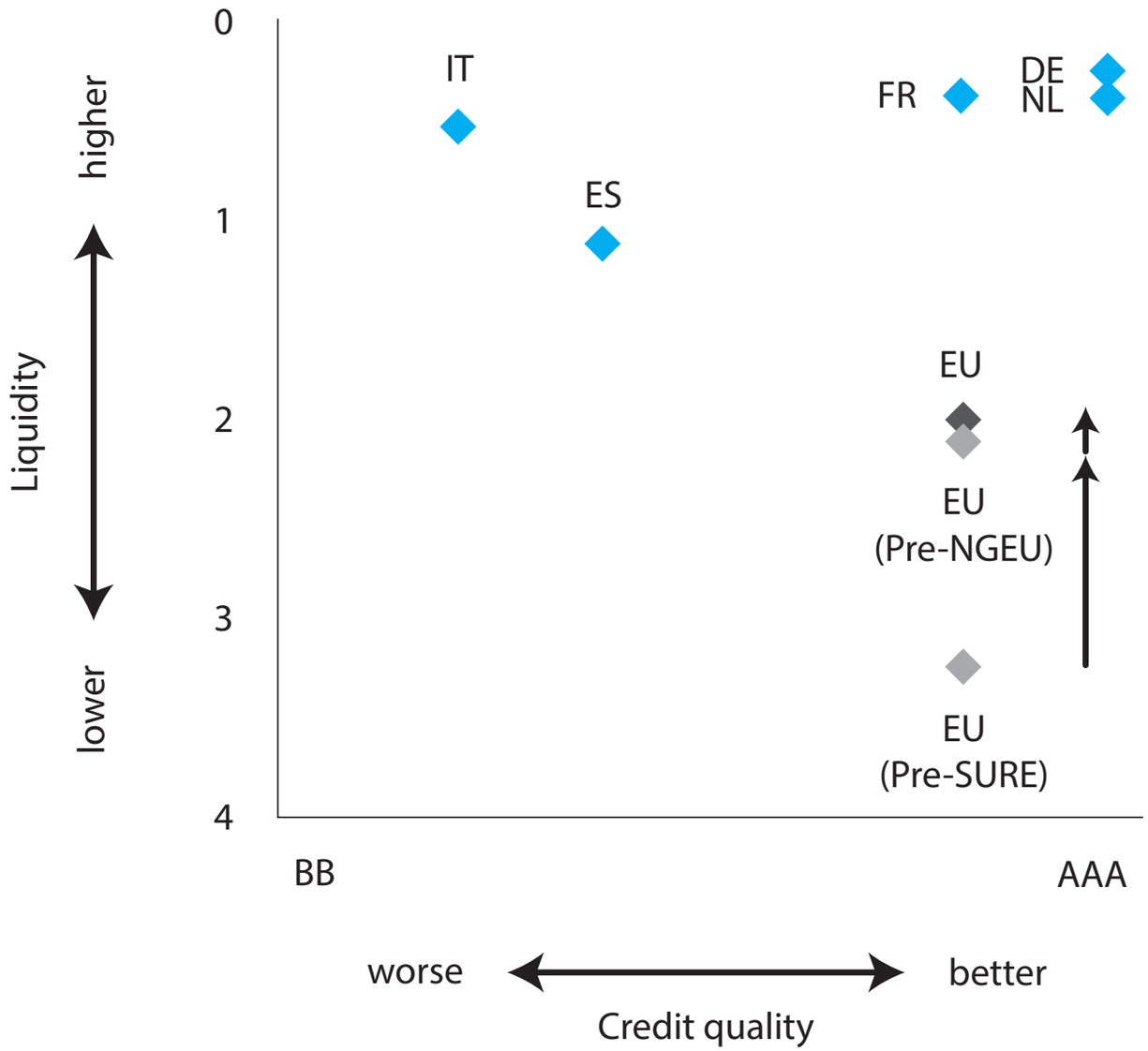
Figure 1 plots the minimum rating from four rating agencies on its horizontal axis, suggesting that they collectively consider EU bonds' credit quality to be close but not (yet) equal to that of, for example, German Bunds.

At the same time, EU bonds have traded at tight yield spreads relative to German Bunds, and below the GDP-weighted average of euro area sovereign yields (not shown in the chart), suggesting that the high credit quality of EU bonds is well understood by market participants.

EU bonds' yield spreads over the German Bund also reflect the robustness of EU-issued bonds. These spreads rose only slightly during the onset of the pandemic-related recession in early 2020, and by considerably less than Italian and Spanish spreads (see Bletzinger *et al* 2022 for details).

This stability of EU yield spreads does not mean that EU bonds will automatically become a supranational euro-denominated safe asset. But, like a good friend, EU bonds have been shown to retain their value during these demanding times.

Figure 1. Credit risk and liquidity indicators for EU bonds



Notes: The chart shows a scatterplot of market liquidity (average bid-ask spreads in basis points) versus credit quality (minimum credit rating). The arrow origin points refer to September 2020 ('Pre-SURE') and May 2021 ('Pre-NGEU'). The arrow end-points, and all other diamonds, refer to October 2021 (following the NGEU's first auction). Higher liquidity corresponds to tighter bid-ask spreads. The rating score on the horizontal axis is calculated from the minimum issuer ratings from Standard & Poor's, Moody's, Fitch, and DBRS Morningstar.

A safe asset is traded in liquid markets. Market liquidity ensures that investors can sell their asset at any time without causing a major change in the market price. Liquidity risk is the second key risk (after default risk) for which investors demand compensation.

The spread between bid and ask quotes is, arguably, the most straightforward indicator of market liquidity, providing information on how costly a bond transaction can be expected to be on any given day. Before the first issuance of SURE bonds in October 2020, EU bonds were subject to considerably lower market liquidity (ie. a wider bid-ask spread) than the sovereign bonds of large euro area countries.

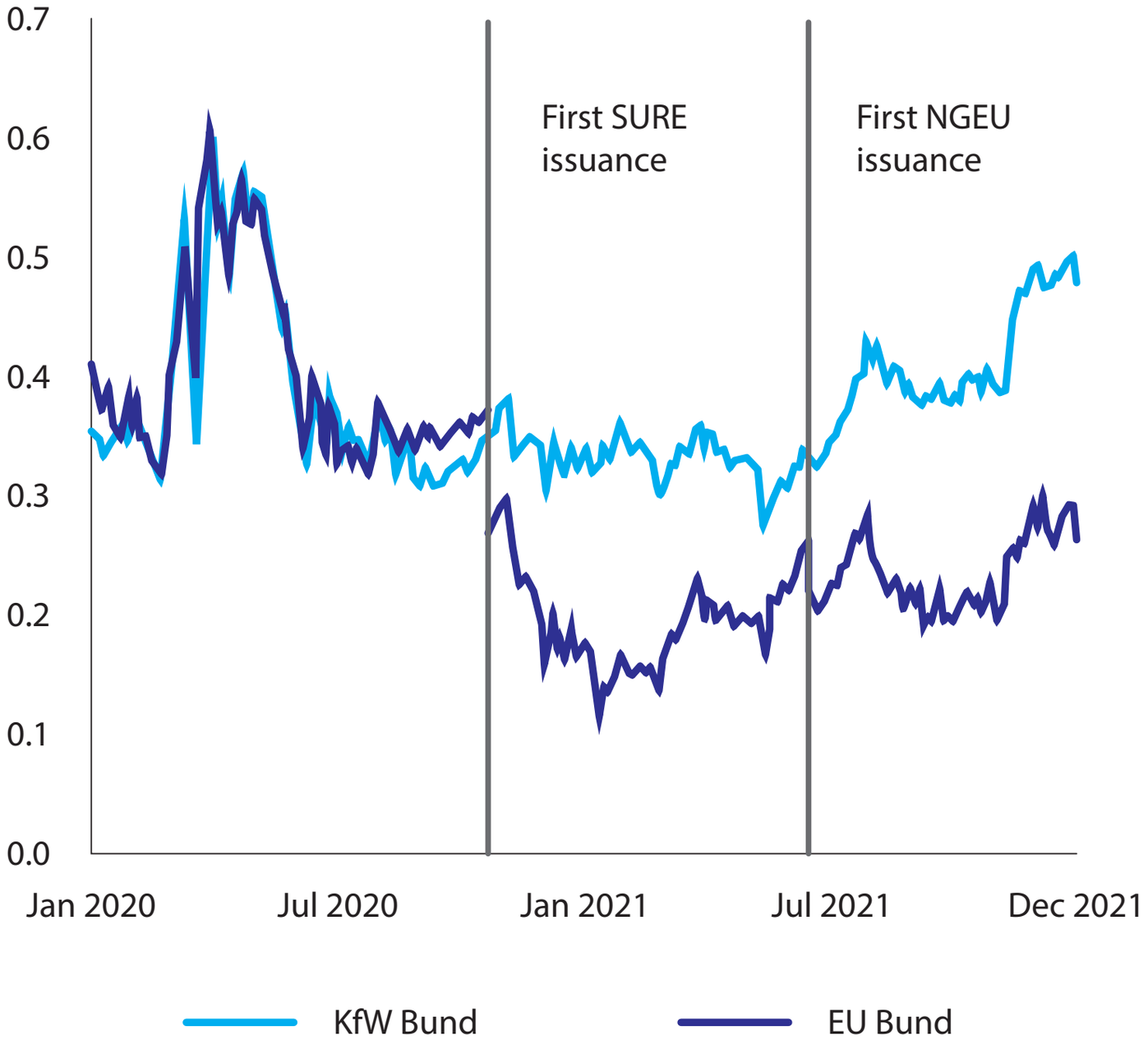
Figure 1 shows that the EU bonds' bid-ask spreads decreased substantially over time following the launch of SURE and the NGEU programmes, approaching the level of Spanish sovereign bonds' bid-ask spreads.

A clear improvement in EU bonds' market liquidity can also be observed in their decreasing yield spreads over other reference bonds. Figure 2 compares the ten-year EU bond-Bund spread with the ten-year KfW bond-Bund spread over time. The two-time series evolve almost identically, up to the first issuance of EU SURE bonds on 20 October 2020.

EU bonds' total market volumes, and therefore also their expected trading volumes, increased considerably following each SURE and NGEU issuance date. The divergence between the two yield spreads, particularly following the first SURE bond issuance, suggests that investors understood and incorporated the improved liquidity conditions into the yields of EU bonds.

In Bletzinger *et al* (2022) we also argue that a safe asset's market liquidity should be sufficiently high to accommodate central banks' monetary policy operations. Specifically, central bank purchases (flows) and holdings (stocks) of these assets should not inappropriately dry up a burgeoning market.

Figure 2. EU bond-Bund spread vs. KfW bond-Bund spread



Notes: The chart shows the KfW bond-Bund yield spread and the EU bond-Bund yield spread (in percentage points). The sample period is from January 2020 to December 2021. The vertical lines refer to the first issuances of SURE and NGEU bonds.

Our analysis of the reaction of EU bonds' bid-ask spreads to Eurosystem bond purchases, accounting for holdings, suggests that central bank purchase flows and asset stocks do not appear to have significantly hindered the trading of EU bonds.

Policy implications

EU bonds score relatively highly on the quality scale (because of their low perceived default risk), but, while their market liquidity has improved, it is still low relative to, for example, German Bunds. Market liquidity will probably improve to some extent over time as the market grows.

EU bonds' prospects for becoming a genuine euro-denominated safe asset could potentially be hampered by the fact that both the SURE and the NGEU programmes are foreseen to be one-off, time-limited pandemic emergency responses.

For example, Schwarzer *et al* (2022) argue that permanent EU debt issuances would strengthen the euro as global currency. After all, traditional safe assets, like US Treasuries or German Bunds, tend to trade in markets without a definite endpoint which makes the cost of setting up a dedicated trading infrastructure worthwhile.

By contrast, the final SURE and NGEU-related EU bonds are currently foreseen to mature in 2052 and 2058 respectively. This finite maturity may deter investors from establishing a long-term investment strategy in which EU bonds would be considered a permanent part of their portfolios.

That obstacle might be mitigated by the establishment of an additional bond-financed EU budget to cushion some of the detrimental impact from Russia's war of aggression against Ukraine, as was being discussed within the EU at the time of writing.

Finally, the perception of EU bonds as safe assets also hinges on the continuation of their favourable regulatory treatment. While the lifetime and regulatory treatment of SURE and NGEU-related bonds are to some extent within the ambit of the EU member states, other determinants of secondary market liquidity depend primarily on private sector actors.

For instance, EU bonds are currently not included in sovereign bond indices. This exclusion restricts demand for them from certain safe-asset funds.

In addition, there is currently no direct derivative hedge instrument for EU bonds. For such an instrument to be viable, a deep and liquid repo market would need to evolve first. Even though it is too early to judge whether private sector market participants will include EU bonds in sovereign bond indices or introduce futures contracts, both the recent improvement in market liquidity and the overall increasing attention paid to EU bonds offer some support for such steps. ■

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References

Bletzinger, T, W Greif and B Schwaab (2022), "Can EU bonds serve as euro-denominated safe assets?", Journal of Risk and Financial Management 15(11): 1-13.

Brunnermeier, MK, L Garicano, P Lane, M Pagano, R Reis, T Santos, D Thesmar, S Van Nieuwerburgh and D Vayanos (2016), "The sovereign-bank diabolic loop and ESBies", American Economic Review Papers and Proceedings 106(5): 508–512.

Brunnermeier, MK and L Huang (2018), "A global safe asset for and from emerging market economies", NBER Working Paper No 25373.

Brunnermeier, MK, S Langfield, M Pagano, R Reis, S Van Nieuwerburgh and D Vayanos (2017), "ESBies: Safety in the Tranches", Economic Policy 32(90): 175-219.

Brunnermeier, MK and Y Sannikov (2016), "The I Theory of Money", NBER Working Paper No 22533.

Gorton, GB and G Ordonez (2022), "The supply and demand for safe assets", Journal of Monetary Economics 125: 132-147.

Gossé, J and A Mourjane (2021), "A European safe asset: new perspectives", Bulletin de la Banque de France No 234(6).

Juncker, J-C, D Tusk, J Dijsselbloem, M Draghi and M Schulz (2015), "The Five Presidents' Report: Completing Europe's Economic and Monetary Union", European Commission.

Leonello, A (2018), "Government guarantees and the two-way feedback between banking and sovereign debt crises", Journal of Financial Economics 130(3): 592-619.

Schwarzer, D, H Rey, A Sapir, M Mills, B Eichengreen, O Dhand, C Coeuré and C Carraro (2022), "A New Era for Europe", VoxEU.org, 1 March.

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If it doesn't trade, is it really marketable debt?

Rebecca Christie says Europe's bond markets are essential infrastructure, just like the power grid

When it comes to encouraging fiscal discipline, euro area policymakers want the market to be part of the solution. This will not succeed until they make peace with the idea that, while it is their job to set conditions and incentives, it is not their job to dictate prices and spreads.

Within the environment that policy creates, market discipline is something the market does to itself, not something a government imposes when it disapproves of national choices. Governments need to get used to market-set prices as a source of strength and information, not just a source of risk.

Since the start of the euro crisis in 2010, the European Union has taken tentative steps toward accepting this reality. But every step forward has come with trepidation and scepticism. The EU deserves a lot of credit for adapting its institutions and creating new ones so that all of its members can preserve market access.

It is changing its fiscal rules so that member states will take more ownership of managing their financial health. Now it needs to accept the daily operations of the market itself.

Historically, market trading has been viewed as synonymous with risky speculation. This is like viewing electricity solely as a fire hazard. Yes, sparks can start fire, and fluctuating prices can get dangerous. But day to day, having a power grid – or an active capital market – is necessary infrastructure for modern life.

Embracing a market where prices rise and fall is not the same thing as endorsing a free-for-all. It will require policymakers to reframe their ideas of pragmatism and risk.

While the euro area has progressed extensively in its willingness to join forces in a crisis, markets know the EU is not really a joint issuer despite the size of its NextGenerationEU recovery plan. Ratings agencies consider it a

supranational, not a sovereign, and assess it based on the creditworthiness of its top members rather than as a whole.

Yields continue to be higher than fundamentals might suggest. For example, Germany regularly fields challenges to the EU's ability to borrow jointly at all. These challenges fail, but not before reminding investors and voters that the euro area keeps its finances in national compartments when push comes to shove.

The EU needs to have confidence, so the markets can have confidence too

Widening spreads and tumultuous market conditions all year have made policymakers newly attentive to the reality that sovereign debt from different euro area countries trades at different rates. The problem is many ideas for trying to solve it risk exacerbating fragmentation rather than bringing the bloc together.

Recent proposals include creating a European debt buying agency; duplicating and de-stigmatizing a never-used precautionary credit line system; and generally trying to revive the magic of Mario Draghi's 'whatever it takes' moment.

Establishing fixed-income capital markets

There's a missing element at the heart of Europe's financial system: trust in the market. What if every euro area country could sell debt at varying price points with an expectation that it would trade regularly, in all weather? Buy and hold should not be the only option.

The goal of a debt auction should not be just for the European Central Bank or a pension fund to buy a bond and wait until it matures. It should be to form a benchmark yield curve and anchor an entire ecosystem of fixed-income capital markets.

If a 'liquidity crisis' is defined by a lack of cash, or by loss-averse securities holders facing off against rapacious fire-sale speculators, then a liquid market should be defined by a healthy mix of buyers and sellers in all conditions.

The euro system knows this, on some level. In 2015, the ECB set up a securities lending programme like the longstanding offerings of the US Federal Reserve. These programmes are essential bond market infrastructure and keep the market going in the face of all kinds of technical challenges.

The long-standing debate over a European safe asset also acknowledges the truth that the euro won't be a serious international currency until it has one, at scale. The historic joint borrowing enabled by the NextGenerationEU pandemic recovery programme brought that vision so much closer. But as long as it is limited and temporary, Europe will not be able to close the deal.

The disinterest in market borrowing starts at the top. Even at the height of the euro crisis, a financial flashpoint dominated by lack of market access, European policymakers continued to rail about the perils of speculation. Germany is famous for not taking meticulous care of its primary market, instead giving itself ample leeway to just reduce supply if the bids failed to show up.

The market has historically indulged them, as in 2011, when Germany failed to place its full offering in two long-term debt sales in a row. If any other major developed country couldn't sell all the debt it planned, the ratings agencies might start looking into default. But as with trade surpluses and fiscal guidelines, Germany has got off with a shrug and a promise.

The bonds make their way into the secondary market later, the world keeps spinning. The secondary market still gets the bonds as German bond trading is dependable enough that the market can absorb these bonds either at auction or at its leisure later, and pricing adjusts in routine and non-destabilising ways.

Without trading, there is no liquidity. Without liquidity, there is no market. ECB researchers in 2017 found that more participation in primary market sales leads to smoother secondary market trading – notably a process that works better when market volatility is otherwise higher.

When public debt sales are regular, predictable and designed with follow-on trading in mind, the market-makers make markets, and everyone benefits.

Balancing public and private funding

A strong and steady secondary market is the key to a strong public borrowing scheme, as documented in Bruegel's 2021 assessment of the NextGenerationEU programme.

The European Commission has admirably sought a balance between encouraging long-term investors, who provide primary market demand and a price anchor and making sure there is enough secondary market liquidity for smooth trading.

Its investor base as of October 2022 is 34% fund managers, 25% bank treasuries and 21% central banks and other official institutions; a mix of pension funds, insurance companies, banks and hedge funds make up the rest.

Likewise, the EU has done an effective job of building a primary dealer network, selling its debt at auction and through syndications, and monitoring follow-on trading. It will not, however, reap the true benefits of a mature public borrowing programme unless its efforts continue at scale.

On the private-sector side, policymakers are at least willing to talk about how broader market operations would help the general economy grow. Capital markets union may not be progressing much, but there is at least a top-level consensus that more and better trading is part of the path forward. Illiquid markets have more price volatility, which can be disruptive.

For the public sector, overall, the philosophical shift is taking longer to happen, despite the desire of euro area politicians to catch up with the dollar and its deep and liquid US Treasury market. Even relatively pro-debt economists and policymakers seem to be struggling with the shift from buy-and-hold to actively encouraging trading.

Consider this year's call from Italian and French leaders Mario Draghi and Emmanuel Macron to adjust the euro area's debt rules to allow for more public investment spending. They gave a nod to a December 2021 proposal by Francesco Giavazzi, Veronica Guerrieri, Guido Lorenzoni and Charles-Henri Weymuller as part of their case for more borrowing.

The heart of the plan aims to take the burden of buying sovereign debt off the ECB – but not by trusting the market. It suggests creating a European Debt Agency to take on sovereign bonds instead. Rather than printing money to do it, as the ECB has done through its monetary policy operations, this new agency would instead go to the markets directly. It would create an intermediary between investors and individual countries and provide a new euro-denominated safe asset.

As a bonus, it could offer a new mission for the European Stability Mechanism, currently reduced to a warehousing role for the debt it issued during the euro crisis and seeking a new mandate. What this plan lacked was a sense of what would happen to the secondary market after sovereign debt was sucked up and out of circulation, as well as what effect its own borrowing would have on market access.

The EU's current joint borrowing programme, the NextGenerationEU recovery programme, aims to explicitly 'crowd in' investment and borrowing at the national level. There seem to be few safeguards to keep the various proposed new debt agencies from crowding out other sovereign issuers.

Furthermore, by limiting the amount of sovereign debt in the markets, one can imagine they could depress liquidity and therefore hurt the balance sheets of the countries ostensibly being helped.

This is the big shift that Europe has yet to make: that more debt can be safer debt, at least when it comes to the world's major currencies. A permanent national debt is a gift, as the US has found since the days of Alexander Hamilton.

US debt managers strive to protect the secondary market, not eliminate it – in fact, during the height of the Alan Greenspan era, fears were not that the US would issue too much debt but that it might run too much of a surplus.

A country is not a business, and it does not need to balance its books. On the contrary, its entire job is to marshal credibility so people believe in its banks and its borders. For small, poor countries, credibility is in short supply. For the world's largest consumer market, it ought to be abundant.

The EU does not need yet another issuer of high-quality quasi-sovereign debt. Instead, it needs to encourage the issuers it has, so they can trade freely and at the scale needed to provide stability in global financial markets. It needs to have confidence, so the markets can have confidence too. ■

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Headwinds persist

Maarten Verwey and Oliver Dieckmann discuss the Commission's Winter 2023 Economic Forecast and describe how the EU economy is set to escape recession

Almost one year after Russia started its war of aggression against Ukraine, the economic outlook for the EU is brightening a bit. Last year, the EU economy managed to shift away from Russian energy commodities. Decisive policy support and consumers' and businesses' response to the energy crisis boosted the resilience of the economy.

This column describes how, entering 2023 stronger than projected in autumn, the EU economy is now expected to escape the recession that was anticipated for the turn of the year. For the first time in a year, the 2023 projections for growth are revised higher while the inflation outlook is revised lower.

From the Autumn 2022 Forecast to the Winter 2023 Forecast

In November, the EU economy was seen at a turning point. As the reopening momentum faded, the terms-of-trade shock unleashed by soaring gas prices was making its way through the economy (Gunnella and Schuler 2022), eroding households' real incomes and weighing on firms' profitability. This, combined with monetary policy tightening and weakening external support was expected to push the EU economy into recession (European Commission 2022).

According to the European Commission's Winter Interim Forecast, the EU economy is set to escape recession. In the history of the Commission's euro area forecasting, which began in May 1998 after the Council decision on the introduction of the euro, the withdrawal of a recession call is unique.

Against this, backdrop the Winter 2023 Forecast reassesses the global outlook, the pace of monetary tightening, the role of policy support to households, and several technical assumptions (European Commission 2023).

The Winter Interim Forecast includes mainly revisions to the growth and inflation outlook in 2023. For the first time since the start of Russia's war of aggression, the 2023 projections for growth are revised upwards while the inflation outlook is revised downward (Figures 1 and 2).

While uncertainty surrounding the forecast remains high, risks to growth are seen as broadly balanced. Domestic demand could grow stronger if declines in wholesale gas prices pass through to consumer prices more strongly

Figure 1. Growth forecasts for 2022 and 2023, euro area

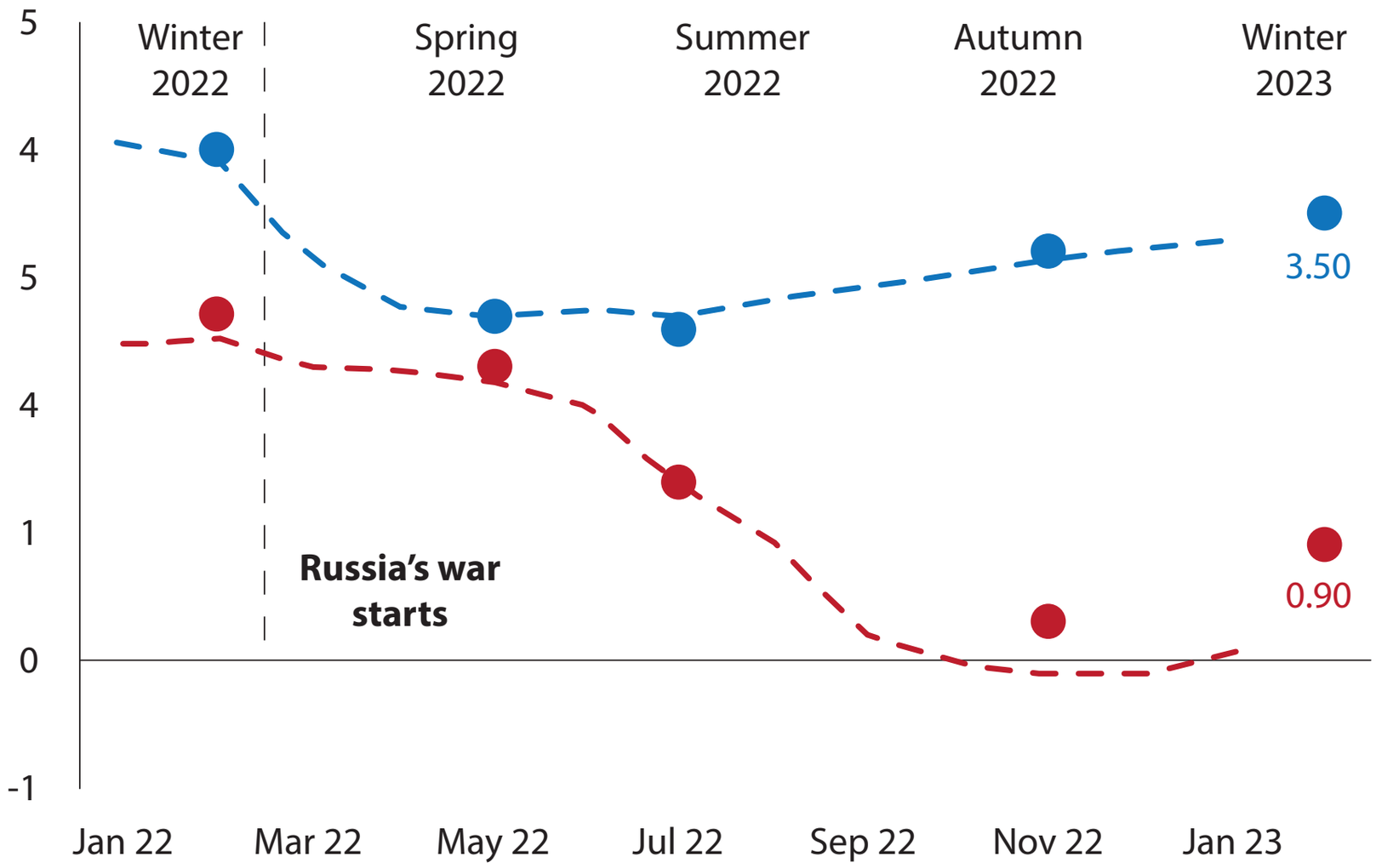
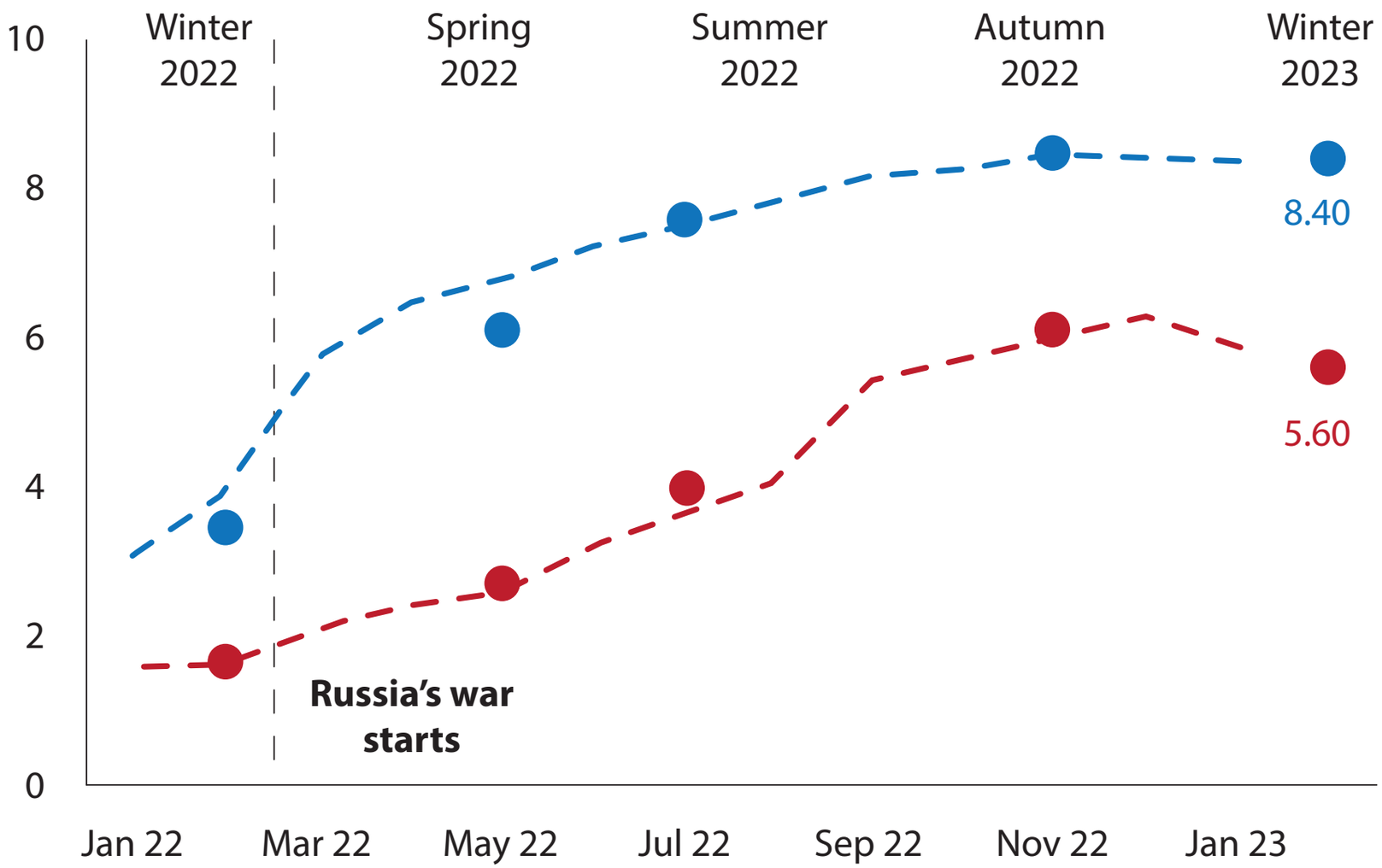


Figure 2. Inflation forecasts for 2022 and 2023, euro area



Enhanced resilience helped the EU economy to finish 2022 stronger than expected

The EU has made impressive progress in weaning itself off Russian energy commodities and enhancing resilience against adverse shocks. Thanks to benign weather conditions, demand restraint and efficiency gains, gas consumption was about 25% below the average for the same months over the past five years.

Stepped up efforts to diversify supply sources have also borne fruit, as evident from a sharp fall in the share of pipeline gas from Russia in total EU imports of gas and the strong increase in imports of seaborne LNG.

These developments have left gas storage levels at around 75% of capacity, only marginally below their level at the beginning of the heating season, and above seasonal average. This implies lower refilling needs and easing concerns about gas rationing going forward.

Stronger-than-anticipated growth in the second half of 2022 improved the starting position for 2023. In the third quarter, the hit to GDP growth was milder than initially estimated. In the fourth quarter, according to Eurostat's preliminary flash estimate, economic activity stagnated in the EU instead of shrinking by 0.5% as forecast in autumn.

These outcomes raised the carry-over to growth in 2023 as compared to the autumn by 0.4 percentage points to 0.3% in the EU (by 0.5 percentage points to 0.4% in the euro area). Moreover, in recent months economic confidence among households and businesses began rebounding, though from low levels.

Recent developments support a slightly more positive growth outlook, but headwinds remain strong
Energy commodity prices fell below pre-war levels and should remain lower than assumed in autumn. Recent developments in demand and supply have shifted the outlook for energy prices in Europe.

At the cut-off date of the forecast, natural gas prices in Europe (Dutch TTF futures) were about one half lower than at the time of the Autumn 2022 Forecast but also lower than at the time of the Spring 2022 Forecast, and markets expect them to remain broadly stable over the forecast horizon (Figure 3). Electricity prices have also come down significantly since autumn.

The EU labour market is expected to remain tight. In the third quarter of 2022, employment continued to increase, labour market slack was unchanged, and the job vacancy rate declined only marginally (Kiss *et al* 2022, Soldani *et al* 2022).

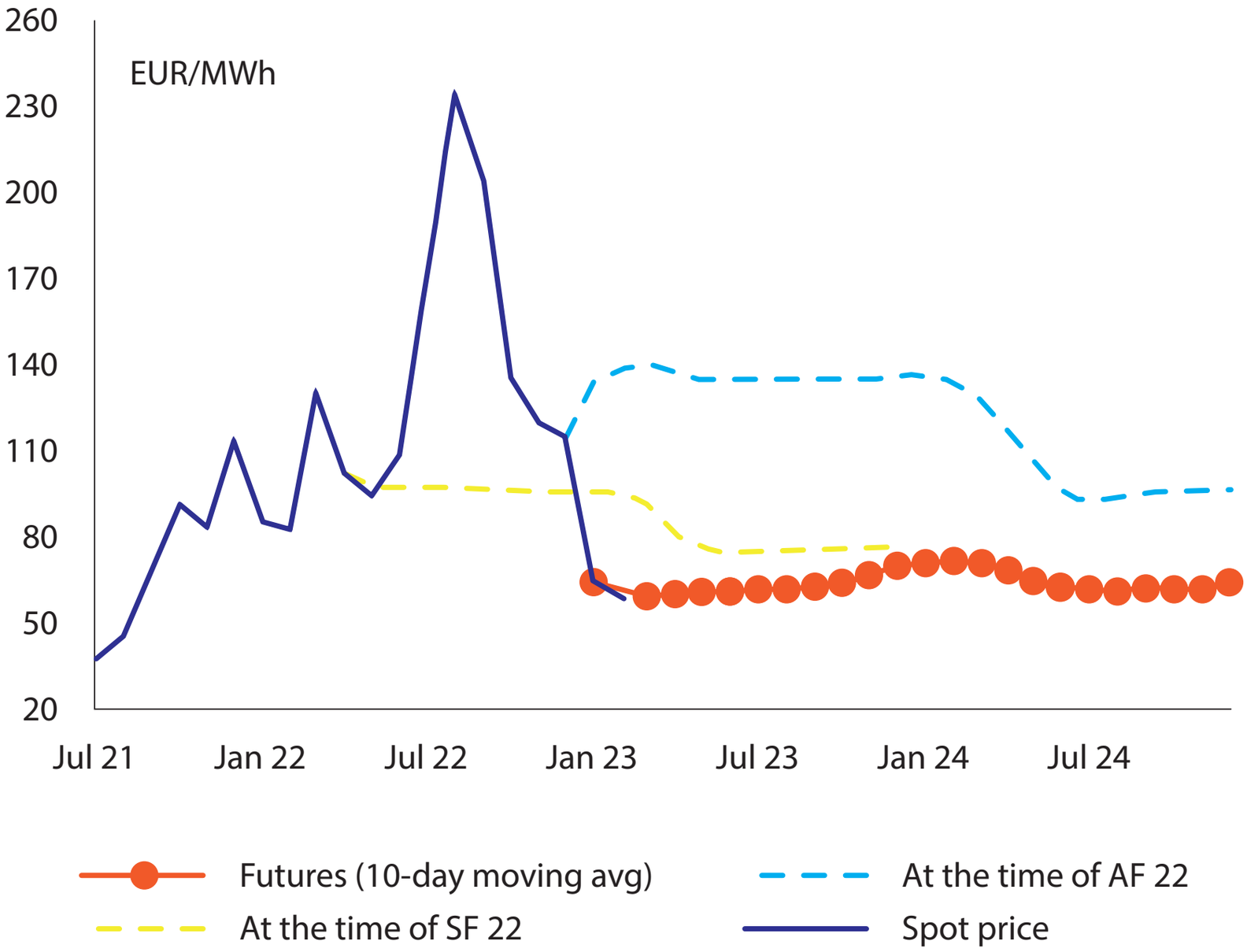
Until December, the unemployment rate stood at its all-time low of 6.1%. In January, the Employment Expectations Indicator increased to the highest reading since June and survey results pointed only to a marginal abatement in labour shortages.

The temporary slowdown of activity is set to weigh on employment, but difficulties in recruiting could motivate firms to hoard labour. Accordingly, the projected marginal rise in unemployment in early 2023 would be largely temporary.

Nominal wages are projected to increase stronger than before the pandemic. Continued tightness of labour markets, higher minimum wages in several member states, and increased efforts to compensate for inflation put upward pressure on wage negotiations, especially in light of fading recession risks.

Moreover, wages of many employees still reflect settlements agreed upon before inflation accelerated last year, which suggests a lagged and staggered impact of past inflation on wages.

Figure 3. Natural gas future and historic prices



Source: ICE.

Monetary policy tightening is expected to be stronger than previously assumed. Since the turning point in the monetary policy stance in December 2021, the ECB raised policy interest rates by 300 basis points.

This has lifted market expectations about short-term interest rates, whereas long-term sovereign yields remained at the previously assumed levels. The annual growth rate of bank lending to the private sector has remained positive but decelerated further in December.

In contrast with the tighter credit outlook, conditions for market financing have loosened somewhat, thanks to a pick-up in valuations, which could suggest that investors expect a rather short tightening period (Adrian *et al* 2023).

The outlook for the EU's external environment remains weak. After largely stagnating in the first half of 2022, global economic activity picked up somewhat in the third quarter, but signs of renewed weakness emerged at the end of last year.

Survey indicators remained consistent with falling momentum heading into 2023, in particular in advanced economies. China's abandonment of its zero-COVID policy and the vigorous re-opening are likely to improve its growth prospects (IMF 2023), despite possible short-term disruptions.

The path of output expansion is lifted up and inflation revised downward

Opposing forces result in a marginal improvement of the growth outlook for this year. The positive growth impact of the faster unwinding of the terms-of-trade shock is set to be partially mitigated by the more forceful monetary tightening.

In particular sectors most sensitive to financing conditions (eg. construction) are set to feel the impact. Overall, GDP is projected to stagnate in the first quarter instead of contracting as forecast in autumn.

As of spring, growth-supportive factors (including disbursements under the Recovery and Resilience Facility) are expected to gain importance. GDP growth in 2023 is projected at 0.8% in the EU (and 0.9% in the euro area) and thus 0.5 (0.6) percentage points higher than in autumn, which is mainly due to the higher carry-over.

In 2024, growth is expected at 1.6% (1.5% in the euro area), largely unchanged compared to autumn.

The forecast puts the EU economy on a higher growth path than in autumn. After Russia's war pulled the economy to a lower growth path, the EU is now projected to move to a slightly higher path, with GDP exceeding in the fourth quarter of 2024 the level projected in autumn by about 1% (Figure 4).

HICP inflation is set to continue declining at a slightly swifter pace in 2023. According to Eurostat's flash estimate, in January, inflation in the euro area fell for a third consecutive month, whereas core inflation slightly increased, partly reflecting the impact of past energy inflation on core items (eg. Corsello and Tagliabracci 2023).

Looking forward, falling energy commodity prices and tighter financing conditions are set to lower inflationary pressures. By contrast to the expected sharp drop in energy inflation and the fall in food and goods inflation, services inflation is expected to remain elevated, reflecting the wage outlook. Taking into account strong negative base effects, HICP inflation is forecast to fall strongly (Figure 5).

Figure 4. Real GDP growth path, EU

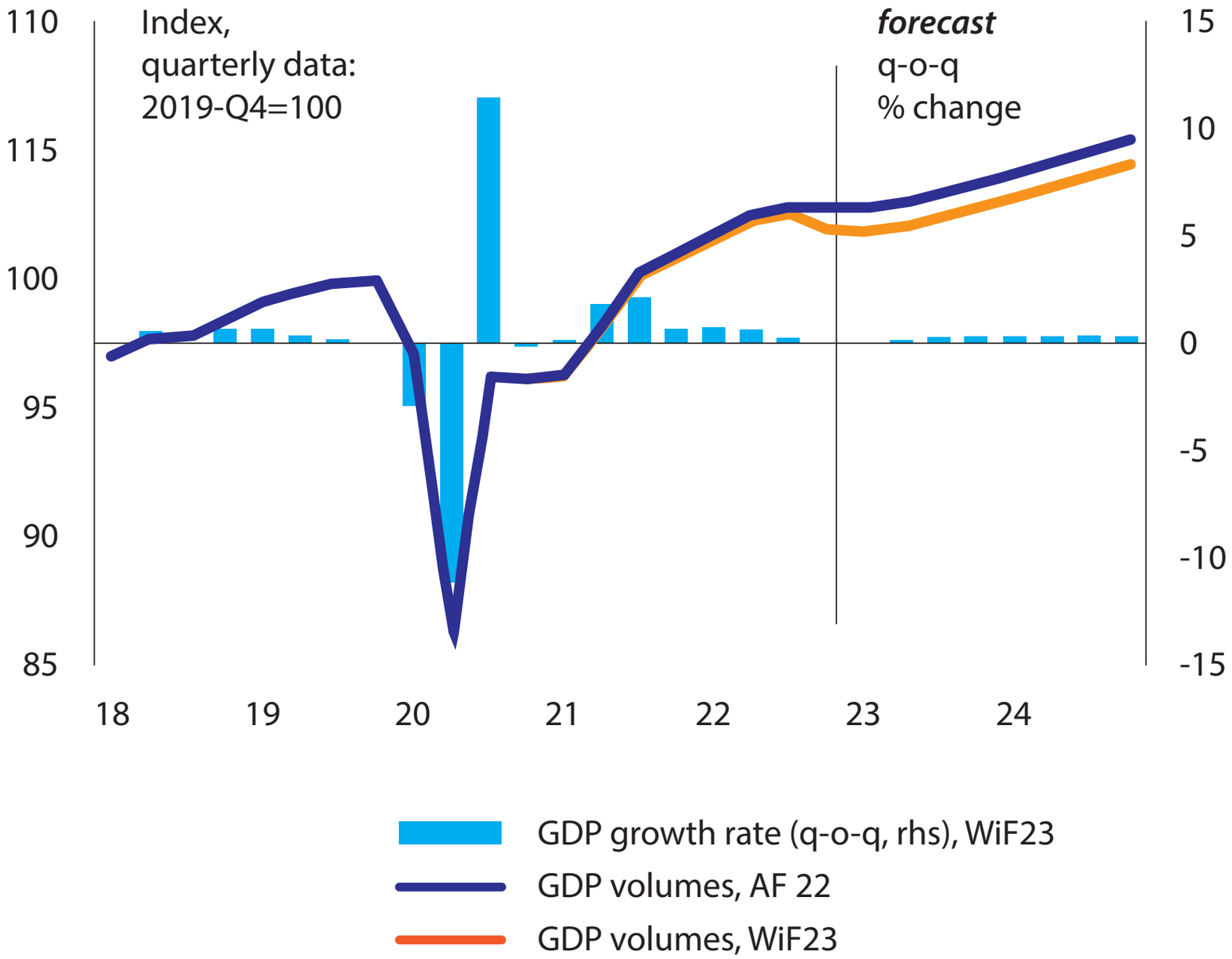
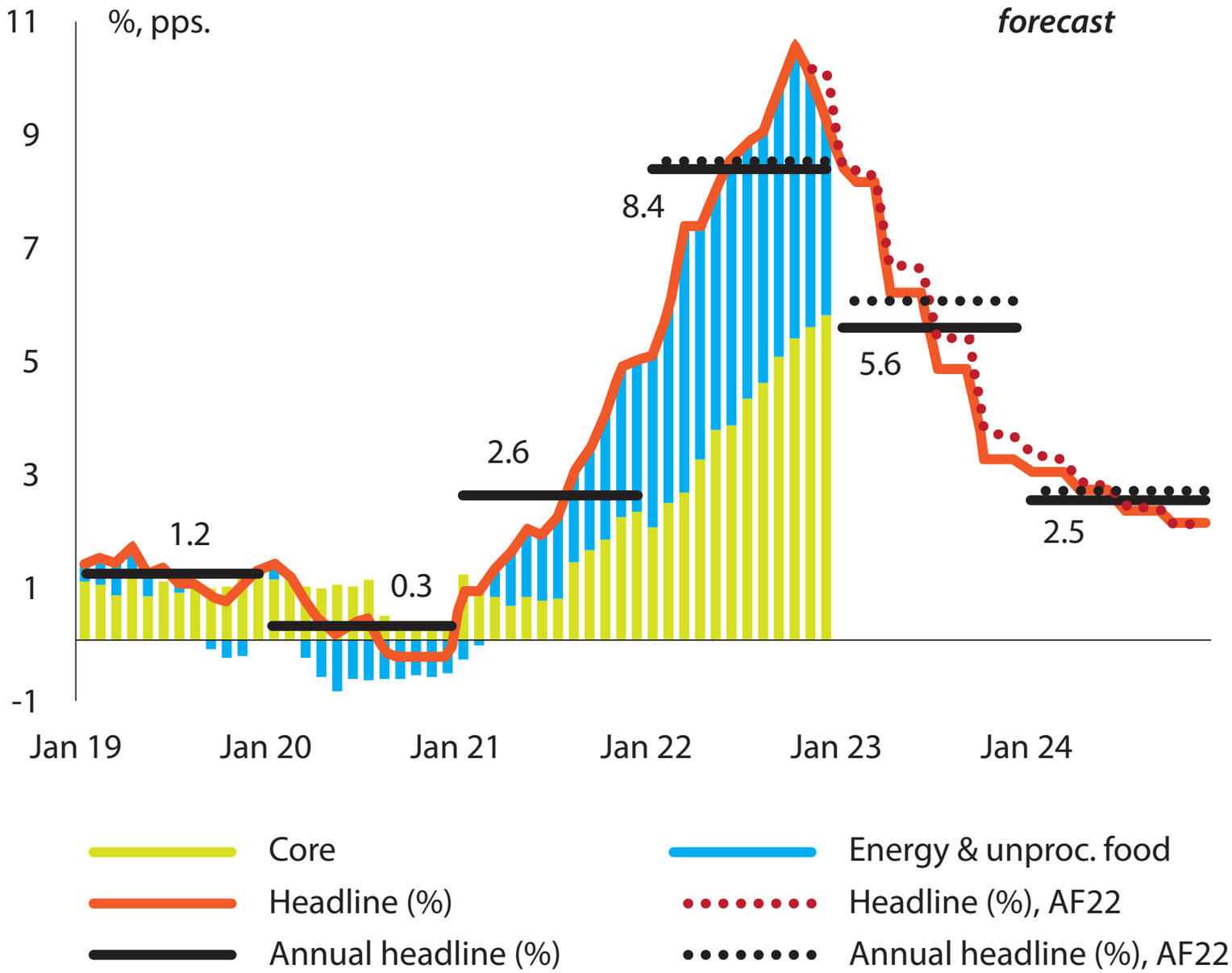


Figure 5. Inflation outlook euro area



Risks to the outlook are more balanced

While uncertainty surrounding the forecast remains high, risks to growth are seen as broadly balanced. Domestic demand could grow stronger if declines in wholesale gas prices pass through to consumer prices more strongly.

Nonetheless, a potential reversal of that fall cannot be ruled out in the context of geopolitical tensions. External demand could get a stronger push from China's re-opening.

Risks to inflation remain largely linked to developments in energy markets, mirroring some of the risks to growth. Especially in 2024, upside risks to inflation prevail, as price pressures may turn out broader and more entrenched if wage growth were to settle at above-average rates. ■

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References

Adrian, T, E Erceg and F Natalucci (2023), "Looser financial conditions pose conundrum for central banks", IMF Blog, 2 February.

Corsello, F and A Tagliabracci (2023), "Assessing the pass-through of energy prices to inflation in the euro area", Banca d'Italia Occasional PaperNo. 745.

European Commission (2022), "European Economic Forecast – Autumn 2022", European Economy Institutional Paper No 187, November.

European Commission (2023), "European Economic Forecast – Winter 2023", European Economy Institutional Paper, February.

Gunnella, V and T Schuler (2022), "Implications of the terms-of-trade deterioration for real income and the current account", ECB Economic Bulletin3: 32-5.

IMF (2023), "Inflation peaking amid low growth", World Economic Outlook Update, January.

Kiss, Á, MC Morandini, A Turrini and A Vandeplas (2022), "Slack and tightness: making sense of post COVID-19 labour market developments in the EU"", European Commission – DG ECFIN Discussion Paper No. 178.

Soldani, E, O Causa, N Luu and M Abendschein (2022), "The post-COVID rise in labour shortages across OECD countries", VoxEU.org, 28 November.

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Time to step up policy coordination in the euro area

The euro area economy has shown impressive resilience. Nevertheless, Reinhard Felke and Nicolas Philiponnet argue that policymakers should sustain vigilance and action

The euro area economy has weathered the shock emanating from Russia's invasion of Ukraine with impressive resilience. In spite of initial worst-case scenarios, it now looks like the euro area could avoid a recession altogether and recent readings suggest that inflation rates may have peaked already.

Irrespective of these positive macroeconomic developments, risks abound on the horizon, requiring policymakers' sustained vigilance and action. This column focuses on diverging inflation trends in the euro area, the interplay between monetary and fiscal policy, and supply-side issues.

In an effort to contain the shock originating from Russia's aggression in Ukraine, European governments have adopted a host of emergency measures to support households and companies. While this has mitigated energy poverty, inflation, and the drop in living standards, measures have often not been entirely coordinated and designed in optimal fashion (Arregui *et al* 2022).

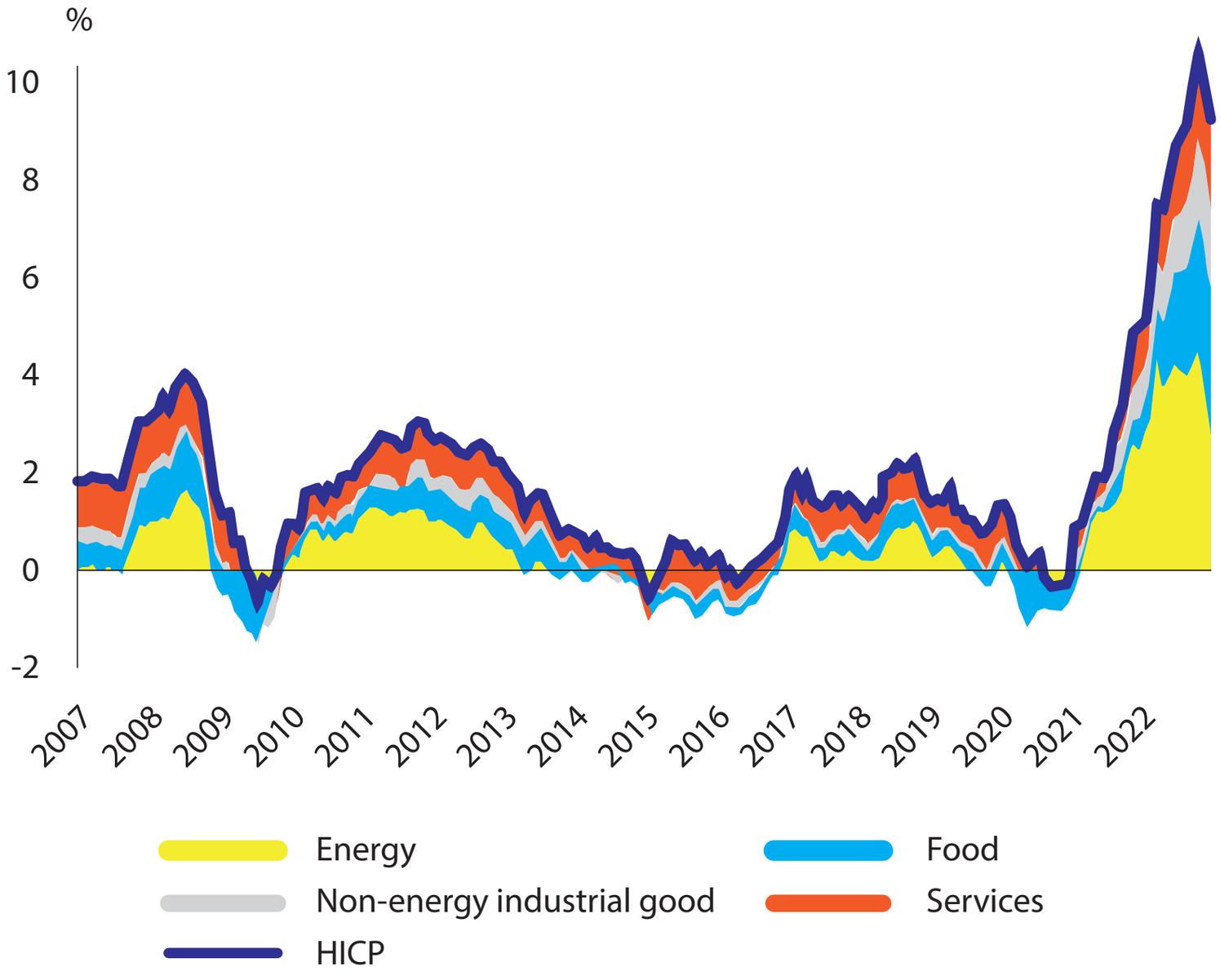
Moreover, specific measures differed widely, not only in terms of design features but also in terms of size, depending on individual governments' fiscal space (European Commission 2022b).

High inflation and recession fears rightly called for demand-side policy responses to support vulnerable households and corporates (Bethuyne *et al* 2022), but beyond the very short term, these can only be successful when partnered with a much broader and longer-term policy agenda to limit energy demand, develop alternative sources of energy, and improve productivity.

Diverging inflation trend in the euro area

Inflation is high in all euro area member states, but it also shows striking heterogeneity across countries. Discrepancies in inflation rates across the euro area have gone less noticed in the policy debate so far.

Figure 1. Components of HICP inflation in the euro area, 2007-2022



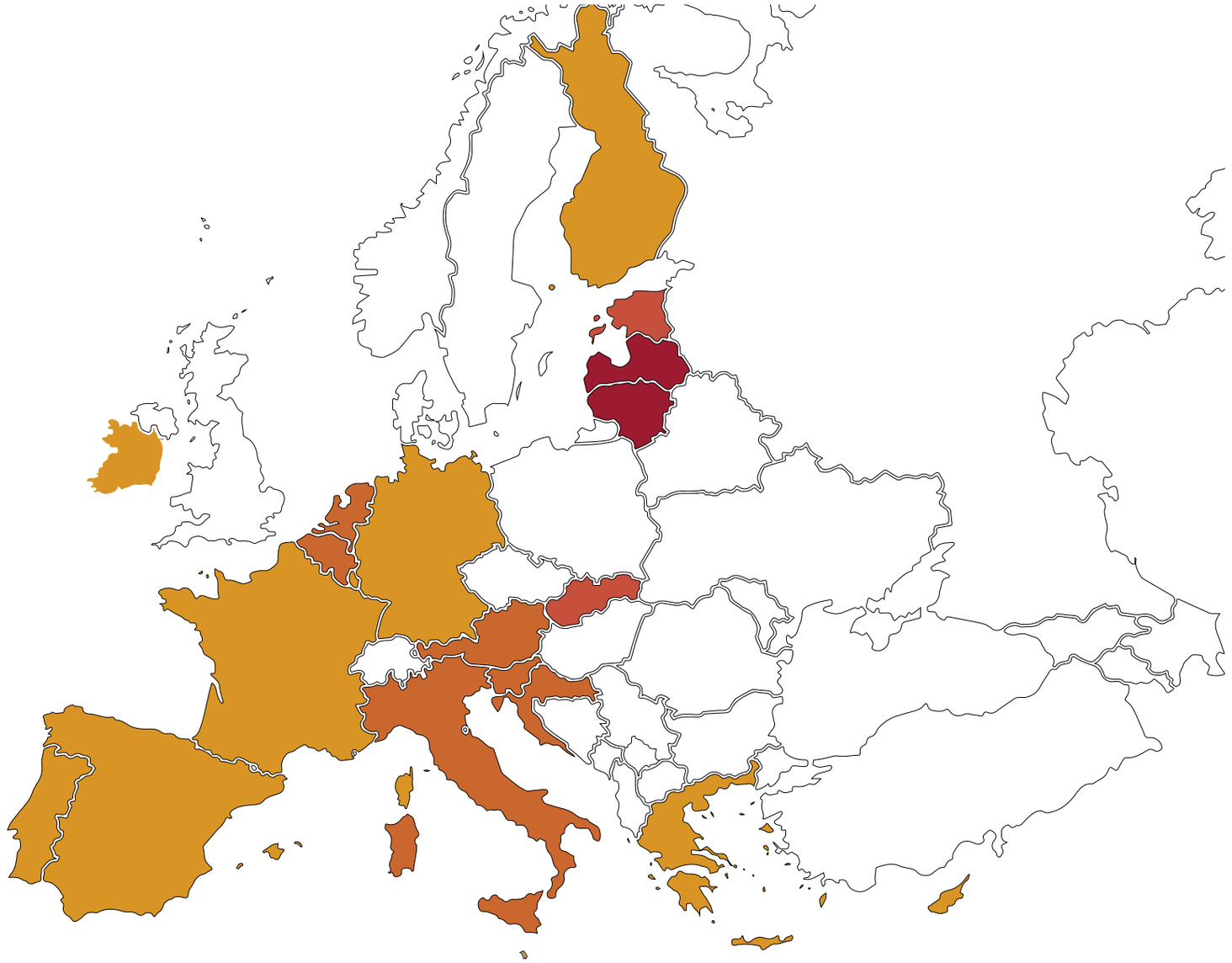
Note: Annual inflation; monthly data.

Although they are exposed to the same global factors impacting energy prices, the annual inflation rate was above 20% in Latvia and Lithuania in December and below 7% in Spain, France and Luxembourg (Figures 2).

Such large divergences are unprecedented since the creation of the euro area. They are to a large extent driven by economic structure and country-specific energy intensity, that is, the energy necessary to produce one unit of value added in the economy. Structural features drive in particular the extent to which increases in energy prices pass through to other sectors and goods in the economy.

Addressing high inflation and the consequences of the energy shock remains a key challenge for policymakers in the euro area. A coordinated policy response is needed to avert long-term divergences and fragmentation

Figure 2. HICP inflation in the euro area, December 2022 (%)



Policy measures taken by individual countries to compensate workers and companies, in some cases by muting the energy price increases also contribute to price divergences.

Inflation pressures are expected to ease gradually going forward, but this will not necessarily take place at an even pace throughout the currency union. Persistent gaps in price and wage inflation across the euro area could impede the good functioning of the euro area and they call for particular attention.

First, divergences make it more challenging to ensure that the single monetary policy is effective throughout the euro area. Second, price differential may translate into competitiveness divergences driving persistent differences in economic and labour market performance.

It is worth recalling that it was ten years of build-up in external imbalances within the euro area's early days that laid the foundation for the euro crisis in 2010.

Vigilance and policy coordination in this respect is therefore warranted, reinforcing the relevance of tools such as the Macroeconomic Imbalance Procedure within the European Semester.

Managing the policy mix

Confronted with a clear deceleration in economic activity and still high inflation, fiscal policymakers are in a tight spot. Fiscal policy needs to respond to social needs and support vulnerable, yet viable, energy-intensive companies, but it should also not provide an inflationary push to the economy.

In a context where monetary conditions are tightening, there is a risk that fiscal and monetary policy end up pulling in opposite directions. This is a very different situation from the COVID-19 period, where the accommodative

monetary policy and the supportive fiscal stance acted in sync. The budgetary plans of euro area countries currently foresee an overall neutral fiscal stance for 2023, which is appropriate.

However, this stance could become much more expansionary if the emergency energy measures, which are currently expected to be rolled back in 2023, end up being extended. Much will thus depend on developments in energy prices and on the policy reactions to these.

If supports continue to be required, further efforts will be needed to increase the quality and targeting of the related measures. So far, only 20% of energy measures are income measures targeted to vulnerable households or energy-intensive companies (European Commission 2022a).

Most measures are poorly targeted and, more often than not, they distort prices and reduce the incentives to lower energy consumption. There is a consensus on the need to enact temporary, targeted, and non-distortionary measures moving away from broad-based price measures (Eurogroup 2022).

Still, the political pressure to lower actual energy prices, together with the difficulties of designing and rolling out well-targeted income measures, will remain an obstacle. A common approach at the EU level to adopt two-tier energy price systems, according to which a lower price is applied for a basic share of the energy consumption, could be instrumental.

Fiscal policy's focus on addressing the immediate impact of the energy crisis should not crowd out the long-term response to structural challenges. The green and digital transition, but also security concerns, call for additional investment.

Most of the investment needed for the green transition is expected to come from the private sector but public spending still has a role to play, for instance as part of large infrastructure projects or to support a green industrial policy (Terzi *et al* 2022).

At a time when public debt in some euro area member states is at a record-high level, the fiscal space available at the national level to support investment needs for the long-term is limited. The increase in interest rates, which will gradually feed in higher debt service, is set to weigh on member states' debt dynamics.

In this context, EU level instruments can provide support (European Commission 2023). The need to respond to long-term reform and investment needs while addressing short-term policy challenges is the key rationale for the Recovery and Resilience Facility, launched in early-2021, and of the REPowerEU initiative, on which the Council and the European Parliament reached an agreement in December 2022.

Preventing entrenched competitiveness differentials

As energy prices increases diffuse throughout the economy, the competitiveness of euro area companies vis-à-vis international competitors is affected.

More energy-intensive production processes, and in particular upstream processes, are affected the most. However, inter-sectoral dependency means that even sectors with relatively limited energy content see a rise in input prices.

Within sectors, more vulnerable companies, and in particular SMEs, may find it difficult to improve energy efficiency in the short term. It is therefore important to facilitate adjustment and to do so in a coordinated manner across the EU.

Higher competition can contribute to lower inflation and provides further incentives for companies to increase energy efficiency. A more efficient insolvency framework can also support the reallocation of resources associated to the energy transition.

In the short term, however, temporary support schemes to help vulnerable firms weather the sudden increase in energy prices, in line with the state aid framework, are useful (European Commission 2023).

However, differences in the level of public support, together with heterogeneous energy price inflation across countries, impacts on relative competitiveness within the euro area.

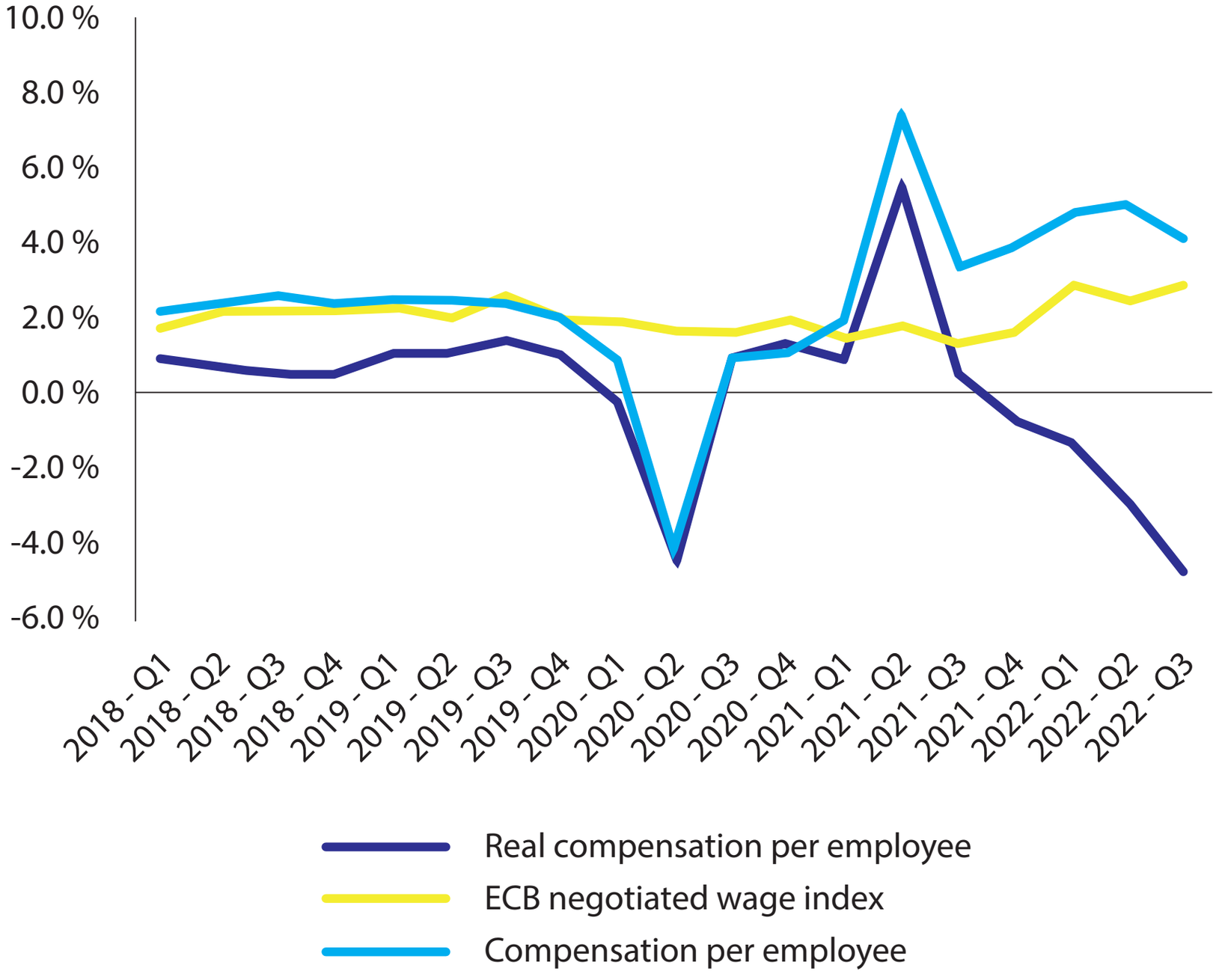
Within the Single Market, support should be coordinated to avoid harmful distortion to fair competition and a possible 'subsidy race' that would weigh on public finances and delay the energy transition.

Eventually, as the costs for carbon-intensive energy will remain elevated, efforts to increase energy efficiency and the use of renewable energy are key to maintain euro area companies' competitiveness.

Developments in wages in the face of high inflation also remain a key point of attention for policymakers and social partners. Compensation per employee increased in 2022, but at a pace that was much below inflation (Figure 3).

On the upside, the contained wage developments have contributed to keeping inflation expectations well-anchored. This implies however that the purchasing power of wage has eroded – and is expected to continue doing so in 2023 (European Commission, 2022a) – holding back consumption in the short term.

Figure 3. Nominal and real compensation per employee



The impact of inflation is strongly regressive, hitting lower income levels disproportionally hard. This calls for an adequate update in the minimum wage, and targeted social benefits and tax measures that can alleviate the impact on low-wage workers. Mirroring the heterogeneity in inflation, developments in nominal wages are very different from country to country.

Going forward, wages are expected to accelerate in a staggered manner in order to gradually recapture lost purchasing power. There is a thus risk that, even if energy prices recede, divergences in unit labour costs persist over time.

It will be important that future wage growth remains in step with relative productivity developments to avoid that divergences in unit labour costs become entrenched and contribute to widening competitiveness gaps across the euro area.

Conclusion

Addressing high inflation and the consequences of the energy shock remains a key challenge for policymakers in the euro area. Given the heterogenous impact across the area, a coordinated policy response is needed to avert long-term divergences and fragmentation.

With its proposal for the euro area recommendation, which was approved by the Council on 17 January, the Commission has outlined a comprehensive policy agenda encompassing fiscal, labour market, social and structural policies (European Commission 2022c).

It echoes the Eurogroup's call for coordinated energy measures. There is an overall consensus on the way forward, and the next few months will put the resolve of member states and their ability to adopt a coordinated approach to

the test. The recent agreement on REPowerEU and the effective implementation of the RRF are encouraging signals in that respect. ■

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References

Arregui N, O Celasun, D Iakova, A Mineshima, V Mylonas, F Toscani, Y Wong, L Zeng, L and J Zhou (2022), "Targeted, Implementable, and Practical Energy Relief Measures for Households in Europe", IMF Working Paper No. 2022/262.

Bethuyne, G, A Cima, B Döhring, Å Johannesson Lindén, R Kasdorp and J Varga (2022), "Targeted income support is the most social and climate-friendly measure for mitigating the impact of high energy prices", VoxEU.org, 6 June.

Eurogroup (2022), "Eurogroup statement on draft budgetary plans for 2023", Eurogroup statements and remarks, December.

European Commission (2022a), European Economic Autumn 2022 Forecast, European Economy Institutional Paper 187, DG ECFIN, November.

European Commission (2022b), Euro area report, European Economy Institutional Paper 193, DG ECFIN, December.

European Commission (2022c), Recommendation for a Council Recommendation on the economic policy of the euro area, COM(2022) 782 final.

European Commission (2023), A Green Deal Industrial Plan for the Net-Zero Age, COM(2023) 62 final.

Terzi, A, M Sherwood and A Singh (2022), "Industrial Policy for the 21st Century: Lessons from the Past", European Economy 157.

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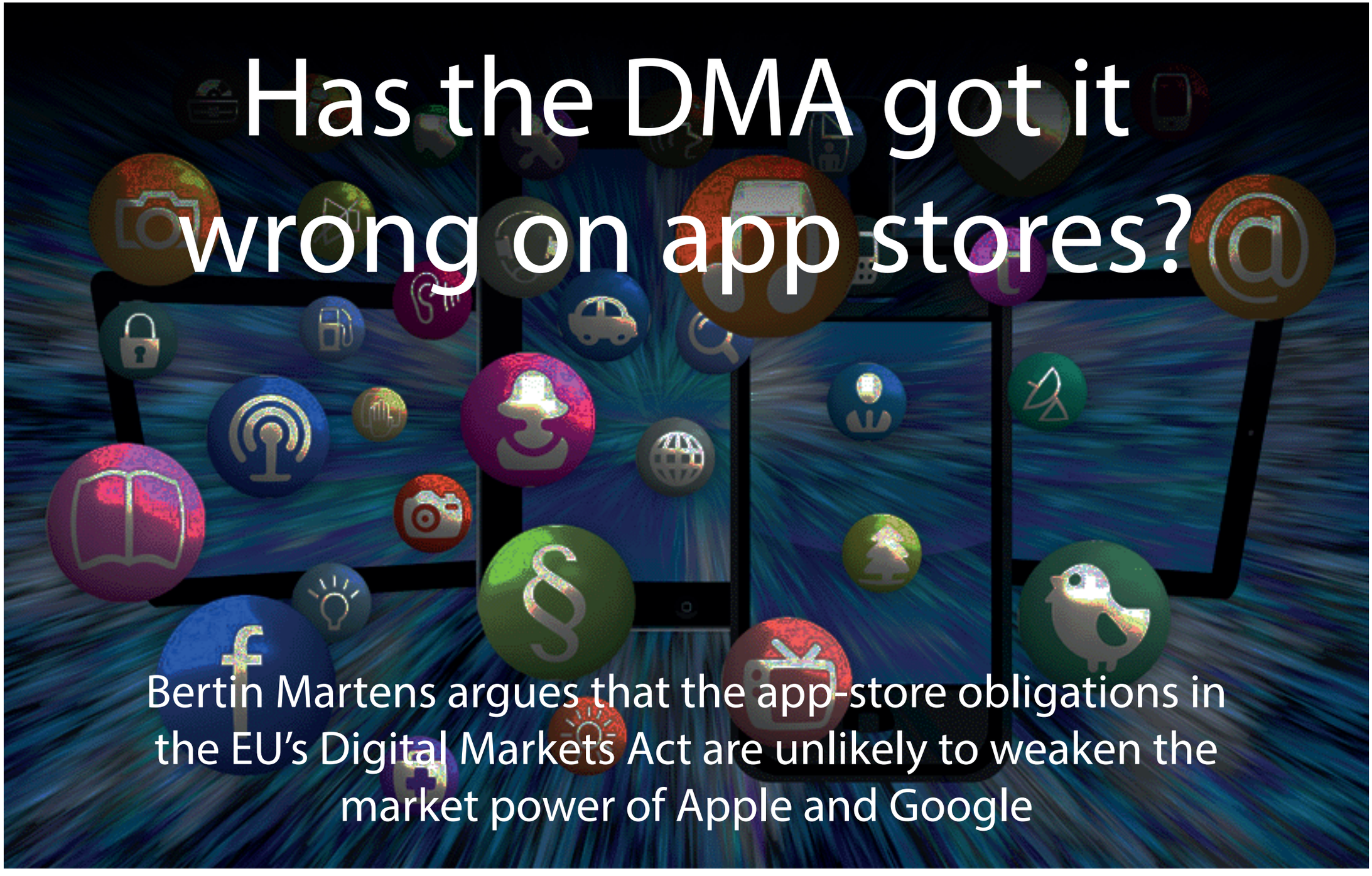
Has the DMA got it wrong on app stores?



Bertin Martens argues that the app-store obligations in the EU's Digital Markets Act are unlikely to weaken the market power of Apple and Google

Apple's iPhone and Google's Android mobile operating system dominate the smartphone market. The two companies also control the app stores consumers use when downloading apps for use on their smartphones.

iPhone users can download apps only from the Apple app store. Android phones, meanwhile, allow 'sideloading' of apps from stores other than Google Play. For example, handset manufacturers can install their own app stores on phones. However, these alternatives are rarely used.

As a result, Apple and Google are firmly entrenched as app gatekeepers. They charge app developers store entry fees and a 15%-30% fee on in-app sales of digital services, such as subscription renewals and additional features in games, though there are no fees on in-app sales of physical goods and services, such as e-commerce products or transport services.

Some popular app developers, including Spotify music streaming and Fortnite games, have complained about these high fees. They say they harm consumers by increasing prices for in-app services. They want to bypass the incumbent stores with their own app stores and payment services.

The European Union's Digital Markets Act (DMA), which will apply from 2 May 2023, buys into these arguments. It seeks to erode the market power of app stores and to increase competition in app markets.

This will be done, first, by a requirement that consumers should be able to download apps from competing app stores. Second, consumers and app developers should be able to use competing payment service providers for in-app sales.

These obligations together are intended to stimulate price competition and enable app developers to circumvent the high fees Apple and Google charge on in-app sales.

The gravity force of network effects

But there are reasons to doubt whether these provisions will work. Google already complies with the first obligation because Android phones allow sideloading from other stores. But, because of network effects, this theoretical choice makes little difference.

Regulators need to consider the whole rather than the separate parts, or risk losing the network benefits in the bid to tackle monopolistic pricing behaviour

App developers want to be where consumers are, and vice versa, meaning that developers must be present in both the Apple and Google Play stores, while consumers have no incentive to switch to other stores because it would not give them access to more apps.

A look at the Chinese Android app market gives a sense of the importance of the network effect. Google withdrew the Google Play store and Google Search from China when it came under censorship pressure (Apple has no search engine and accepted app store content restrictions imposed by Chinese authorities).

The effect in China was to remove the dominant app store and open up competition between hundreds of smaller Android app stores. Under the DMA, this might be considered a successful achievement of contestable markets, but in fact the Chinese experience has been higher search costs among fragmented stores and less security for consumers, without evidence of more price competition.

More fragmentation also means higher development and marketing costs for app developers, who need to be present in many stores. Nobody has gained from eliminating network effects around the Google Play store.

Consumers might be attracted by specialised app stores. Large game developers such as Fortnite, for example, might be able to generate sufficiently strong network effects around their own app stores because they have a large and loyal consumer bases, and because their app stores cater to several types of game devices, not only smartphones.

However, these popular game developers are unlikely to want to share their stores with their competitors. This would result in fragmentation of the market for games and the unwinding of network effects. Ordinary apps,

meanwhile, are unlikely to attract enough consumers to make their own stores viable. Network effects will force them to stay in the main Google Play and Apple app stores.

Network effects are also relevant for payment services. Via Apple Pay, consumers can cover all payments in all their iPhone apps, whereas separate app-by-app registration and payment would be onerous. Banks and credit card issuers will also want to benefit from these network effects.

So while app-store operators may exploit their power to increase prices, consumers and app developers also benefit from each other's massive presence. A monopolistic price enables app-store operators to monetise and appropriate part of these consumer benefits.

As long as consumers consider that network-effect benefits exceed the price they pay, including switching costs, they will stay with the dominant app store and payment service. The DMA tends to ignore the benefit side. It bets that price competition may overcome the gravity force of network effects.

Some consumers might indeed be prompted by lower prices to step outside the app stores and use another payment service. A newspaper app for example, could offer a subscription discount if payment is done through the newspaper's own website and payment service rather than through the app. The newspaper would then avoid the app-store operator's 15% fee. But how much of this 15% price margin would the newspaper be willing to share with subscribers?

Ex-ante versus ex-post measures

The idea of taming the big app stores also faces other difficulties.

Regulators could try to intervene in the pricing of access to stores. But app-store operators can retaliate by charging higher fees on alternative payment channels. That is what happened in the Netherlands, after the Dutch competition authority judged that Apple should allow alternative payment channels to increase price competition.

Apple lowered the fee on in-app purchases from 30% to 27%, but developers now pay a separate 3% fee on the in-app payment service. Even if the fee on in-app purchases went to zero, Apple has many other options to recuperate revenue.

The DMA prohibits 'anti-circumvention' measures that make the exercise of users' rights unduly difficult. For instance, restrictions imposed by app-store operators on app developers that prohibit the advertising of alternative payment services inside an app are likely to be considered as anti-circumvention measures.

However, there are loopholes. For example, the DMA allows app-store operators to protect the integrity and security of apps and hardware. Apple and Google can justifiably claim it is costly to run app stores and operating systems, and to ensure consumers can enjoy secure and high-quality apps. It would be much harder to argue that such alternative fees are anti-circumvention measures.

This is where the proportionality principle comes into the debate: are these fees proportionate to the service provided? That is where economics may slip back into the DMA. The DMA is deliberately designed to remove economic efficiency considerations from the implementation of the app-store obligations.

Competition authorities are too frustrated with endless economic arguments with large platforms. The ex-ante DMA obligations are designed as a short-cut to gain time. But the short-cut may turn out to be a dead-end.

Alternative fees could spark a classic economic debate about reasonable fees for app-store services: 15%, 5%, or some other number? Going down that road is likely to end up with price regulation, similar to the telecoms sector, where network access prices are subject to regulation.

Some argue that app stores, like telecom networks, should indeed be treated like public utilities and regulated accordingly. However, creating a precedent with app stores could soon spread to other core platform services operated by DMA gatekeepers. Policymakers are unlikely to want to go that way.

Alternative approaches

Full implementation of the DMA is no guarantee that the app-store obligations will achieve the objectives of an open and contestable app-services market. Regulators need to consider the whole rather than the separate parts, or risk losing the network benefits in the bid to tackle monopolistic pricing behaviour.

The DMA app-store obligations reflect old standards in competition policy, such as price competition and the idea that small is beautiful when it comes to market shares. But in a digital platform economy, big market shares, because of network effects, also have their beautiful side.

Policymakers could start by recognising the benefits of network effects for developers and users of apps and payment services. That would create space for a comparison of the costs of monopolistic behaviour with the benefits of network effects.

This cost-benefit analysis may not be admissible yet in the dialogue, foreseen in the DMA, between authorities and gatekeepers. That dialogue is supposed to focus only on the implementation of the obligations, not on the effectiveness of the obligations.

While this distinction may be a bit artificial, the European Commission may want to play it hard in the early phases of implementation. It will however be forced to reconsider that position if the results remain unconvincing.

The DMA allows for a revision of the obligations, following a market investigation of their effectiveness, by delegated act and without changes to the DMA regulation itself. That is where economic cost-benefit analysis and evidence will become unavoidable.

Economic analysis will necessarily take into account the multi-sided market nature of app stores, including the costs and benefits of network effects that are an integral part of multi-sided markets.

The DMA gives competition authorities deep access to gatekeepers' internal data. That will facilitate economic analysis and enable them to make more informed judgements about the costs and benefits of various policy options. Any revision of obligations should avoid the costs of a partial or full unwinding of network effects and app market fragmentation. ■

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Pro- and anti-competitive provisions in the proposed EU Data Act

Bertin Martens explores several pro- and anti-competitive provisions included the proposed EU Data Act

The proposed European Union Data Act gives users access and portability rights to the data generated by their use of tangible digital products and devices. This pro-competitive measure weakens the de-facto monopolistic control product manufacturers have over product data.

However, the Data Act would also grant manufacturers a de-jure right to monopolistic pricing of data transfers to third-party service providers, restoring their control over data markets. Other anti-competitive provisions include restrictions on the use of data for competition purposes and a prohibition on transfering data to platforms identified as gatekeepers under the EU Digital Markets Act.

Unnecessarily fuzzy definitions of products and data that fall under the Data Act would create uncertainty in implementation and incoherence with other EU data regulations.

The Data Act should be simplified by dropping anti-competitive provisions and granting users and third-parties selected by users free access to all data generated by the use of a product or a service. This would increase competition in data-driven services and prevent users paying twice for their data. It would not disincentivise producers from investing in data-driven products and services.

A further step could be the creation of a level playing field between producers and users in data-access rights. This can be achieved by introducing the principle of mutual exhaustion of data rights at point of sale. This would put all data co-generating parties in a position to generate economies of scale and scope in data aggregation, or data-driven externalities, to maximise innovation.

1 Introduction

Modern digital economies are replete with connected internet-of-things devices, including in home appliances, buildings, cars, industrial machines and medical devices. These devices contain physical sensors that collect analogue signals – light, sound, temperature, physical movement – and convert them into binary electronic data.

Data is processed by embedded software, or communicated to remote servers for further processing. Device manufacturers can design open or closed data architectures. With closed architectures, technical-protection measures at hardware and software level prevent device users from accessing the data directly.

Competition-restricting provisions in the DA create unnecessary obstacles to the development of data markets and innovation in data-driven services markets

Manufacturers retain exclusive control over the data and become de-facto owners of the data. Device users can only access the data in line with the monopolistic terms and conditions set by manufacturers. Open data architectures, by contrast, increase competition in upstream data markets and in downstream data-driven services markets.

The European Union's 2016 general data protection regulation (Regulation (EU) 2016/679, GDPR[1]) took a first step towards the freeing of personal data collected by digital devices or in online services from exclusive control by manufacturers.

It introduced several data rights for natural persons as data subjects, including the right to access, delete and port personal data, and the obligation of data controllers to obtain data subject consent for collection of their personal data.

However, the GDPR says nothing about access to non-personal data, such as business data, or access rights for businesses that are legal entities.

The recognition that data access rights are important culminated in the European Commission's February 2022 proposal for a Data Act (DA; European Commission, 2022a), which would open up the data architecture of digital devices by introducing a data access right for device users, including the right to port data to a third-party of their choice[2].

The DA takes a balanced approach that combines a strengthening of user rights with strengthening of the manufacturer's position, by granting the latter an exclusive right to negotiate a contract with users and third

parties, charge a price for third-party data access, and other restrictions on the use of device data in services markets.

This combination of pro- and anti-competitive provisions looks very similar to the economic logic that underpins intellectual property rights (IPR), with monopolistic rights that result in static welfare losses that are compensated for by dynamic welfare gains from incentives to continue to invest in collecting data.

In this paper we address two research questions. First, we discuss to what extent the DA's mandatory data access rights for users will effectively weaken the device manufacturer's monopolistic control over user data and open up competition in data-driven services markets.

This analysis takes a vertical-integration perspective, between upstream data markets and downstream data-driven services markets. It starts with the main pro-competitive provision in the DA, which grants 'product' or device users access and portability rights to the device data.

It discusses the scope of these access rights in terms of the definition of 'products' or devices, and the type of data that falls within the scope of the DA. It assesses to what extent these definitions might promote or distort competition in data and data-driven services markets.

It then explores several anti-competitive provisions, including monopolistic third-party data pricing rights for device manufacturers and data holders, and the prohibitions on using data to compete in product and services markets, and on porting data to platforms that are designated as 'gatekeepers' under the EU's 2022 Digital Markets Act (Regulation (EU) 2022/1925, DMA[3]).

We find that the combination of data portability rights for users and the right to monopolistic data pricing for device manufacturers tilts the balance in the data value chain in favour of the manufacturer and data holder, at the expense of users and third-party service providers.

In line with other scholars (Kerber, 2022), we conclude that the DA de jure endorses a de-facto exclusive data control right for the device manufacturer, by introducing a quasi-IPR-like data right.

Manufacturers already have classic IPR instruments at their disposal to protect and incentivise their investment in data-collection hardware and software in devices (Antoine and Leistner, 2022). Moreover, fuzzy definitions of the scope of the DA create uncertainty in implementation, and may result in distortions in device markets and data-driven services markets.

Other competition-restricting provisions in the DA create unnecessary obstacles to the development of data markets and innovation in data-driven services markets. As a result, the DA is likely to have, at best, an ambiguous impact on competition in these markets, and may slow down innovation.

We recommend the elimination of anti-competitive and market-distorting provisions in the DA, including the third-party data-pricing right for manufacturers and data holders, the prohibition on porting data to DMA gatekeepers, and other direct restrictions on the use of data for competition purposes.

The scope of the DA could be clarified by applying DA portability rights to all non-personal data generated by the use of devices, and extending its application beyond devices to services. These policy recommendations are not new. They are already applied in several other EU data-regulation instruments, including the DMA and the proposed European Health Data System (EHDS, European Commission 2022b).

These recommendations would contribute to greater coherence and reduced uncertainty in the rapidly emerging EU data-regulation structure, a vast and complex political- economy project in the making.

While the DA remains silent on data rights for producers, we also explore the potential implications of creating a level playing field between data-access rights for producers and users.

In a second step, we take a wider perspective on the social value of co-generated data and market failures that may prevent realisation of social value in data-driven services markets.

Once collected, data is non-rival and can generate economies of scope in re-use for a wide variety of purposes, without functional loss to the original use, though some uses may compete with and result in private economic loss for the original user.

Data can also generate economies of scale and scope in data aggregation, or data-driven network effects. These externalities make aggregated datasets more valuable than segmented datasets. Obstacles to aggregation constitute market failures in data markets.

The DA does not address data-driven network effects. It assigns data access rights to product users and assumes implicitly that producers have full access to product and related services data. That may not necessarily be the case.

Producers are in a better position to generate economies of scale and scope in data aggregation, or data-driven network effects, because they can aggregate data across many users; users only have access to their own user data.

Granting producers the same data access rights as users would not only restore the level playing field between the co-generating parties – in case that field is distorted – but would also enable producers to generate data-driven network effects that may contribute to further innovation in data-driven services.

We recommend that the social value of data could be maximised by introducing the concept of mutual exhaustion of data rights, for producers and users, at the point of a data product or service sale, subject only to restrictions related to pre-existing rights for the parties, such as GDPR rights for personal data or trade secrets for business data.

This paper is structured as follows. Section 2 presents the main pro-competitive provision in the DA, giving users access and portability rights to device data. It explores the scope of this right with regard to the definition of 'products' and user data.

Section 3 presents third-party data-pricing rules and explores the economic implications for data markets and data-driven services markets.

Section 4 focuses on the prohibition on porting of data to large platforms that are designated as gatekeepers under the EU Digital Markets Act (DMA).

Section 5 examines other anti-competitive clauses that prohibit the use of product data for design of competing products or services that affect the welfare of any of the parties involved.

Section 6 explores economies of scale and scope in data aggregation and proposes the introduction of mutual exhaustion of data access rights at point of sale, as a means to maximise the social value of data.

Section 7 summarises and concludes with some policy recommendations.

2 The Data Act opens access to product data

The proposed DA constitutes a regulatory intervention in digital data markets. It imposes mandatory data access rights for users of 'products', thereby circumventing any access rights negotiated or offered in commercial markets[4]. What type of market failure justifies this regulatory intervention?

Whether closed architectures result in product and/or service market failures and justify regulatory intervention depends on the relationship between device markets and aftermarkets for related services produced after the purchase of the device.

According to the Chicago Critique (Posner, 1978), there is no need for regulatory intervention when device markets are competitive and users have sufficient information on aftermarket services costs at the time of buying a device.

Prospective buyers can add up the cost of the device and aftermarket services to compare the joint cost between competing devices. That simple formula works well when it is relatively easy to predict aftermarket services costs, for example, running and maintenance requirements for cars[5].

This is much harder for most digital devices because the data they generate enables consumption of a wide range of data-driven services, often provided through apps, with variable quantity and pricing options that are hard to predict, especially when technology and services markets are evolving fast.

Most of these services are experience goods that can only be evaluated after initial use. Device users may remain trapped with a device and service that is no longer competitive. Hence regulatory intervention is important to ensure effective competition in data markets and data-driven services markets by opening up the data architecture. This enables users of digital devices to separate the choice of device and aftermarket services.

The producer-user relationship envisaged by the DA applies to wide range of industrial and services settings. In a complex industrial production chain for example, there may be many producer-user pairs. A firm runs a production process that uses many machines, produced and sold or leased by other firms.

Each of these machines, in turn, may consist of several data-generating components produced by other firms. DA Recital (20) suggests that multiple owners or leasing parties should be given access to the data, but component producers should not, unless they retain an active role as a provider of data.

The DA remains silent on the rights of data producers. The implicit assumption in the DA is that producers are in fact data holders and should give users access to the data. The reverse situation may occur, whereby users become data holders and producers have no access to the data.

For example, a manufacturer of industrial robots assembles several data-producing components, produced by other firms, into a robot. The DA does not grant component producers access to their component data in that case. These data could be useful for the component manufacturer to improve the quality of his components.

With the DA, the European Commission has proposed a horizontal cross-sectoral approach to open access to digital data. It would be too cumbersome to study potential market failures in each and every product market and examine whether the Chicago Critique conditions would be applicable.

As such, the DA has potentially a very wide reach across the entire digital economy, just like the GDPR. That brings us to two other key elements that determine the scope of the DA: the products and data affected by the regulation.

2.1 What is 'product' data?

The DA grants product users free access to all *"data generated by the use of a product"* (Art 3.1). That introduces the new concept of 'product' data into EU legal jargon, alongside the existing distinction between personal or non-personal data introduced by the EU GDPR. It also begs the question about the distinction between 'product' and 'non-product' data.

DA Art2(2) defines a product as a tangible item that collects data concerning its use, is able to communicate data via a publicly available communications service, and whose primary function is not storing and processing data.

According to Recital (14), this may include vehicles, home equipment and consumer goods, medical and health devices or agricultural and industrial machinery. Recital (15) adds that personal computers, tablets, smart televisions and speakers, cameras, webcams and sound recording systems are not to be considered as products, and their data should consequently not fall into the category of product data.

Recital (14) moreover specifies that data inferred or derived from product data should not be considered within the scope of the DA. As noted in the introduction to this paper, the notion of 'machine' data, or data generated by a tangible physical product, has lingered around at least since the European Commission (2017) communication on data policy. The DA proposal still reflects this thinking with the introduction of 'product' data.

The GDPR introduced the distinction between personal and non-personal data and marked the start of various attempts to split data into different categories. The debate on the borderline between personal and non-personal data has never really been settled and leaves an ambiguous grey zone. The DA could have started from the residual category of non-personal data. Instead, the authors decided to introduce a new criterion to categorise data: product data.

The origins of European Commission thinking about machine or device data as a separate concept go back several years when, in line with Zech (2015), the European Commission (2017, pp 10-13) suggested the introduction of a data producer right that would give the owner or user of a data-enabled device an exclusive right to non-personal 'machine' data. Others objected to this exclusive right because it would fragment access to co-generated data and increase transaction costs in data markets (Kerber, 2017; Drexl, 2018).

Since then, the idea of granting exclusive data ownership rights to a single party has gradually been abandoned[6] and replaced by access and use rights for multiple parties. Data is usually co-generated between at least two parties who have a stake in the data and can claim access rights.

However, the concept of 'machine data' has continued to float around. It resurfaced in the European Data Strategy (2020, p 21), which previewed the DA, and has now been given legal status in the DA. This is problematic.

Digital data does not float in thin air. All data require tangible electronic devices (products, machines) that combine hardware and software to collect, store, process and transmit data. Data that registers physical phenomena, such as user behaviour or environmental conditions, requires physical sensors that convert analogue into digital signals.

Conversely, interaction between digital machines and humans requires conversion of digital electronic signals into analogue output that can be interpreted by humans.

In that sense, all data is product or machine data. The dichotomy between product and non-product data is therefore artificial and makes little sense in a digital world. The DA implicitly acknowledges this.

In order to maintain the idea of product, device or machine data as a separate category, it introduces a rather arbitrary distinction between products that are included (Recital 14) and excluded (Recital 15) from the scope of the DA.

Creating a category of products that do generate data but do not fall under the definition of product data, makes the problem even more complex and inevitably leads to borderline disputes.

These disputes already started before the DA was proposed. During preliminary discussions in the Council of the EU, the Czech Presidency of the Council in July 2022 noted that *"smart watches have a strong element of collection of data on human body indicators or movements and should thus be considered covered by the definition of 'product'"*[7].

One could make exactly the same argument for laptops, smartphones, cameras and other devices that have been excluded from the category of 'products'. For example, would agricultural field data collected on a smartphone or tablet be exempted from the application of the DA, while the same field data collected by a device integrated into a tractor would be subject to the DA?

Many home and industrial appliances today are managed through apps that operate on smartphones and tablets. The apps are intermediaries between the sensors and the data holder who uses edge processing and communication capabilities on these devices to transmit (pre-processed) data to his own servers.

Since Recital (15) excludes these devices from the DA data-governance regime, data access rights would not apply when these devices are used for data collection. This creates a loophole for manufacturers and data-based service providers to circumvent the DA and distort competition in data markets by moving their services to these devices.

Medical and health devices have been included in the 'product' category and should thus fall under the application of DA rules. But what if medical data are collected by a smartphone that is not considered to be a 'product'?

Fortunately, the European Commission's (2022) proposal for a European Health Data System (EHDS) (2022) bypasses this border dispute in the case of health data devices. It ignores DA distinctions between product, non-product and services data, or between primary and processed data. That unified data approach could have been a template for the DA as well.

All these problems can be avoided by dropping the product definition in Art 2(2) and Recitals (14) and (15). There is no need for a definition of 'products' because all data is collected and stored on tangible products. Some products or devices already provide users with access to data and the possibility to transfer data to third parties.

For example, most laptops, tablets and smartphones have very open data-access systems. Users can easily access and transfer the data collected and stored by these devices to any party of their choice. They already comply with the DA. Many devices have less open access systems and do not comply with the DA, or only partially.

The DA will force them to open up access to data. Art 2(2) could be replaced by a statement that declares all data generated by digital devices and services to be subject to the provisions of the DA.

The DA offers no useful purpose or rational for the distinction between 'product' and 'services' data. The primary purpose of the DA could be to provide a horizontal data access regime that extends data access rights beyond the GDPR to non-personal data and for business users.

The Business-to-Platform Regulation[8] took some first steps in that direction. The DMA expanded these access provisions to non-personal data for businesses to core services data in very large gatekeeper platforms.

The DA can generalise these user data access rights further to smaller businesses. The DA data-governance regime would then apply to any data collected by a device or a service. Dropping the definition of product data would avoid many anti-competitive distortions, or attempts to create distortions based on borderline disputes, in data markets and data-driven services markets.

2.2 What data does the DA cover?

Recital (14) states that product data *"represent the digitalisation of user actions and events and should accordingly be accessible to the user, while information derived or inferred from this data should not be considered within the scope of this regulation."*

This raises a new question about the data covered by the DA: where is the borderline between primary and derived or inferred data? Recital 17 states that this excludes *"data resulting from any software process that calculates derivative data … as such software process may be subject to intellectual property rights."*

This stretches IPR law beyond its current boundaries. It extends copyright protection of software code to the data generated by that software. This would be equivalent to, for example, Microsoft claiming IPR rights on data files generated by users of Microsoft Office software. Excel spreadsheets would only give users access to the primary data that they put into Excel files but not to data calculated by the spreadsheet.

The Recital gives legal endorsement to a commercial strategy that has been tried by machine producers, for example in the agricultural sector (Atik and Martens, 2021). Perzanowski and Schultz (2016) discussed why this practice has no legal foundations.

If we take Recital 17 literally, almost all digital data could be classified as processed data. The digitalisation of user actions and events in an environment implies the conversion of analogue sensor signals (light, sound, mechanical movement, temperature, etc) into digital data. That conversion requires the use of software that derives digital output data from an analogue impulse recorded by a hardware sensor.

In complex machines, digital output data from many sensors can be processed in local-area networks that steer processes in these machines. For example, modern cars have several local networks that handle engine and fuel functions, automatic gearboxes, breaks, etc, in function of the driver's behaviour.

Connected and semi-automated agricultural machines include many sensors and processors of sensor data, as well as complex software processes that handle machine functions at a more aggregate level, depending on the user's instructions given to the machine.

Moreover, agricultural machines may process combined data inputs from third parties, including land and soil mapping providers, agricultural inputs suppliers and agronomic advisory services, to optimise machine outputs. Farmers will want to access all these types of data. It is not clear to what extent the DA definition of accessible user data would effectively make all this data available to farmers.

The European Parliament rapporteur on the DA has proposed an amendment to Art 3(1) to clarify this (European Parliament, 2022): all data generated by the use of devices that are accessible to the data holder should also be accessible by users.

This amendment creates a level playing field between data holders and product users. It discards the distinction between primary and processed data and replaces it by all data accessible to the data holder. This approach has already been tried in other EU data regulations.

For example, the distinction has been dropped by some data-sharing obligations for gatekeepers in the DMA and primary data portability provisions in the EHDS.

However, the proposed European Parliament amendment has its own problems. Modern digitally equipped machines, including cars, aeroplanes, robots and smartphones generate huge volumes of data, much of which is for internal use to ensure the proper functioning of the system. Modern cars for example generate thousands of datapoints and signals between components of the vehicle.

All these data are in principle accessible inside the vehicle, but only a small subset is exported outside the car and accessed by the car manufacturer for technical or business use. Access, storage and transmission to an external data server would require expensive storage and telecommunication capacity that would probably be more costly than the potential benefits, at least in the perception of the manufacturer or data holder.

DA Art 3.2 leaves it to the manufacturer or data holder to inform the user about the data generated by usage of a product and how it can be accessed – again discarding the distinction between primary and processed data. The proposed amendment pushes the problem at step further: what do we mean by data accessible to the data holder?

Other service providers and innovators may have use cases for existing but unavailable data, some of which are not necessarily in the business interest of the manufacturer or data holder. The DA would allow the manufacturer to act in his private interest and declare this data not available. That is not necessarily in the interest of society.

The distinction between primary and processed data takes inspiration from the GDPR that gives natural persons access rights to data provided by a person but not to data inferred or derived from that data.

However, not all EU data regulations follow this principle. For example, data-sharing obligations in the DMA go a step further and include market data generated in e-commerce platforms, search engine data and advertising data.

All these datasets include at least to some extent processed data, such as responses to search queries, the outcome of pricing auctions for ads presented by advertisers and ad slots offered by publishers in advertising markets, and consumer demand and sales data in e-commerce platforms.

The European Commission's (2022) proposed data sharing rules for the EHDS completely abandon the distinction between primary and processed data. User data processed by medical devices or even in medical services form an integral part of the data-sharing obligations.

Another reason for sharing processed data with users is that data is usually co-generated between the device manufacturer, data holder and user. The software response would not exist without user input, and user input would not be provided if a software response was not expected.

Data co-generation illustrates why an extension of IPR-like provisions to data is inappropriate. Patents and copyright are not co-generated between an innovator and the users of that innovation; they are the innovator's sole product.

Recital (20) suggests that all parties that have ownership or contractual rights to a product should be considered as co-users and should have access to the data that the product generates. This refers to machine-leasing firms for example.

However, co-generation goes beyond legal and contractual rights to the product or machine that generates data. It includes parties that share the physical and/or digital space from which the device obtains its data.

In agriculture for example, a drone can be used to generate spraying maps and a spraying machine can implement this map. If drone, sprayer, landowner and farmer are different firms, they may claim (partial) access to each other's business data because there are bilateral contracts between the parties.

3 Data access and pricing rules

The DA would introduce a dual-pricing regime for data access: users have free access to the data, third-parties should pay for access. According to Arts 3(1), 4(1) and 5(1), users should have access to data generated by the use of a product, free of charge and in real-time, either directly in the product or indirectly through the data holder.

Data should also be made available to a third party of the user's choice, though not free of charge. Third party data recipients should pay a fair, reasonable and non- discriminatory (FRAND) price according to Art 8(1) and Art 9(1)[9], defined as marginal costs plus a reasonable mark-up, but short of a full profit-maximising monopolistic price.

If the third party is an SME, it should only pay marginal costs without mark-up. Data recipients should conclude a contract ('license agreement') with the data holder and cannot re-sell the data to another party or re-use it for purposes other than those foreseen in the contract.

These provisions bestow IPR-like quasi data- property rights on data holders. The proposed DA remains silent on the right of users to directly transfer their data to a third party in return for benefits[10]. We can assume that the DA does not want to open up this possibility because it would undermine the data holder's ability to charge a price to a third party.

The DA justifies this pricing regime as a means *"to preserve incentives to invest in products with functionalities based on the use of data from sensors built into that product"* (Recital 28). It is hard to see how free third-party data transfers would undermine that incentive.

Data-collection hardware, sensors and software are embedded in a product when it is sold to the user. The manufacturer can recuperate that cost in the sales price, at the point of sale. Manufacturers may update the software but cannot update data collection as such. The underlying primary data collected by the product will not change, even when third-parties pay for a data transfer.

Similarly, when a producer sells a data-based service to a user, the cost of data collection and processing is included in the price of the service. The incentive to produce that service will not disappear if the producer is forced to share the service data with a third party selected by the user.

This dual data-pricing regime leaves data control effectively in the hands of product manufacturers and data holders, unless users do their own data processing. It reduces competition and innovation in aftermarket services.

While some users may be in a position to produce their own services, most users will outsource the production of a data-driven service to a third party. The price paid for the data by that third party will be at least partly reflected in the cost of the service delivered to the user.

Despite the DA's good intentions, expressed in Art 4(1), user access to their own data is not free in this pricing mechanism. Attenuated monopolistic pricing still enables data holders to appropriate and monetise at least part of the user's and third-party's surplus from data use.

Moreover, this may trigger a double marginalisation problem (Staahl *et al* 2019) when both the data holder and the third-party service provider are in a position to set profit-maximising prices. That would drive up prices for data-driven services beyond efficiency levels.

We can observe the implications of a similar data-pricing regime in the automotive sector. The EU Type Approval Regulation (Regulation (EU) 2018/858) mandates access to car maintenance and repair data for independent service providers that are not part of the manufacturer's network of official dealers.

However, the regulation also allows manufacturers to charge a price for the data. Hoegaerts and Schönenberger (2019, p 99) estimated that this increases the price of independent maintenance services by six percent, and possibly more depending of the number of data points that need to be retrieved. Applying the DA to cars will not change that.

DA data-access provisions would only make a difference for car users who produce their own data-driven services. For example, car-rental firms and fleet managers may access the data to keep track of usage, performance and maintenance requirements in their fleets.

The DA goes a step further than the Type Approval Regulation. DA Art 8(3) prohibits price discrimination between third-party data recipients and recipients affiliated (vertically integrated) with the data holder or product manufacturer.

Vertically integrated service should either be considered as a third-party service and be charged the same price, or pricing should be zero for all parties that offer a similar service. That could in principle restore the level playing field for access to data between official dealers and independent service providers.

However, there are many ways to hide data price discrimination in the multifaceted contracts between car manufacturers and official dealers. It is not clear how the prohibition against price discrimination can be verified and enforced.

The Digital Markets Act proposes a more transparent anti-discrimination mechanism for vertically integrated gatekeeper platforms.

Rather than a data price rule, DMA Art 6(1) sets a data access or quantity rule: vertically integrated firms should not have access to market data, or all competing firms should be given equal access to the data. The latter is easier to verify.

The marginal cost pricing rule generates considerable uncertainty because it is subject to a wide range of interpretations. The automotive sector again illustrates this point. Manufacturers can make the data directly available through an On-Board Diagnostics socket inside the car, as they have done for several decades. Installing that socket is a fixed cost that can be recuperated through the sales price of the car.

With the arrival of digitally connected cars however, manufacturers started to collect car data on remote servers. Access to the data is diverted from the car to these servers. Running this remote data-server system entails not only fixed but continuous operational costs. Should all these costs be added to the marginal cost of data access, or is the near-zero direct access cost the appropriate benchmark for a 'reasonable' price?

Similar situations can occur in most connected devices. The DA (Recital 21) would allow both for direct and indirect access to the data, possibly through remote cloud servers operated by a third party designated as data holder on

behalf of the manufacturer. That does not help to clarify marginal cost pricing and may constitute another point of friction in user access to the data.

The European data regulation landscape is becoming increasingly fragmented with respect to data- access pricing. The recently proposed EHDS regulation (European Commission, 2022b) mandates free of charge patient health data transfers between medical service providers.

Health data is personal data subject to the provisions of GDPR Arts 20 and 12, which mandate third-party data portability free of charge. It is difficult to see how the EHDS could have proposed a positive data access pricing rule.

Pricing of third-party data access exists in some sector regulations. For example, the EU Second Payment Services Directive (Directive (EU) 2015/2366) sets a 'reasonable price' for transferring account data from banks to payment service providers.

Payment service providers are competitors as well as complementors of retail banking services. They reduce transaction costs for all parties involved in a payment, in return for a fee, part of which is recuperated by banks through a third-party fee to access the data.

As long as these fees remain marginal compared to the value of the transaction and do not eliminate the reduction in transaction costs, they will not negatively affect the transaction. That explains the success of the Second Payment Services Directive in terms of promoting strong competition in payment services markets. However, the example from car maintenance services above shows that this outcome is not guaranteed.

There is also uncertainty with respect to the scope of application of data-access pricing rules in the DA. It covers all 'product data', which may include personal as well as non-personal data. DA Recital 30 confirms that processing of product data remains subject to the GDPR, *"including where personal and non-personal data are inextricably linked."*

This may trigger a second bifurcation in the data-access pricing regime, with personal (and mixed) data still subject to the GDPR's free-of-charge data transfer to third parties. This suggests that the type of data, rather than economic reasoning, matters to determine the third-party access pricing rule.

4 The prohibition on porting data to DMA gatekeepers

DA Art 5(2) would prohibit data transfers to very large third-party platforms that have been designated as 'gatekeepers', or very large, hard-to-avoid platforms, under the DMA.

In practice, this implies that it is unlikely that data can be transferred to platforms operated by companies such as Apple, Google, Amazon, Microsoft or Meta. This prohibition is presented as a pro-competitive measure.

From a competition perspective, gatekeepers already collect huge data pools that reinforce their market power (Crémer *et al* 2019). The prohibition would prevent a further increase in that data-driven market power.

This section argues that this is a one-sided view that ignores the competition-enhancing effects of platforms and the welfare-increasing benefits of network effects in platforms. It explores the transmission mechanisms for the potential welfare-reducing and anti-competitive impact of this prohibition.

These negative welfare effects occur particularly when gatekeepers play an intermediary role that reduces transaction costs in services markets and economies of scope in the aggregation of market information (Carballa-Smichowski *et al* 2022).

Two examples, from the automotive and smart home services sectors, illustrate how this prohibition creates data-portability bottlenecks that reduce users' choices, competition in downstream services markets and network benefits that users could derive from their internet-of-things devices.

In modern cars, Apple's CarPlay and Alphabet's Android Auto are the dominant in-car operating systems (OS) that potentially enable users to install a variety of aftermarket car services apps. Users are familiar with these OS outside the car. They facilitate seamless synchronisation with other mobile and home consumer devices.

The OS retrieve data directly inside the car through an interface that converts the specific data format of the car brand and model to a standard format so that app developers do not have to re-write their apps for every car model.

The OS in principle enables users to install an alternative navigation app to replace the manufacturer's default navigation service, or maintenance apps from their preferred independent maintenance service provider, or price comparison apps to assist them in the selection of the cheapest maintenance provider.

Intermediary service providers, such as car rental and fleet management companies, could implement their own car services in these OS without the agreement of the manufacturer. That would put the Apple and Android OS in competition with the car manufacturer's own OS that has exclusive access to mechanical and navigation data.

Manufacturers' OS offer few apps, selected by the manufacturer and designed to direct users towards the manufacturer's own aftermarket services or preferred service providers. Some manufacturers operate app stores. But they do not allow apps from competing service providers.

For the time being, car manufacturers apply technical protection measures to preserve their exclusive access to mechanical and navigation data. As a result, Apple and Android OS are limited to media and entertainment services that are not based on car data.

The DA's data access and portability rules would apply to cars and would eliminate car manufacturers' exclusive access to car data (Gill, 2022). However, the prohibition against transferring data to core platform services offered by DMA gatekeepers, such as app stores and operating systems, effectively prevents any change in that situation. This reduces competition in data-driven services because drivers' choices would be limited to services and apps offered by the car manufacturer.

It also prevents seamless integration of car data services across applications in cars, home devices, smartphones and other digital devices. Car manufacturers will benefit from these restrictions in competition; car users will lose.

In principle, the DA opens up possibilities for independent service providers to circumvent these restrictions and develop their own apps outside the Apple and Android ecosystems. In practice, there are many obstacles on this alternative route.

The DA does not impose an obligation on car manufacturers to open an app store within their own OS, or to open the app store to apps from competing service providers. Independent service providers could also put their apps in the Apple and Android stores and ask users to download them to their smartphones instead of directly into their cars.

App developers would then have to transfer car data from a central server operated by the car manufacturer to the smartphone. This may create latency problems for time-critical apps. Inside the car, small smartphone screens would compete for attention with the manufacturer's larger screen[11].

App developers would incur higher app development costs because apps would have to be adapted to the data and formats of each car brand and model. Manufacturers would charge independent service providers a third-party access price for the data, and users would probably have to pay for at least part of these charges.

A similar situation occurs in smart home services where Google and Amazon have developed strong market positions with their standardised operating systems that connect seamlessly with many smart home devices from a wide range of smaller producers. That gives these producers access to a wide market.

It also benefits users who can integrate a wide variety of brands and models of smart fridges, heating systems, security devices, etc, into their Google or Amazon-operated home systems.

The DA's prohibition on porting data to these gatekeeper platforms would prevent that. As a result, consumers will face a very fragmented market with many hurdles to integrate devices from different manufacturers into a single home network. Produces of smart home devices will have to develop their own home systems.

A common and open data interoperability standard could overcome these hurdles. There is no incentive for the largest players in this market to design an open standard when users are not allowed to port their data to platforms that use that standard.

Complications occur because of ambiguity around devices that would fall under the prohibition in DA Art 5(2). It is not clear if that prohibition would apply only to smart home devices not produced by gatekeepers, or also to devices produced by these firms.

In the former case, it may have an adverse effect on competition because it would push consumers to buy only Google and Amazon smart home devices and thereby strengthen the market position of these big players. In the latter case, it would effectively disrupt vertical integration of home applications inside these firms.

There is an additional ambiguity in the interpretation of this prohibition with regard to the recipients of data transfers. The DMA definition of core platform services includes OS such as Android and Apple iOS. However, apps or app developers within these OS are not gatekeepers according to the DMA.

As such, they do not fall under the DA prohibition on transferring data to gatekeepers. However, when the app has access to the data, the OS will usually have access as well, at least to part of the data. Most if not all apps contain code that enables the OS operator to monitor activity and data flows within the app.

This raises the question of whether the gatekeeper's OS would be considered the recipient of the data transfers, or should the services app within the OS be considered the recipient? In the former case, the DA prohibition would prevent any transfer; in the latter case not.

The DA rapporteur in the European Parliament (2022) proposed an amendment to Recital 14 that seeks to overcome this ambiguity. It mentions OS explicitly as falling under the data access rule of the DA. If that amendment were accepted in the final version, it would endorse the former interpretation.

The same ambiguity applies to data transfer pricing. If the operating system provider, as a large firm, is the recipient, the DA's marginal-cost-plus-markup rule applies; if the app is the recipient, with many app developers qualifying as SMEs, the marginal-cost-only rule would apply.

Similarly, would all app-based services qualify as 'comparable recipients' under the DA, resulting in a prohibition of price discrimination, or can they be price-discriminated depending on the type of service they offer?

There is no need for a DA lock on data transfers to DMA gatekeepers because the DMA already contains a data unlocking mechanism. DMA Arts 6(7) and 6(9) impose data-sharing obligations on gatekeepers precisely to avoid strengthening their market position.

DMA Art 6(1) unlocks gatekeepers' exclusive control over their data and prohibits privileged use of this data for gatekeepers' vertically integrated services, unless they are publicly available or shared with competitors.

Moreover, data-sharing conditions imposed on gatekeepers in the DMA are more favourable to users than in the DA. Contrary to marginal cost pricing in the DA, DMA gatekeepers should share data free of charge and via API tools that ensure real-time effective interoperability at the operating system, hardware and software level.

Last but not least, the prohibition on data transfers to DMA gatekeeper platforms makes it very difficult to generate network externalities with product data. It limits welfare gains for users as well as producers from network effects. Product manufacturers can try to create their own data platforms, but their network effects will inevitably be very limited because they only reach their own products and users, not an entire market of users and competing and complementary products.

It fragments market information into narrow silos of inefficient use of that information. The DA does not mention data-driven network effects. Even the DMA only looks at the anti-competitive side of network effects and does not consider the positive welfare effects of these network effects for platform users.

Gatekeeper platforms achieve strong market positions precisely because they offer strong network benefits to users. These network externalities generate user welfare: users get more benefits than what they pay for.

Weakening these network effects is considered to be pro-competitive and therefore welfare enhancing. The DA has inherited this one-sided perspective on platforms. As a result, the ostensibly pro-competitive provision that prohibits data transfers to monopolistic DMA gatekeeper platforms is likely to have an anti-competitive and innovation-reducing impact in downstream services markets for IoT products.

Cabral *et al* (2021) suggest that policymakers should tread a fine line in the balance between the negative welfare effects of reduced competition by dominant platforms, and the positive welfare effects of network externalities. That advice has been ignored in the DA.

5 The prohibition on using data for competition purposes

A particularly striking anti-competitive feature of the DA are the prohibitions it imposes on use by data holders, users and third-party data recipients of product data to compete with each other in product or related services markets (DA Arts 4(6), 5(5) and 6(2)).

Users may use the data to develop new and innovative products, or related services, but not if these products or services compete directly with the product or service from which the data originates. Data holders should not use data in a way that could affect the commercial position of the user or a third-party, unless they have consented to such use of the data.

This reduces the scope of legitimate data-driven innovations to not-too-close substitute products. Who will decide whether a data-driven insight or service innovation undermines or improves the economic position of users and third-parties?

Does the use of data for targeted advertising, price and service quality discrimination, and more generally the use of data for service innovation in accordance with the preferences of users and the commercial strategies of service producers, undermine or strengthen the economic position of users and providers?

These provisions effectively reduce competition in data-driven services and product markets. They suggest that the status quo ante in the private welfare of product manufacturers, data holders, users and third parties is preferable to innovation. Non-use of information seems to be preferable to efficiency and welfare-enhancing economic use.

The DA offers no meaningful economic arguments to support these anti-competitive provisions. The provisions may have been included to enhance trust in the DA because access to data cannot be used against the interests of any of the parties involved.

As other authors have noted (Metzger and Schweitzer, 2022; Picht, 2022; Schweitzer *et al* 2022), this reflects a negative prejudice against competition and a misguided approach to regulatory policy as a tool to preserve the private interests of stakeholders, rather than to boost the social welfare of society.

A possible rationale for these provisions may have been the protection of intellectual property rights and trade secrets of product manufacturers and data holders. Traditional IPR strengthens the static monopoly right but also boosts dynamic innovation incentives by allowing the development of substitutes that do not interfere with the scope of the patented or copyrighted product features.

However, manufacturers and data holders can apply traditional IPR instruments, such as patents and copyright, to protect their hardware, embedded software and designs against direct competition. The scope of these IPR rights is

well-defined in law and does not prevent competition from innovative products that are partial substitutes for the original product, but differ in some important technical characteristics that are not covered by IP rights.

The DA introduces additional IP protection by prohibiting the use of data by third-parties for developing competing products with the manufacturer, or preventing the manufacturer from developing competing services with the third-party data recipient. There is no need for these data-related prohibitions as an additional layer of protection on top of IP law.

The main objective of the DA is to address monopolistic market failures in vertical integration between upstream product markets and downstream data-driven services. It overlooks however that data adds another aspect to the traditional vertical integration arguments: economies of scope in the re-use of data.

Since data is non-rival, re-use in competing and non-competing services can be social-welfare enhancing. The DA provisions address this concern by opening user access to data. That breaks any attempt at vertical restraints or vertical integration between upstream and downstream markets.

However, the prohibition on competing with the original product or related service producers restricts the re-use of data to innovation in non-competing products and services. This erodes a considerable part of the social value of data.

6 Filling the gaps: towards mutual exhaustion of rights

The previous sections discussed anti-competitive provisions in the DA that create obstacles to the proper functioning of data markets and data-driven services markets.

In this section, we focus on two market obstacles that the DA ignores – data rights for producers and data-driven network effects – and propose to solve these issues with the introduction of the principle of mutual exhaustion of rights between all parties.

The DA grants an asymmetric data access right to product users but remains silent on producer rights to access and use the data. It assumes implicitly that producers have de-facto access to the data. That assumption is not necessarily true. Users may be businesses that have market power and do not want producers to access the data generated through business usage of a product or service.

Data-access bottlenecks may also occur in production chains that involve many producers of data-generating components. Producers may sell parts and components to other producers who assemble them into new products. Parts producers do not necessarily have access to the data generated by the use of these parts in an assembled product or in a production chain.

Data is usually co-produced or co-generated between at least two – and often many – parties: the producer and the users of a product or service. The data would not exist without collaboration between these parties. As a result, these parties may have a material interest in, and claim access to, the co- generated data[12].

The optimal social-welfare maximising allocation of access rights between the co-generating parties, including possible compensation mechanisms, is a complex exercise that cannot be achieved with a few general legal clauses. The DA short-cuts this complex process by separating data access rights and the right to monetise data, and by allocating the former to users and the latter to product manufacturers.

This standard solution may at least partly address competition and vertical integration (between pre- and aftermarket services) issues. However, it is unlikely to be sufficient when considered from a horizontal data integration or data-network effects perspective.

Data is subject to economies of scale and scope in aggregation: merging a larger number and variety of data into a single pool may generate more economically valuable insights, compared to the insights that can be gained from keeping the data separated (Calzolari *et al* 2022; Ishitashi, 2022; Carballa- Smichowski *et al* 2022).

Economies of scale and scope are also known under the label of data-driven network effects or externalities that can improve the quality of data-driven services (Prüfer and Schotmuller, 2020; Acemoglu *et al* 2019; Choi *et al* 2019). The DA ignores these network effects.

Producers often have an advantage over users because they can potentially aggregate data across all the products and services they sell. Users can only access the data from the product they bought and are usually not in a position to generate significant economies of scale and scope in data aggregation, unless they hold a significant market share of producer output.

Market forces may work both ways, putting more data aggregation market power into the hands of producers or users of products. The combination of data-access claims from all data co-generators, and the ability to generate data network effects in data aggregation, is a reason to establish a level playing field in terms of data access and use rights between producers and users.

This could be achieved with the introduction of the principle of mutual exhaustion of data access and use rights for producers and users, at the point of sale of a data-driven product or service[13].

Mutual exhaustion implies that neither party can claim any rights or restrictions on what other parties can do with the data generated by a service that they produce or use, beyond the payment and conditions agreed at the point of sale of that product or service. Users have full and unrestricted free access rights to these data.

Similarly, users cannot claim any data access and use restrictions on producers, beyond the point of sale of the service. Mutual exhaustion would be subject to restrictions imposed by pre-existing rights, such as those attributed by the GDPR to natural persons, and those attributed to legal persons by IPR and trade secrets law. While the GDPR and IPR are a rather well-defined body of law and jurisprudence, trade secrets are rather poorly defined in terms of digital data.

Mutual exhaustion would apply to all producer-user pairs at every stage in a production process. Its general application would maximise economies of scale and scope in data aggregation and the resulting innovation potential. This may have very far-reaching consequences for the organisation of production processes. It would require further research before it can be turned into a practical application. ■

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7 Summary of the policy recommendations

Recommended changes to the draft Data Act	Relevant articles and recitals
Drop the definition of 'products' and allow the application of the DA to data generated by the use of all products and services	Delete Recitals 14 and 15. Extend the scope of Art 3 to all products (goods) and services
User data-access and portability rights should cover all data that the manufacturer or data holder has access to	Covered by the amendment to Art 4 (1) proposed by the European Parliament rapporteur. Delete Recital 17
Eliminate exclusive data-pricing rights for product manufacturers and data holders in case of data transfers to third parties	Delete Art 9(1) and extend the compensation provisions of Art 9(2) to all users, irrespective of the size of the firm
Eliminate restrictions on data transfers to gatekeepers under the DMA	Delete Art 5(2)
Eliminate the restrictions on the use of data for product and services competition	Delete Art 4(4) and Art 4(6)
Create a level playing field between all data co-generators by introducing a mutual exhaustion of data rights at point of sale	Introduce an explicit reference to access rights for users AND producers in Art 3. Revise references to 'users' in other relevant articles accordingly. Introduce the principle of mutual exhaustion of rights at point of sale in Art 3.

Endnotes

1. Available at https://eur-lex.europa.eu/eli/reg/2016/679/oj

2. The DA covers other issues as well, including government access to business data, switching between cloud services and data interoperability standards. This paper discusses chapters I-III of the Data Act, which focus on access to 'product' or device data.

3. Available at https://eur-lex.europa.eu/eli/reg/2022/1925/oj

4. For a more detailed overview of provisions in the DA, see for example Colangolo (2022), Graef and Husovec (2022), Habich (2022), Perarnaud and Fanni (2022), Efroni et al (2022).

5. This is why EU competition policy allows an exemption on restrictions on vertical agreements in the motor vehicle sector under the EU Motor Vehicle Block Exemption Regulation 461/2010. For a more detailed discussion of the relationship between competition law and mandatory data access provisions, see Picht (2022) and Schweitzer et al (2022).

6. Though arguments in favour of data ownership rights keep popping up. See for instance Donewald et al (2020).

7. European Council document 11194/22 on the Data Act, 12 July 2022, available at https://data.consilium.europa.eu/doc/document/ST-11194-2022-INIT/en/pdf

8. Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R1150

9. The FRAND pricing concept is borrowed from Standard Essential Patent (SEP) licensing, another indication that the DA is inspired by IPR principles. SEPs became industry standards and confer a monopolistic position on the holders of SEPs, in return for a FRAND pricing of SEP licenses. There are no meaningful economic definitions of FRAND pricing, other than pricing below the profit-maximising monopolistic price. For a more detailed discussion of FRAND pricing rules from a competition law perspective, see Picht (2022), Picht and Richter (2022) and Metzger and Schweitzer (2022).

10. Users will only sell data to a third party for other purposes than providing services to the user, because that would increase the price of the third-party service to the user.
11. Smartphone and car screen mirroring technology could partly overcome that problem.
12. This mutual claim of producers and users distinguishes the economics of data from the economics of IPR. IPR-protected innovations are produced unilaterally by an innovator. Users of an innovative service or product do not contribute to the innovation and cannot claim rights on that innovation, except for the rights granted to them by a bilateral license contract, or possibly by legal exceptions to IPR.
13. This idea is also discussed in Schweitzer et al (2022).

References

Acemoglu D, A Makhdoumi, A Malekian and A. Ozdaglar (2019) 'Too much data: prices and inefficiencies in data markets', Working Paper 26296, National Bureau of Economic Research
Antoine, L and M Leistner (2022) IPR and the use of open data and data sharing initiatives by public and private actors, study for the European Parliament Policy Department, May
Cabral, L, J Haucap, G Parker, G Petropoulos, T Valletti and M Van Alstyne (2021) The EU Digital Markets Act: a Report from a Panel of Economic Experts, Joint Research Centre of the European Commission
Calzolari, G, A Cheysson and R Rovatti (2022) 'Machine Data: market and analytics', mimeo, European University Institute, October
Colangolo, G (2022) The European proposal for a Data Act, a first assessment, Centre on European Regulation (CERRE), July
Carballa-Smichowski, B, N Duch-Brown, S Höcük, P Kumar, B Martens, J Mulder and P Prüfer (2022) 'Economies of scope in data aggregation with a case study in health data', mimeo

Choi JP, D-S Jeon and B-C Kim (2019) 'Privacy and personal data collection with information externalities', Journal of Public Economics 173: 113-124
Donewald, C, M Fenwick, P Jurcys, M Lampinen, V Nekrosius and A Smaliukas (2020) 'Ownership of user-held data why property law is the right approach', Harvard Journal of Law and Technology Digest [2021]
Drexl, J (2018) Data access and control in the era of connected devices, study on behalf of the European Consumer Organisation (BEUC), Brussels
Efroni, Z, P Von Hagen, L Völzmann, R Peter and M Sattorov (2022) 'Position Paper regarding Data Act Proposal of the European Commission', Weizenbaum Institute for the Networked Society, Berlin, June
European Commission (2017) 'Building a European Data Economy', COM(2017)9, 10 January
European Commission (2022a) 'Proposal for a Regulation of the European Parliament and Council on harmonised rules on fair access to and use of data (Data Act)', COM(2022)68, 23 February European Commission (2022b) 'Proposal for a regulation on the European Health Data System', COM/2022/197 final, 3 May
Gill, D (2022) 'The Data Act Proposal and the Problem of Access to In-Vehicle Data and Resources', mimeo, May
Graef, I and M Husovec (2022) 'Seven Things to Improve in the Data Act', mimeo, March
Habich, E (2022) 'FRAND Access to Data: Perspectives from the FRAND Licensing of Standard Essential Patents for the Data Act Proposal and the Digital Markets Act', mimeo, University of Zurich
Hoegaerts, L and B Schönenberger (2019) The automotive digital transformation and the economic impacts of existing data access models, Technical Report for the International Federation of Automobile Service Providers (FIA)
Kerber, W (2022) 'Governance of IoT Data: Why the EU Data Act will not fulfill its objectives', GRUR International, ikac107: 1-16.
Metzger A and H Schweitzer (2022) 'Shaping Markets: A Critical Evaluation of the Draft Data Act', mimeo, September
Perarnaud, C and R Fanni (2022) 'The EU Data Act, Towards a new European data revolution', CEPS Policy Insights 2022-05, Centre for European Policy Studies
Perzanowski, A and J Schultz (2016) The End of Ownership: Personal Property in the Digital Economy, MIT Press

Picht, PG (2022) 'Caught in the Acts: Framing Mandatory Data Access Transactions Under the Data Act, Further EU Digital Regulation Acts, and Competition Law', Research Paper No. 22-12, Max Planck Institute for Innovation & Competition
Picht, P and H Richter (2022) 'The Proposed EU Digital Services Regulation 2020: Data Desiderata', Research Paper No. 21-21, Max Planck Institute for Innovation & Competition
Posner, R (1978) 'The Chicago School of Antitrust Analysis', University of Pennsylvania Law Review 925 (1979): 925-948.
Prüfer, J and C Schotmuller (2020) 'Competing with big data', The Journal of Industrial Economics 69(4): 967-1008
Schweitzer, H, A Metzger, K Blind, H Richter, C Niebel and F Gutmann (2022) Data access and sharing in Germany and in the EU: Towards a coherent legal framework for the emerging data economy, report for the German ministry of economics and climate, July
Staahl Gabrielsen, T, B Johansen and G Shaffer (2018) 'When is Double Marginalization a Problem?' Working Papers in Economics 7/18, University of Bergen, Department of Economics
Zech, H (2015) 'Information as property', Journal of Intellectual Property, Information Technology and Electronic Commerce Law 6(3): 192-197

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The fiscal case for Europe to 'go Dutch' on defence

Hanno Lustig argues that there is a clear self-interested fiscal rationale for Europe to invest more in its own defence, starting by stepping up its aid to Ukraine

If you start from the economic fundamentals, Russia's decision to invade Ukraine seems hard to fathom. A country whose GDP is roughly equal in dollars to that of Belgium, the Netherlands, and Luxembourg combined, and less than 5% of the combined GDP of the US and the EU, decides to invade Ukraine and indirectly take on the EU and the US.

But it is perhaps less surprising once you dig into the details. What matters for deterrence is defence spending. In 2021, the US spent 3.3% of its GDP on defence, but Germany spent only 1.1% of its GDP on military expenditures.

That's one-third of the US spending/GDP ratio. This puts Germany roughly in the middle of the EU pack. Countries like the Netherlands and France spend more, but others like Belgium, Austria, and Portugal spend even less.

All of these countries are NATO members. All have pledged to spend at least 2% of their GDP. Only the UK, Lithuania, Estonia, Latvia, Norway, and Greece kept their 2% promise in 2021[1].

Since the fall of the Berlin wall, the US has spent an average of 2.6% more of its GDP each year than Germany on defence. If Germany had spent as much as the US on defence over this period, then, all else equal, it would have been running large deficits in excess of 3% of GDP instead of small deficits of around 1% of GDP[2].

Germany has benefited tremendously from a large US defence subsidy, as have other NATO countries. Six decades of spending cuts reduced German defence spending from 4% of GDP in 1960 to 1% of GDP in 2021 (see Figure 1). These cuts have taken a toll.

When the invasion started in March of 2022, the commander of German Army forces, Alfons Mais, stated unequivocally that his troops were not battle-ready: *"And the Bundeswehr, the army that I am allowed to lead, is more or less broke. The options we can offer policymakers to support the alliance are extremely limited."*[3]

It seems unlikely that US taxpayers will continue to subsidise Europe's defence when they face cuts to Social Security and Medicare. Politicians on both sides of the political aisle in the US are increasingly reluctant to spend US taxpayer dollars on foreign 'military adventures'

German soldiers even lacked basic equipment, such as helmets and backpacks. At the start of the Ukraine war, Europe's largest army, the Bundeswehr, was effectively declared to be of no practical use by its own commanding officer.

Putin may have made some mistakes in invading Ukraine, but underestimating Europe's defence posture was not one of them. Since then, the German Chancellor has announced significant increases in defence spending, but the German government has been slow to execute.

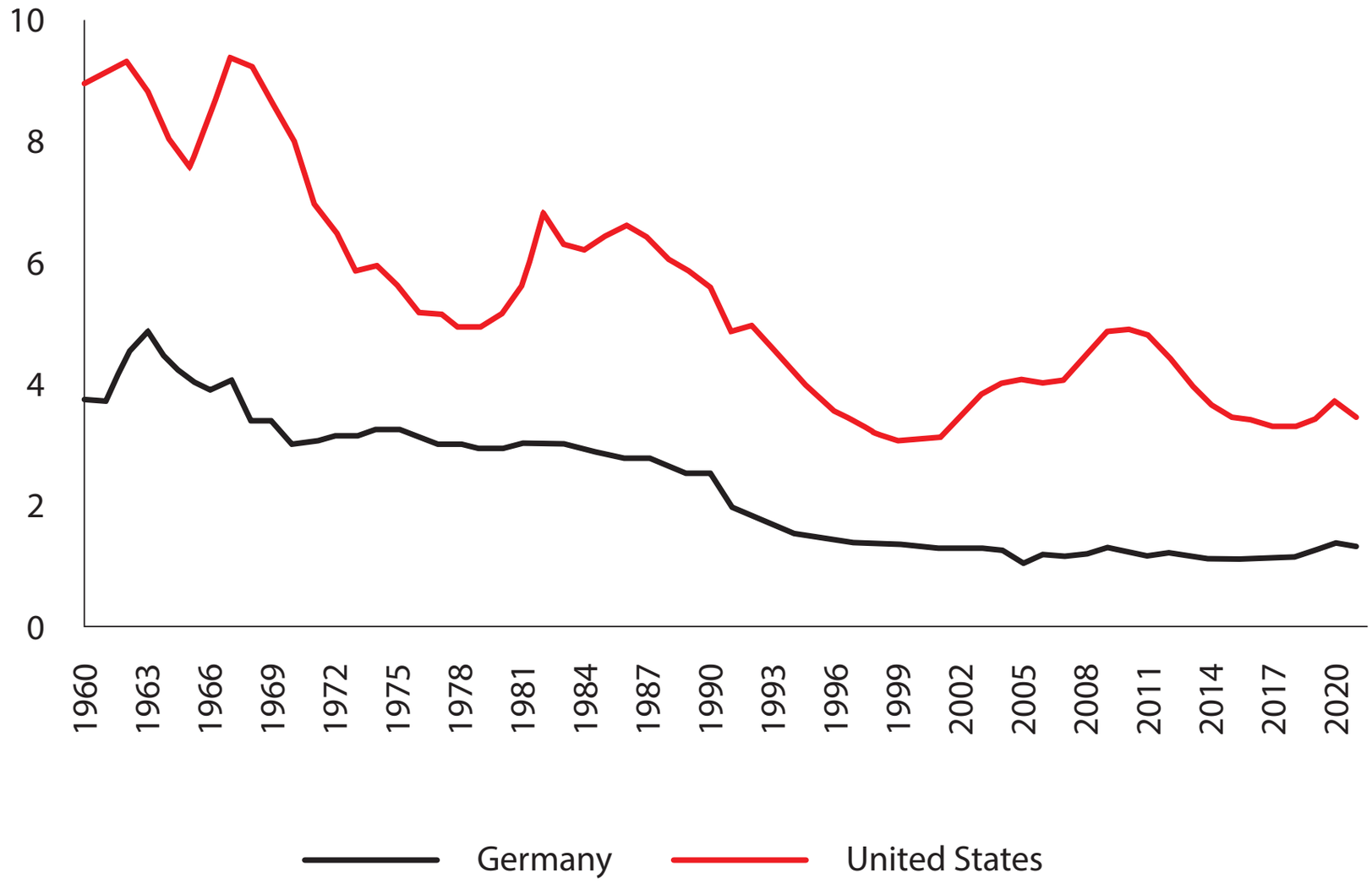
According to the Ukraine Support Tracker at the Kiel Institute for the World Economy, even now, the EU's overall support for Ukraine is barely keeping up with the US at about $55 billion in 2022, less than 0.3% of its GDP, even though Ukraine is in the EU's backyard.

And when it comes to direct military support, the EU countries' efforts again fall short compared to those of the US. Looking at bilateral aid as a percentage of GDP between January and August in 2022, the UK and the US outspent all other European countries except for those bordering on Russia (Estonia, Latvia, Poland, Norway, and Lithuania).

In spite of the rhetoric coming out of Paris, France itself spent less than 0.05% of GDP on direct aid to Ukraine, as did Italy and Belgium (Antezza *et al* 2023: 24).

Incentives matter. After WWII, many NATO countries decided to free-ride on US defence spending, betting that the protection afforded by the NATO umbrella renders their own national defence efforts moot. This is a textbook example of 'moral hazard'.

Figure 1. Defence spending as a percentage of GDP



Source: World Bank World Development Indicators, "Military Spending as % of GDP".

Joining NATO was like getting fire insurance. Once you have acquired fire insurance for your property, you might be less inclined to clear the brush around your house to prepare for fire season.

Some European countries failed to maintain and renew their fleet of military aircraft and helicopters, and their tanks. European countries have even pursued policies that have actively endangered their national security and that of others.

The German, Italian, and Austrian energy policies that fostered dependence on Russian gas are one example of this. Another example comes from the shipping industry. Incredibly, for much of 2022, European shipping companies were transporting Russian oil to Asia, helping to fund Putin's war.

Going forward, the US-backed insurance policy may prove not to be as valuable, because the insurer's financials are less sound than they used to be. To understand why, the EU's defence ministers should start by studying the US federal government's fiscal situation. The US federal government is not on a fiscally sustainable path.

The US Treasury can borrow at lower rates than other governments because Treasuries play a unique role in the international financial system. Even after accounting for the extra seigniorage revenue the Treasury earns from its role of safe asset provider to global investors, it is hard to rationalise the current valuation of Treasuries (Jiang *et al* 2019).

Bond market investors desperately need safe assets, and this need may lead the bond market to ignore the country's own fiscal fundamentals for long periods of time. But eventually, bond market investors will return to the US' fiscal fundamentals.

That is what happened to the Dutch Republic at the start of the 18th century and the UK at the start of the 20th century. Both countries were the safe asset suppliers of choice in their respective eras (Chen *et al* 2022).

The fiscal fundamentals of the US are not sound. The US federal debt exceeds its GDP. Once you add state and local debt as well as unfunded pension liabilities, the US general government debt-to-GDP ratio exceeds that of most European countries[4].

The Congressional Budget Office (CBO) just released its latest budget projections for the federal budget a few days ago. Starting from the laws currently on the books, the CBO currently projects average federal deficits of 8% of GDP after interest expense, and a debt/GDP ratio of 195% by 2053[5].

These are projections of future spending and tax revenue based on current law. They are not the best forecasts conditional on all available information, but they still serve as a helpful benchmark. Over the past two decades, ten-year projections have been overly optimistic relative to what actually happened to the debt/output ratio and deficits.

These projections imply that Congress will likely have to consider unprecedented spending cuts in the near future. And it seems unlikely that US taxpayers will continue to subsidise Europe's defence when they face cuts to Social Security and Medicare. Politicians on both sides of the political aisle in the US are increasingly reluctant to spend US taxpayer dollars on foreign 'military adventures'.

There are other reasons for Europeans to look askance at the US protective umbrella. The US faces more significant national security threats elsewhere. Its foreign policy continues to pivot to the Pacific, and away from the Atlantic.

The US political system has become increasingly polarised and dominated by populists on the left and the right, making each presidential election a high-stakes gamble that could portend the end of the US protection Europe has benefited from.

The invasion of Ukraine serves as a reminder to Europeans that there is nothing inevitable about the survival of liberal democracies. The most effective way to preserve the security and freedoms of future generations of Europeans is to permanently degrade the military threat posed by the Russian Federation.

Ukraine's defence forces have shown themselves to be willing and able to accomplish this task. Ukrainian soldiers are actively containing Russia, buying the rest of Europe time to get its own defences back in shape after years of underinvestment. It is hard to understand why the EU does not provide significantly more direct military support to Ukraine.

There is a clear self-interested fiscal rationale for Europe to invest more in its own defence, starting by stepping up its aid to Ukraine. It also happens to be the right thing to do.

When it comes to national defence, Europe has been behaving like that friend who always runs to the restroom when the check arrives. It's time for Europe to start picking up its own tab, beginning with Ukraine. It's time for Europe and the US to 'go Dutch' on defence. ■

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Endnotes

1. OECD Data, "General Government Spending, Defence", 2021.
2. World Bank World Development Indicators, "Net lending and borrowing as % of GDP".
3. "Germany is ready to lead militarily," New York Times, 23 March 2022.
4. OECD Data, "General Government Debt", 2021.
5. Congressional Budget Office, "Long-Term Budget Projections", February 2023. Jiang et al (2022) provide an analysis of the US fiscal capacity based on CBO projections.

References

Antezza, A, A Frank, P Frank, L Franz, I Kharitonov, B Kumar, E Rebinskaya, and C Trebesch (2023), "The Ukraine Support Tracker: Which Countries Help Ukraine and How?", Kiel Working Paper.
Chen, Z, Z Jiang, HN Lustig, S Van Nieuwerburgh, and MZ Xiaolan (2022), "Exorbitant Privilege Gained and Lost: Fiscal Implications".
Jiang, Z, HN Lustig, S Van Nieuwerburgh, and M Z Xiaolan (2022), "Measuring U.S. Fiscal Capacity Using Discounted Cash Flow Analysis".
Jiang, Z, H Lustig, S Van Nieuwerburgh, and MZ Xiaolan (2019), "The U.S. Public Debt Valuation Puzzle", NBER Working Paper No. 26583.

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