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ABOUT

The Publishers

The European Liberal Forum (ELF) is the official political foundation of the European Liberal Party, the ALDE Party. Together with 51 member organisations, we work all over Europe to bring new ideas into the political debate, to provide a platform for discussion, and to empower citizens to make their voices heard. Our work is guided by liberal ideals and a belief in the principle of freedom. We stand for a future-oriented Europe that offers opportunities for every citizen. ELF is engaged on all political levels, from the local to the European. We bring together a diverse network of national foundations, think tanks and other experts. In this role, our forum serves as a space for an open and informed exchange of views between a wide range of different EU stakeholders.

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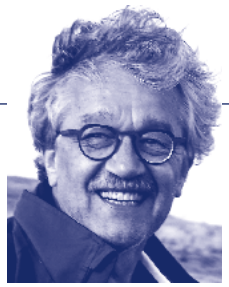

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EDITORIAL

Facing Permacrisis: to Remain the Same, the EU Needs to Change

–
DR MARIA ALESINA
European Liberal Forum

DR MARIA ALESINA

The EU evolves through crises. As a *sui generis* project, it does not have a pre-defined destination point and is constantly 'in the making'. Shocks and disruptions point to the weak links in its construction and urge the EU to expand in the directions neither initially envisioned nor easily predictable.

Every new crisis thus signifies a potential step forward – deeper into the integration process. However, the growing frequency and intensity of disruptions is a challenge in itself. In the past decade, there was indeed no shortage in their number and variety. In the increasingly interconnected world, a butterfly effect of local developments reaches unseen scopes and speeds. As a result, we have been facing new turmoil every year, leading us to a state of permacrisis.

The trend is unlikely to slow down any time soon. This calls for the EU to become a pro in crisis management. To remain the same, the EU needs to change – constantly. Flexibility, innovativeness, and reactivity must become the characteristic features of our political approach and policy development. It is not an easy task for an entity known for the complexity of its decision-making. At the same time, ad-hoc solutions required by urgent circumstances often entail long-term repercussions. The question is, thus, where our crisis response is leading our societies and economies in the long run.

The third issue of the *Future Europe Journal* is dedicated to exploring how Europe has been transitioning to new modes of functioning due to its multi-faceted crisis management. In their contributions, our authors reflect on two interrelated dynamics. On the one hand, the papers study how the European markets and industries adapted to new challenges and demands. On the other hand, the authors focus on innovative instruments and practices that policymakers could utilise to navigate crises and out-of-the-ordinary scenarios on the EU level. Both angles shed light on the long-term transformations and trajectories to which the European states, markets, and the Union as a whole are heading.

Flexibility, innovativeness, and reactivity must become the characteristic features of our political approach and policy development. At the same time, ad-hoc solutions required by urgent circumstances often entail long-term repercussions. The question is, thus, where our crisis response is leading our societies and economies in the long run.

Thematically, the contributions cover a range of issues that arose from the major turbulences of the past several years: economical, financial, related to global warming, public health, and global geopolitical competition. Special attention was paid to the digital and sustainable vectors as a cross-cutting theme of the crisis response.

We were working on this issue amid the brutal Russian aggression against Ukraine. Any other shock can hardly compare to the one of war, especially on the continent that is used to being the haven of peace. For this reason, we decided to leave this important topic for the next issue of the *Future Europe Journal*, which will be explicitly dedicated to European security and defence matters.

The contributions were written by academics and industry experts from across Europe. Special acknowledgements for preparing the journal go to Dr Kristijan Kotarski (University of Zagreb), the Guest Editor of the third issue, and Prof Dr Gérard Pogorel (Institut Polytechnique de Paris-Telecom) for his insightful concluding remarks.

As the two sides of the same coin, challenges and opportunities usually go hand in hand. With crises circulating across borders at the speed of light, who, if not the EU, can provide solutions to problems that cannot be solved on the national level? This is another chance for the EU to present a counterargument to populists and showcase its added value to European citizens. This issue provides insights into what has been done in the past and what is yet to be accomplished for shaping the Europe of tomorrow – more resilient, more credible, and more liberal.

INTRODUCTION

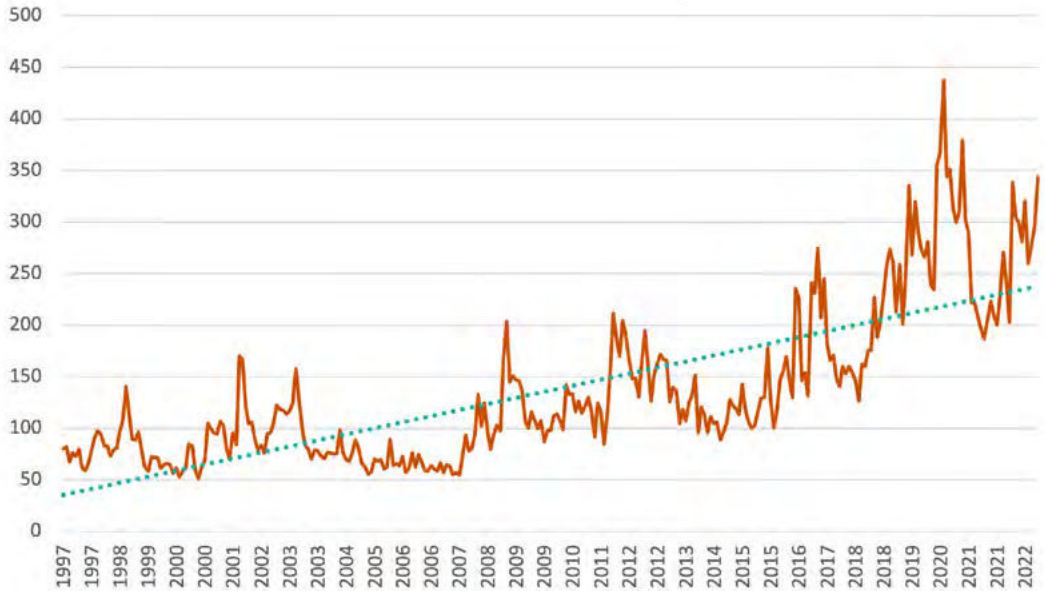
The New Era of Polycrisis and How to Tackle it

DR KRISTIJAN KOTARSKI
Guest Editor of the Issue, University of Zagreb, ELF Associate Fellow

Crisis mode: On

It seems that the proper characterisation of events happening over the last couple of years is the age of polycrisis and permacrisis. Multiple crises unfold in front of our eyes simultaneously such as: the COVID-19 pandemic, Russia's brutal onslaught on Ukraine, the cost of living crisis, climate change, natural catastrophes and the appearance of new disruptive technologies, to name just a few of them. It

Figure 1 Global Economic Uncertainty Index
Source: Economic Policy Uncertainty



feels as if there is almost no end in sight to the extended period of insecurity and instability. Crises are both global and interlinked. In order to illustrate this viewpoint it is useful to look at the Global Economic Policy Uncertainty Index (GEPU) data spanning over the last two decades[1]. Heightened uncertainty has become a standard feature of our daily life (*Figure 1*).

Generally, like all things in life, crises are only good in moderation and if shared by others (Spicer, 2022). While it is always difficult and sometimes even impossible to choose one's own fights when facing crises, it is still possible to shape some sort of shared response.

Everything said so far is not only a matter of perception, as the *Figure 2* shows. Namely, both the EU and the rest of the global economy appear to have swapped the age of Great Moderation for the age of Great Volatility. The EU experienced even sharper economic downturns in two of the biggest crises since the Second World War, the Great Recession and the COVID-19 pandemic. Heightened economic volatility and uncertainty have also taken a toll on the state of democracy, both globally and in the European context. *Figure 3* displays V-Dem Institute's assessment on the direction of key components of democracy in the EU. It shows moderate, albeit concerning decline since the early 2010s. A similar trend is also observable for the global state of democracy.[2] As if it was not enough to have less effective political systems breeding more discontent, new crises are waiting in the wings. Some might conveniently add that beyond suffering from economic recessions, we could also add social and geopolitical recessions to the list (O'Connor, 2022; World Economic Forum, 2022).

Making matters worse, crises buffeting our systems have gotten more confusing since it is often too difficult to pinpoint their underlying cause and by implication, propose neat and clean solutions. This comes in stark contrast to our past experience. E.g. the spectre of institutional sclerosis hauting European states in the 1970s and 1980s led to the ambitious move of creating the European single market, which in turn boosted their dynamism and performance (Tooze, 2022). Morevover, the ozone layer crisis in the 1980s caused by CFC emissions were effectively tackled by the Montreal Protocol. In the old days it was relatively straightforward to argue for unleashing the potential of market forces or propose new globally-binding environmental agreements. Nevertheless, there are several factors at play which militate against this 'concise diagnosis and effective therapy' sequence in the current global context. First, today's crises are more complex and demand coordination between myriad of stakeholders. In that light, distributional battles have become fiercer due to sheer speed and scale of crises and the corresponding reshuffling of power which they induce. Second, the nature of power has undergone a profound transition. It has become easier to get power but on the flipside, it has also gotten much harder to use it to control others and harder to keep it once you possess it (Naim, 2013).

Unfortunately, thinking in silos or silos mentality has been reinforced by social networks and other means of communication (Acemoglu, 2022; Haidt, 2022). Today it is more difficult to discern truth from falsehood, while states and societies are often prone to use those networks in an increasingly authoritarian fashion, making possible the ghastly fusion of both Orwellian and Huxleyan worlds. Precisely this kind of development in a moment of multiple crises, especially overlapping ones, is dangerous and counter-productive. It is already a stylized fact that crises bear political pathology and sap societal creativity (Simonton, 1990). When faced with threat and urgency emanating from crisis, people tend to fall into the trap of rigidity and group-think, which reinforces existing biases. Information restriction (supressing information channels or narrowing horizons of attention) and control constriction (power concentration at higher levels of hierarchy) often lead to maladaptive reaction (Staw, Sandelands and Dutton, 1981). However, when operating environment changes radically and coping mechanisms are not clear, flexibility and diversity in response are required and have a survival value.

Navigating our way forward

Generally, like all things in life, crises are only good in moderation and if shared by others (Spicer,

2022). While it is always difficult and sometimes even impossible to choose one's own fights when facing crises, it is still possible to shape some sort of shared response. The first step on the road to shared response is to agree on the very existence of a common threat. The second step encompasses the need for a common narrative which basically considers creating stories capable of changing people's behavior. Experts too often define wicked problems[3] in relationship to background solutions, best described by the old wisdom *If the only tool you have is a hammer, you will start treating all your problems like a nail*. Moreover, those solutions are also shaped by pre-existing values and biases.

On the contrary, the most viable way for convincing people on moral and social issues is not by facts. Whether one likes it or not, human reasoning does not take place in a logical world but emotional world based on stories (Haidt, 2012). In that regard liberal centrism possesses a specific quality in being able to reconcile extreme positions. Accepting as a point of departure a story that our Western political system, based on pillars of liberal democracy and market economy, is a form of liberation which enables constant innovation, inluding new forms of exploatation enabled by those very innovative abilities, seems quite a sensible story. Therefore, even if our system does not deliver desirable outcomes all the time or is on many occassions shaken by deep crises, one should not throw the baby out with the bathwater but try to reinvent the system itself, as was the case multiple times in our modern history.

The pending reinvention in the 21st century will crucially hinge on breaking the polarization spiral affecting our societies and coming up with answers to three Is (investment, insurance and innovation). First, the polarization spiral is fed and perpetuated by the way how social networks work so changing their architecture is one of the most pressing issues of our time. Reducing the virality of the content through demetrication efforts (e.g. hiding data on engagement with posts or tweets) is essential to avoid negative popularity contests. Narrowing the reach of unverified accounts is also inevitable if the goal is to address the issue of troll farms, foreign agents or conflict instigators. Problem-solving and managing crises is a self-reinforcing process: just as trust is necessary for reaching solutions, delivering such solutions is the best way of building further trust (Lehne, 2022). Solving this chicken-or-egg problem by reasonably tweaking our information environment in line with liberal principles facilitates forging consensus and crisis response.

Second, investments to facilitate green transition will have to be scaled up significantly. New innovative solutions to mobilizing and crowding-in capital will have to be found by both private and public sector. New public-private partneships will have to emerge. And this feat is almost impossible to accomplish unless there is an agreement on introducing a global minimum corporate tax rate and updating the rules on where largest corporations pay their taxes. Securing new streams of income or reducing the existing tax burden does not have to come at the expense of efficiency and market dynamism. On the contrary, unbridled tax competition drives market concentration and monopolization since it tilts the playing field in favor of large incumbents (Tilford, 2018). Hopefully, this agreement will live up to its committment in 2024, after already facing multiple delays.

Third, new insurance forms against currently uninsurable risks such decreased demand for certain skill set will reduce anxiety and insecurity (Schiller, 2003). The creation of new insurance markets in tandem with reinforcing existing social safety nets is inexorable in preventing the ascent of authoritarian populism and the state of policy paralysis in tackling emerging crises. The call for global economic coordination made in the previous point on investments could be also useful in helping states to use their fiscal capacity wisely and stimulate the development of new insurance markets.

Fourth, both technological and institutional innovations are needed to address questions of what and how when it comes to dealing with crises. New technologies such as generative AI open up many possibilities to manage climate change more effectively. Still, new institutional innovations will also have to spring up due to very potential for abuse of those same technologies. E.g. generative AI is too powerful and transformative to leave its fate in the hands of a few monopolistic companies controlling the computing power to feed algorithms or having the access to vast troves of data. Tax codes need to be revamped as well, to put workers and technology on an equal footing, in order to avoid excessive automation if workers are taxed significantly more (Acemoglu, 2021). Finally, rapid progress of artificial intelligence requires the creation of an intergovernmental panel for artificial intelligence, just like on climate change. Therefore, innovation is too important to be left to innovators alone.

Summary of the content and some critical reflections on their key ideas

How crises-proof is really the EU and what can be done to improve its crisis management capabilities? The first thematic block of this volume is titled States in Crises and it primarily focuses on the EU and how its architecture and policies could be made more efficient, resilient and democratic. Complementarily, the second thematic block *Markets in Transition* bring more sector-specific stories. In the past, crises were often stimulative for the promotion of EU integration. However, it would be naive to conclude that more crises will lead to more integration, especially if they will take the asymmetric form, hitting some parts of the Union different than the rest. Some relatively recent crises

Figure 2 Annual growth in constant prices (%)
Source: IMF Economic Outlook 2022

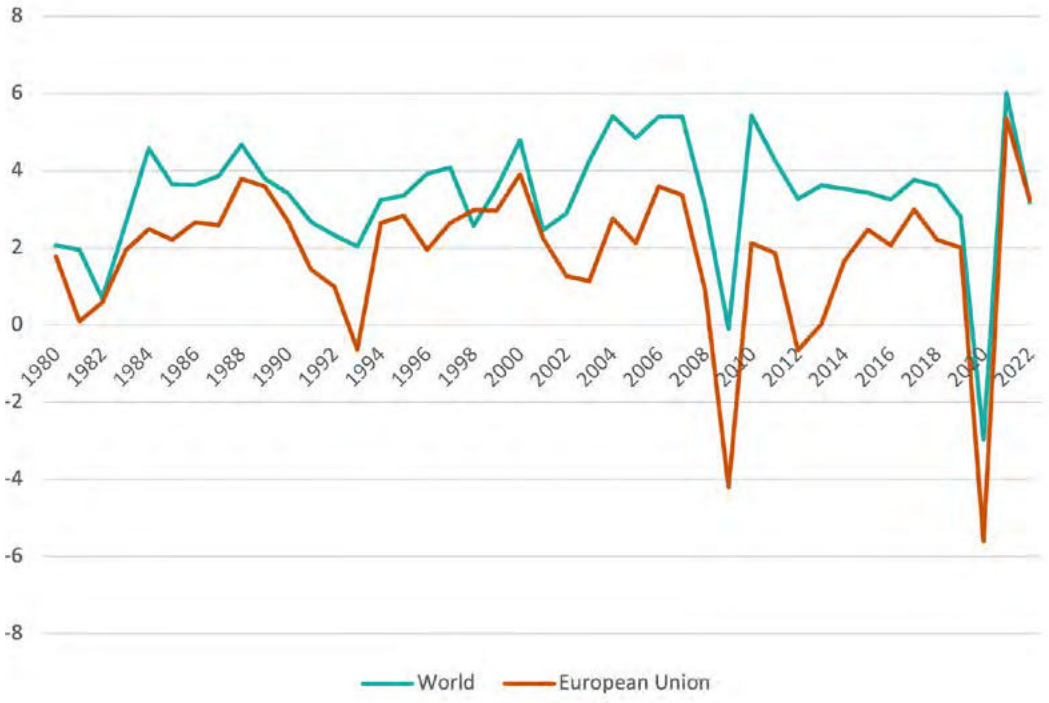
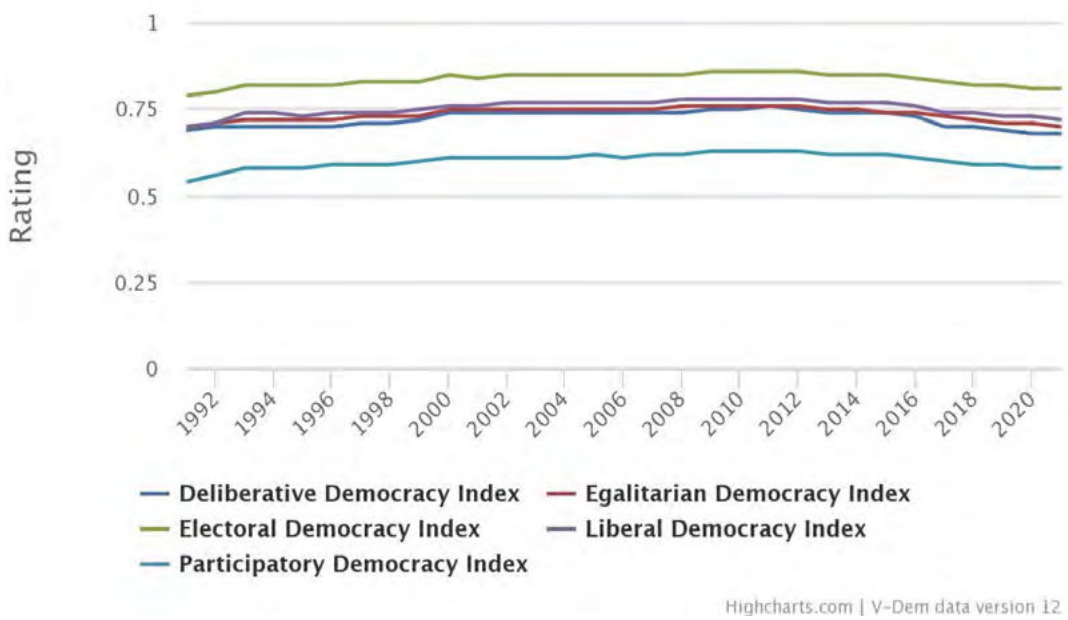


Figure 3 European Union
Source: V-Dem



such as the EU's financial crisis led to new and reinforced architecture in the form of banking union, notwithstanding additional work that needs to be done. Other crises with more asymmetric effects, such as the migration crisis, are still lingering in the absence of an agreement on how to best tackle it together.

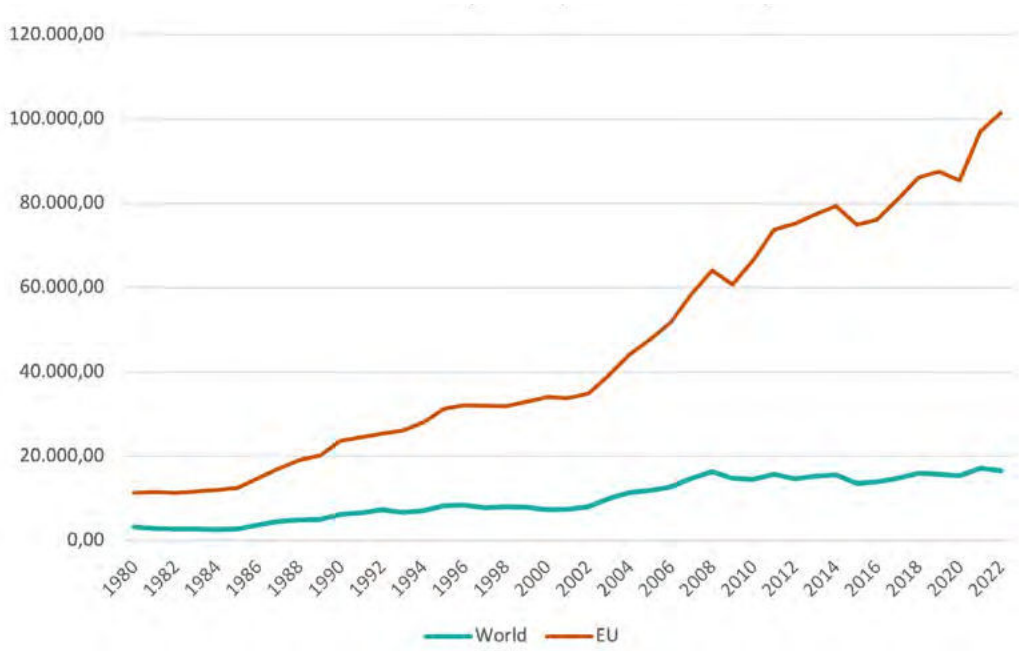
Overcoming crises requires solidarity and the best way to ensure it among member states is to identify enlightened self-interest and see how it is tightly intervowen with mutual interdependence. Sooner or later, rising global interconnectedness and rapidly changing environment makes somebody else's problem your problem. Therefore, preventing excessive concentration of power at the higher levels of hierarchy while at the same time being able to pool joint resources when it is reasonable to expect that common efforts add value is a golden formula. To provide a fresh example, letting European Commission issue new bonds in the context of current energy crisis would set a bad legal precedent and represent a pro-cyclical fiscal policy. On the other hand member states' reluctance to embrace some degree of resource pooling for strictly supporting the provision of EU-wide public goods would be equally bad.

Overall, there are ten interesting and complementary contributions in this issue, despite authors' diverse academic and professional backgrounds. Hence, in the next couple of pages I will try to do justice to each of the contribution and distil their key ideas and arguments. For the sake of clarity and coherence, they will be divided into three sections: *Reforming the EMU, Agriculture-Climate-Energy Nexus* and *Industrial Policy, Technology and the Geopolitics of Standard-Setting*. Hopefully, readers will enjoy all ten contributions, broaden their horizons and leverage authors' ideas in their academic, professional and civic endeavours.

1.REFORMING THE EMU

The first two contributions cover the functioning of the EMU. In his very lucid analysis Velimir Šonje (Managing Director and Founder at Arhivanalitika) elaborates how the inflationary crisis impacts the current institutional architecture of the EMU. The ECB's decision to raise interest rates by 300 basis points since July 2022 has definitely put peripheral member states under pressure. However, the situation is currently under control and the monthly inflation rate in January 2023 fell for the first time since January 2021. On the other hand, fragmentation risk has been partially addressed by the newly created Transmission Protection Instrument (TPI),

Figure 4 GDP in current prices (billions of USD)
Source: IMF Economic Outlook 2022



which should enable the ECB to purchase bonds when there is unwarranted and disorderly market dynamics threatening the integrity of the European single market.

However, the underlying issue still remains unresolved and that is the EMU's proper institutional development. Šonje poses the key question which is who receives information feedback from government bond markets and what incentives does it create. He is skeptical towards deeper fiscal unification due to policymakers' inclination to misrepresent EU's reality for that of a large and relatively closed economy (*Figure 4*). Misjudgement like this raises the possibility for costly policy-errors such as overstimulating demand, similar to the US excessive fiscal expansion to tackle the COVID-19 pandemic. In his opinion fiscal decentralization is the key to preventing both fiscal dominance in the Eurozone (member states holding the ECB as a permanent hostage to their short-term electoral goals) and bureaucratic dominance in the EU (weakly overseen central bureaucracy with limited democratic accountability). The recent Qatargate scandal vividly underlines this danger, as too big linguistic, psychical and psychological between decision-makers and citizens facilitate corporate or foreign agents capture.

The main take-away message from Šonje›s contribution is that the EU needs infrastructural integration of government bond markets within existing fiscally decentralised political model. This can improve bond price discovery and markets' disciplinary role. Furthermore, this kind of solution reduces moral hazard but it also puts a floor on the forces of disintegration by potential activation of TPI in case of emergency. However, TPI eligibility criteria are still waiting to be polished in a final version, which is imprudent. Summarily, fiscally decentralised political model enables the EU to steer clear of political resentment caused by high power distance and the lack of trust in the case of excessive power centralisation.

The second contribution by Damir Odak (Former Vice Governor at Croatian National Bank) is dedicated to the issue of banking union and its completion. The issue of banking systems' resilience has been always important for the survival of EU integration, especially now in the midst of an inflationary crisis. The system currently faces elevated inflation and interest rate hikes, which negatively impact banks' balance sheets. Furthermore, it is reliant on a heavy mortgage portfolio plagued by two risks: fixed rates and housing prices. While on average bank shares are always valued above their book value in normal circumstances, the P/B ratio of Eurozone banks had fallen below one in 2009 and has remained at this level up to this date. The author advocates the completion of all three pillars of the banking union, including the deposit insurance scheme (EDIS). He thinks that the creation of a single supervisory mechanism is important regardless of the difficulty of equally treating banks which are objectively unequal due to operating in still different markets.

However, it seems that the 'singleness' of the of EU financial market will be under constant pressure unless the sovereign-bank nexus will be established at the EU level. Namely, in all previous historic episodes of nation-state building fiscal union has always preceded banking union and not vice versa. Odak conludes that it is open whether creating a fully fledged banking union will serve as a point of further integration in the future. Regardless of this potentially insurmountable political question, retaining and enhancing integrated banking supervision, as well as establishing missing pillars such as a genuine deposit insurance is a desirable way forward.

The third contribution written by Emanuele Bracco (University of Verona) deals with the the role of fiscal policy in nudging people into making optimal choices. Having this in mind, the author coined a very illustrative term 'fiscal forward guidance'. Similarly to relying on forward guidance in monetary policy decisions, which rests on clear communication of monetary policy decision-makers' take on future interest rates and asset purchases, innovative fiscal policymakers can also impact consumers' and citizens' choices by environmental and behavioural taxes over the long-run. In that regard, the author is aware that taxing harmful products and behaviour always faces difficult trade-offs such as the possibility of strategic delocalization of production to localities with less stringent regulation or of consumers opting for illegal or counterfeit products.

Therefore, in order to retain fiscal space and protect tax collection capacity, while at the same time allowing for the promotion of innovation, health and sustainability, EU member states should set a clear path of tax hikes for harmful products and behaviour. Those tax hikes should maintain tax differential over less harmful ones. Precisely this could guide consumers and firms towards safer products and maintain sufficient tax revenues. Finally, a clear path outlined for companies would enable them to exploit new opportunities by investing in process and product innovation. On the other hand, bans and command-and-control measures should be preferably avoided.

2. AGRICULTURE-CLIMATE-ENERGY NEXUS

The following four contributions are neatly intervowen and form agriculture-climate-energy nexus. All papers overtly or tacitly imply the need for policy and technology change to address the pressing challenges of today's complex world. However, the technological change does not happen in a vacuum and is always tightly related to policy change, i. e. to questions of who shapes it and how it is being shaped. There are multiple policy equilibria and cui bono always takes the center stage. Some interests groups promote certain ideas that play into their goal of keeping the status quo, while other interest groups try to monopolize the discourse of

change and impose their particularistic goals on a broader society, regardless of those goals' impact on total economic and social welfare. On the other hand, even when there are no starkly opposing interest groups to certain technologies sometimes the unwarranted fear of new technologies also forms an obstacle.

When it comes to mitigating climate change, technology will play an unavoidable role. However, it is important not to fall into the trap of easy tech fixes for what is essentially a wicked problem, a problem difficult or maybe impossible to solve because of its complex, interconnected and constantly evolving nature.

In the first contribution Joost van Kasteren (RePlanet EU) deals with the introduction of new breeding technologies (NBTs), based on gene-editing. In spite of having the potential to greatly enhance agricultural yields, improve sustainability of production, raise the nutritional quality of food and establish a more secure supply-chains, NBTs face adverse regulatory framework in the EU. Environmental and health risks of these new technologies are comparable to, or even less than, classical breeding technologies or mutation breeding.

However, the European Court of Justice ruling dating from 2018 stated that new breeding methods such as CRISPR/Cas shall be treated in the same manner as GMOs. A very strict approval procedure prevents the creation of new innovation ecosystem. On the other hand, multiple jurisdictions, such as the UK, Switzerland and Canada are likely to take the lead, in direct contravention to the EU's ambition to excel in the green economy and strengthen its technological autonomy. Hopefully, in 2023 the European Commission will spearhead a renewed debate on the appropriate regulatory framework, which shall move away from the existing one that works to the detriment of consumers, the environment, biodiversity and the competitive position of Europe's agriculture industry.

While technology change does not make into the frontlines of a contribution on agriculture, Marko Lovec (Faculty of Social Sciences, University of Ljubljana) provides a very comprehensive overview of Common Agricultural Policy (CAP) and its historical resilience to change. Most reforms so far have been very partial and policy change debate has been often hijacked by vested farm interests. This has also precluded the introduction of new technology fixes to sustainability problems created by agricultural production. In the author's opinion, carbon pricing instruments would support investment in alternative and innovative feed. Precisely those changes would mobilize investments in vertical farming and aquaponics to bring production closer to urban areas and increase the role of renewables in agriculture, thereby facilitating smart integration of agriculture, climate and energy policy. Based on his analysis, the necessary steps forward include delinking the issue of CAP reform from passing the Multiannual Financial Framework (MFF). This is in turn only possible by raising the public awareness on both the explicit and implicit costs of CAP in its current form and by increasing the role of the European Parliament as a co-legislator.

When it comes to mitigating climate change, technology will play an unavoidable role. However, it is important not to fall into the trap of easy tech fixes for what is essentially a wicked problem, a problem difficult or maybe impossible to solve because of its complex, interconnected and constantly evolving nature. Almost every new innovation opens up a new set of problems and challenges. E.g. algae growth in the ocean could contribute to the storage or removal of CO_2 but it is legitimately feared that it might also lead to severe acidification. This is precisely the argument elaborated by Laura de Vries (European Climate Pact Ambassador in Netherlands). Besides, an even more important argument revolves around her warning about who owns and controls the deployment of climate technologies, particularly those that could bear irreversible consequences for the planetary ecosystems. Of particular concern appears to be solar radiation management (SRM).

She strongly advocates democratizing climate technologies to prevent new power asymmetries

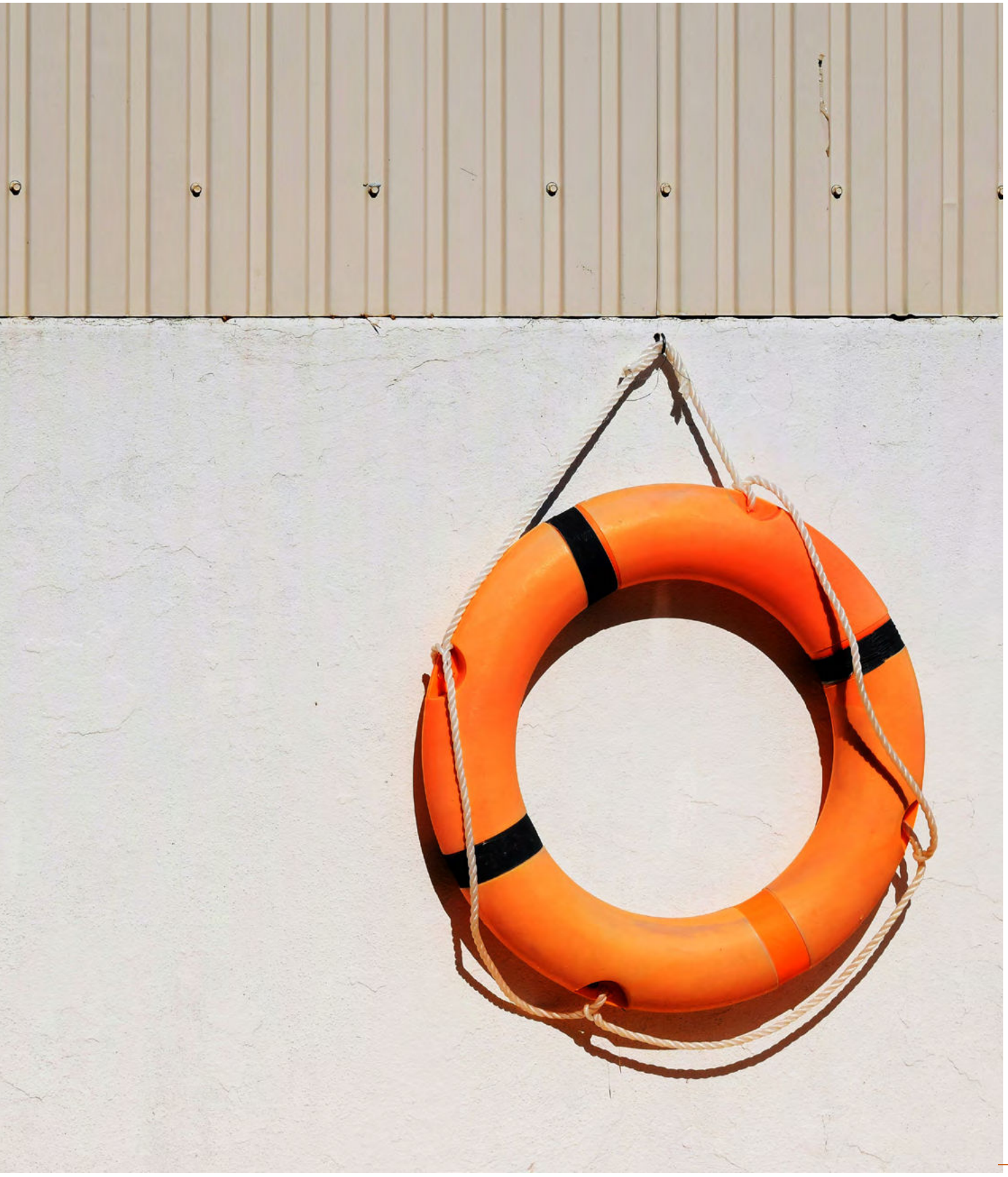


Photo by Matthew Waring on Unsplash

from taking place. Notwithstanding the fact that she does not stipulate it directly, this would probably require better alignment of risks and rewards in future collective research efforts. One potentially useful idea would be the creation of professionally managed public venture funds, which would take equity stakes in a large cross-section of new technologies, funded by the issuance of 'innovation bonds'. It is of utmost importance for that kind of pioneering effort to be decoupled from short-term political pressures and favoritism, following historically successful institutional innovations such as independent central banking.

All of this would require a major transformation of how the state's role in the economy is conceived. In the parlance of distinguished economist Dani Rodrik (2015), there is a necessity to traverse the path from welfare to innovation state. However, the state must carefully watch that new technologies serve society and their direction reflects social priorities. It is useful to shortly remind us what are those priorities: safety, sound environment, empowerment of human labor and promotion of democratic values and human rights.

In the next contribution Christian Sandström (Jönköping International Business School and the Ratio Institute) compellingly argues of the dangers of government-led investment cycles that often turn into green bubbles, costing taxpayers and many investors gargantuan sums of money. He recounts the Swedish experience with subsidised ethanol cars and ethanol production and shows how this policy led to inferior and costly technological solutions and products. His arguments pretty much convincingly point out to the danger of repeating the very same mistake with currently hyped approach to hydrogen-based technologies. This fear stems not only from the lack of policymakers' awareness of the principle of technological neutrality but also from historic experiences of costly and perverse incentives that promoted systematic subsidy entrepreneurship.

The author of this introduction thinks that a good point on the merit of upholding the principle of technological neutrality was recently made by the Mazda's European CEO Martijn ten Brink. He said that: *2035 ICE ban is a disgrace of the politicians* (Potts, 2022). While this statement might appear pretty harsh on its face value, it still conveys an important message that the car industry is in the dark on which technology might be the most cost-effective in ensuring green transition. The comparison between hydrogen fuel cell electric vehicles (FCEVs) and battery-powered EVs does not come up with a clear winner on lifetime carbon footprint criteria, as the calculation largely hinges on how materials for their production are being sourced (Fletcher, 2022).

In that regard politicians should refrain from openly picking the winner since they have even less information than the industry itself of what might and what might not work. Even more precarious threat according to Sandström is to be found in the high likelihood that primary beneficiaries of interventionist industrial policies will be vested interests, as the most recent example of grants approved by European Investment Fund show. Interestingly, the funding had been predominantly allocated to carbon capture projects as compared to projects aimed at preventing CO2 emissions in the first place.

The main take-away message from this contribution is that politicians enjoying democratic legitimacy have the mandate to impose broader societal goals such as net-zero emissions until certain deadline, fitted with a coherent set of incentives and disincentives. However, when it comes to innovation and its role in tackling climate change, the EU should abstain from command-and-control measures, as is argued by Emanuele Bracco in his contribution for the second thematic block titled *Markets in Transition*. Instead, it should rely on taxation, emission-trading and cutting regulatory red tape, as argued by Sandström. The author of this introduction also deems as important to boost the financing of cutting-edge basic science research, which constitutes a genuine public good. In addition to establishing independently-run public venture capital funds, as discussed above, to give taxpayers a stake in the development and deployment of new technologies one shouldn't forget that states also have to improve regulatory framework for private venture capital investing in clean technologies. The latter is significantly underdeveloped in the EU, as compared to the US but also Asia Pacific.

When it comes to subsidies they should only find their application in speeding up the adoption of already proven and scalable technologies, such as subsidies for increasing solar and wind power capacity. Harnessing the Wright law, stipulating that for every cumulative doubling of units produced costs will fall by a constant percentage, will be of key importance. There is still no market saturation in green technologies but subsidies should be targeted primarily to SME and households, time-bound and removed once the main obstacles and market failures are overcome.

We have never witnessed such an immense challenge in scope and timing. Previous energy transitions were primarily technology- and market-driven, while these days public policy plays the dominant role. Those transitions unfolded over decades, even centuries, and were additive, not fully displacing incumbent technologies (Yergin, 2022). Hence, besides relying on the previously mentioned policy instruments, the author of this introduction deems that the EU needs to break a taboo on nuclear energy to expand base-load electricity generation, without which it is impossible to cover for wind lulls or cloudy days (Richie and Roser, 2021).[4] Unfortunately, the market for nuclear energy suffers from the lack of standardisation which hampers economies of scale. Hence, the EU should make important strides in this

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area, while ensuring that the commercial advantage of this power source does not come at the expense of regulatory safety.

3. INDUSTRIAL POLICY, TECHNOLOGY AND THE GEOPOLITICS OF STANDARD-SETTING

The last three contributions presented in this introduction deal with the idea of shaping the world of tomorrow by setting the appropriate industrial policy, technical standards and regulatory framework. Fear of future technological change is always an issue if there is low social trust into policies necessary to prevent its abuse. Serious design flaws in the algorithms and biased data sets might easily lead to privacy violation and identity-based discrimination. In addition, more and more workers that do not program algorithms directly face a stifling 'code ceiling', which causes soaring inequalities (Walsh, 2020). Without proper regulation and education of users AI will tend to exacerbate, rather than ameliorate, pre-existing political, social, and economic problems (Sambuli, 2022). And this undertaking should be framed not in technocratic but existential terms, in order to protect liberal democracy from being undermined by nascent corporate oligopoly.

In their contribution on the role of trust in AI in the healthcare Francesco Cappelletti (Policy and Research Officer, ELF) Francesco Goretti (European Laboratory for Non Linear Spectroscopy, University of Florence) endorse the view that AI has the potential to assist HCPs (health care providers) in their tasks, provide consistency over time, and produce faster and more precise results, especially when it comes to developing and personalising new drugs. This is also in line with a special note from Aleksandra Krygiel Nael (Head of Government Affairs and Policy, MedTech EMEA, Johnson & Johnson). She states that policy makers and healthcare stakeholders should also leverage technology, data and public policy to increase evidence-based decisions and reduce inefficiencies and wastage in the healthcare systems. However, Cappelletti and Goretti decisively argue that solutions should be developed and deployed responsibly, with a focus on transparency, accountability, and patient privacy.

Scary algorithms need not be our future. Yet, despite the EU's recent proposal of an AI Act in 2021, the first such effort by a major regulator which aims to block certain uses, more has to be done in coordination with major allies to set appropriate ethical guardrails through coordinating bodies such as the EU-US Trade and Technology Council, or where politically impossible, work on creating a first-mover advantage. As of this writing, the EU's regulatory power has started to fade in comparison to the United States and more and more corporate rules is being handed down by Washington (Forohar, 2023). If losing a regulatory race against United States sounds hard to swallow, then it is even more disconcerting to be on the losing side with regard to the rising regulatory impact of an authoritarian China.

In the final text of this thematic block on *States in Crisis*, Tim Rühlig (German Council on Foreign Relations) dissects the new era of geopolitical competition in setting technical standards. Once an arcane field only reserved for technical specialists from private companies, determining technical standards has undergone profound politicization. In the context of digital economy institutional 'lock-ins' and network effect play an ever more important role. Being a standard-setter offers at least four distinct advantages. First, it enhances competitiveness by leveraging first-mover advantage. Second, it increases regulatory and legal influence since standards developed for large markets tend to have extra-territorial reach. Third, technological standards have a far-reaching security implications and standard-setter can exploit critical vulnerabilities to its own advantage. Fourth, standards facilitate discreet value transmission because technology is not value neutral and standards guiding its application promote certain social and political values such as more or less privacy.

While setting technical standards has been the prerogative of Western companies and their professional associations since the Second World War, China's ascendancy has put this modus operandi to serious test. It will be a giant task ahead for EU policymakers to walk a tightrope between 'business-as usual approach' and emulating China' statist measures. Imitating Chinese approach would be counterproductive for the EU's innovation capacity and competitiveness. In that regard the author does not shy away from giving a detailed set of recommendations to EU policymakers on how to uphold EU's signature policy, the so-called 'Brussels effect' or the *unilateral regulatory globalisation*

caused by the European Union de facto externalising its laws outside its borders (Bradford, 2020).

In the final contribution Gerald Pogorel (Telecom Paris-Institut Polytechnique de Paris) discusses the future outlook of the EU's industrial policy. In that manner he advocates that the EU must define in a consistent way its policies within a "3-Circle" framework: the „Union Circle" (the 27), the "Friendship Circle", the EU and its allies in Europe, in the Americas, and Australasia, and the "Wisdom Circle", involving the political and economic intricacies of dealing with rivals like China and other authoritarian middle-powers. He warns of the risk of scrapping the EU's state aid policy in exchange for a free-for-all approach that undermines the Single Market (the „Union Circle") and leads to a massive loss for EU taxpayers and consumers.

When it comes to the „Friendship Circle", the EU should boost it diplomatic stance, enhance coordination to avoid expensive duplication,[5] and avoid beggar-thy-neighbour policies towards friends. In that regard, the author of this introduction would add that the EU should properly frame what does the strategic autonomy actually represent, what are the precise trade-offs between economic efficiency and resilience, and who is to pay for the security premium, if production is not to be based on the comparative advantage principle.

Finally, regarding the „Wisdom Circle", Pogorel states that the only realistic way forward is for allies in the Friendship circle to hedge their bets. Based on presented trade data, that clearly show rising trade between both pairs, US-China and EU-China, and in spite of rising geopolitical frictions, it is improbable and extrememly expensive to opt for a major trade decoupling. On the contrary, de-risking is the right approach since risks to supply chains can be measured and their probabilities considered. They can be mitigated, starting by increasing inventories, multi-sourcing, diversifying providers.

At the end, the author presents some novel solutions for increasing the EU's industrial competitiveness such as: complementing Horizon R&D with financially less constrained instruments allowing for more risk-taking, creating programmes in charge of producing EU public goods devoid of member states return provisions and establishing a joint study programmes between the EU and its transatlantic and transpacific partners. Those are all welcome initiatives presented by Professor Pogorel but at the end one has to pose a really unpleasant question. Can the EU really become the technological and industrial powerhouse without more integration in the field of defense and security policy? The answer to that question is left to the reader and future issues of this journal.

REFERENCES

Acemoglu, D. (2022). 'The End of Real Social Networks'. *Project Syndicate*, 7 September, https://www.project-syndicate.org/commentary/social-media-destroying-human-communication-by-daron-acemoglu-2022-09.

Acemoglu, D. (2021). ' Give Workers a Fighting Chance'. *Project Syndicate*, 2 February, https://www.project-syndicate.org/commentary/us-must-close-capital-and-labor-income-tax-gap-by-daron-acemoglu-2021-02.

Bradford, A. (2020). *The Brussels Effect: How the European Union Rules the World.* New York: Oxford University Press.

Fletcher, C. (2022). 'Hydrogen vs. Electric Cars: Comparing Innovative Sustainability', *Earth.org*, 26 August, https://earth.org/hydrogen-vs-electric-cars/.

Haidt (2012), J. *The Righteous Mind: Why Good People Are Divided by Politics and Religion,* New York: Pantheon Books.

Haidt, J. (2022). 'Yes, Social Media Really Is Undermining Democracy'. *Atlantic*, 28 July, https://www.theatlantic.com/ideas/archive/2022/07/social-media-harm-facebook-meta-response/670975/.

James, H. (2020). 'Navigating the Pandemic Trilemma'. *Project Syndicate*, 6 April, https://www.project-syndicate.org/commentary/navigating-covid19-economy-health-democracy-trilemma-by-harold-james-2020-04.

Kotarski, K. (2022), 'The Impact of Surging Inflation: The Future of Debt, Money and Banking in the EU'. *European Liberal Forum Policy Paper,* December, https://liberalforum.eu/publication/the-impact-of-surging-inflation/ .

Lehne, S. (2022). ' The EU and the Creative and Destructive Impact of Crises'. *Carnegie Europe*, 18 October, https://carnegieeurope.eu/2010/22/18/eu-and-creative-and-destructive-impact-of-crises-pub-88145.

Naím, M. (2013). *The End of Power: From Boardrooms to Battlefields and Churches to States, Why Being in Charge Isn't What It Used to Be.* New York: Basic Books.

O'Connor, S. (2022). ' Young People Are Suffering a Social Recession'. *Financial Times,* 19 July, https://www.ft.com/content/de08f787-b2ee-4615-a493-fa53b7200c48.

Potts, G. (2022). 'Mazda's European CEO Claims 2035 ICE Ban Is 'a Disgrace of the Politicians'. *TopGear*, 26 January, https://www.topgear.com/car-news/interview/mazdas-european-ceo-claims-2035-ice-ban-disgrace-politicians.

Ritchie, H. § Roser, M. (2021). ' Why Did Renewables Become so Cheap so Fast?'. *Our World in Data*, 1 December 2020, https://ourworldindata.org/cheap-renewables-growth.

Rittel, H. W. J. § Webber, M. M. (1973). 'Dilemmas in a general theory of planning'. *Policy Sciences*, 4, 155–169.

Rodrik, D. (2015). ' From Welfare State to Innovation State'. *Project Syndicate*, 14 January, https://www.project-syndicate.org/commentary/labor-saving-technology-by-dani-rodrik-2015-01.

Schiller, R. J. (2003). *The New Financial Order: Risk in the 21st Century.* Princeton and Oxford: Princeton University Press.

Simonton, D. K. (1990). 'Political Pathology and Societal Creativity'; *Creativity Research Journal*, 3:2, 85-99.

Spicer, A. (2022). 'If "Permacrisis" is the Word of 2022, What Does 2023 Have in Store for Our Mental Health?'. *The Guardian*, 30 December, https://www.theguardian.com/commentisfree/2022/dec/30/permacrisis-word-of-2022-2023-mental-health.

Staw, B. M., Sandelands, L. E. § Dutton, J. E. (1981). 'Threat Rigidity Effects in Organizational Behavior: A Multilevel Analysis'. *Administrative Science Quarterly,* 26(4). 501–524.

Tilford, S. (2018). ' The Free-Market Case Against Tax Competition', *Project Syndicate,* 17 September, https://www.project-syndicate.org/commentary/free-market-case-against-tax-competition-by-simon-tilford-2018-09.

Tooze, A. (2022). 'Welcome to the world of the polycrisis'. *Financial Times*, 28 October, https://www.ft.com/content/498398e7-11b1-494b-9cd3-6d669dc3de33 .

Yergin, D. (2023). 'The Energy Transition Confronts Reality'. *Project Syndicate*, 23 January, https://www.project-syndicate.org/commentary/energy-transition-four-major-challenges-by-daniel-yergin-2023-01.

Varieties of Democracy (V-Dem) (2023). 'Graphing Tools', https://v-dem.net/data_analysis/VariableGraph/.

World Economic Forum (2022). 'We are in a geopolitical recession' - Ian Bremmer on globalization, populism and the power of crisis'. *Radio Davos/Anna Bruce-Lockhart,* 20 June, https://www.weforum.org/agenda/2022/06/ian-bremmer-crisis-geopolitical-recession-davos-2022/.

ENDNOTES

Introduction

1 GEPU a joint project funded by: Alfred P. Sloan Foundation, Becker Friedman Institute, Chicago Booth School of Business, MacArthur Foundation, National Science Foundation and Stanford Institute for Economic Policy Research. GEPU Index covers GDP-weighted average of national EPU indices for 21 countries: Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States.

2 V-Dem provides a multidimensional and disaggregated dataset that reflects the complexity of the concept of democracy as a system of rule that goes beyond the simple presence of elections. We distinguish between five high-level principles of democracy: electoral, liberal, participatory, deliberative, and egalitarian, and collect data to measure these principles.

3 Wicked problems are problems that are difficult or maybe impossible to solve because of their complex, interconnected and constantly evolving nature. Policy problems cannot be definitively described. In a pluralistic society there is nothing like the undisputable public good and there is no objective definition of equity. There are also no definitive solutions to the problem (Rittel and Webber, 1973).

4 Furthermore, one additional step justifying this decision is the EU's energy import dependency which is staggering, In comparison to China's rising dependency which is still in the range of 20-25%, as well as to the US' progress in becoming a net exporter of energy over the past 15 years, the EU's dependency ratio has fluctuated in the very high range of 55-65% over past three decades (Kotarski, 2022).

5 Furthermore, the EU should design some matching subsidies, if faced with the total lack of cooperation on the equal treatment between US and EU producers on the Washington's part. However, the EU should welcome the US in a race-to-the-top in spearheading green transition. In the long run, bigger US market for clean technologies will also favour EU businesses.

SECTION 1

REFORMING THE EMU

Behind the Veil of Inflation

Eurozone After This Crisis

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Abstract

High inflation, which emerged in the second half of 2021 and accelerated in early 2022, seemed to be a consequence of monetary policy during the pandemic. However, at a scrutiny, high inflation was not a *domestic* phenomenon in the Eurozone. It emerged in the global economy and was driven by the consequences of lockdown and consequent economic policy reactions. Inflation was mainly a consequence of the macroeconomic stabilisation policies in the United States. The European Central Bank (ECB) could do very little, as if it were a central bank in a small open economy. Therefore, recent institutional changes and monetary policies in the Eurozone did not lead to loss of control over money supply and prices within it. Instead, they should be primarily understood as a balancing act within the architecture of the Eurozone, which is characterised by weak common fiscal instruments and long-term decline in the relative size of the European economy vis-a-vis the United States and China. Hence the relative importance of external shocks is increasing in the Eurozone. Within this setup, events during the pandemic and its aftermath confirmed the possibility of a monetary union without a developed fiscal union.

However, high inflation poses a threat to the credibility of the Eurosystem. The correlation between a more flexible inflation target, which was introduced in July 2021, and the emergence of high inflation, although not a causation, is a reason to worry with regard to the long-term ability of the ECB to manage credible currency. The ECB can rebuild the credibility of its monetary policy in the new institutional setup if the call of central bankers for a more uniform monetary transmission across Eurozone, as reflected in the new transmission protection instrument (TPI), remains clearly separate from fiscal policy making.

Introduction

The Great Recession of 2008/09 led to an unprecedented change in the monetary and fiscal institutions and instruments in the Eurozone. The pandemic recession in 2020 and its aftermath were accompanied by further institutional inventions. The Pandemic Emergency Purchase Programme (PEPP) was a nonstandard monetary intervention of previously unimaginable proportions (€ 1.850 billion, which accounts for 15% of GDP in the Eurozone for 2021). Another example is the old definition of the inflation target of the European Central Bank (ECB; up to 2% per annum), which was replaced by a more flexible symmetric target of 2% in the medium term.[6] Lastly, in July 2022, the ECB Governing Council introduced a transmission protection instrument (TPI), which enables purchase of government bonds irrespective of national capital keys. This scheme is applicable only if economic and fiscal fundamentals are sound, but bond markets temporarily suffer from *unwarranted, disorderly market dynamics that pose a serious threat to the transmission of monetary policy across the euro area* (ECB's official wording). The fiscal rules of the Stability and Growth Pact (SGP) were suspended to enable a sufficiently strong fiscal stimulus to counter the recession due to the pandemic.[7] Next Generation EU (approximately € 800 billion or 6% of the GDP of the EU) demonstrated the capacity of the EU to devise a one-off common fiscal instrument financed by the issuance of a common EU bond (signed by the European Commission; however, paying it off remains to be determined).

High inflation in the second half of 2021 and 2022 seemed to be a consequence of the monetary policy of the ECB and fiscal expansion. This article depicts a relatively different picture, that is, higher inflation emerged in the global economy, which was driven by lockdowns and economic policy reactions to the pandemic that primarily occurred in the United States. The initial inflation impulse was *imported* into the EU and the Eurozone. Moreover, the consequences of the Russian aggression only added fuel to the fire.

The implied absence of the direct link between money supply and prices in the Eurozone does not indicate that the Eurosystem is free of problems related to monetary policy credibility. On the contrary, the correlation among the revised definition of the inflation target of the ECB, the unprecedented monetary expansion and the emergence of high inflation, could be easily confused with causation. Therefore, the Eurosystem must rebuild its reputation and protect the credibility of the euro during this episode of high inflation and its aftermath. These actions can be achieved only if monetary and fiscal operations remain strictly distinct. In this respect, having a monetary union with a decentralised fiscal policy can be helpful but requires carefully crafted monetary instruments and fiscal rules.

The first section of the paper, which is entitled *The Roots of High Inflation*, illustrates that the Eurozone should be understood as a small open economy in the context of the global economy. An important sequel to this story is elaborated in the second section: *Flexible Inflation Targeting Makes Sense.* Notwithstanding new policy instruments, such as the TPI, monetary transmission and inflation rates are not uniform in the Eurozone in a manner that is comparable with the relative uniformity of the monetary transmission and inflation rates across US federal states. This notion leads to the third section entitled *Monetary union Without Fiscal union: A Reinterpretation.* Decentralised fiscal policies may present advantages over premature fiscal centralisation, which eurofederalists frequently call. The advantage of fiscal decentralisation is reflected in the easier rebuilding and maintenance of monetary policy credibility during episodes of high inflation and in their aftermath.

The Roots of High Inflation

The Eurozone/EU nominal GDP of € 12.3/14.5 trillion (2021) represents approximately 13%/15% of the global GDP. In terms of nominal GDP, the US economy is approximately 60% and 87% larger than those of the EU and the Eurozone, respectively. China is approximately of equal size. The GDP of Japan reached approximately 41% of that of the Eurozone and the GDP of the United Kingdom came close to one quarter of the nominal GDP of the Eurozone in 2021.

Eurozone/EU is relatively open to international trade. The sums of exports and imports are approximately 42% and 23% in the EU and the United States, respectively.[8] The EU imported approximately 58% of consumed energy products in an annual amount of approximately € 350 billion or 2.4% of the GDP in 2020.[9] In terms of the import of agricultural and food products, the figures for 2021 amounted to € 150 billion or 1.2% of GDP. With a relatively large share of imported goods and their prices determined by the markets for global commodities, Eurozone is a price-taker similar to any other small and open economy in that it imports part of inflation.

Despite of importance of imported inflation, refraining from overestimating the external shocks to the prices of food and energy related to the increased geopolitical tension and the outbreak of the Russian aggression on Ukraine in early 2022 is important. The reason is that the current cycle of high inflation began much earlier.

The Eurozone rate of inflation reached 4.1% in October 2021, which is five months prior to the Russian invasion. It was equal to the previous historical maximum recorded in July 2008. The inflation rates for November and December 2021 continued to grow, which reached 4.9% and 5.0%, respectively.

The inflation in 2021 was related to the pandemic and its global consequences. The world price of crude oil was normalising in 2021 after a dip during lockdown in the spring of 2020. China and the United States were rapidly recovering from the lockdown-induced short recession in 2020 and, until September 2021, the situation was seemingly returning to normal. The price level in the Eurozone [10] as of August 2021 was 2.71% higher compared with that in March 2020, such that the implied average monthly rate of change for 17 months (February 2020 to August 2021) was 0.16%, which is 1.9% per annum and perfectly in line even with the old definition of the ECB inflation target of up to 2% per annum. For this reason, the initial months of high inflation in 2021 did not provoke inflation anxiety among policy makers. As such, they retained the rhetoric of transitory inflation.[11]

Despite of importance of imported inflation, refraining from overestimating the external shocks to the prices of food and energy related to the increased geopolitical tension and the outbreak of the Russian aggression on Ukraine in early 2022 is important. The reason is that the current cycle of high inflation began much earlier.

The fact that the ECB's definition of inflation target changed to 2% over the medium term in July 2021 was less important compared with other factors that had led to inflation rate which exceeded the target in the months following September 2021. In October and November 2021, the global price of crude oil spiked over its long-term average. The commodity markets in general were booming and supply chain disruptions contributed to cost-push factors, which lifted inflation in the Eurozone. The stop-and-go (close-and-open) pandemic measures worldwide created global supply problems, including an upsurge in the cost of international transportation.[12] However, the key to understanding inflation does not lie on the supply side. The root causes were on the side of the global aggregate demand dynamics. The global aggregate supply was unable to cope with the pace of recovery of aggregate demand in 2021. It was a mix of monetary and fiscal policies implemented in 2020 and 2021, primarily in the United States, which created a strong global demand pressure.

The fiscal expansion of the United States was the strongest after WWII. Biden's fiscal deficit of 12.1% in GDP (2021) followed Trump's 15% of GDP deficit figure in 2020.[13] These figures are more than twice as large compared with that of the Eurozone, where the fiscal deficits for 2020 and 2021 reached 7.1% and 5.1% of GDP, respectively, although its economic activity contracted more than that of the United States.[14]

The US Federal Reserve (FED) acted as an innocent bystander. The monetary policy was accommodating fiscal expansion. The United States reached the previous historical maximum rate of inflation of the Eurozone of 4.1% (reached in October 2021) six months earlier, that is, April 2021. By the end of 2021, the consumer price index in the United States was running at 7% per annum, which was approximately 2 percentage points above the inflation in the Eurozone. Coupled with the equally astounding recovery of China in the second half of 2020 and 2021, the economic *stabilisation* policies of the United States created an unprecedented increase in global aggregate demand. They affected the prices of global assets and commodities and paved the way for disruptions in supply chains, because the global supply lacks elasticity. In terms of distinction between the cost-push (supply side) and demand-pull factors of inflation, the aggregate demand of the United States (recall that the United States composes nearly a quarter of the global GDP) as measured by domestic absorption[15] increased by 10.9% in nominal terms in 2021 compared with that prior to the pandemic in 2019. The comparable rate of growth in the Eurozone was 1.8%. In the Eurozone, a significant contribution came from government consumption only. The consumption of the household sector was still depressed in 2021 compared with that in 2019 (–1.7% in nominal terms).[16] Demand-pull factors of inflation were absent in the Eurozone.

The major differences in the aggregate demand dynamics between the United States and the Eurozone explain why the ECB did not consider policy tightening in 2021 and why the transitory inflation narrative prevailed. The US Federal Reserve (FED) began to consider tightening in

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the spring of 2021, when tapering talk began about phasing out nonstandard monetary instruments. However, *tapering talk* is akin to treating cancer with a headache pill when the demand is booming, and inflation is running high. Nevertheless, foreign exchange markets, which tend to anticipate policy changes, immediately reacted. The United States dollar was at its short-term low versus EUR in May 2021 (approximately 1.22 USD per euro), and then began to appreciate. At the moment of writing this article (September 2022), the overall rate of USD appreciation recorded since May 2021 is approximately 20%. The stronger dollar also contributed to inflation in the Eurozone because many imported commodities are dollar-denominated.

Therefore, the Eurozone behaves like a small open economy. It is *importing* exogenous inflationary shocks, which is partially induced by foreign and primarily US monetary and fiscal policies. At the same time, the Eurozone is facing constraints to domestic demand management. In addition, it faces the problem of neglecting the implications of the floating exchange rate of the euro vis-a-vis the US dollar, because a weak euro implies more expensive imports, whose world prices act as adverse shocks on the supply side. The recovery of domestic demand and the subsequent war in Ukraine added a further impulse to inflation in 2022; however, the genesis of the present inflation cycle is rooted in events that occurred much earlier.

Flexible Inflation Targeting Makes Sense: The Role of Relative Price Variability

As a large € 12 trillion economy, the Eurozone is intuitively perceived as a global economic giant; effectively, however, it functions similar to a small open economy within the global economy. As a consequence, after living with the German-inspired rigid inflation target (up to 2% per annum) for more than two decades, the Eurozone shifted to a flexible inflation target in July 2021. This change occurred at the beginning of the recent period of high inflation. However, assuming that change of the inflation target in 2021 had anything to do with inflation in 2021 and 2022 would be erroneous. We explain this by using the standard Phillips curve conceptual framework.

The Phillips curve (1958) represents a negative relationship between inflation (or nominal wage growth) and rate of unemployment. If an economy is large and closed, then inflation and wages are driven by internal demand and the structural features of the labour market, respectively. The structure of the labour market determines the long-term natural rate of unemployment or the so called non-accelerating inflation rate of unemployment (NAIRU). Money supply management cannot influence NAIRU, but it is critical for short-term changes in aggregate demand, prices and inflationary expectations. Therefore, the central bank can set the inflation target at a rate, where the short-term Phillips curve crosses the NAIRU. Such a credible inflation target helps control inflationary expectations and minimises the cyclical fluctuations of economic activity. This story is applicable to an economy that is large and closed.

Alternatively, if an economy is small and open, then prices are subject to external shocks. Indeed, external shocks have dominated the Eurozone since 2020. Even William Phillips was aware of this fact: in the original formulation in 1958, he emphasised that the curve is identifiable in the absence of exogenous inflationary shocks.[17]

The major problem with exogenous inflationary shocks is that they are hardly predictable. In addition, when they are strong, policy makers are left with no other option but to explain to stakeholders and the public that inflation features a significant part that the central bank cannot control. However, explanatory honesty is risky because it may be extremely complicated for the public to understand. Explanatory honesty can also undermine the confidence of policy makers in instruments that they manage and public confidence in the central bank and currency. Thus, a credibility crisis may emerge.

In this regard, considering the two types of small open economies in the context of monetary policy credibility is beneficial. In very small open economies, flexible inflation targets lead to loss of credibility, especially when such economies are poorly managed. In addition, the exchange rate is crucial for domestic prices and inflation expectations. In this case, credibility can be restored only by *importing* stability from abroad. Fixed exchange rate regimes, currency boards or entries to a monetary union are apparent crutches.

In regular small and open economies, such as the Eurozone, striking a balance between a flexible inflation target, which is required due to structural openness and monetary policy credibility, is possible. However, doing so is walking on the edge. Personalities, narratives, central bank communications, even cultural factors, institutions, and history, are important for resolving the trade-off between a flexible inflation target and credibility.

In the context of the Eurozone, such soft factors are related to its internal strucutral heterogeneity. Three factors of structural heterogeneity within the Eurozone exist, which further complicate the resolution of the credibility trade-off. Namely, the Eurozone is not a fiscal union; national labour markets exhibit extremely diverse structural characteristics (at the time of writing, the rate of unemployment widely ranges around the EU-27 average of 6.6%, from 2.9% in Malta and Germany to 11.4% in Greece and 12.6% in Spain).[18] Lastly, various policy traditions and policy design capacities are employed to address exogenous inflationary shocks,

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which are reflected in extremely different instruments for national fiscal interventions.[19]

Interestingly, the level of economic development does not belong to the heterogeneity factors of the Eurozone. Real GDP per capita ranges from 65% of the EU-27 average in Greece to 277% in Luxembourg. The measurement of income per capita is sensitive to peculiar factors in Luxembourg and Ireland,[20] such that the true representative range is approximately 1:2 (65% in Greece vs. 132% of the EU-27 average in the Netherlands). In the United States, the District of Columbia is an outlier, similar to Luxembourg and Ireland, such that its true range lies between 35,000 USD per capita at purchasing power parity in Mississippi and 75,000 in Massachusetts and New York.[21] Therefore, putting aside differences in the level of economic development, the fundamental heterogeneity in the Eurozone is related to specific features of the national labour markets, decentralised fiscal policies and differences in other economic policy traditions, institutions and practices of the member states.

The internal heterogeneity of the Eurozone is reflected in very large variations of national inflation rates compared with differences in the rates of inflation across federal states in the United States.[22] In July 2022, the Eurozone's inflation of 8.9% was significantly below the unweighted average of 19 national rates of inflation (11.6%) and its median value (10.4%). The Baltic states significantly influenced the distribution of the inflation rates of member states, as the maximum value was recorded in Estonia (23.2%), whereas Malta and France exhibited the lowest inflation of 6.8%. Nonetheless, even without the Baltic states, the range of inflation rates in the Eurozone is large compared with that observed in the United States.[23]

The variation in inflation rates may be compatible with the convergence of price levels if converging countries record higher rates of inflation. However, convergence does not explain the majority of variations in national inflation rates during the recent period of high inflation. This is additional argument on why the flexible inflation target in the Eurozone makes sense: the idiosyncratic factors that influence national markets make the concept and measurement of the inflation of the Eurozone subject to large price variations around the mean.[24] This scenario makes up the nightmares of monetary policy makers. The TPI of the ECB was born out of these considerations in July 2022. However, TPI (purchase of government bonds irrespective of national capital key) may have quasi-fical implications.

Monetary Union Without Fiscal Union: A Reinterpretation

Central bankers in Europe are facing the following tough questions: (i) how can high inflation be addressed without hurting economic activity, which is facing adverse real external shocks and the consequences of the war in Ukraine, including Russia's decoupling from the west; (ii) how should the current and targeted inflation (and their difference) be interpreted in a manner that would calm inflationary expectations while national rates of inflation are so different; (iii) finally, how should national heterogeneities within the Eurozone be overcome to render the transmission of monetary policy more effective (TPI related issue)?

The relationship between fiscal and monetary policy is crucial for providing answers to these questions. If the public believes that economic policy making is devised in the regime of fiscal dominance with mainly accommodative monetary policy, then inflation expectations may become rooted. Consequently, the amplitude of economic cycles and interest rates may widen, the natural rate of unemployment (and interest) may become barely identifiable and distinguishing cyclical changes in unemployment from

structural ones may become difficult.[25] The variability of relative prices and the likelihood of policy errors increase, whereas long-term economic growth may decelerate, because allocating the factors of production towards their most productive uses in a described environment is more difficult.

The economy of the United States in 2020–2021 is an example of fiscal dominance regime (recall FED acting as a passive bystander in 2021).[26] In general, the stronger the central political power, the more likely that a monetary union will be under the fiscal dominance regime. This scenario is not always bad: extreme shocks, disasters, wars, and catastrophes indeed require extreme interventions. In such cases, possessing ability for fiscal accommodation and credible monetary authority at the same time may be advantageous. However, if monetary policy accommodation lasts for too long (as in the case of the Federal Reserve in 2021), or if fiscal intervention is employed as if it were a catastrophe or war, while society is facing a much more benign threat, then the long-term consequences of fiscal dominance regime may be disastrous in all cases. Society may end up with monetary authority that has lost its credibility and cannot implement accommodative monetary policy when accommodation is truly needed.

Many political and economic models disregard this danger. A monetary union without fiscal union is often presented as a structural weakness of the Eurozone. This argument has three origins. The first is political: it involves the call of eurofederalists for the homogeneity of the union. The second is intuitive and is for technocrats who prefer strong tools of intervention: for example, the imitation of powers and the determination of macroeconomic stabilisation policies in the United States is an attractive motive to follow despite policy errors that may lead to global implications, as explained in *The Roots of High Inflation* section. The third argument in favour of fiscal unification is related to the fiscal interpretation of the economic theory of optimum currency area (OCA), which is popular among macroeconomists.

In the original formulation of OCA theory by Robert Mundell in 1961, the synchronisation of business cycles and the mobility of capital and labour are sufficient conditions for the OCA. Later additions to the original formulation point out that perfect synchronisation and perfect factor mobility are rarely observed in the real world. Fiscal transfers within monetary union are required for compensation. The late Mundell did not prefer this fiscal add-on to his theoretical base. Instead, he believed that cyclical coordination within the Eurozone will increase with time, irrespective of fiscal policy (endogenous maturation of the currency union).

The fiscal interpretation of OCA theory disregards the history and politics that underlie the real world of fiscal redistribution. In the real world, peculiar events occur such as excessive political centralisation, bureaucracies awash with the money of taxpayers, technocrats who are not subject to accountability and democratic control standards, and public resentment due to the feeling of high power distance. In such a world, fiscal decentralisation with decision-making at the lower organisational level, which can be overseen by the public, may be advantageous per se. Among other advantages, fiscal decentralisation can prevent the emergence of fiscal dominance regime in a large monetary union without fiscal union.

Thus, we are faced with a fundamental Eurozone dilemma. On the one hand, two arguments are in favour of the fiscal interpretation of OCA. Firstly, without sufficient fiscal transfers, government bond yields (national interest rates) will wildly fluctuate and undermine the effectiveness of a common monetary policy (transmission), and secondly, without sufficient common monetary policy instruments, macroeconomic interventions will be weak for addressing major swings in business cycles (the *big bazooka* problem). Both failures may create incentives for exits and lead to the breakup of the monetary union. On the other hand, the sufficiency of fiscal transfers cannot be viewed without reference to their efficiency and effectiveness, which are dependent on democratic and market control over fiscal policy. Missing this reference may also create incentives for exits and lead to the breakup of the monetary union if member states, that is, national democracies, begin to perceive that the costs of the union are greater than its benefits.

As such, institutional innovations in the Eurozone evolve as balancing acts between the two poles. Institutional inventions after 2008, including the most recent ones, partially compensate for the lack of common fiscal policy.[27] They are primarily motivated by reactions to (or prevention of) overly wide fluctuations in the government bond yields and spreads of member states.

The variability of government bond spreads is a good test of the effectiveness of a monetary union without fiscal union. The extremely low variability of bond spreads is viewed as negative because it may reflect overoptimism and the loss of the preference of government creditors for fiscal discipline and sustainability. This error occured in the 1999–2007 period. On the other hand, an extremely high variability may also be negatively considered, because it may reflect financial panic, that is, markets occasionally lose their role of reflecting fundamental information (TPI clearly reflects an endeavour to prevent this type of market failure).[28] This tendency was evident in the 2009–2014 period. Therefore, government bond markets are not always pricing risk properly.[29] Nevertheless, information feedback from government bond markets is indispensable, because it is reasonably accurate for most of the time.

Figure 1 depicts 283 (January 1999 – July 2022) monthly variations of 10-year government bond spreads versus the German Bund yield for the 11 original member states of the Eurozone. The data demonstrate that market sensitivity to risk was clearly paralysed before the Great Recession. During the Great Recession, the risk-off mode was then deactivated, and risk perception exploded in a type of compensatory sobering, as illustrated by the escalating sovereign risk in the Eurozone. However, after the introduction of Eurozone reforms in the 2011–2014 period, the volatility of spreads moderated. Thus, assuming that markets were pricing risk correctly after 2015 is reasonable.

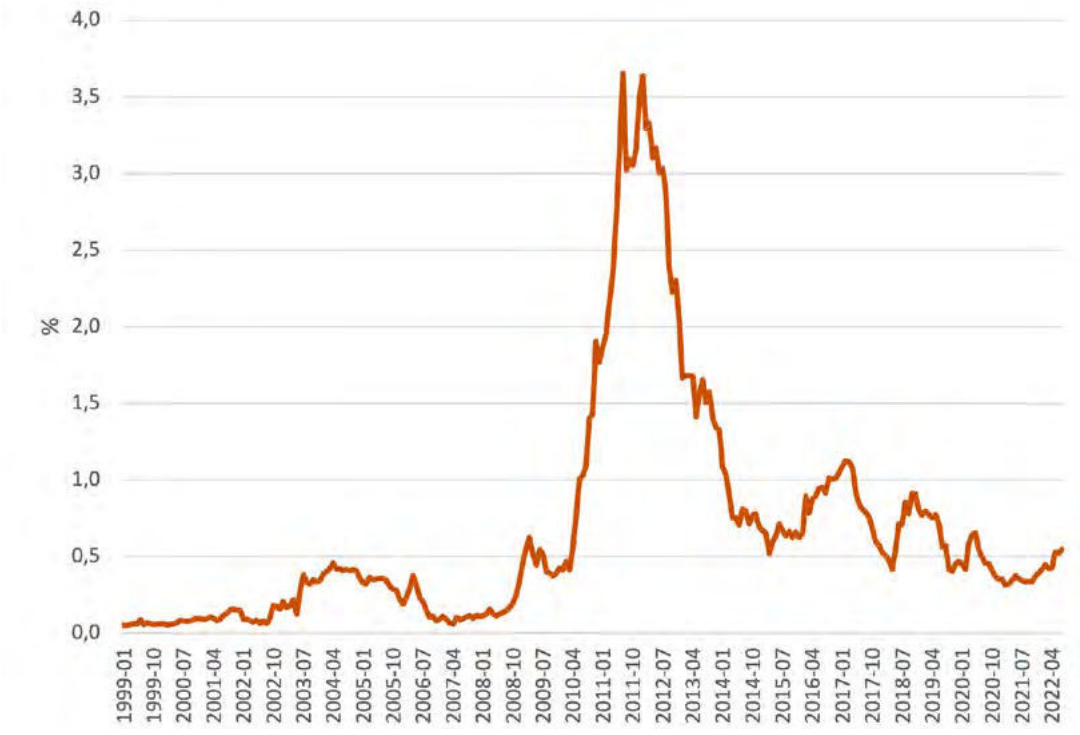
The key question is as follows: Who receives information feedback from government bond markets and what incentives does it create?

If market information acts as an input to the democratic decision-making of member states, then an opportunity exists for (i) corrective fiscal actions at the national level, which may lead to the sustainable convergence of interest rates across member states and (ii) the avoidance of fiscal dominance regime in the Eurozone. In this case, the ECB can appropriately balance flexible inflation targeting and monetary policy credibility.

What if this signal or incentive were to be lost, for example, due to premature fiscal unification? Firstly, a more technocratic mindset would prevail in the ECB Governing Council due to the smoother functioning of the monetary transmission mechanism. It would strengthen the illusion that the Eurozone is a large, closed economy similar to the United States, which can increase the likelihood of policy errors, such as the ones recently observed in the United States. Secondly, even if government bond markets would retain certain degrees of elasticity to fundamental fiscal information (which is very unlikely in the case of fiscal unification), then the question is, Who would receive this information and act upon it? Given the history, size and political structure of the Eurozone, a highly likely scenario is that the major information recipient would be weakly overseen central bureaucracies with limited democratic accountability. Long-term consequences in terms of public resentment (reaction to the feeling of high power distance) and the future of EU integration are beyond the consideration of this article; however, this vision remains bleak. Hence, fiscal decentrali-

Figure 1 Standard deviation of 10y government bond spreads vs. Bund for 11 original members of the Eurozone

Source: Eurostat, author's calculations.



sation is key to the prevention of fiscal dominance in the Eurozone and bureaucratic dominance in the EU. Cleverly designed institutions, which aim to ensure the smooth functioning of government bond markets can oil the channels of monetary transmission and ensure the effective responses of countercyclical monetary and fiscal policies in a fiscally decentralised monetary union.

Conclusion: On the Transmission Protection Instrument and Stability and Growth Pact Reform

In this respect, the functioning of government bonds and financial markets in general is critical. The infrastructural integration of government bond markets within the existing fiscally decentralised political model can improve bond price discovery and the disciplinary role of the government bond market.[30] This aspect can provide a fertile ground for the long-term convergence of government bond yields and increased effectiveness of monetary policy transmission. For this reason, the new TPI of the ECB is an important step in this direction.

TPI is the latest addition to the common instruments intended to strike a balance between monetary and fiscal rules and interventions. This balance reflects a tendency to use effective monetary tools only if their redistributive potential is limited by prior fiscal instruments, which resolve big distributional questions with democratic legitimacy. For example, the European stability mechanism (ESM) is a fiscal intervention tool, which can be supported by the outright monetary transactions (OMTs) of the ECB only if a prior political decision exists on ESM lending by the ministers of finance in the Eurozone. Similarly, instruments of monetary policy, such as quantitative easing, PEPP and Asset Purchase Program (APP), follow politically legitimate national capital keys which reflect the ECB's shareholdings in proportion to national populations and gross national products. Hence departures from capital keys in search for the effectiveness of monetary transmission is similar to opening Pandora's box. National capital keys provide relatively stringent guidelines, which eliminate the danger of the excessive redistributive effects of monetary instruments without political legitimacy.

In the same spirit, the new TPI is aiming at the government bonds of member states, given that they do not exhibit an excessive deficit or macroeconomic imbalance procedure, which legitimizes departure from national capital keys. This situation renders TPI as a mechanism for the correction of bond market failures, not for the correction of government bond spreads when they reflect reality of sovereign credit risk. TPI design rules out objections about the lack of prudential concerns associated with the ease of access of member states to financial markets and institutions.[31] This institutional invention is a clever one, which will make a positive contribution to the financial stability of the Eurozone, if the doors for burdening the TPI with large redistributive effects without prior democratic political proof remain closed.

The strength of barriers between fiscal and monetary interventions is rooted in the general principles of the EU Treaty. However, translating the general principles to practical delineations is difficult. In fact, the fiscal-monetary barrier may shift over time. For example, being in the Excessive Deficit Procedure (EDP) rules out TPI (it makes a member state a candidate for ESM/OMT if a country cannot correct short-term fiscal imbalances). However, EDP activation is dependent on SGP fiscal rules, which are currently suspended and under revision. In other words, fiscal rules may change. So, the ECB Governing Council may find that it is not on automatic pilot. Acting in

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such circumstances is difficult when the Governing Council needs to decide on the applications of member states for TPI.

In response, the ECB Governing Council will need to develop transparent financial criteria for delineation between the volatility of bond yields which correctly reflect fiscal fundamentals and volatility, from volatility which is qualified as *unwarranted, disorderly market dynamics that poses a serious threat to the transmission of monetary policy across the euro area*. The results of this analysis will face political criticism because political elites in member states, which will eventually face the rejection of their applications, will raise their voices against the ECB in particular and European institutions in general. Therefore, remaining independent and driven by considerations about financial markets and conditions is of critical importance for the Governing Council instead of transforming into a logrolling forum for the negotiation of silent fiscal support for the governments of member states.

The forthcoming SGP reform may further complicate this situation. Many voices call for a more decentralised implementation of fiscal rules.[32] This is a reasonable proposal in a fiscally decentralised monetary union. It is affirmative for the disciplinary role of markets and national democracies. It may alleviate incentives for the re-direction of national political conflicts and anger towards EU institutions. In addition, it considers the reality of various countries, such as Greece, Italy and, perhaps, a few others, which find that calibrating the long-term paths of public debt to GDP towards 60% is impossible. Although 3%/60% fiscal rules may no longer be relevant for many member states, seriously considering long-term bond yields and spreads in national decisions on midterm fiscal policies is critical. For this mechanism to work properly, an important aspect is that government bond markets should work as smoothly as possible and do not fail. An even more important notion is that the ECB remains truly independent from national fiscal woes.

REFERENCES

Andrade, P. et. al. (2019). 'The Optimal Inflation Target and the Natural Rate of Interest'. *Brookings Papers on Economic Activity,* Fall, 173-255, https://www.brookings.edu/wp-content/uploads/2020/10/Andrade-et-al-final-draft.pdf.

Baltic Dry Index (2022), 'Which measures the cost of international maritime transportation, surpassed the pre-pandemic historical high by an astounding 120% in early October 2021. It remained above this rate from April 2021 to June 2022', https://tradingeconomics.com/commodity/baltic.

Beetsma, R. et. al. (2022). 'Making the EU and national budgetary frameworks work together'. *Vox EU*, 13 September, https://cepr.org/voxeu/columns/making-eu-and-national-budgetary-frameworks-work-together.

Eurostat (2022), 'EU Imports of Energy Products', *Eurostat*, 23 September, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_-_recent_developments#Overview.

Eurostat (2022), *Eurostate Database*, https://ec.europa.eu/eurostat/web/main/data/database

Federal Reserve Bank of St. Louis (2022), *FRED Economic Data*, https://fred.stlouisfed.org.

Phillips, A. W. (1958). 'The Relation Betweeen Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957'. *Economica*, November, 283-299, https://doi.org/10.1111/j.1468-0335.1958.tb00003.x.

Statista (2022), *Statista Database*, https://www.statista.com.

The World Bank (2022), *World Development Indicators Database*, https://databank.worldbank.org/source/world-development-indicators.

United States Congress Joint Economic Committee (2022), https://www.jec.senate.gov/public/index.cfm/home/.

The Banking Union

A Potential Catalyst of the Future of the European Union

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Abstract

The banking union is a globally unique endeavour to integrate the banking systems of various countries with independent fiscal policies and diverse legal systems. It lacks completion, because it has been initially designed by EU member states (MSs) who were unable to reach a consensus on the deposit insurance scheme.

The banking union was an answer to the fiscal crisis in 2012. Its major declared objective is the elimination of the fragmentation of the EU banking market as well as the separation of the sovereign–bank nexus at the national level. However, achieving these objectives will not prevent a crisis similar to the one that occurred in 2012.

Thus far, the level of confidence vested by investors in banks in the Eurozone is significantly lower than those in non-EU and US banks. To date, published data do not explain why this is the case. The created framework failed to motivate cross-country mergers of EU banks and the creation of a homogenous Eurozone banking market. As such, the completion of the banking union could significantly improve this situation, and its success is crucial for the future of the EU integration. Only the creation of a true sovereign–bank nexus at the EU level would enable full banking integration in the EU.

Introduction

The banking union is more unique than the majority of other EU structures. The existing regulatory structure is not a consequence of a deliberate political decision. Instead, it was created as a by-product of pragmatic solutions applied when MSs failed to reach a consensus on the intended solution. Such a status has severe consequences, as presented in this paper. Nevertheless, the consequences could be much more serious and far-reaching if significant adverse developments affect the banking sector in the EU.

An effective policy against fragmentation is integration. If integrated EU banks were to operate in an integrated EU economic/fiscal area, then fragmentation would disappear. However, following the crisis, the sovereign–bank nexus at the MS level was seemingly strengthened instead of diminished. To overcome fragmentation, this nexus should be encouraged instead of suppressed but at a new level, that is at the EU level.

The fundamental logic of banking regulation and supervision is simple: the state guarantees the deposits of banks[33]; therefore, it holds the evident authority to supervise all entities that require such guarantees. Moreover, the business of banking, especially its associated problems, can exert significant economic and, therefore, political impacts. To mitigate such risks, the state (i.e. the Parliament) appoints the agency or agencies responsible for supervision and regulation, which are, in turn, accountable to the Parliament for their results.[34]

This system was also intended for the EU. However, although the legislative process initially went well, as demonstrated by the completion of two out of the three intended pillars,[35] the MSs failed to agree on the third pillar or the so-called European Deposit Insurance Scheme (EDIS). [36] This situation created inconsistency in the system. A single supervisory mechanism (SSM) supervises, while the national government potentially pays the price if a bank goes bankrupt. To further complicate this structure, the national government does not pay if the failed bank is resolved in any other way. The resolution is then paid by the creditors of the banks and funds available to the single resolution mechanism (SRM).

Such a peculiar arrangement opens numerous questions and dilemmas. The most important one is the fact that the SSM was supposed to be single. However, omitting the guarantor or the MS from the process was impossible. This solution would be very questionable because the one who is supposed to bear the consequences must have a very loud say. This requires an arrangement of shared responsibility between national and EU institutions in the supervisory process. Although such arrangements are designed to operate smoothly,[37] their performance under stress is yet to be evaluated.

Another important consequence involves the resolution function. After the implementation of the SRM, the resolution strategy decides who pays the costs and who is responsible for the implementation of the resolution. Such a decision can lead to significant economic and financial consequences for MSs.

A consistent system, which potentially emerges from the finalisation of the banking union, would require decision-making and cost internalisation at the level of EU institutions. In this case, EU institutions would be solely responsible for ensuring the smooth and reliable operation of the Eurozone banking sector.

Sovereign–bank nexus and financial market fragmentation

The decision to push forward with the banking union was made in 2013 as a consequence of the crisis in 2012, the year when the EU underwent its biggest financial turmoil. It was hit by the consequences of the Greek de facto default on public debt, while several other countries were running the gauntlet of barely sustainable public debt. In this situation, Mario Draghi turned the table with his famous speech 'whatever it takes' on 26 July 2012.

His statement required resolute regulatory changes to prevent the repetition of the circumstances of 2012. As EU problems emerged primarily from the fiscal area, fiscal policy was a logical area for regulatory intervention.[38] However, fiscal independence was a very politically untouchable issue, such that EU politics did not even seriously endeavour to discuss fiscal integration. Instead, a decision was made to initiate radical changes in the financial sector. Through the establishment of the innovative concept of a banking union, such changes were intended to preclude fiscal problems by breaking the 'fragmentation of the EU financial sector' and the 'sovereign–bank nexus'.

Therefore, instead of doing what was deemed impossible, EU politics decided on an action that could be agreed upon by MSs and pretended that this initiative was the solution. This approach is a reminder of a joke about a man looking for a lost key under the streetlight, although he lost it on the other side of the street, which was dark.

Fragmentation is a term given to the differences among national banking systems in the EU, while the nexus represents the case of a strong coordination between the governments and banks of MSs. They are described as items 2 and 6 in the introduction of the SSM Regulation.[39]

Therefore, the sovereign–bank nexus was blamed for fragmentation and development in 2012. It needed to be omitted with the introduction of the banking union. The nexus consists of the following processes:[40]

- The accumulation of the government debt of MSs from banks operating in a particular MS;
- Sovereign guarantee for the banks; and
- The influence of economic activities of a particular MS on the health of banks and governments.

The influence of the centralisation of supervision in the SSM on any of these processes and the prevention of the repetition of a crisis similar to that in 2012 through centralised supervision were and remained unclear.

Banks will continue to hold sovereign debt, because it is defined as a zero-risk weight item in the Basel accord,[41] the sovereign guarantee of deposits remains and the health of banks and governments would always influence and be influenced by economic activity in the MS. For these issues, the method of banking supervision is irrelevant.

Although supervision is seemingly an appropriate tool for addressing fragmentation, it is also a bold assumption. Fragmentation is the consequence of objective forces. With exposure to the national economy and fiscal policy, national banks dance to the domestic tune of the economy.

The developments in 2012 were a consequence of irresponsible fiscal policy, faulty disclosure of government debt and, in one case (Ireland), government guarantee for banks.[42] As such, no connection existed between banking supervision, the establishment of responsible fiscal policy and appropriate reporting on public debt. Although supervision in certain MSs was weak, the establishment of a unique, partially centralised system opened significant uncertainties simply due to its uniqueness.

Furthermore, the sovereign–bank nexus is a concept that banks strive for since their earliest beginning, and banking functions the best when it is firm and reliable, providing banking with a backstop from political authorities.

An effective policy against fragmentation is integration. If integrated EU banks were to operate in an integrated EU economic/fiscal area, then fragmentation would disappear. However, following the crisis, the sovereign–bank nexus at the MS level was seemingly strengthened instead of diminished. To overcome fragmentation, this nexus should be encouraged instead of suppressed but at a new level, that is at the EU level.

Measuring the success of the banking union

Measuring the success of banking regulation and supervision remains an elusive task. Alternatively, it is a relatively elusive task during normal times. During a crisis, the measure becomes self-evident.

Fortunately, at the moment, the evaluation of EU supervision is an elusive task. Despite the relatively high pressure coming from several directions, the banking system is not in a crisis. Optimists would state that the scenario renders the measure of success self-evident, whereas pessimists may add only one word at the end of the sentence: 'yet!'.

This study applies several measures to determine the level of performance of the banking union. The first one would be a methodology published under an ambitious title: *Banking Union's accountability system in practice: A health check-up to Europe's financial heart*. [43]

The authors conclude that '"You can't see the forest for the trees" so the saying goes. Yet, when it comes to Banking Union accountability, a closer look to the details of every tree is needed to see the forest with a fresh pair of eyes.'. In other words, the proposed method for health check is very detailed and systematic. It is frequently based on measuring the quantity of communication between the European Parliament, the European Banking Authority (EBA), and the Single Supervisory mechanism (SSM) operations of the European Central Bank (ECB). It also intends to determine the quality of this communication. The findings are mixed at best, as the conclusion identifies weak accountability.

Although the abovementioned approach is relevant for assessing the quality of regulatory communication and for determining how well the SSM explains its actions to the Parliament, it is barely useful for assessing the quality of supervisory actions. The reason is simple: members of the European Parliament are seldom experts on banking supervision. This fact also explains the lack of focus on communication, which was frequently observed by the authors.

Such a measure could be usable in good times. On a rainy day, the only thing of importance is the resilience of the

system and banks under shock. The aforementioned form of health check is not aimed to indicate the resilience under shock.

Information about resilience requires answers to different questions. The first one is a judgement on the health of the banking system from the perspective of those most interested in it, that is, the shareholders of banks. Their valuation of banks' stock is a simple and robust measure of shareholders' confidence in the reported figures.

Under normal circumstances, the average bank share is always valued above its book value. The invested money managed by professionals and the stable cash flow generated from mainly captive businesses should always be more valuable than cash of the same face value. The balance sheet of a bank is only a pile of cash or cashable assets; however, if shareholders believe that it is appropriately evaluated, then they would pay it above book value. Historically, proving this case is easy. For example, the average valuation of US banks is always higher than their book value, except during extreme shocks and stagflation periods.

Examining data from the ECB,[44] the P/B[45] of Eurozone banks decreased to less than one in 2009 and remained at this level with a few oscillations until 2022. The same ratio reported by US banks never went significantly below one within the observed period. Other sources presented similar results.[46] Evidently, at the beginning of 2021, the unweighted average P/B of all banks (EU banks excluded from the calculation) and of US banks was well above the book value amongst the 100 biggest global banks. Different from US banks, the listed EU banks were traded well below their book value for an extended period.[47] In June 2022, according to Bloomberg, the eight biggest publicly traded banks based in the Eurozone were traded on average (unweighted) at 46% of their book value, while none of them displayed P/B higher than one. The eight biggest publicly traded banks in the United States are traded at an (unweighted) average of 112% of their book value, while five of them exhibited P/B ratios higher than one.[48]

Notably, the price of the stocks of Eurozone banks recovered close to an average P/B ratio of one with the introduction of the SSM in 2014. However, something decreased the enthusiasm of investors, such that the ratio decreased again to 0.6 in 2015.

On the basis of these data, shareholders and prospective investors seemingly do not believe in the book value of EU banks. Another more concerning aspect is that other bank managers do not believe in the reports of their colleagues. Otherwise, a major bank with a P/B ratio of 0.25 and a P/E of 3.5 would be an irresistible target for acquisition with potential suitors queuing in front of its door. In other words, buying it would be more profitable than smuggling blood diamonds.

If one assumes that shareholders properly value the capital of their banks, that would significantly decrease the value of equity of EU banks. The total leverage ratio based on market capitalisation would halve, compared with one based on the declared capital of the Eurozone banks. The overall leverage ratio based on the market capitalisation in June 2022 would get near 3.3%, only a notch over the Basel III accord minimum. Such an approach would leave a few very significant banks *underwater*.[49]

Should auditors and supervisors perceive market sentiment as a signal to treat the banks' books with bigger caution? No formal requirements are in place to do so. Although it should not be dismissed as irrelevant, a market valuation cannot be taken as completely reliable. Market perception could be distorted and stay so for a significant period of time.[50] Therefore, additional and easily quantifiable objective measures are also required. An example is the leverage ratio. The ECB published a *fully loaded* leverage ratio in Q4 of 2021 that amounted to 5.86%.[51]

If the leverage is calculated simply by dividing capital by total assets, then the ratio is 6.8%. This measure will be used for a consistent comparison.

If the same calculation is conducted for US banks,[52] then their respective ratio is 9.7% or 43% more equity per unit of assets. The difference of 43% in the reported equity per unit of assets does not mean proportionally more resilience. The United States banks obtained a 6.7 percentage point (ppt) capital to total assets ratio higher than the Basel minimum required leverage,[53] while the ratio of the EU is at the same time 3.8 ppt above this level[54]. Thus, an average US bank enjoys 84% more buffer over the Basel minimum. Furthermore, as market events are approximately normally distributed, such a difference in buffer size could indicate that the banking system of the United States has ten 10 or more times less likelihood of a widespread banking crisis (dependent on the assumed relative position of respective national banking in the distribution of future adverse events).

Based on all the abovementioned measures, significant space exists for the SSM to improve the resilience of the banking system of the Eurozone and, even more, the confidence of investors in it.

What causes the lack of confidence? A number of analysts claim that the present bank stock pricing of the Eurozone assumes extremely adverse tail events.[55] Nonetheless, prices remain down as of mid-2022 despite improvements in major indicators. Such a situation has currently lasted for 14 years.

Photo by Dovis on Pexels

The process of cross-border integration would be very helpful in overcoming fragmentation; however, it remains on hold as banks are waiting for the unfolding of the developments in the EU political arena.

Initially, the reasons that underlie the process were transparent and understandable. Stock prices reacted to losses in 2008. Worries about forbearance, high non-performing loans (NPLs) and low profitability then depressed banks' stock prices them. However, supervisors addressed all of these problems, made them transparent to investors while bankers reported them as resolved. By the end of 2021, a reported average return on equity of EU banks was stable in the range of 7%,[56] while the average return on investment was double this figure. NPLs are low,[57] and the Texas ratio[58] was low across the board.[59] These figures should have made shareholders confident and happy.

Nonetheless, the STOXX600 banking index, which fell from more than 530 to less than 130 index points in 2009 with certain oscillations in the meantime was still at 125 in June 2022. None of the performance indicators of major EU banks could explain the reason.

Without an extensive opinion poll conducted among investors and potential investors in bank stock, providing evidence-based responses about the underlying cause is impossible. However, this project is beyond the scope of this paper; thus, it offers no definite answer.

Notably, the increased confidence of investors occurred simultaneously with the introduction of the SSM. The entire process of the introduction of the SSM appeared relatively convincing to investors, and the average P/B was gradually increasing to 0.9, while the best-performing banks reached more than one. This indicates that investors welcomed the SSM at the time of its introduction. Therefore, the confidence deficit appeared after the introduction of the SSM.

The enthusiasm of investors was short-lived, and the STOXX600 banks were back at 130 index points and a P/B ratio of 0.6 in 2016. The market has maintained these figures untill mid 2022.

Nonetheless, claiming that the confidence deficit is a consequence of the lack of activity on behalf of supervision would be certainly erroneous. Indeed, supervision invested a huge effort, but the effects of such efforts were limited by several unusual obstacles placed in front of supervisors.

The first peculiarity is that the SSM is not allowed to order an accounting adjustment unless it exercises it through the powers entrusted to it by the national supervisors of the SSM country, [60] which are based on the local legal framework. Such an approach is not a consequence of the law but of a too restrictive reading of it. Supervision is allowed to do only what is explicitly mentioned in the regulation. Other supervisors possess this authority. Without accounting adjustments, establishing a case of non-compliance or the failure of banks is impossible.[61]

This type of constraint motivated supervisors to create several imaginative and bold regulations that bypass this limitation. Although these efforts partially resolved the problem, they created other unintended consequences.[62]

In addition, the SSM is a supervisor but not a regulator of the banking market. Such a position severely limits the ability of the SSM to influence banking regulation, especially in the complex EU political environment, which renders the regulatory development much slower and politically demanding.

The specificity of the SSM is also an complicated situation concerning the procedures of the lender of the last resort. All other supervisors cooperate with only one such lender, while the SSM has 19 of lenders of last resort,[63] that is, national central banks. However, as members of the currency union, they are exposed to serious limitations that may not always enable them to follow the Bagehot dictum.[64]

Another peculiarity of the EU regulatory environment is the frequent querulant attitude of banks towards the supervisor. Tens of active court cases are initiated by banks against supervisory measures. A huge majority of these cases were initiated as soon as banks met the legal preconditions to initiate litigation without even attempting to use all available resources to reach an agreement with supervisors.

The motivation for such an approach may be present if banks are convinced that the supervisor is so constrained, such that additional legal pressure and the generated legal risks would constrain it even further. However, rational shareholders would always pay more for the shares of a bank that is supervised by a strong and proactive supervisor. It provides an additional level of vigilance, which protects the interests of shareholders. Conversely, bank management prefers to face weak supervision.

Numerous litigations indicate that banking regulation opened sufficiently murky areas, because a very unlikely scenario is that SSMs or bank lawyers are reckless and pursue pointless cases. Therefore, lawmakers and regulators likely contributed to the situation in a significant manner.

The discrepancy between the reported and market values of banks firmly confirms the confidence gap. It could be irrational or caused by a form of PTSD among investors,[65] or it could be the consequence of the rational perception of certain important facts not presented in reports. Whatever the ultimate cause is, the situation requires the focus of the EU regulatory and supervisory community. A bank with a P/B of 0.25 cannot raise new capital if needed.

Cross-border integration of EU banks

Any bank management faces the strategic choice between integrated corporate governance and holding structure. Integrated governance means organising a single bank that is operating in several countries through local branches but maintaining a single governance structure with one management operating all branches and reporting one balance sheet and profit-and-loss statement (P&L). In contrast, a holding structure means that a banking group consists of a number of subsidiaries organised around a holding company. The holding strategically steers the subsidiaries, but each of them has a separate management, balance sheet and P&L. The integrated model is more suitable for the single market, while the holding model is an ideal form of organisation that covers multiple markets.

Despite the establishment of a banking union, banking in the Eurozone has remained national. Only one example of cross-border integration is notable—Nordea,[66] the bank that integrated its subsidiaries across Scandinavia into a single bank.

Other banks are cautious despite the encouragement they receive from the SSM.[67] This cautiousness is reasonable and emerges from two sources. The first is the interest of banks, and the second is the interest of governments.

The policy of banks is driven by uncertainty about the future dynamics of EU integration and its potential impact on specific markets. By retaining a holding structure, they possess the flexibility not only to adapt business policy to national circumstances but also to dispose of certain businesses if they need extra capital or feel uncomfortable with local legal or business developments. In this sense, cross-border integration would render such flexibility much more difficult.

The interest of governments emerges from securing fiscal income. If a bank is integrated, then it reports its profit and pays taxes in the country of its domicile. In addition, an independent bank employs more people than would the branches of an integrated bank. Furthermore, a national bank would be much more involved in the domestic sovereign–bank nexus than would an integrated bank. Therefore, the governments of host countries are motivated to retain banks incorporated in their jurisdiction.

Another issue is the uncompleted EDIS. As the government of a domicile country guarantees all deposits of a local bank, cross-border integration could significantly increase potential liabilities, which creates a potentially unbearable fiscal burden and a shock to the national financial system. Nonetheless, in the present architecture, a counter-argument may exist. Cross-border integrated banks tend to be larger and more complex; therefore, the possibility that the selected resolution strategy would be bankruptcy is less likely. If the resolution strategy would prevent bankruptcy, then the guarantee of the government would not be realised. Nonetheless, its very existence could force the government to participate in bail-out with all adverse fiscal and political consequences. The SRM is aware of the cost of the local deposit guarantee scheme in the case of bankruptcy; thus, the participation of the government could become an important negotiating point during the preparation of the resolution.

Therefore, the interests of banks and governments are slowing down the integration process for the time being. The process of cross-border integration would be very helpful in overcoming fragmentation; however, it remains on hold as banks are waiting for the unfolding of the developments in the EU political arena. If the fiscal and legal policies of EU members remain fully independent, then the holding structure could be a better fit. The absence of EDIS and the unresolved issue of taxation of bank branches emphasise such a conclusion.

Completing the Banking Union

The fact that EU politics did not complete all the three announced pillars of the banking union certainly has consequences. It is not possible to firmly claim a connection between the earlier described situation in the capital market

and the fact that seven years of work on it the EDIS still did not produce a final roadmap. Nevertheless, this fact is a signal to participants in capital markets, definitely not an encouraging one. Completing the banking union as it was initially announced would certainly be a step in the right direction. Forecasting the extent to which completing the union would turn around market perception is difficult, but the completion of the banking union certainly would not worsen the perception.

The introduction of EDIS as a convincing and reliable tool would create an opportunity for revisiting and streamlining supervisory procedures without the burden of shared responsibility. Afterwards, all responsibility would be at the EU level, such that all decision-making could be conducted at the EU level as well.[68] This notion does not indicate that the present distributed supervisory architecture should be firmly centralised. Nevertheless, the centralisation of decision-making during crises could render it more efficient and, therefore, more convincing.

Is the finalisation of EDIS feasible today in the current political environment, which is characterised by multiple crises? EU politics successfully averted a long list of more demanding challenges, and the completion of EDIS is certainly within its reach. A possibility exists that it was only put aside for the time being, because it required substantial work and negotiation, and it did not seem critical. The SSM worked apparently well without it, such that it could wait. This perception could prove to be too relaxed, as the banking union will need all three legs to stand firm if things get rough.

Why is the success of the banking union crucial for the future of the EU?

The fact that the banking union is not the best tool for addressing the matters that it was supposed to address does not mean that the SSM is a wrong idea. It only means that it was designed for pragmatic reasons and marketed as a solution for the wrong problem. In particular, it was implemented in a piecemeal fashion, that is, it was a part of the solution needed to appropriately address the problem instead of being the entire solution.

The proper objective for the banking union is described under item 5 in the introduction to the SSM regulation, which discusses the standardisation of banking supervision at the EU level. As part of the overall EU integration process, such standardisation is a key precondition for the previously mentioned establishment of the new EU-wide sovereign–bank nexus. Indeed, the SSM is the best possible tool to achieve it. Without the SSM, such a nexus is hardly tenable, because inconsistent regulatory and supervisory approaches would permanently fragment the market.

The banking union, which is an important part of the overall integration architecture of the EU, becomes the cornerstone of this architecture. Furthermore, the structure was left uncompleted, that is, without its third pillar. Although the missing pillar could be nearly neglected as long as no major problems surfaced in the banking sector, the lack of it could lead to far-reaching consequences in the crisis. Intuitively, we know that a chair on two *pillars* would not endure any shake-up, while the one with three legs is the most difficult to overturn.

As a consequence of its prominent position, the banking union became more than a major part of the EU integration process. It became the benchmark of its success. Consequently, EU banking became the most federalised area of EU regulation. As such, it also became the laboratory for testing integrationist policies. The success of the banking union could significantly influence the approach towards further EU integration.

Future risks

The future facing EU banking is beset with risks. Having a relatively thin capital buffer over the Basel minimum is not a sign of excessive robustness. The attitude of shareholders conveys a worrying message. Therefore, the road ahead does not appear smooth and safe.

The meaning of *ahead* for the EU banking sector is also questionable. For example, the consequences of the 2008–2009 shock were recognised and mainly resolved between 2012 and 2015. If such is the rhythm, then the consequences of the COVID-19 pandemic are still *ahead*.

Moreover, the banking system currently faces increased inflation and pending interest rate hikes. It is reliant on a heavy mortgage portfolio that is plagued by two risks, namely, fixed rates and housing prices. Weak demographics and increasing interest rates hold the potential to significantly influence the currently soaring housing prices.

EU politics is seemingly convinced that a combination of slow-motion problem recognition and smart intervention on the part of supervision would be sufficient for preventing any politically sensitive development in EU banking. However, the behaviour of investors indicates that the market has a few doubts about the reliability of the mechanism. Furthermore, banks frequently disrespect and legally attack supervisors. This scenario could be an indication that the time is right for EU institutions and MSs to rethink their attitude towards banking regulation.

Open questions for the future

The banking union, as a step following monetary integration in the EU, was a strange choice. Logically, the major point of integration would be fiscal. Historically, only one case of integration of banking supervision preceding fiscal integration is recorded: the EU banking union.

Although it is a strange beginning, it is not the wrong one. The banking union could be successful given that it is complete, while permanently standing as a point of integration in an otherwise decentralised EU.

However, in such an environment, the SSM should find a means for accommodating permanent fragmentation, because the sovereign–bank nexus would remain at the national level. This notion could denote less cross-border integration and the predominant retention of holding instead of the integrated management structures of banks. The endeavour to equally address banks that are objectively unequal because they operate in different markets may be possible; however, designing the tools needed to achieve it would be a daunting challenge for the SSM.[69]

The war in Ukraine can be an important catalyst. It does not only create several uncertainties but also indicates that the *Great Moderation* period is behind us economically and politically. The world is back in its *normal* state in which the power of arms decides geopolitics. In her recent speech, Isabel Schnabel called this new reality 'a great volatility'. Although it is a return to historically normal circumstances, we are fortunately still not accustomed to it. As the union created around the Great Moderation, the EU needs time and effort to adjust to this new reality. The adjustment could require the promotion of further integration.

Once the three-pillar banking union is completed, the way forward for the banking union is dependent on the appetite of MSs for further integration. If the EU integration continues to gain momentum, it would trigger an even further integration of EU banking through the gradual establishment of the EU-wide sovereign–bank nexus. Without further integration, the SSM should adjust to fragmentation and its *singleness* will be under permanent pressure, because the same approach to banks in different environments would not always be optimal. Despite all prospective difficulties, retaining integrated banking supervision is a crucial point. The European banking market is already too integrated and interdependent for independent national supervisors. EU-wide financial stability, the integration of financial markets and independent national supervision/regulation of banking form the impossible trinity, which can be resolved only if one of the objectives is abandoned.

Despite the possible answer to the *big question* of EU integration, the interests of shareholders and overall financial stability could be improved if EU lawmakers were to contemplate why banks are querulant and uncooperative with supervisors. After all, lawmakers established the SSM to protect the interests of the EU and its MSs instead of as a playground for bank lawyers.

The regulatory environment surrounding EU banking is imperfect and incomplete. Its further development requires considerable thinking and decision-making, which may extend beyond the completion of the proposed architecture of the banking union. Based on its present position, no reasonable alternative exists to the SSM.

If the EU level sovereign–bank nexus is the desired outcome, then even the completed banking union, which is composed of three pillars, would remain short of the objective. Achieving this requires the success of wider integration agenda. If such a nexus is not the objective, then the banking union could prove to be an excessive step and, thus, become a framework that is permanently deprived of institutional preconditions required for achieving optimal results.

While steering the future of its banking regulation, EU institutions and its MSs should consider that banking holds the power to inadvertently decide the future of the EU.

REFERENCES

Basel Committee for Banking Supervision (2010, rev. 2011), *A global regulatory framework for more resilient banks and banking systems.* Bank for International Setlement.

Dirk Holländer, D.E. (2021). *Banking Hub by Zeb.* Retrieved from what drives banks' price-to-book (P/B) ratios? The balance sheet–what else!, August 27, https://www.bankinghub.eu/banking/research-markets/price-to-book-ratios

ECB Banking supervision (2022), *Supervisory Banking Statistics,* May, www.banking-supervision.europa.eu: https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.supervisorybankingstatistics_first_quarter_2022_202207~7df1e28443.en.pdf?160f4850deffd9818a3b419175a7e925

Grodzicki, M., d'Acri, C. R. and Vioto, D. (2019). 'Recent developments in banks' price-to-book ratios and their determinants'. *Financial Stability Review,* May, Box 5, 66-69.

Enria, A. (2021). *How can we make the most of an incomplete banking union?.* September 9, www.bankingsupervision.europa.eu: https://www.bankingsupervision.europa.eu/press/speeches/date/2021/html/ssm.sp210909~18c3f8d609.en.html

Giovanni Dell'Ariccia, C. F. (n.d.). *Managing the sovereign-bank nexus,* www.ecb.europa.eu: https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2177.en.pdf

M, L., & D., R. M. (2022). 'Banking Union's accountability system in practice: A health check-up to Europe's financial heart'. *European Law Journal,* 1-31.

MAN institute (2018, September). *European Banks–A Closer Look at an Unloved Sector,* https://www.man.com/maninstitute/european-banks-closer-look-at-an-unloved-sector

Odak, D. (2020). *A Political Economy of Banking Supervision* (Springer).

The Council of the European Union (n.d.), *Regulation (EU) No 1024/2013,* eur-lex.europa.eu: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1024.

Tümmler, M. (2022). 'Completing Banking Union? The Role of National Deposit Guarantee Schemes in Shifting Member States' Preferences onthe European Deposit Insurance Scheme'. *Journal of Common Market Studies,* 1-17.

Fiscal Forward Guidance

How Tax Policy Can Be Used for Non-Fiscal Objectives

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Abstract

Tax policy primarily aims to raise revenue to service public debt and finance government services and transfers. Tax policymakers often claim it can be used to pursue other goals like increased economic growth and desirable consumption behaviours. This paper explores how tax policy can be used to foster innovation and health outcomes, in search of a 'fiscal forward guidance'. The focus is on tax policies that promote environmental sustainability through innovation or healthy consumption behaviour. Environmental regulation may harm firms' competitiveness, incentivise strategic delocalisation to localities with less stringent regulation, and foster innovation. Similarly, although regulations and restrictive tax policies on tobacco, alcohol, or sugar-sweetened beverages are intended to improve health outcomes, they may drive consumers to illegal or counterfeit products. This study reviews the theoretical underpinning of 'good' fiscal policy in these realms and present evidence of successful and unsuccessful fiscal policies to boost innovation and consumption.

Introduction

In developed countries, governments absorb between a third and a half of the national income. Tax revenues are necessary to sustain government expenditure on transfers and welfare spending and to service public debt. The succession of the health crisis and the war in Ukraine has put enormous pressure on governments, increasing public spending on direct healthcare spending and transfers to face the socio-economic consequences of the pandemic. Higher debt levels have been reached, further reducing fiscal space to tackle secular challenges, such as ageing and climate change. Therefore, it is even more crucial for governments to determine ways to move the economy forward without the luxury of fiscal space, using fiscal policy efficiently to improve the country's position in terms of innovation, sustainability, and health.

This paper focuses on two main fiscal policy areas: environmental and behavioural taxation. These two areas have seen an important evolution in the past few decades: as climate change has gained prominence in the political debate, an increasing number of countries have pushed for regulation and tax instruments that could curb greenhouse emissions and the use of fossil fuels; this push has also raised many concerns about the impact of this legislation on critical industrial sectors, such as automotive, chemical, and energy. Similarly, we observe a gradual and consistent increase in taxes on tobacco and alcohol, and the idea of taxing other specific food items, such as sugary drinks, is gaining traction.

These two broad categories of taxation share several characteristics. Firstly, neither is a major source of revenue for governments. Environmental taxation (mostly taxing fuels and energy production) accounts for about 5% of tax revenue in OECD countries, with excise duties and taxes on tobacco, alcohol, and sugary drinks accounting for even less. Secondly, politicians typically justify these types of tax policies as a way to achieve 'better' than simply collecting revenue: saving the environment, improving people's health, and discouraging self-destructive consumption behaviour. Thirdly, many commentators worry about the potential adverse consequences of environmental and health taxes on the poorer members of society.

This paper is organised as follows: Section 2 examines the theoretical foundations of environmental taxation. Section 3 reviews empirical evidence on this type of taxation. Sections 4 and 5 investigate behavioural taxes on sugar, alcohol, and tobacco-related products, focusing first on the effects of taxes on consumption and then on optimal tax policy. Section 6 concludes and supplies policy recommendations.

The theoretical underpinning of environmental taxation and regulation

Economic theory has always been quite precise in the prescription for environmental taxation. Since Pigou (1920), the basic idea is that producing pollution imposes an externality on society, i.e. a cost not considered by the price system. Because this cost remains 'hidden' from polluters, pollution levels will exceed the socially optimal level. The optimal response is to develop a system that reveals this hidden cost so that companies can internalise (consider) it when making production decisions.

Carbon taxes (e.g. excise duties on fuel) and permit trading both precisely respond to this theoretical underpinning. Other types of regulations known as 'command-and-control' may aim to achieve similar results, but economists regard them as inferior. Examples include regulating which industrial processes can or cannot be used and mandating product standards or emission levels. All of these 'non-market' interventions require the government to 'pick the winner' in terms of which process/technology are allowed or prohibited, putting the government in a non-neutral position concerning technologies or corporate choices. The government requires specific information on certain industries to make sound decisions in this area, which may not be readily available. Command-and-control policies also fail to reward innovation and instead focus solely on banning/punishing polluters or violators, providing little incentive to improve one's environmental record.

According to the OECD (2010), to be effective, an environmental tax should be directly linked to the pollutant and levied as much as possible on final goods or consumptions, allowing firms to freely take advantage of process innovation and technological possibilities to optimise their production around this tax. Another important element for taxation is its credibility and predictability. Environmental taxation dynamically affects the economy: a well-designed tax may spur investments in innovation and firms need to see a clear path ahead to make these investments, as highlighted by Akigit and Stancheva (2020).

However, from an empirical standpoint, the issue is much less clear. The evidence on the superiority of market-based environmental policies over non-market ones is sometimes mixed.

The challenge in the past years has been to find empirical evidence to support two competing hypotheses: the 'Pollution Haven' (McGuire, 1982) and the Porter hypothesis (Porter, 1991). The first posits that increasing environmental standards or taxes will compel firms to relocate polluting activities towards less demanding areas. This may even increase global pollution levels and disproportionately affect less wealthy areas, which are more likely to be the target of this relocation. This goes together with Baumol and Oates' (1988) position, who stated that stringent environmental regulations may worsen a country's external position with jobs, profits, and environmental degradation being exported to laxer jurisdictions.

Meanwhile, the Porter hypothesis contends that environmental taxation and regulation triggers process and product innovation to overcome or circumvent stringent environmental requirements. In some cases, the overall effect on competitiveness between gains from innovation and losses from regulation may be positive; this is often referred to as the 'strong version' of the hypothesis. However, in most cases, the overall effect is a loss of productivity or competitiveness, and the hypothesis remains true in its 'weak' form. Whichever version of the hypothesis is correct in a given situation, the direct result is that some of the costs associated with environmental compliance will be overcome by process and product innovation. Thus the

cost of environmental regulation is bound to be systematically overestimated.

The empirical question remains: Can environmental policies trigger innovation so much that they may become a competitive advantage?

Innovation and environmental regulation

To address this issue, we must recognise that environmental challenges present at least two distinct market failure issues. First, pollution is an externality, and policies must encourage market participants to internalise this externality, such as through an emission trading system or carbon taxation. Second, environmental improvement is achieved through R&D and innovation activities, which are vulnerable to knowledge market failures. The inventor can internalise not all benefits of new knowledge because diffusion is critical to profitability and patents are not always able to fully protect innovation; additionally, diffusion may lead to further innovation, making it even trickier for inventors to reap its benefits. Fetter et al. (2018) provide an example of this: in response to public concerns about the environmental damage posed by fracking, the state of Pennsylvania imposed on companies the obligation to disclose the composition of chemicals used in the process, revealing their industrial processes to the public (but also to competitors). Evidence shows that companies decreased the diversification of chemicals used across wells, leading to a decrease in innovation. The overall effect of this case of compulsory disclosure on the environment and innovation is unknown, but this example shows how market failures in the property rights "market" of ideas affect firms' behaviour and should be taken into account by regulators.

Overall, empirical evidence points to the centrality of public policies, such as R&D subsidies and environmental taxation, in fostering innovation where it is most needed.

Additional market failures can result from learning-by-doing and path dependence, switching costs (consider the competition between hydrogen and electric mobility), and capital market failure. All of these various market failures necessitate tailored policies for specific situations.

Empirical works also faced a challenge in measuring innovation and establishing a causal link between innovation and environmental policies. Initially, data such as Pollution Abatement Cost and Expenditure or ad-hoc indices of environmental stringency have been used. Recently, the increased availability of firm-level surveys has been important in exploiting more granular data on this topic (see for example Popp et al., 2019 for a review). In fact, country or sector-level data are rarely detailed enough to investigate which parts of the economy are affected by innovation policies.

All these issues demand different policies: subsidies for start-ups are essential to overcome initial costs, especially when both learning-by-doing and path dependence are high. Meanwhile, subsidies to R&D activities help overcome the knowledge market failure and decrease uncertainty for firms, as there is strong evidence of a long lag between discoveries and commercialisation (over ten years in some fields). This is reminiscent of Rodrik, Velasco, and Hausman's (2008) theory, who pointed out how to solve complex economic growth problems and critically analysed which of the many possible policy interventions may have the largest impact, acting sequentially rather than simultaneously in implementing policy tools.

There is sufficient evidence that regulation stringency (whether through market or non-market tools) decreases foreign direct investments (FDI) in polluting firms. For example, Wagner and Timmins (2009) studied FDIs of German firms worldwide and found that lower environmental standards typically increased German FDIs in that country, especially in more polluting sectors, such as the chemical industry. Environmental regulations also negatively impact employment in the affected sectors, but the overall effect on employment is usually negligible.

On a more positive note, Jaffe and Palmer (1997) and Brunnermeier and Cohen (2003) showed that

stringent environmental regulation leads to higher levels of investment and more environment-related patents. However, the overall effect on productivity seems to be negative, supporting the weak Porter hypothesis, which states that stringent regulations both increase costs and spur innovation, but not sufficiently to make the overall effect positive. There is also evidence that this drop in productivity is short-lived and absorbed in a few years.

Overall, empirical evidence points to the centrality of public policies, such as R&D subsidies and environmental taxation, in fostering innovation where it is most needed. When environmental policies are implemented, costs and regulations are imposed on firms; over time, the productivity decline is partially recovered through innovation. This means that the costs imposed on the economy by stricter environmental regulations or taxes are frequently lower than expected and pose only a minor risk to firm international competitiveness.

Tobacco, tax, and drinks

Another area in which tax policy has been used to achieve non-revenue goals is the so-called 'sin taxes', i.e., taxation on goods considered harmful or immoral, such as alcohol, tobacco, and more recently, sugar-sweetened drinks. At times, these go under the more neutral name of 'behavioural taxes', i.e., taxes whose main aim is to affect people's behaviour and consumption choices.

The rationale for taxing these products, like environmental policies, is based primarily on the externality they cause to consumers' health. Some of these products are also addictive, and to the concept of externality, we must add the notion of internality: the harm caused by consumers' insufficient ability to anticipate the addictive power of specific goods and thus incorrectly predict their capacity for self-control once they begin consuming them, resulting in excessive consumption.

Also, in this realm, policy makers typically rely on market- and non-market -based policies. Non-market policies include smoking bans in public spaces, by age or quantity, limits on advertising, and prescriptions on packaging. However, market policies directly intervene on product prices via excise duties and taxes.

Prima facie behavioural taxes on tobacco, alcohol, and beverages mostly involve raising revenues and discouraging consumption behaviours deemed harmful, with little dynamic effects regarding product innovation.

The recent proliferation of non-combustible nicotine and tobacco products (NNTP), such as e-cigarettes or vaping devices, can be viewed as a market response to meet the demand for tobacco-related products in less harmful ways. In this regard, both environmental and behavioural taxation show us how tax policies have substantial dynamic effects, incentivising producers to pursue better alternatives through profit signalling.

Consumer product data is widely available, thanks to detailed retail surveys such as the Nielsen Retail Survey. Evidence overwhelmingly found that taxes are at least partially transmitted onto prices, and consumers respond to higher prices by cutting their consumption. Wagenaar et al. (2009) performed a meta-analysis on alcohol taxation and found that a 1% increase in alcohol prices decreased consumption between 0.51% and 0.77%. The overall health effects may be more difficult to estimate, as often consumers who engage in heavier drinking (and therefore take higher risks on their health) are also the ones with the more rigid demand for alcohol, i.e., the ones who are less sensitive to price changes.

The concern for the increasing obesity rates, especially in the US, has brought some localities to tax sugar-sweetened drinks. Consumers also react to prices (in response to increased taxation) when it comes to soft drinks. The most well known example is described by Seiler (2019) on the city of Philadelphia, where a tax on sugary drinks resulted in a 22% decrease in consumption and a 16% decrease in caloric intake. These results are particularly intriguing because they highlight an important feature of many tax increases: consumers affected by the hike also engaged in 'tax avoidance' by increasing their out-of-town purchases. We can compare this behaviour to that described in the 'Pollution Haven' hypothesis, in which environmental taxation or regulation simply pushes polluters towards laxer jurisdictions.

One main difference between sugary drinks and alcohol is how taxes are typically designed: taxes on sugary drinks are closely linked with the amount of (added) sugar, making a strong and clear link between the harmful substance and the tax levied. For alcohol consumption, taxation follows more complicated patterns, as it is also heavily affected by the different types of alcohol and how both politicians and voters perceive them. France and Italy for example do not tax wines, but tax spirits, whereas the UK taxes more heavily wine than beer. In other words, the ideal theoretical link between the level of harm (or quantity of harmful substance) and tax is mediated by political and cultural considerations, as well as the goal of raising adequate revenues.

In terms of optimal taxation, the market for tobacco and nicotine products is probably the most interesting to analyse. Here we have several traditional products that are heavily taxed and are known to be harmful to health, such as cigarettes or fine-cut tobacco. They impose an important burden on society through increased health expenditure

and decreased life expectancy and quality of life, causing many non-communicable diseases, such lung cancer, cardiovascular disease, and respiratory disease. EU countries have been coordinating their tax policies on these products, imposing minima across countries, with many countries, especially in Western Europe taxing cigarettes at a substantially higher level than the mandated minima.

In recent years, several alternative non-combusted products have been introduced in the market, such as e-cigarettes heated tobacco products, and in general, non-combustion 'vaping' devices. Because these products are still relatively new, there is little evidence of their long-term health effects. However, it is well understood that the most harmful negative health effects of smoking are caused by combustion. Thus, some health authorities and expert polls report that NNTP are substantially less harmful than traditional cigarettes (McNeill et al. 2018; US Surgeon General, 2018). Many people believe that non-combustible alternatives are especially beneficial in terms of avoiding noncommunicable diseases (McNeill et al., 2018), especially since some of the risk associated with smoking traditional cigarettes dissipates over time (Nutt et al., 2014).

Taxing according to the harm level

The coexistence of these new and old products on the market has sparked intense research and policy debate about the optimal way to tax them while preserving both revenue and health concerns.

Theoretically, just as with pollution or alcohol, the optimal way to tax a harmful good would be to tax it according to its level of harm, allowing consumers to fully internalise the externality resulting from its consumption. Furthermore, the tobacco industry is complicated. Because of the existence of so many different products, one cannot ignore the potential interaction between these markets and how taxation of one good may affect consumption of another.

First of all, we must determine whether traditional (more harmful, combusted) and innovative (less harmful, combustion-free) products are substitutes or complements from the point of view of consumers. Many of us have observed that people who used to smoke cigarettes are now using NNTPs or alternating between the two depending on the situation (which may be affected by regulation on whether one can smoke or vape in a particular location). Most studies based on Nielsen Retail Scanner data seem to point towards the fact that these products are economic substitutes (e.g. Allcott & Rafkin, 2020), which is confirmed by survey-based studies such as Pesko et al. (2020). Positive cross-price elasticities circumstantiate this: for example, Abouk et al. (2021) found that a 1% increase in cigarette prices leads to a 0.34% increase in consumption in NNTP, pointing towards the fact that consumers substituted cigarettes with NNTP as the former became relatively more expensive. The observation of dual usage may also be explained as part of the gradual transition of consumers from old to new products. Because cross-price elasticities are positive and harm levels differ substantially, the optimal policy should signal this to consumers through visibly different levels of taxation, facilitating their transition to less harmful products. This may be seen as a 'second -best' approach because government programmes to convince people to quit smoking have minimal success rates.

A less obvious advantage of this approach is that the government would signal to producers their preference for less harmful alternatives to smoking, incentivising innovation towards the discovery and commercialisation of less harmful alternatives. In this way, the government can encourage innovation and 'guide' firms towards developing products that meet the government's health goals.

In practise, NNTP and tobacco product policies vary greatly across Europe (and across the world). Some governments have decided to tax NNTP like they tax combustion-based traditional tobacco products, whereas others have maintained important tax differentials (World Bank, 2019). Many governments were naturally concerned that the introduction of novel (initially untaxed) NNTPs would erode their tax base and capacity to raise revenue from these markets, regardless of health outcomes.

As consuming these products involves both addiction and habit formation, taxation levels may also have long-run effects. It is well known that high taxation on nicotine and tobacco products discourages initiation but is not very effective in making people quit, for example. Furthermore, in countries with soft borders or organised crime, skyrocketing taxes have resulted in high initiation via illicit products. According to data, this has been the case in France.

Currently, the EU regulation has no particular prescription for novel tobacco products, as they were not sufficiently widespread when the directive was agreed upon. A revision of the tobacco directive is expected in the near future, and the policy debate delves on whether to impose similar or different taxation levels on NNTPs and traditional cigarettes. Imposing different levels of taxation would be completely consistent with economic theory, which suggests taxing based on harm levels, and empirical evidence indicating substitutability between old and new products. Substitutability that, given the lower damage produced by new products, should be aimed by public authorities trying to achieve better public health outcomes. Following along the idea of harmonising taxation between old and new products would imply a massive relative price change in favour of traditional products. Once again, as these products

Theoretically, just as with pollution or alcohol, the optimal way to tax a harmful good would be to tax it according to its level of harm, allowing consumers to fully internalise the externality resulting from its consumption.

are substitutes, we can expect many consumers to return to traditional cigarettes as a response.

European countries have taken different approaches, with heterogeneous levels of taxation for NNTPs. The majority of them have established a strong preference for NNTPs. Some countries, such as France, took a different approach, imposing very high taxes on heated tobacco products and negligible taxes on e-cigarettes. Taxation on traditional cigarettes is also among the highest in Europe, more than twice the European minimum. This level of taxation for traditional cigarettes is the result of the decision to increase tobacco taxes beginning in 2017 (KPMG, 2021). The stated goal of this dramatic tax hike was to decrease smoking prevalence. However, data on the effect of this policy tell a different story. This massive price increase also harmed smoking prevalence, which increased in the more disadvantaged strata of society over the period 2000–2020. Some also linked this policy to the massive increase in counterfeit market, which now covers about 15% of total consumption (KPMG, 2021).

Similar policies were enacted in New Zealand, in which draconian tax hikes were implemented to curb smoking prevalence, with similar (inconclusive) results. Aside from having little effect on smoking prevalence, these policies appear to hit disproportionately the less fortunate strata of society, where smoking prevalence is high and disposable income is low. For this reason, New Zealand recently adopted a 'Tobacco Harm Reduction' strategy that includes differential taxation of combustion cigarettes and NNTPs, capitalising on the two products' substitutability (Burrowes et al., 2022). New Zealand went further, banning combusted products for individuals born after 1 January 2009. Early evidence appears to confirm that the strategy of strongly nudging consumers towards better alternatives successfully achieves lower rates of smoking prevalence by substituting less harmful alternatives for combusted products.

Some EU countries are moving decisively towards the concept of incentivising progressive substitution. This is the case in the Czech Republic and Poland, where tax calendars directed to create a clear price signal able to guide consumers' choices have been implemented (see Stoklosa et al., 2021 for Poland and EC Intelligence, 2022 for the Czech Republic)

Policy recommendations

Environmental and behavioural taxes will become more central in political debate. The disruption caused by the climate transition and the war in Ukraine will strain the entire manufacturing sector tremendously. Analogously, after being hit by the pandemic, healthcare systems will face an increased burden from an ageing population. In both cases, the government should use fiscal levers to achieve immediate goals, such as correcting market failures and using tax policy incentives to dynamically alter consumer and firm incentives. Governments may be able to direct the economy towards more sustainable paths through 'fiscal forward guidance' to meet the challenges posed by demographic and climate transitions.

In terms of environmental taxation and regulation, evidence suggests that environmental regulation has a minor negative effect on productivity, which is partially compensated by innovation (weak Porter hypothesis). Simultaneously, there is a risk of pushing polluting industries out of the EU and into less stringent jurisdictions ('Pollution Havens'). This is problematic from an environmental standpoint, but it also jeopardises European manufacturers' competitiveness in both domestic and international markets.

The EU is already moving towards a carbon border-adjustment mechanism (CBAM), in which importers to the EU will be required to pay duties proportionate to the pollution involved in the production of the imported products. Some importers will be required to report the pollution content of their imports to the EU beginning in October 2023, as a first step towards the imposition of pollution-related import tariffs. This is a highly contentious issue on many levels, including trade relations between China and the EU (and the US) and the potential impact of such tariffs on EU inflation. We can also expect the CBAM to be legally challenged as a (environmentally motivated) protectionist policy under the WTO agreement. One can imagine that in sectors that are both more polluting and more subject to international competition (and more geopolitically strategic), the EU will have every incentive to push for import adjustments that may prevent sector relocations outside the EU or (similarly) the loss of international competitiveness of domestic manufacturers.

Pushing for a leap forward in R&D activities is likely to be less controversial and more effective in the short and medium term. Considerations regarding the imposition of pollution-related import tariffs must also be made interna-

tionally, with the understanding that they will be subject to political considerations. Given the potential fiscal burden of such policies, the Union should consider providing financial support to national governments for such programmes, similar to the Next Generation EU funding and scrutiny infrastructure.

In this sense, some policy recommendations may be formulated:

1. Market-based measures such as taxation and emission trading should be preferred over command-and-control measures to spur environmental innovation.

2. Environmental taxation should be stable and predictable, indicating a clear path for companies to exploit through process and product innovation investment.

3. Pollutant taxes, whether direct or indirect, help target and incentivise reducing harmful emissions.

4. Mechanisms such as the CBAM will have to be put forward in international fora, to avoid EU firms to flee towards 'pollution havens' permanently damaging the EU relevance in some key manufacturing sectors.

5. Taxing according to harmfulness should be applied in the realm of behavioural taxation, such as sugar-sweetened beverages and tobacco-related products.

6. When substitute products are available (e.g. natural fruit juices or non-combustible nicotine products), the tax system should encourage consumers to switch to them by maintaining a visible tax differential.

7. Clear paths of tax increases for harmful products while maintaining the tax differential for less harmful ones will guide consumers and firms towards safer products while ensuring adequate tax revenues.

REFERENCES

Abouk, R., J. C. Courtemanche, D. M. Dave et al. (2021). 'Intended and Unintended Effects of E-cigarette Taxes on Youth Tobacco Use'. *National Bureau of Economic Research*, Working Paper No. 29216.

Akcigit, U. § Stantcheva, S. (2020). 'Taxation and Innovation: What Do We Know?'. *National Bureau of Economic Research*, Working Paper No. w27109.

Allcott, H. § Rafkin, C. (2020). 'Optimal regulation of ecigarettes: Theory and evidence (Technical Report)', *National Bureau of Economic Research*.

Baumol, W.J. § Oates, W. E. (2 ed.) (1988). *New York, The Theory of Environmental Policy* (Cambridge: Cambridge University Press).

Brunnermeier, S. B. § Cohen, M. A. (2003). 'Determinants of environmental innovation in US manufacturing industries'. *Journal of Environmental Economics and Management*, 45(2), 278–293.

EC Intelligence (2022), 'Czechia embraces harm reduction, looks to include it in public health strategy', https://ecigintelligence.com/czechia-embraces-harm-reduction-looks-to-include-it-in-public-health-strategy/.

Fetter, T. R., Steck, A. L., Timmins, C. et al. (2018). 'Learning by Viewing? Social Learning, Regulatory Disclosure, and Firm Productivity in Shale Gas'. *National Bureau of Economic Research*, Working Paper No. 25401.

Hafstead, M. A. C. § Williams, R. C. I. (2016). 'Unemployment and environmental regulation in general equilibrium'. *National Bureau of Economic Research*, Working Paper No. 22269.

Hausmann, R., Rodrik, D. § Velasco, A. (2008). 'Growth diagnostics'. In *The Washington Consensus Reconsidered: Towards a new global governance*, 324–355.

Jaffe, A. B. § Palmer, K. (1997). 'Environmental Regulation and Innovation: A Panel Data Study'. *Review of Economics and Statistics*, 79(4), 610–619.

Kenfield, S. A., Stampfer, M. J., Rosner, B. A. et al. (2008). 'Smoking and Smoking Cessation in Relation to Mortality in Women'. *Jama*, 299(17), 2037–2047.

KPMG (2021), *Illicit cigarette consumption in the EU, UK, Norway and Switzerland*.

McGuire, M. C. (1982). 'Regulation, factor rewards, and international trade'. *Journal of Public Economics*, 17(3), 335–354.

McNeill, A., Brose, L. S., Calder, R. et al. (2018). *Evidence review of e-cigarettes and heated tobacco products 2018: a report commissioned by Public Health England.*

Nutt, D. J., Phillips, L.D., Balfour, D. et al. (2014). 'Estimating the harms of nicotine-containing products using the MCDA approach'. *European Addiction Research*, 20(5), 218–225.

Pesko, M. F., Courtemanche, C. J. § Maclean, J. C. (2020). 'The effects of traditional cigarette and e-cigarette tax rates on adult tobacco product use'. *Journal of Risk and Uncertainty*, 60(3), 229–258.

OECD (2010). *Taxation, innovation and the environment*. (Paris), https://www.oecd-ilibrary.org/environment/taxation-innovation-and-the-environment_9789264087637-en

Pigou, A. (1920). *The Economics of Welfare* (London: MacMillian).

Popp, D. (2019). 'Environmental policy and innovation: a decade of research'. *National Bureau of Economic Research*, Working Paper No. 25631.

Porter, M.E. (1991). 'America's green strategy'. *Scientific American*, 164(4).

Seiler, S., Tuchman, A. § Yao, S. (2019). 'The impact of soda taxes: pass-through, tax avoidance, and nutritional effects'. *Stanford University Graduate School of Business*, Research Paper No. 19-12.

Stoklosa, M., Pogorzelczyk, K. § Balwicki, L. (2021). *Tools to reduce tobacco use among young people in Poland: addressing affordability and accessibility of tobacco products through taxation and other measures*, https://www.tobacconomics.org/files/research/711/tools-to-reduce-tobacco-use-among-young-people-in-poland-single-page-view.pdf

US Surgeon General (2018). *Surgeon General's Advisory on E-Cigarette use Among Youth* (Washington DC: Department of Health and Human Services).

Wagenaar, A. C., Salois, M. J. § Komro, K. A. (2009). 'Effects of beverage alcohol price and tax levels on drinking: a metaanalysis of 1003 estimates from 112 studies'. *Addiction*, 104(2), 179–190.

Wagner, U. J. § Timmins, C. D. (2009). 'Agglomeration effects in foreign direct investment and the pollution haven hypothesis'. *Environmental and Resource Economics*, 43(2), 231–256.

World Bank Group (2019). *E-cigarette use and taxation*. Working paper No. 136053, 12 April, https://documents1.worldbank.org/curated/en/356561555100066200/pdf/E-Cigarettes-Use-and-Taxation.pdf

Photo by Jonathan Cooper on Unsplash

ENDNOTES

Section 1

6 New definition of inflation target was implemented in July 2021.

7 Suspension is still active and the debate about the SGP reform is ongoing.

8 The World Bank, World Development Indicators Database.

9 Eurostat (2022), EU Imports of Energy Products, Eurostat, 23 September, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_-_recent_developments#Overview

10 Measured by HICP (source: Eurostat).

11 After registering deflation in the second half of 2020, higher inflation rates in 2021 carried over the effect of the low base; hence, normalisation.

12 Baltic Dry Index, which measures the cost of international maritime transportation, surpassed the pre-pandemic historical high by an astounding 120% in early October 2021. It remained above this rate from April 2021 to June 2022.

13 Source: The Balance.

14 Source: Eurostat.

15 Sum of household consumption, gross investment and government consumption (C+I+G).

16 Source: FRED for US, Eurostat for Eurozone.

17 A. W. Phillips (1958), The Relation Betweeen Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957. Economica, November, p. 283-299. https://doi.org/10.1111/j.1468-0335.1958.tb00003.x

18 Eurostat, data for July 2022. The comparable range for US federal states is from 1.8% in Minnesota and 2% in Nebraska, New Hampshire and Utah, to 4.5% in Alaska and New Mexico and 5.2% in the District of Columbia.

19 For example, countries with low real GDP per capita and Denmark tend to pass large shares of exogenous energy price shocks onto corporations, while the household sector is subsidized. In more developed countries, the relative strentgh of inflation passthrough is sectorally inverse. Another interesting case is Malta, which has long-term fixed energy prices due to its special agreement with supplier SOKAL from Azerbaijan.

20 The valuation of R&D is an issue in measurement of Irish GDP. The economy of Luxembourg is heavily dependent on financial services. It is much more informative to view the actual individual consumption, which stands at 45% above the EU average in Luxembourg and 10% below the average in Ireland.

21 Source: Statista.

22 Source: United States Congress Joint Economic Committe.

23 Highest rate of inflation in July 2022 among 11 original members of the Eurozone was in Belgium (10.5%).

24 Additional factors are in favour of flexible inflation targets, which are beyond consideration in this article, such as demographic change (ageing), deglobalization, changes in long-term productivity growth and structural shifts in preferences for risk-free liquid assets, which may lower the natural rate of interest and render estimation more difficult at the same time (P. Andrade, et. al. 2019), The Optimal Inflation Target and the Natural Rate of Interest, Brookings Papers on Economic Activity, Fall, 173-255. https://www.brookings.edu/wp-content/uploads/2020/10/Andrade-et-al-final-draft.pdf

25 The structural origins of unemployment variations may have become increasingly more important over the last decade or so, which involves factors such as population ageing, immigration, technological change and, most recently, the restructuring of global supply chains (onshoring instead of offshoring, which was prevalent during the earlier stage of globalisation).

26 Fiscal dominance should not be confused with the strength of fiscal stimulus. Fiscal dominance is a political feature that reflects histories, institutions, widespread beliefs, preferences of voters, even the beliefs, personalities and political careers of key policy makers. In this respect, notably, the public debt-to-GDP ratio of the United States took 26 years (1981–2007) to double from 31.5% to 63% and only 14 years for the next doubling from 63% to 126% in 2021. The long-term path of the public debt of the United States is not necessarily a reflection of fiscal dominance in its entirety: long-term economic growth, private savings-to-GDP ratio and the structural features of the global demand for government bonds also play important roles in shaping the historical path of public debt. However, it does indicate the political submisiveness of monetary policy decision-making at least during certain historical periods that call for increased intervention.

27 The European stabilility mechanism (ESM), outright monetary transactions (OMTs) and transmission protection instrument are clear examples of such instruments. OMTs are the bond purchase instrument of the Eurosystem for member states that use ESM money. This instrument was never used, although it has been in place since 2012.

28 Member states can apply to the ECB Governing Council for activation of the TPI if it they are not subject to excessive deficit or macroeconomic imbalance procedure.

29 Bond markets misprice long-term fiscal solvency, which lies beyond the investment horizon of bondholders (e.g. due to the absence of very long-term perspectives on the sustainability of public pension systems in an era of ageing population).

30 Government bond markets are typically organized as segmented OTC markets with predominant roles of specialistsor market makers and a small role of retail investors. Infrastructural integration, low transaction costs and openness to a large number of investors would contribute to price discovery within the efficient and integrated market. Government bonds will largely remain bonds of member states for decades to come, but no reason exists for not having an integrated bond market, which technically functions as if it were a market for one government bond based on the principles of low cost, rapid settlement and transparent accessible auction.

31 In line with Art. 124 of the Treaty.

32 R. Beetsma et. al. (2022), Making the EU and national budgetary frameworks work together, Vox EU, 13 September, https://cepr.org/voxeu/columns/making-eu-and-national-budgetary-frameworks-work-together

33 It is important to keep in mind that in the EU a state guarantee is on the other hand supported by legal obligation of all banks to redeem costs incurred to the government by failing banks through their participation in the DGS scheme. The supervision is needed to ensure that the shock, if occurs, is bearable for the financial system, and that individual banks can sustain sudden losses incurred by it. Otherwise, the shock could create a domino effect, forcing the government to commit irredeemable funds.

34 In the case of the legal environment in the EU, in which banks are the final obligors for all such costs, the agency can also be liable to the banks if costs occur in the case of its omission and, thus, return the cost burden to the government budget.

35 Single supervisory mechanism (SSM) and single resolution mechanism (SRM)

36 For detailed rationales and interests that underlie the reluctance of implementing EDIS, the reader is encouraged to see TÜMMLER, M. (2022). Completing Banking Union? The Role of National Deposit Guarantee Schemes in Shifting Member States' Preferences on the European Deposit Insurance Scheme.

37 Although not always with optimal results, as will be discussed in Chapter 3.

38 Among the hardest hit economies were two that experienced widespread banking crisis, namely, Ireland and Spain, which were generated by economic shocks in the construction sector and losses in the US market, respectively. Banking supervision was unable to make a significant difference in these areas.

39 Council regulation (EU) No 1024/2013

40 Gi-Dell'Ariccia, C. Ferreira, N Jenkinson, L Laeven, A Martin, C Minoiu, A Popov (2018): 'Managing a sovereign-banking nexus'; www.ecb.europa.eu.

41 Basel Committee on Banking Supervision, (2010 rev 2011). The supervisor cannot limit a bank's exposure toward sovereign debt denominated in domestic currency, based on credit risk.

42 Those events were also strongly influenced by events in global financial markets in 2008–2009. Though the weakness of some member states' credibility would most likely occur independently, absent global financial shock the situation would most likely have been much easier to resolve.

43 Marco Lamandin and David Ramos Muñozunder; European Law Journal (2022), p. 1–31

44 Financial stability review, ECB, May 2019, Box 5, p 66–69

45 Price/book ratio – the ratio between market price and book value of a stock

46 For example: Dr D. Holländer, (27. August 2021); What drives banks' price-to-book (P/B) ratios? The balance sheet – what else!: https://www.bankinghub.eu/banking/research-markets/price-to-book-ratios

47 It is unclear whether those are Eurozone, EU or overall European banks. However, the conclusion would be similar in both cases.

48 That can also be explained by the difference in the profitability. Though unweighted average P/E is about 8,5 in both groups, Eurozone banks' average P/E is distorted by an outlier traded on high P/E due to low profitability. Removing it from the sample, European P/E becomes significantly lower than the US (6,7:8,4).

49 That is only a speculation, as none of the supervisory standards allows such an approach. Besides, as it is visible from the next chapter, the pricing issue at the moment lacks any 'substantial' reason potentially requiring accounting adjustment.

50 J. M. Keynes once said: 'Markets can remain irrational longer than you can remain solvent!'

51 https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html

52 https://www.federalreserve.gov/releases/h8/current/default.htm

53 As US legal requirement is higher than the Basel requirement and applicable buffer is much lower. However, bank getting marginally below legal requirement would be, though incompliant, much healthier than the EU's marginally compliant bank, giving regulators much more space for manoeuvre.

54 Providing that ratio between approximated and fully loaded leverage is the same in US and Eurozone.

55 For example, MAN institute. (September 2018). European Banks – A Closer Look at an Unloved Sector.; https://www.man.com/maninstitute/european-banks-closer-look-at-an-unloved-sector Quote: 'We believe for the best-run banks in Europe, you'd need some fairly apocalyptic tail events to justify current pricing'.

56 https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.supervisorybankingstatistics_first_quarter_2022_202207~7df1e28443.en.pdf?160f4850deffd9818a3b419175a7e925

57 Ibid, table T4.03.2, p. 74.

58 The ratio between equity of the bank and net value of non-performing loans (NPL). The higher the ratio is, the more capital is invested in NPL, and bank solvency is therefore more dependent on the value of NPLs.

59 Ibid, table T4.03.2, p. 74 gives overall SSM NPL of 423 bn EUR with coverage of 43%. Net value of NPLs is 237 bn EUR. T00.01 p2 gives equity of 112 largest SSM banks of 1.600 bn EUR. Average texas ratio was below 15%.

60 Most of the supervisory authorities, when they judge that the bank overvalued its assets have the authority to order the decrease in accounting value to a more realistic one. SSM should achieve this objective by using indirect tools, requiring more work and opening administrative and legal risks.

61 Such a reading of the law is akin to the pilot who suffocated during check-list execution, as 'breath in–breath out' instruction was not written in the list.

62 Odak D., (2020), A political economy of banking supervision, p. 105–114.

63 On January 1st 2023 Croatia joins the Eurozone. However, as there is no significant institution on the consolidated level in Croatia, it will remain 19.

64 Central banks should lend early and without limit, to solvent firms, against good collateral, and at high rates.

65 Post-traumatic stress disorder – distorted perception of reality and behavioural distortion appearing as a consequence of excessive stress.

66 Maybe it is worth noticing that Nordea was the only significant Eurozone bank on 23 June 2022, with P/B over 1.

67 Enria, A. (2021) How can we make the most of an incomplete banking union? https://www.bankingsupervision.europa.eu/press/speeches/date/2021/html/ssm.sp210909~18c3f8d609.en.html

68 Today the working compromise is that non-strategic entities whose assumed resolution strategy is bankruptcy (and therefore could trigger insurance pay-out) are supervised by a domestic supervisor, while strategically important entities having different resolution strategies are supervised by the SSM. It remains to be seen if the final 'three pillars' system would follow a similar dividing line as it could represent a serious obstacle to the implementation of EDIS.

69 The fact that SSM is not a regulator of EU banking market would also influence its ability to achieve it.

SECTION 2

AGRICULTURE-CLIMATE-ENERGY NEXUS

Gene Editing

An Essential Tool for Sustainable and Healthy Food Systems

–
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Abstract

New breeding technologies (NBTs), including gene editing technologies, are recognized for their potential to increase the productivity of healthy food systems and reduce their impact on the environment and climate change. These technologies have comparable or even lower environmental and health risks than classical breeding techniques and, therefore, do not require stricter regulations. However, in 2018, the European Court of Justice classified plants produced using NBTs, including new breeding technologies such as the CRISPR/Cas system, as genetically modified organisms, thereby subjecting the crop varieties developed using NBTs to onerous authorization procedures. As a result, crop varieties arising from NBTs cannot be produced in the European Union (EU), negatively impacting consumers, the environment, biodiversity, and the competitiveness of Europe's agriculture industry. Herein, it is argued that the societal benefits of NBTs outweigh the risks and that the existing EU legal framework for classical breeding techniques can mitigate any remaining risks.

Introduction: What are new breeding technologies?

New breeding technologies (NBTs), such as gene editing, hold great potential for enhancing the productivity of healthy food systems and for reducing their environmental impact, including climate change. NBTs can also contribute to strengthening the resilience of food systems and supply chains that are vulnerable to disruptions, as seen during international crises such as the war in Ukraine and rising food prices. Furthermore, the environmental risks associated with NBTs are comparable to, or even lower than, those of classical breeding technologies that have been used for centuries or more. This suggests that there is no need for NBTs to be subjected to stricter regulation than those applied to traditional methods (Lassoued et al., 2019).

Regrettably, the legal situation in the European Union (EU) today does not reflect the potential benefits of NBTs. In 2018, the European Court of Justice ruled that crops developed using gene

editing techniques, such as the CRISPR/Cas system, must undergo the same strict authorization procedure as genetically modified organisms (GMOs) (Court of Justice of the European Union, 2018). As a result, NBT crops cannot be produced in the EU without overcoming unnecessary and burdensome regulatory hurdles. This situation is detrimental to consumers, the environment, and biodiversity, and it also undermines the competitiveness of European agriculture and processing industries (See Schönig, 2020).

The European Commission has announced that it will table a proposal in 2023 to address the current regulatory situation for NBTs. Thus, NBTs will soon become the subject of intense political debate in Europe, with enormous stakes, given that the outcome will determine the future of gene editing in the EU. However, before delving into the debate, it is important to understand what these new breeding methods entail.

NBTs represent the next phase in a series of developments that began thousands of years ago, when women across different regions of the world began saving seeds to sow in the following season (Boulding, 1992). They carefully selected seeds from plants that retained their seeds better, were larger, or were more resistant to disease, resulting in the emergence of numerous "domesticated" landraces that were well-suited to the local climate, soil, and the needs of the people who depended on them.

Although the exact date remains unknown, cross-breeding of plants within the same species but with different traits is believed to have begun in the 16th century. This was done to produce crops that were both productive and disease-resistant. In the early 20th century, following the rediscovery of Mendel's laws of inheritance, people worldwide began to search for both wild and domesticated plants with desirable traits. They aimed to crossbreed them with other plants that possessed similarly beneficial characteristics (Kingsbury, 2009).

Crossing two varieties of a species takes an substantial amount of time, often spanning 10–40 years before arriving at the desired combination of traits. It is analogous to mixing the words of two voluminous Tolstoy novels and attempting to create a coherent novel afterwards. Furthermore, the availability of spontaneous mutations (naturally occurring changes in the genetic material) that arise somewhere in the world limits the process.

In the 1930s, people started deliberately creating mutations by treating seeds with chemicals or radiation, a technique called classical mutagenesis or mutation breeding (Kingsbury, 2009:266-272). However, mutagenesis is an imprecise and unguided process because it is impossible to know in advance what kind of mutations will be created. Indeed, some mutations are harmful, causing the seed to stop germinating or to grow poorly, whereas others are neutral, and only a few may be useful. Well-known examples of products resulting from mutation breeding include durum wheat for pasta, pink grapefruit, several varieties of rice, and groundnut.

Classical mutagenesis, although taking less time than cross-breeding, is still a time consuming process. It is analogous to mixing the words of one Tolstoy novel rather than two. Some well-known examples of crops created through classical mutagenesis include red grapefruit, durum wheat, and many varieties of cereals, pulses, and bananas.

The NBTs under discussion offer a highly improved and sophisticated form of mutagenesis, also referred to as "targeted" or "site-directed" mutagenesis. NBTs enable specific changes to the DNA of seeds. For example, this technology allows for the "switching off" or "switching on" of a gene that has been "switched on or off" through evolution, respectively (Frederick, 2021).

It is possible to replace a specific gene with a gene from another variety within the same species, which is called cisgenesis. The resulting variety does not differ from varieties made through the centuries-old process of cross-breeding, although the process is faster and more specific. The process is analogous to the "search and replace" function in a word processor.

NBTs, including gene editing, differ from genetic modification in that no "foreign" genes from other species are introduced. Although gene editing is a faster and more directed process, it still operates on the same principles that apply in nature. However, under current EU rules, NBTs are considered genetic modification technologies and are therefore subject to the GMO directive.

NBTs in the context of EU policy

Prior to 2018, NBTs were not subject to GMO legislation at the EU level, granting member states the liberty to create their own policies (European Council (1990a); European Council (1990b)). However, the European Court of Justice's 2018 ruling altered this exemption, offering greater clarity regarding the legal status of mutagenesis and plant breeding techniques but prompting multiple EU governments, including the Netherlands, Estonia, Belgium, Cyprus, Finland, France, Germany, Greece, Italy, Portugal, Slovenia, Spain, and Sweden, to urge the European Commission to revise and update the EU's GMO legislation.

The EU's GMO legislation was initially established in 1990 and has undergone various revisions since. The court's ruling means that NBTs are, in principle, bound by the corresponding EU-wide authorization, traceability, and labeling requirements. Nevertheless, many stakeholders feel that this

NBT crops cannot be produced in the EU without overcoming unnecessary and burdensome regulatory hurdles. This situation is detrimental to consumers, the environment, and biodiversity, and it also undermines the competitiveness of European agriculture and processing industries.

approach is no longer appropriate. Indeed, mutagenesis has been used in agriculture for many years and has a well-established safety record.[70]

Since November 2019, the European Commission has embarked on a fact-finding mission and consulted with stakeholders regarding the concept of proposing a legal framework for plants derived from targeted mutagenesis and cisgenesis as well as their associated food and feed products (European Commission, 2022). It is anticipated that this proposal will be presented during the first half of 2023. As the policy discussion regarding the regulation of these novel techniques is just beginning, it is imperative to thoroughly evaluate the societal and environmental benefits of NBTs while also considering the associated risks.

The potential use of NBTs as part of Europe's Green Deal

NBTs offer tremendous potential for society, particularly in terms of sustainability, human and animal health, and environmental protection. Furthermore, small, and medium-sized firms and farmer-breeders collectives will have increased accessibility to these technologies. NBTs can play a crucial role in achieving the objectives of the EU's Green Deal, particularly the Farm-to-Fork strategy aimed at advancing the sustainable development of the European food system. Additionally, NBTs have the potential to improve the nutritional value of agricultural products and align the composition of foodstuffs with consumer needs.

The importance of NBTs for sustainable agriculture is best exemplified by the concept of the "genetic yield gap," which was introduced in 2022 by a group of international researchers in the scientific journal *Nature Food*. They mapped the yield gap of wheat, one of the world's most important cereal crops (Senapati et al., 2022).

Traditionally, the yield gap refers to the difference between the theoretically possible yield under optimal conditions (e.g. high-quality soil, adequate water and nutrients, and no diseases and pests) and the actual yield. This yield gap varies markedly among regions. In many sub-Saharan countries, as well as Australia, and Kazakhstan, theoretical losses may be as high as 70%, whereas in countries such as France and New Zealand, the yield gap averages around 30%.

In recent decades, numerous efforts have been made to narrow the yield gap. The Green Revolution ushered in improved seeds, fertilizers, and pesticides as well as the requisite knowledge to use them effectively. Consequently, yields per hectare have nearly tripled over the past 60 years.

However, further narrowing the yield gap is limited by financial and biophysical constraints. Financially, small farmers in low- and middle-income countries find that the costs of fertilizers and pesticides may outweigh the value of their yields. Biophysically, the need to reduce the environmental impact of fertilizers and pesticides presents another constraint, as highlighted in the EU's Farm-to-Fork strategy that aims to foster fairer, healthier, and more sustainable food systems.

Therefore, researchers and seed suppliers are increasingly focusing on influencing the genetic properties of crops to narrow the yield gap. For example, they aim to make crops genetically resistant to diseases, pests, and extended periods of drought or give them the ability to bind nitrogen with the help of soil bacteria, thereby reducing the need for artificial fertilizers.

NBTs hold enormous potential for vital crops such as wheat. Studies suggest that world wheat production could double if its genetic potential were fully realized (Senapati et al., 2022). Furthermore, wheat has a long history of breeding, dating back 10,000 years. The genetic potential of less-developed crops, including "orphan crops," such as cassava and sorghum, is probably even greater (CropLife International (2019).

Time is of the essence

Unlocking the genetic potential of crops through classical breeding is possible in principle, but it is considered very time consuming. Using CRISPR and similar techniques, achieving what could take 10–40 years with older technologies can now be completed in just 1 or 2 years.

The speed of NBTs is critical for several reasons. Globalization has enabled not only people and goods to travel around the

world but also diseases and pests. An alarming example is the rapid spread of the fall armyworm in Africa. Originally found only in the Western Hemisphere where its natural enemies exist, this caterpillar of the moth *Spodoptera frugiperda* (Timilsena et al., 2022) arrived in West Africa around 2010 and within a few years spread across the entire continent, causing substantial damage, particularly to maize crops. For example, crop losses in Kenya and Tanzania have been as high as 70%. However, some maize varieties are resistant to the armyworm (Singh et al., 2022), and with the help of gene editing, this characteristic can be incorporated into the maize varieties grown in Africa and Asia.

Developing new varieties quickly is crucial for various reasons, including climate change, which is causing prolonged droughts in many parts of the world. Australian researchers have discovered a wheat gene (GAS) that makes the crop more drought-resistant (Zhao et al., 2022). Wheat seeds with this property can be sown up to 1.2 m deep to reach deeper groundwater. In Australia, under climate conditions from 1901 to 2020, this variety could have yielded 20% more wheat. Crops that are resistant to diseases, pests, and weeds could further increase yields. Higher productivity can also reduce the need for land, which can be returned to nature, conserving biodiversity, ecosystems, and traditional landscapes.

Given that the existing regulatory framework is sufficient for the shotgun approach to mutagenesis, it is difficult to understand why new breeding techniques based on gene editing, which offer a more precise and reliable way of achieving the same goals, should require more stringent regulations.

There is currently no universally agreed-upon definition of "marginal land." However, based on soil quality, nearly half of Europe's agricultural area is classified as marginal land. This land is less suitable for agriculture due to factors such as poor soil fertility and/or water balance (Gerwin et al., 2018). Instead of using this land for high-yield agriculture, it could be designated for nature or low-yield agriculture combined with the re-creation of traditional landscapes to promote biodiversity. In addition, this land could function as a carbon sink, effectively storing carbon, and helping to mitigate the effects of climate change (Lamb et al., 2016).

Healthier diets and cancer prevention

NBTs have the potential to help farmers and growers adapt to the impacts of climate change by producing higher yielding crops with fewer inputs of nutrients, water, and crop protection products, leading to a reduced environmental footprint and more space for nature. To meet the growing demand for food, we require a yearly productivity increase of 1.73%. However, the current growth rate stands at only 1.12%. By improving productivity and decreasing the environmental impact of food systems, NBTs can help bridge this gap (College of Agricultural and Life Sciences, 2022).

Plant breeders can use NBTs to quickly find traits that make crops more resilient to drought and diseases, and improve nutrient use efficiency, minimizing losses to the environment, by screening the genomes of different varieties, including wild, and cultured plants. NBTs can also enhance the safety and nutritional value of food products. For instance, a genetically edited tomato developed in Japan contains five times more gamma-amino butyric acid than a typical tomato, which may help combat high blood pressure. In 2020, this edited tomato received regulatory approval (Asanuma § Ozak, 2020).

A group of mainly European researchers has developed a tomato variety with increased levels of vitamin D (Li et al, 2022), which is a crucial nutrient for preventing various diseases such as cancer, neurodegenerative diseases, bone diseases, and serious forms of COVID-19. With over a billion people worldwide not getting enough vitamin D, this new variety could play an essential role in improving human health. Similarly, in other crops like rice, NBTs have been utilized to develop varieties that can prevent deficiencies in micronutrients (e.g. iron, zinc, and

vitamins), which are often prevalent in women and children in low- and middle-income countries.

NBTs not only enable the production of substances that promote health but can also be used to remove substances that can damage health, including naturally occurring substances in crops, such as allergens, and those created during processing. Rothamsted Research in the UK is currently conducting field trials with a wheat variety that contains markedly less asparagine, an amino acid found naturally in wheat. Asparagine can be converted into acrylamide, a potentially carcinogenic substance, when bread is baked, or toasted. Potatoes also have this problem, especially if they are stored for a long time. Asparagine reacts with sugars during baking and frying of potatoes (the Maillard reaction), resulting in the formation of acrylamide. However, gene editing techniques can prevent the production of sugars in potatoes.

Plants naturally produce substances that can be toxic or allergenic and are generally not healthy for humans and animals. These chemicals protect plants from being eaten by other organisms, including humans, by making them poisonous, or bitter-tasting. Our ancestors successfully reduced the content of naturally occurring toxins in plants over the centuries to the point where they are no longer harmful or rendered harmless through processing, such as with potatoes, and cassava. However, anti-nutritional factors, chemicals that impede the absorption of vitamins and minerals, still pose a challenge. Oxalic acid in spinach and rhubarb is a well-known example of an anti-nutritional factor that impedes the absorption of calcium, among other substances. Phytic acid, found in cereals, legumes (e.g. beans, peas, and lentils), and nuts, impedes the absorption of iron, potassium, magnesium, and zinc. NBTs can reduce or even block the production of these factors, thereby improving the absorption of vitamins and minerals.

Gene editing can also be used to reduce or block the production of naturally occurring allergenic substances in plants. Gluten, a protein found in wheat, barley, and rye, is a notorious example that can lead to severe reactions such as celiac disease or less severe reactions such as gluten intolerance. Gene editing has already been used to develop several cereal varieties in which the production of the proteins causing the allergy or intolerance is reduced or blocked.

Regulating NBTs and the need for a "level playing field"

Several politicians have raised concerns about potential unintended consequences of modern gene editing techniques. These concerns range from the creation of harmful products or by-products to the emergence of invasive species (The Greens/EFA in the European Parliament, 2022). It is certainly important to carefully analyse any potential risks associated with these new technologies. However, what is noteworthy about these concerns is that they focus selectively, if not arbitrarily, on the use of modern genetic techniques alone. Classical cross-breeding experiments and techniques, which have been employed for thousands of years, as well as classical mutagenesis, in which seeds are exposed to radiation and chemicals, are considered "safe." The European Court of Justice also shares this view, as its ruling on NBTs does not encompass classical cross-breeding (Court of Justice of the European Union, 2018).

It is important to acknowledge that unintended effects can occur *with any breeding technique,* including in nature where spontaneous mutations are the driving force behind evolution. Therefore, regulators and policymakers should not focus solely on whether modern genetic techniques in plant breeding can lead to harmful unintended effects, but must also consider whether the chance of this happening is more or less likely than with traditional cross-breeding and classical mutagenesis techniques, which are commonly considered safe.

In short, the chance of unintended effects occurring is actually lower with modern targeted breeding techniques than with traditional and less precise methods. The reason for this is clear: in traditional cross-breeding, the genetic material of two different varieties is combined, and through a series of crosses, breeders aim to produce a new variety with the desired characteristics. However, when applying traditional methods, problems may arise. A prime example of the potential risks of traditional breeding techniques is the case of the potato variety Lenape, which was introduced onto the market in 1968 (Koerth, 2023). This potato was created by cross-breeding a commercial variety with a wild counterpart from the high mountains of Peru. The result was a visually appealing potato with a high dry weight, low sugar content, and resistance to potato blight. Unfortunately, shortly after its introduction, Lenape was found to contain excessive levels of toxic alkaloids. Within two years, this "ideal" potato disappeared from the market, and new varieties were tested for their alkaloid content to prevent a similar occurrence.

In classical mutagenesis, seeds are exposed to chemicals or radiation to induce mutations in the genetic material (Kingsbury, 2009). This can be described as a "shotgun" approach, where the aim is to induce a useful change in the genetic material, but unintended, and harmful effects can also occur; therefore, it is analogous to firing a shotgun and hoping that one of the pellets will hit the target, although others could cause unintended damage to non-targets.

Despite the element of chance involved in traditional breeding methods and classical mutagenesis, we still

consider them safe due to the regulatory framework in place, i.e. the infrastructure for monitoring and compliance, to prevent potentially harmful varieties from entering the market and reaching consumers. In the EU, for instance, new varieties must be included in the Plant Variety database, and products derived from these varieties must be authorized under the Novel Foods Regulation (European Parliament § European Council, 2015).[71] This system of rules and regulations has been effective so far, and there are no current proposals to tighten it.

Given that the existing regulatory framework is sufficient for the shotgun approach to mutagenesis, it is difficult to understand why new breeding techniques based on gene editing, which offer a more precise and reliable way of achieving the same goals, should require more stringent regulations. In other words, there is no need to regulate NBTs more strictly than traditional methods. This is not to say that unintended effects can never occur, but the likelihood of such effects is smaller, and our current safety nets are more than adequate. Furthermore, any unintended changes can be rapidly detected through genome analysis.

Debunking social and economic concerns about NBTs

In addition to safety concerns, concerns have been raised about the potential social and economic consequences of using modern breeding techniques. Critics argue that new varieties may be unaffordable for small farmers in low- and middle-income countries, leading to consolidation, and monopolization of the seed sector (Hebron, 2021). However, the opposite may actually be true. Genome-editing technologies are becoming increasingly accessible and democratizing the benefits of science. These techniques are relatively inexpensive to implement and can be used to enhance both major and minor crops, making it possible for smallholder farms to benefit from genome-editing (Pixley et al., 2022).

Gene editing technologies are affordable and can produce results quickly, making them accessible to small and medium-sized breeding companies as well as farmers' collectives. Both research institutes and commercial companies can provide the necessary facilities for developing and implementing new crop varieties. An example of this is the work of the International Institute of Tropical Agriculture on genome-editing bananas for disease resistance (IITA, 2020).

However, one potential obstacle is the patents associated with modern techniques such as CRISPR. Fortunately, these technologies provide enormous freedom to operate for small and starting entrepreneurs. They require little investment, and the number of available and accessible tools is so vast that a patent is no longer a major concern. Moreover, many of these techniques are developed at universities and other public research institutions and are in the public domain (Cameron, 2017). For foundational CRISPR technologies, non-exclusive licenses are available for many patents. Furthermore, if monopolization becomes a problem, the EU has one of the world's best antitrust agencies, the European Commission, to address the issue.

Finally, if accessibility to NBTs for small and medium-sized farms is a concern, imposing heavy-handed safety rules and regulations is not the answer. Such rules would only make it harder for small farmers to access these technologies, as the cost of red tape and administrative burdens weigh more heavily on small farmers than on corporations. The same holds true for complex systems with standards and certifications as well as the introduction of labeling requirements for NBTs. Such requirements do not exist for traditional cross-breeding methods and classical mutagenesis; therefore, labeling would create unwanted market distortions.

Conclusion and policy recommendation

To fully utilize the genetic potential of crops, e.g. improving their ability to withstand droughts and other climate change effects, the EU must remove the unnecessarily burdensome approval procedures for NBTs. These technologies should be treated no differently than traditional breeding methods that are deemed inferior and less safe breeding technologies by scientific standards. It is illogical and counterproductive to do otherwise, especially during a time of rapidly increasing food prices and global geopolitical conflicts that disrupt supply chains.

Over the past 50 years, the EU has successfully established an infrastructure that ensures the quality of seeds.[72] Europe's robust economic and knowledge ecosystem has thrived, producing some of the best and most innovative agricultural science in the world and leading in numerous other ways. However, by imposing excessively strict regulatory requirements for NBTs, the EU is undermining its own achievements.

NBTs can be a powerful tool for promoting green innovation and achieving public health objectives. However, if the current situation remains unchanged, Europe will not be at the forefront of this technological breakthrough. Other countries, including the UK, Switzerland, and Canada, are likely to take the lead, which contradicts Europe's ambition to excel in the green economy and strengthen its technological autonomy.[73] This situation should not be allowed to occur, and it is unnecessary for it to do so.

REFERENCES

Asanuma, N. § Ozak, T. (2020). 'Japan approves gene-edited 'super tomato'' (2022). *Nikkei Asia*, 12 December, https://asia.nikkei.com/Business/Science/Japan-approves-gene-edited-super-tomato.-But-will-anyone-eat-it

Boulding, E. (1992). 'Women and the Agricultural Revolution'. *In The Underside of History: A View of Women Through Time*, Boulder CO, Westview Press 1976; Rev. ed. Sage 1992.

Cameron, D. (2017). 'DuPont Pioneer and Broad Institute Join Forces to Enable Democratic CRISPR Licensing in Agriculture'. BROAD Institute, 18 October, https://www.broadinstitute.org/news/dupont-pioneer-and-broad-institute-join-forces-enable-democratic-cris-pr-licensing-agriculture.

College of Agricultural and Life Sciences. (2022). 2022 *Global Agricultural Productivity (GAP) report*. Virginia Tech, https://globalagriculturalproductivity.org/2022-gap-report/.

Council (1990a). Council Directive 90/220/EEC of 23 April 1990 on the Deliberate Release of GMOs into the Environment, 23 April, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31990L0220.

Council (1990b). Council Directive 90/219/EEC of 23 April 1990 on the Contained Use of Genetically Modified Micro-Organisms, April 23, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31990L0219.

Court of Justice of the European Union (2018). Judgement of the Court (Grand Chamber), 25 July, https://curia.europa.eu/juris/document/document.jsf?text=&docid=204387&pageIndex=0&doclang=EN&mode=req&dir=&occ=first&part=1&cid=752477

Court of Justice of the European Union (2018). Press Release No. 111/18, 25 July, https://curia.europa.eu/jcms/upload/docs/application/pdf/2018-07/cp180111en.pdf

CropLife International (2019). 'Cassave and Gene Editing: Eliminating Toxins in Cassave to Unlock its Potential'. *CropLife Innovations in Plant Breeding*, https://croplife.org/wp-content/uploads/2019/12/CRP17043_CaseStudy_Cassava_FINAL.pdf

EUPVP – Common Catalogue Information System,

European Commission (2022). *European Commission 2023 Work Programme*, https://ec.europa.eu/info/sites/default/files/com_2022_548_1_annexe_en.pdf

European Commission. 'EU Marketing Requirements', https://food.ec.europa.eu/plants/plant-reproductive-material/legislation/eu-marketing-requirements_en

European Parliament § European Council (2015). Regulation (EU) 2015/2283 of the European Parliament and of the Council on novel foods, amending Regulation (EU) No. 1169/2011 of the European Parliament and of the Council and repealing Regulation (EC) No. 258/97 of the European Parliament and of the Council and Commission Regulation (EC) No. 1852/2001, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015R2283

Euroseeds, 'ESTA: Documents', https://euroseeds.eu/esta-the-european-seed-treatment-assurance-industry-scheme/esta-standard-checklist-2/.

Frederick, E. (2021). 'An on-off switch for gene editing'. *MIT News,* April 14, https://news.mit.edu/2021/switch-crispr-gene-editing-0414

Gerwin, W. et al. (2018). 'Assessment and quantification of marginal lands for biomass production in Europe using soil quality indicators'. *Soil* 4, 267-290, https://soil.copernicus.org/articles/4/267/2018/

Greens/EFA in the European Parliament (2022). 'Public Consultation on New Genetic Modification Technique: Greens/EFA Response to the Commission', Letter, 20 July, https://www.greens-efa.eu/en/article/letter/public-consultation-on-new-genome-techniques.

Hebron, C. (2021). *Editing the Truth: Genome Editing is not a Solution to Climate Change* (Brussels: Friends of the Earth Europe Briefing, October, https://friendsoftheearth.eu/wp-content/uploads/2021/10/Editing-the-Truth-Genome-editing-is-not-a-solution-to-climate-change-ENG.pdf

https://ec.europa.eu/food/plant/plant_propagation_material/plant_variety_catalogues_databases/search/public/index.cfm

IITA (2020). 'Science-based policies can unlock Africa's access to genome-edited crop varieties'. IITA News 2545, 6-10 July, http://newint.iita.org/wp-content/uploads/2020/07/Bulletin_2545.pdf.

Kingsbury, N. (2009). *Hybrid, the History and Science of Plant Breeding* (Chicago: University of Chicago Press).

Koerth, M. (2013). 'The case of the poison potato'. *Boingboing*, 25 March, https://boingboing.net/2013/03/25/the-case-of-the-poison-potato.html.

Lamb, A. et al. (2016). 'The potential for land sparing to offset greenhouse gas emissions from agriculture'. *Nature Climate Change,* Vol. 6, 488-492, https://www.nature.com/articles/nclimate2910

Lassoued, R., Macall, D.M., Smyth et al. (2019). 'Risk and safety considerations of genome edited crops: Expert opinion'. *Current Research in Biotechnology,* Vol. 1, 11-21, https://www.sciencedirect.com/science/article/pii/S2590262819300024

Li, J. et al. (2022). 'Biofortified tomatoes provide a new route to vitamin D sufficiency'. *Nature Plants*, Vol. 8, 611-616.

Mukhopadhyay, A. (2022). 'Canada relaxes rules governing gene-edited crops'. *S§P Global,* 20 September, https://www.spglobal.com/commodityinsights/en/ci/research-analysis/canada-relaxes-rules-governing-gene-edited-crops.html

Pixley, K.V., Falck-Zepeda, J.B., Paarlberg, R.L. et al. (2022). 'Genome-edited crops for improved food security of smallholder farmers'. *Nature Genetics*, Vol. 54, 364–367, https://doi.org/10.1038/s41588-022-01046-7.

Raad voor plarterassen, https://www.raadvoorplantenrassen.nl/en/online-applications/eu-common-catalogue.

Schönig, W. (2020). 'Silver Lining? Genome-Editing Regulation Following CRISPR Ban in Europe's Agribusiness'. *MOFO Life Sciences*, January 15, https://lifesciences.mofo.com/topics/silver-lining-genome-editing-regulation-following-crispr-ban-in-europes-agribusiness

Senapati, N., Semenov, M.A., Halford, N.G. et al. (2022). 'Global wheat production could benefit from closing the genetic yield gap'. *Nature Food*, Vol. 3, 532–541.

Singh, M. et al. (2022). 'Maize diversity for fall army worm resistance in a warming world'. *Crop Science* Vol. 62, 1-19.

SWI (2022). 'Swiss parliament paves way for genome editing' (2022). *SWI*, 8 March, https://www.swissinfo.ch/eng/swiss-parliament-paves-way-for-genome-editing/47412526

Timilsena, P., Niassy, B., Kimathi, S., et al. (2022). 'Potential distribution of fall armyworm in Africa and beyond, considering climate change and irrigation patterns'. *Scentifici Reports*, Vol. 12, https://doi.org/10.1038/s41598-021-04369-3

UK Government (2023). 'Genetic Technology (Precision Breeding) Bill'. Government Bill, Originated in the House of Commons, Session 2022-23, 21 March, https://bills.parliament.uk/bills/3167.

Zhao, Z., Wang, E., Kirkegaard, J.A. et al. (2022). 'Novel wheat varieties facilitate deep sowing to beat the heat of changing climates'. *Nature Climate Change*, Vol. 12, 291–296, https://doi.org/10.1038/s41558-022-01305-9

Common Agricultural Policy

Reformist Context, Veto Players and Symbolic Change

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Abstract

The past three decades have seen the European Union (EU) reform its Common Agricultural Policy (CAP) to make it less trade distorting and better oriented towards social expectations regarding environmental and social sustainability. However, apart from the change in declared objectives and policy mechanisms, the change in actual impact has been limited. Using the 2021 CAP reform as an example, this study argues that such incremental policy change has been caused by decision-making rules and procedures biased towards the status quo. Leading up to the 2021 CAP reform, EU institutions engaged in negotiations for more than three years. The parallel negotiations over the EU's Multiannual Financial Framework (MFF), where the CAP accounts for 38% of the EU's total budget, were strained as a result of the United Kingdom's (UK) departure as its largest net contributor because of veto-based procedures, which prevented any substantial change in the distribution of CAP funds. In addition, the Agriculture and Fisheries Council and the European Parliament, as colegislators, weakened several of the European Commission's reformist proposals, including those that pertain to the European Green Deal agenda. The article asserts that a more substantial CAP reform could be attained by autonomising negotiations over agriculture and food from those on the EU's budget and raising awareness of the European Parliament's colegislator role.

Introduction: *Plus ça change...*

The Common Agricultural Policy (CAP) is one of the European Union's (EU) costliest and most controversial policies. Enacted in 1962 as part of the deal on the European Economic Community (EEC) between German industrial interests and French agricultural interests, the CAP has been pivotal in

European integration and has remained largely unchanged until the 1980s. From the 1980s to the 2010s, EU institutions gradually replaced price and production support with direct payments to align the CAP with the new multilateral trade rules, pressures to curb the CAP's budget and new societal expectations regarding environmental protection, rural development and food.

However, despite this shift in formal CAP objectives and instruments, changes in fund distribution and policy impact remain limited.[74] Direct payments continue to support intensive production, increase land prices and hamper the sector's restructuring, including generation renewal. As much as 85% of direct payments are allocated to 20% of the biggest producers and landowners, putting additional pressure on small and mid-sized family farms.[75]

This study asserts that CAP reform has been incremental because of decision-making rules and procedures that enabled conservative status quo players to impede certain changes, such as the replacement of direct payments with less distorting measures, that would better fulfil goals associated with food, climate, biodiversity, animal welfare and rural development. Specifically, parallel negotiations on Multiannual Financial Frameworks (MFFs), where the CAP accounted for 40%–50% of the bloc's expenditures and where decisions are made by consent, prevented any major distributive change and affected CAP substance through package deals over MFF and CAP regulations. In addition, the colegislation procedure introduced by the Treaty of Lisbon (2009) allowed the Agriculture and Fisheries Council and the European Parliament to change more easily the legislative proposals by the European Commission, which has typically been the most reform-oriented EU institution.[76]

This study is based on a literature review of past reforms and empirical research on the 2021 CAP regulation reform, which was affected by the withdrawal of the United Kingdom (UK), the largest net contributor to the CAP budget, adding pressure on MFF negotiations and making it more difficult to reach a consensus on substantive change. The European Commission used the European Green Deal (EGD) to advance environmental issues in agriculture via two strategies, Farm to Fork (F2F), which aims to reform the EU's agricultural and food policy, and the Biodiversity Strategy, which addresses the EU's environmental policy. However, the reformist impact of the EGD on the CAP was constrained by the veto players in the MFF and CAP negotiations, potentially weakening the impact of the 2023 reform.

The policy relevance of this article lies in its assertion that a more substantial reform could be attained by autonomising negotiations on the CAP from those on the budget and focusing more on the role of the European Parliament in the process.

Explaining and understanding CAP reforms

Policy change generally takes place for two reasons: (a) changes in the contexts that shape actor preferences and positions and (b) changes in representation and decision-making institutions affecting the prospects of a policy change. Additionally, context change can also refer to the shifting of ideas through which contexts are interpreted.

According to the academic literature,[77] three main factors have affected CAP reforms: trade changes, budget changes and new societal expectations. Scholars have also identified four types of institutional drivers: changes in voting rules and procedures, changes in the policy network, the path dependency of the reform process and the individual quality of reform agents. From the perspective of idea changes, public policy studies have focused on the replacement of protectionist with neoliberal and multifunctional discourses. The way these factors shaped CAP reforms will be explained more thoroughly.

REFORM CONTEXTS

The first reform factor is a change in the EU's trade policy agenda with third countries.[78] At its inception, the CAP mainly consisted of supportive measures for the prices of commodities, such as cereals, milk and beef. However, as a result of these support mechanisms, production was incentivised. When the EEC became self-sufficient in the production of food in the 1980s, budget sources were increasingly needed to prevent a decline in their prices, triggering pressure from net contributors to the CAP's budget. The increased use of export subsidies to dump overproduction on the global markets caused a heavy distortion of global markets and a trade war with other large exporters such as the United States. Ideas to reduce price supports or introduce production quotas triggered tensions between big and small producers, between different sectors and between member states with different production structures.

In the context of the Uruguay round of negotiations on agriculture under the General Agreement on Tariffs and Trade, the 1992 MacSharry reform reduced guaranteed price levels and introduced budget-funded compensatory payments that accounted for price difference and was applicable up to the past production volume. The MacSharry reform anticipated the Uruguay Round Agreement on Agriculture (URAA) of 1994, which aimed to gradually eliminate price and production supports. In 1999, to address the expected deepening of the trade regime, the Agenda 2000 reform further reduced price supports, bringing main commodity prices to global levels and accordingly increased compensatory payments. In 2001, the launch of the Doha

Development Round (DDR) under the auspices of the World Trade Organisation (WTO) went parallel with the 2003 CAP reform, which removed the requirement to produce in order to be entitled to "direct payments", also known as "decoupling". Member states could now decide to implement historical (per-farm) or per-area payments. The 2008 Health Check reform integrated the remaining market supports into the direct-payments scheme. Since the late 2000s the international trade negotiations stalled. In this context, the EU institutions recoupled a small part of the supports in 2013. They used food security concerns as a pretext. At the same time, the EU rejected ideas to reintroduce some of the past market interventions. Market interventions were now understood merely as a "safety net" to correct major market distortions.

The second major driver in the subsequent CAP reforms was the EU budget. The growing CAP expenditure caused blockades and delays in negotiations over annual budgets. As a remedy, in 1988, the EU introduced regulations defining budget sources and spending throughout multiyear periods (initially termed "financing perspectives" and later "MFFs"), which amplified the need for more predictable CAP spending as well as transparency and competition with other spending items. Initially, CAP reforms increased budget costs, but MFFs later helped stabilise expenses. The net contributors such as the UK, the Netherlands and Germany (to some extent) initially used growing expenditures to advocate reform. In contrast, later, the veto-based MFF negotiations made making changes to the CAP increasingly difficult as conservatives – the top recipients of CAP budget funds such as France, Spain and Italy – would obstruct any major change in the CAP. This resulted in package deals in which changes to both MFFs and the CAP are limited.

The importance of MFF negotiations emerged from the context of the EU enlargement to the East, which was expected to increase expenditure and distribution.[79] EU institutions, because of decision-making constraints and growing diversity of member states, made CAP gradually flexible over consecutive years by allowing member states to apply a variety of payment levels, models and support mechanisms.

The third reform context involves new societal objectives contributing to the CAP's paradigmatic shift.[80] The EEC was focused on making the CAP an expression of agricultural exceptionalism whereas the EU sought to cleanse the CAP of its distorting measures and enable the provision of public goods that the market fails to produce but would benefit everyone and should thus be provided by public policy. The Agenda 2000 reform introduced Pillar II rural development measures. Whereas Pillar I addressed market interventions and direct supports paid on a historical basis, Pillar II accounted for structural support (such as investments for restructuring and payments for sustainable production practices) cofunded by EU member states as part of national rural development programmes. The 2003 Fischler reform conditioned direct payments upon compliance with various preexisting and new environmental regulations, with noncompliance resulting in a deduction of part of the payment. The 2003 reform also redistributed 5% of direct payments larger than €5,000 to the rural development fund, which was known as the "modulation". The 2008 Health Check reform doubled the modulation level and introduced a 4% reduction of large payments over €300,000, thus addressing the issue of concentrated payments. The 2013 reform introduced area-based payments and reduced the gap between their levels within and between member states, known as payment "convergence". The reform also made 30% of direct payments to larger beneficiaries conditional upon measures such as grassland preservation, crop diversification and ecological focus areas, which the European Commission described as "greening".

REFORM INSTITUTIONS

Some institutional factors were affected by CAP-specific changes, while other factors were part of broader ones, such as the revisions to the EU Treaty. The first institutional factor pertains to decision-making rules and procedures. The introduction of a qualified majority vote (QMV) and a change in the nomination of European Commissioners as part of the Single European Act of 1987 enhanced the European Commission's ability to implement reforms. The European Commission's agenda-setting powers were especially important when change was needed since only consensus among member states could influence the European Commission's proposals.[81] The Lisbon Treaty introduced the ordinary legislative procedure to the CAP, according to which both the Council of the EU and the European Parliament agree on the laws, which also enables both institutions to change the European Commission's proposals more easily.[82] Since the European Parliament at the time was less inclined towards introducing new requirements for farmers and more inclined towards increased flexibility than the European Commission, this resulted in weaker reform, as seen in the 2013 reform, the first being adopted under the Lisbon rules.[83]

The second institutional change involves the policy network. As of the early 1990s, national farm ministers and lobby groups no longer played an exclusive role in public agricultural policy debates and were compelled to increasingly share public space with actors from trade, finance, environment and development.

The third factor is the dependency of CAP reforms on past policy decisions. Successive changes were based on a specific preexisting policy reform, setting the precedent for future ones. For example, the Agenda 2000 reform

Table 1 CAP reforms, reform contexts and institutions

	1990s reforms (1992 "MacSharry", 1999 "Agenda 2000")	2000s reforms (2003 "Fischler", 2008 "Health Check")	2010s reforms (2013 "2014–2020")
Market measures (Pillar I)	Price supports replaced by compensatory payments	Phased out	Safety net
Direct supports (Pillar I)	Compensatory payments	Introduction of direct payments	Converging area-based payments and greening
Structural supports (Pillar II)	Introduction of Pillar II	Cross-compliance, modulation and capping	Flexibility to switch funds between pillars
Trade	URAA	DDR	
Budget	Eastern enlargement MFF 2000–2006 and 2007–2013 (-)		MFF 2014–2020 (-)
New expectations	Competitiveness, environmental and social objectives		
Institutions of representation and decision-making	QMV and change in commission nomination procedure (+), path dependency (+), policy network (+), agency quality (+)		Codecision procedure (-), path dependency (+)

Legend: +/- = positive/negative impact. Source: based on Lovec, 2016.

strengthened the MacSharry reform, and the Health Check reform deepened the Fischler reform. EU institutions based their decision on the expected success of the new round of multilateral trade negotiations, which was not the case during these two reforms (Seattle and DDR negotiations failed).[84]

Finally, agency quality also played a role. Individual commissioners capitalised on changes in the policy environment and decision-making processes and on the European Commission's more strategic position to push for a reformist agenda, leading to the MacSharry and Fischler reforms being named after commissioners Ray MacSharry and Franz Fischler, respectively (see Table 1).

REFORM IDEAS, RHETORIC AND DISCOURSES

The reforms were implemented in the context of substantial changes in ideas and rhetoric. These ideas, which typically change over longer periods such as in between individual reforms, became more progressive and established a foundation for the new role of actors and institutions.[85] Discourses legitimised certain actors, institutions and policies.[86] Ideas, rhetoric and discourses shifted from protectionism, which favoured farmers' interest, to neoliberal discourse, which served to liberalise trade and finance, while justifying interventionism to pursue the provision of various agriculture-related functions (hence multi-functionalism) such as environmental protection, rural development and animal welfare.

The 2021 CAP reform

Negotiations surrounding CAP 2021–2027, which took three and a half years to complete, can be divided into three periods: (a) the publication of the initial proposals of the new MFF and CAP in 2017–2018 in the context of Brexit, (b) political changes after the 2019 European Parliament elections and Ursula Von der Leyen's EGD agenda (which included strategies specific to agriculture and the Resilience and Recovery Fund (RRF) to address the economic impacts of the COVID-19 pandemic) in 2019–2020 and (c) the inter- and intrainstitutional (trilogue) negotiations and agreements on the MFF and the new CAP between mid-2020 and mid-2021.

THE INITIAL PROPOSAL

Part of the commission's proposal for the new MFF regulation for the 2021–2027 financial period included an approximately 5% nominal reduction in CAP funding.[87] The main novelty of the proposed CAP regulations[88] was a new governance model that would increase member states' authority over certain measures and eligible entities. Concurrently, member states would have to draft national strategic plans and explain how they will achieve common EU-level objectives (Table 2) by accommodating policy measures, which include annual quantitative targets of common result indicators, similar to the existing policy programming of Pillar II. The commission would have to confirm such plans and oversee their progress, and failure to

Table 2 The CAP's specific objectives and instruments

Principal funding source	**Economic**	**Environmental**	**Social**
Pillar I	Resilience	Climate	Generation renewal
Pillar II	Competitiveness	Natural resources	Rural areas
National	Value chains	Biodiversity	Food safety and quality

Source: Own elaboration.

meet targets could trigger financial sanctions. Other notable proposals included changes in the "green architecture" involving the addition of new and potentially better-targeted measures on the conditionality and environmental elements of Pillar I, such as eco schemes that would be voluntary for farmers but compulsory for member states. Overall, 40% of CAP funds were to be used to address climate and environmental issues.[89] In addition, the commission proposed compulsory payment capping, increased flexibility to transfer funds from Pillar I to Pillar II, and increased member states' cofunding for Pillar II.

The commission formulated its proposal in the context of stalled international trade negotiations and focused on less ambitious interregional agreements. Additionally, the UK's departure created a massive €10 billion gap in the EU's annual budget. This, along with multiple crises affecting the EU in previous years, also created a sense of constraining uniformity and led to ideas of differentiation, as detailed in the Juncker Commission's white paper on the future of the EU. This was consistent with the criticism of the CAP 2014–2020 reform, which was rebuked by farmers and environmental NGOs because of its bureaucracy and poor environmental impact.[90]

From an institutional perspective, the commission's proposal was influenced by the veto setting of MFF negotiations where reformists would block increases in funds while conservatives would block reductions in direct payments. Thus, because the commission knew it would have to sacrifice more of Pillar II, it proposed an increase in national cofounding to save the structural measures, generally considered to be better targeted. With regard to the CAP reform, limited funding and conservative players in the council and the parliament left limited room for manoeuvring. The proposed new governance model was an attempt to increase member states' flexibility and strengthen an evidence-based approach to steer policy towards increased effectiveness and efficiency. At the same time, the extension of programming to Pillar I would not produce radical changes in the policy because it would still confront the constraints of the existing policy evaluation applied to Pillar II, not to mention that the policy instruments were mostly maintained.[91] Other proposed changes such as the new environmental architecture could be characterised as an evolution rather than a revolution, allowing for higher flexibility and advancing measures with potentially stronger performance.

Many of the proposed changes, such as the flexibility to transfer funds and the introduction of eco schemes, were supported not only by reformist Northern Member States but also by countries such as France and Spain, which had many producers operating under quality schemes who hardly received Pillar I payments. It was the new member states (NMS) that assumed the weakest position as they did not benefit from the full convergence of Pillar I payments with the EU average (especially Romania and Bulgaria, where area-based payments were still below the EU average) and would be affected by reduction of Pillar II funds. They also lacked a capacity for strategic planning and largely viewed new environmental 1requirements as additional costs. However, while net contributors blocked the increase in CAP spending in the MFF negotiations, on substantive issues NMS lacked a blocking minority in the Agriculture and Fisheries Council.

CHANGE IN THE POLICY ARENA

Delays in negotiations over Brexit slowed down negotiations over the new MFF; as a result, the legislative process was not completed before the 2019 European Parliament elections. This led to the extension of CAP 2014–2020 and the postponement of the implementation of the new CAP until 2023.

The 2019 European Parliament elections saw the European People's Party and Socialists and Democrats lose majority and the emergence of a new coalition that included the Alliance of Liberals and Democrats (ALDE/Renew), which had been more reform-oriented. Greens also strengthened their position. Ursula von der Leyen, the leader of the new European Commission, put the EGD – a transformative growth plan that seeks to achieve climate neutrality and nature conservation – at the centre of her political programme. This included two agriculture-focused strategies – F2F[92] and the

Table 3 Key differences in the trilogue positions

	European Commission	Council of the EU	European Parliament	Final agreement
Strategic plans: inclusion of EGD targets	Inclusion of EGD targets	No	Political inclusion	Political inclusion
Green architecture: Eco schemes earmark	Compulsory for member states	20% of direct payments	30% of direct payments	25% of direct payments
Capping	€100,000 (labour costs included)	Voluntary	Some compulsory form of redistribution	Some compulsory form of redistribution

Source: Own elaboration.

Biodiversity Strategy[93] – whose aims include a reduction in pesticide and fertiliser use, an increase in the share of farms and areas with organic farming, soil conservation, improved farm animal welfare and the utilisation of part of agricultural lands for nature conservation. The commission's vice president, Frans Timmermans, headed the implementation of the strategies by DG Agri and, interestingly, DG Sante, whose competence in this area had been absent. The commission planned to advocate the integration of these targets in the national CAP strategic plans. In addition, the commission published a new MFF proposal[94] that included the RRF and the provision of additional funds for Pillar II measures targeting new objectives. Thus, the shift towards environmental issues strengthened reformist actors and broadened policy setting, which increased reform expectations paired with additional funds, thus breaking the existing deadlocks.

INTER- AND INTRAINSTITUTIONAL NEGOTIATIONS AND AGREEMENTS

In July 2020, the European Council reached an agreement on the new MFF and RRF, which largely preserved the CAP in nominal terms (with Pillar II being preserved based on RRF top-up). This demonstrated not only the role of veto-based budget negotiations in which reformists would oppose increases in finances and conservatives would block reductions in distributive (Pillar I) measures, but also that of the EGD and RRF, which helped preserve Pillar II. The financial agreement also touched upon substantive issues such as the increased flexibility to use direct payments to fund rural development measures (as well as to use Pillar II funds to increase direct payments) and the issue of capping the largest payments, which was rejected. The European Parliament had no power to amend the MFF and therefore accepted the deal. However, regarding the issue of capping, parliament warned that it expected some form of payment redistribution from the largest to medium-sized and small farms to support CAP reform.

In autumn 2020, the Agriculture and Fisheries Council and the parliament formulated their positions on substantive issues, with both taking a more conservative stance than the commission (see Table 3 for their positions on the main issues).[95] In response, environmental NGOs raised criticism and Timmermans even threatened to retract the CAP proposal but faced opposition from the council (at the time led by German farm minister Julija Klockner) and the parliament (where the Committee on Agriculture and Rural Development played a key role, which, because of diverging views, resulted in a split with the Committee of Environment, Public Health and Food Safety, which for the first time exercised co-competence on environmental matters).

After the formal enactment of the MFF and RRF, the trilogue was conducted in the first half of 2021 during Portugal's presidency. For issues on which the three institutions disagreed, the parliament played a pivotal role in negotiations as seen in the final agreement (Regulation EU 2021/2115) (see Table 3).

Already at the council level, negotiations demonstrated that the QMV allowed for a wider opportunity for reform as opposed to veto setting as seen in the overriding of the NMS on green architecture issues. Meanwhile, the colegislation procedure provided fewer opportunities for reform compared to the pre-Lisbon procedure as the council and the parliament simplified many of the commission's initial proposals. Still, where the parliament had more reformist positions, it was able to influence the final deal. Moreover, compared to previous reforms, the parliament inserted more novel elements in the final agreement, including labour law compliance and gender equality elements, which were introduced for the first time in the CAP regulation.

Discussion and conclusion: the future of the CAP beyond "old wine in new bottles"

In 2023, the new CAP will enter into force; therefore, its impacts are yet to be seen. Strategic planning is not completely new because of the experience surrounding the Pillar II programming of the structural supports within the national rural development plans and the commission's CAP monitoring and evaluation system. Nevertheless, this policy experiment has yet to confirm whether higher flexibility will be balanced with sufficient evidence-based scrutiny from the commission to prevent major competition distortions in the EU market. The early evidence shows that the new governance model mainly allowed governments more flexibility against increased budgetary strain as national strategic plans are especially weak on the most important progressive elements, such as the new conditionalities and eco schemes. The planned midterm policy review will be the first opportunity to raise issues and introduce changes that will feed into the next reform cycle.

Next, F2F's and the Biodiversity Strategy's policy targets could lead to significant legal and regulatory changes, which will nonetheless take time and will not affect the current CAP cycle. There is a significant ongoing opposition by conservative voices who cite the likely decline in domestic agricultural production and farm income, the increase in domestic food prices and the externalisation of CO_2 emissions via higher production elsewhere.[96]

However, such opposition neglects the graduality of the proposed change, parallel investments in sustainable production and the accommodation of a trade policy that aims to incentivise sustainable production elsewhere through carbon pricing instruments. Most importantly, critical assessments overlook the impact of the no-change scenario, such as that of rapid climate change and biodiversity loss, which are major threats to agriculture and food production. Currently, the emissions trading system does not include agriculture. In the EU, agriculture accounts for about 10% of greenhouse gases and is the main factor of biodiversity loss.[97]

The recent global food security crisis has already been (ab)used to distract from necessary reform. To address price surges, the EU agreed on a €1.5 billion emergency package, which in many ways supported intensive practices and targeted the animal agriculture sector but contradicted the goals of climate-oriented proposals such as the extensification of the livestock sector, the reduction of imported protein feed and the promotion of more plant-based diets.

Paradoxically, many of the existing progressive CAP measures mainly offset the negative impacts of other more traditional CAP measures. What must be done is to remove/reorient current CAP instruments such as direct payments and certain Pillar II measures.

Importantly, necessary reforms need not require the introduction of new restrictive regulations and costly instruments. Paradoxically, many of the existing progressive CAP measures mainly offset the negative impacts of other more traditional CAP measures. What must be done is to remove/reorient current CAP instruments such as direct payments and certain Pillar II measures. Increasing land availability would incentivise extensification and carbon farming, which are currently weakly represented in Pillar II. Carbon pricing instruments would support investments in alternative and innovative feeds. Such changes would encourage investments in vertical farming and aquaponics to bring production closer to urban areas. These structural changes would also allow for better integration between agriculture and climate and energy policy via the introduction of battery-powered machinery and green-energy farm production (solar panels, wind turbines and new-generation sustainable biofuels and bioenergy).

While agricultural policies have long been associated with taxpayers' and consumers' rational ignorance because of dispersed costs (versus the concentrated benefits of well-organised farm lobby groups), multiple agriculture- and food-related crises have raised awareness

and called for change. According to the specialised Eurobarometer survey on the CAP conducted in early spring 2022, up to 92% of respondents believed that the biggest challenge to EU agriculture is climate-related extreme weather events, and two-thirds of them want farmers to do more to protect the environment even if it means lessening the global competitiveness of EU agriculture.[98] As this study argued based on both CAP literature and the 2021 CAP reform as a case study, broadening agricultural policy ideas and debate is a necessary but insufficient change criterion since it has largely resulted in limited or superficial policy changes. Thus, it is also important to remember that formal decision-making procedures are heavily oriented towards the status quo. Hence, first, the CAP must be delinked from veto-based budget debates, and, second, the public should pay more attention to the CAP debates in the parliament as the EU's directly elected colegislator, whose role in the process is pivotal.

REFERENCES

Crombez, C., Knops, L., & Swinnen, J. F. M. (2012). Reform of the common agricultural policy under the co-decision procedure. *Intereconomics*, 6, 336–342.

Daugbjerg, C., & Feindt, P. H. (2017). Post-exceptionalism in public policy: Transforming food and agricultural policy. *Journal of European Public Policy*, 24(11), 1565–1584.

Daugbjerg, C., & Swinbank, A. (2004). The CAP and EU enlargement: Prospects for alternative strategy to avoid the lock-in of CAP support. *Journal of Common Market Studies,* 42(1), 99–119.

Daugbjerg, C., & Swinbank, A. (2009). Ideas, Institutions, and Trade: the WTO and the Curious Role of EU Farm Policy in Trade Liberalization. *Oxford: Oxford University Press*.

Daugbjerg, C., & Swinbank, A. (2016). Three decades of policy layering and politically sustainable reform in the European Union's agricultural Policy. *Governance*, 29(2), 265–280.

ECORYS. (2017). *Modernising and Simplifying the Common Agricultural Policy: Summary of the results of the Public Consultation.*

Erjavec, K., & Erjavec, E. (2015). Greening the CAP- just a fashionable justification? A discourse analysis of the 2014–2020 CAP reform documents. *Food Policy*, 51, 53–62.

Erjavec, E., Lovec, M. & Erjavec, K. (2015). ‚From „Greening" to „Greenwash": the drivers and discourses of CAP 2020 reform'. In: J.F. Swinnen (ed.), The Political Economy of the 2014-2020 *Common Agricultural Policy: An Imperfect Storm.* London: Rowman & Littlefield, Brussels: CEPS, 215–244.

Erjavec, E., & Lovec, M. (2017). Research of European Union's Common Agricultural Policy: Disciplinary boundaries and beyond. *European Review of Agricultural Economics,* 44(4), 732–754.

European Commission. (2018a). *A modern budget for a union that protects, empowers and defends. The Multiannual Financial Framework for 2021-2027,* COM/2018/321 final.

European Commission. (2018b). *Proposal of Strategic plans regulation, Horizontal regulation and CMO regulation.* COM/2018/392 final - 2018/0216 (COD).

European Commission. (2020a). *Farm to Fork Strategy for a fair, healthy and environmentally friendly food system.* COM/2020/381 final.

European Commission. (2020b). *Biodiversity Strategy for 2030 Bringing nature back into our lives.* COM/2020/380 final.

European Commission. (2020c). *The EU budget powering the recovery plan for Europe.* COM/2020/442 final.

European Commission. (2022). *Special Eurobarometer 2022 520: Europeans, Agriculture and the CAP.*

European Court of Auditors (ECA). (2018). *Opinion No 7/2018: concerning Commission proposals for regulations relating to the Common Agricultural Policy for the post-2020 period.*

Fondation Robert Schuman (FRS). (2021). The Common Agricultural Policy 2023–2027: Change and continuity. *European issues*, 607.

Garzon, I. (2006). *Reforming the CAP. History of a Paradigm Change. Basingstoke, UK: Palgrave Macmillan.*

Lynggaard, K., & Nedergaard, P. (2009). The logic of policy development: Lessons learned from reform and routine within the CAP 1980–2003. *Journal of European Integration*, 31(3), 291–309.

Lovec, M., Šumrada, T., & Erjavec, E. (2020). New CAP delivery model, old issues. *Intereconomics*, 55(2), 112–119.

Pe'er, G., Zinngrebe, Y., Moreira, F. et al. (2019). A greener path for the EU Common Agricultural Policy. *Science*, 365(6452), 449–451.

Pokrivcak, J., Crombez, C., & Swinnen, J. F. M. (2006). The status quo bias and reform of the common agricultural policy: Impact of voting rules, the European Commission and external changes. *European Review of Agricultural Economics*, 33(4), 562–590.

Skogstad, G. (1998). Ideas, paradigms and institutions: Agricultural exceptionalism in the European Union and the United States. *Governance*, 11(4), 463–490.

Wesseler, J. (2022). The EU's farm-to-fork strategy: An assessment from the perspective of agricultural economics. *Applied Economic Perspectives and Policy*, 44(4), 1–8.

The Impacts of Climate Technology on Equality and Democratic Freedom

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Abstract

Amidst the worsening climate crisis, there has been a surge in investment in technology designed to combat climate change. However, the use and development of so-called "climate technologies" are accompanied by uncertainties and societal risks that require urgent attention. This article critically examines this development. First, I explain why these climate technologies may not be effective at addressing climate change and may, in fact, exacerbate the climate crisis. For example, many climate technologies require large amounts of water and electricity as well as finite raw materials. There is also scientific uncertainty regarding the long-term effects of geoengineering technologies on the planet. Second, I argue that climate technologies present two major societal risks. The development and use of climate technologies may reinforce existing inequalities both within and between countries. The centralisation of knowledge and expertise regarding climate technologies in the Global North is just one illustration of this development. Second, there is a risk that future climate technologies will be "privatised"; that is, there is a risk that democratic control over the future of climate technologies will be lost to profit-seeking corporations and commercial interests. This should worry liberals who are concerned with the democratic rights of citizens. Finally, I present three proposals for ensuring the democratic control of future climate technologies.

Introduction: The Rise of Climate Technologies

Climate technology, or "climate tech", is experiencing a surge in investment and application. The Microsoft Planetary Computer is capable of analysing trillions of pieces of data about the Earth's climate. The American investment company TPG invested $100 million in Climavision, a system that uses artificial

intelligence (AI) to analyse and predict weather patterns across the planet (Climavision, 2022). In 2021, Elon Musk announced that he would award $100 million in prize money to any organisation that can develop technology to remove carbon dioxide from the air.

Technologies that promise to help solve the global climate and ecological crises indeed hold great promise. Artificial intelligence can be used to map deforestation, detect river water pollution, reduce agricultural wastewater, conserve heat and light and detect pollution in commercial supply chains. In 2019, PricewaterhouseCoopers calculated that by 2030, AI applications could reduce CO_2 emissions by 4%. The UN Intergovernmental Panel on Climate Change has already incorporated the anticipated development and application of technologies in its predictions of various future scenarios. For example, in the scenario where global warming is limited to 1.5 degrees Celsius, the panel assumes that technology will be used to capture and store CO_2 emissions from the air and biomass. The two main technologies in this category are direct air capture and storage and bioenergy with carbon capture and storage (Haikola et al., 2021; IPCC AR6 WG III). Companies such as Carbfix in Iceland and Climeworks in Switzerland are already removing CO_2 from the air and storing it underground.

Climate technologies thus hold great potential for combating climate change. Nevertheless, they also present major uncertainties and potential global societal risks that require critical examination.

Climate technologies thus hold great potential for combating climate change. Nevertheless, they also present major uncertainties and potential global societal risks that require critical examination. To what extent do climate technologies offer a solution to climate change? Who determines what the implementation of these climate technologies looks like? How are the benefits, risks and drawbacks of these climate technologies distributed between and within countries?

In this paper, I first focus on the potential for climate technologies to combat climate change. Second, I elaborate on the potential for climate tech to increase inequality. Third, I examine the role of the private sector in the development and application of climate technologies, arguing that democratic control is essential for a just and fair application of these technologies.[99]

A double-edged Sword

Climate technology investments increased considerably between 2020 and 2022. PwC has calculated that worldwide, around 87.5 billion dollars were invested in climate technologies from the second half of 2020 to the first half of 2021 – a growth of 210% over the previous year (PwC, 2021). According to Tech Nation's *Climate Tech Report* 2022, investments in greenhouse gas removal technologies increased by 717% in 2021 and 2022. In the Netherlands, one-third of investments in tech companies in 2022 were in start-ups developing "climate solutions" (Bronzwaer, 2022). In August 2022, the $369 billion Inflation Reduction Act was passed by the United States Congress and was subsequently signed into law by President Joe Biden. The Act is intended to promote energy-efficient buildings, energy storage and renewable energy.

Researchers warn that the development of climate technologies may reduce the urgency around the need to decrease global CO_2 emissions (e.g., Taebi, 2021). For example, Jacobson has referred to climate technologies such as carbon capture, direct air capture and blue hydrogen (a hydrogen production process that involves storing CO_2 emissions underground) as greenwashing technologies. Jacobson writes, "Those three are all designed to keep the fossil fuel industry in business, and they're being promoted by the fossil fuel industry because it keeps them alive and allows them to pollute more, kill more people through their air pollution. All these technologies, biofuels, bioenergy, that's a greenwash technology, sustainable aviation fuels, that's a greenwash technology" (Financial Times, 2022). According to Jacobson, instead of investing in new technologies, governments should scale up technologies that are already available, such as solar, wind and hydropower.

That is, rather than capturing CO_2 emissions created by "dirty" energy production facilities, such as coal plants, efforts should focus on limiting CO_2 emissions in the first place.

Climate technologies are not inherently effective at fighting climate change. The development of new technologies consumes enormous amounts of electricity and water, which is often used for cooling. In 2018, Google and Microsoft used approximately 15.8 billion and 3.6 billion litres of water, respectively (Mytton, 2021). In 2021, Google's data centres consumed over one quarter of the total water used in the city of Dallas, Texas (Rogoway, 2022). That same year, data centres were responsible for approximately 0.9% to 1.3% of global electricity use (IEA, 2022). Moreover, training an AI model can potentially emit as much CO_2 as five cars over their entire lifetimes (Hao, 2019).

Furthermore, technology production infrastructure often requires the extraction of finite raw materials, such as cobalt and nickel. Raw material extraction often involves human rights violations and environmental destruction, particularly when it occurs in the Global South.[100] In Indonesia, for example, the extraction of materials for electric vehicles relies on fossil fuels, such as coal, and pollutes the environment by spreading sulfur dioxide, nitrogen oxides and coal ash into the air. Citizens living near such extraction sites regularly develop respiratory diseases, likely due to pollution. In Indonesia, villagers who have been living in the same place for generations may be forced to leave their ancestral homes (Timmerman, 2022). In Nevada in the United States, the company Lithium Americas plans to open a lithium mine on sacred indigenous land despite opposition from the Paiute tribe (Milman, 2022).

Moreover, the long-term effects of these technologies remain uncertain. This particularly applies to geoengineering or climate engineering technologies, which seek to directly intervene in the climate and limit or even reverse global warming trends.[101] For example, growing algae in the ocean may benefit the storage and removal of CO_2, as algae naturally absorb CO_2. However, large-scale algae cultivation could also acidify the sea, reducing biodiversity in the ocean. Climate technologies are, therefore, best described as a "double-edged sword": They can contribute to the fight against the climate and ecological crises, but they can also hamper this fight or even exacerbate the crisis.

Stressing the link between the fight against climate change and technological development, the European Commission refers to the digital and green transitions as "twin transitions".[102] Muench et al. (2022) put forward that technology can play an essential role in achieving the commission's sustainability goals. For example, AI applications, such as AI-assisted crop management, could make agriculture more sustainable by helping to prevent chemicals from spilling into the soil. Supply chain tracking is another possible application of AI in agriculture. According to the research centre of the European Commission, the Joint Research Centre, the impact of new climate technologies on the environment depends on their energy and raw material usage, as well as CO_2 emissions. The extent to which technology will contribute to tackling the climate and ecological crises, therefore, depends on how new technologies are developed and applied. The connection between the green and digital transitions demonstrates that there is no "quick fix" to the climate crisis: Whether new technologies will contribute to a sustainable future depends on political decisions that prioritise certain values and societal interests over others.

Climate Technologies and Inequality

Climate technologies also raise important questions concerning social and economic equality. Because decisions regarding climate technologies are inherently political, it is important to understand who is making these decisions and how. Who holds the power and means to determine which climate technologies will be developed? Who has the opportunity and resources to deploy climate technologies? Researchers have warned against two types of power imbalances related to climate technology: the power imbalance between countries and the power imbalance between companies and citizens (Nost & Colven, 2022; Lahsen, 2020).

First, climate technologies can reproduce social forms of exclusion and increase existing social and economic inequality between countries. The Global North is responsible for most investments in climate technology, and these investments are primarily aimed at assisting countries in the Global North to mitigate and adapt to climate change. For example, Microsoft's AI for Earth programme, which provides developers and researchers access to global climate data, aims to "democratise" climate technologies by making them accessible to the public. In practice, however, the researchers who have access to this data are mostly Europe and American researchers, and projects that use this data mainly focus on the countries where the researchers live (Nost & Colven, 2022). Indeed, research shows that as much as 78% of research funding for climate technology between 1990 and 2020 went to the United States, the United Kingdom and the EU (Abbas et al., 2022).

Various funding schemes have attempted to democratise access to climate technologies for all countries. For instance, since 2008, the UN Climate Technology Centre and Network has invested in the development of technologies across the globe and the transfer of technologies to the Global South (Lee & Mwebaza, 2020). In 2010, the UN also established the Green Climate Fund, an organisation represented by government officials that invests in climate mitigation and

Photo by Markus Spiske on Unsplash

adaptation in developing countries. The EU, as part of the Global North, plays a crucial role in promoting such initiatives and sharing knowledge and expertise on climate technologies. Through these initiatives, the EU should invest in existing technologies such as solar, geothermal and wind, as the effects and long-term consequences of these technologies are better understood compared to more experimental technologies, such as solar radiation management (SRM). The EU should also advocate for democratic safeguards in the use of these technologies, ensuring that their development and implementation are subject to democratic scrutiny.

This sharing of expertise may even require reforms to intellectual property laws governing these climate technologies. The EU's attempt to lift COVID-19 vaccine patents during the pandemic was criticised for its lack of transparency and failure to increase access to vaccines. Therefore, more recently developed intellectual property regimes may be better suited. Open-source access regimes and licensing pools that enable technologies to be shared within a "pool" of countries or organisations might be able to provide access to technologies without negatively affecting profitability or research and development (Otero, 2022). However, it will be crucial that private companies pursue social and ecological values that serve the public interest rather than financial value for shareholders. Similar to how the fight against the COVID-19 pandemic was and is in the public interest, the fight against climate change must also be waged in the interest of the public.

Climate researchers also warn that unequal access to climate engineering technologies can increase existing inequalities and even increase the risk of conflict (O'Lear et al., 2021). For example, SRM blocks sun rays to prevent further global warming. This works by diffusing aerosols such as titanium dioxide in the air to form a layer between the Earth and the sun, blocking the sun's radiation from reaching the Earth (Pope et al., 2012). Critics argue that SRM will negatively affect predominantly countries that have neither the knowledge nor resources to apply the technology or counteract its effects. This is not a science-fiction scenario. China and Israel have already started artificially boosting rainfall, which has resulted in geopolitical tensions. In 2018, Iran accused Israel of "stealing" its rain by manipulating weather patterns in the region.

There is an urgent need to formulate international agreements on climate engineering. In January 2022, a group of international climate scientists and public administration experts made a plea regarding the necessity of reaching an international agreement banning the use of SRM. They argued that the technology is "not governable in an inclusive and just manner within the current international political system".[103] Roeser et al. (2019) suggest that "reversibility" could be established as a requirement for applying climate engineering. This would outlaw climate engineering technologies that have the potential to trigger self-reinforcing and irreversible spirals; for example, aerosols diffused into the air would need to be continually replenished through reinjection.[104]

The EU, as part of the Global North, plays a crucial role in promoting such initiatives and sharing knowledge and expertise on climate technologies. Through these initiatives, the EU should invest in existing technologies such as solar, geothermal and wind, as the effects and long-term consequences of these technologies are better understood compared to more experimental technologies, such as solar radiation management (SRM).

Democratic Control and Democratic Freedom

The second form of power inequality relates to democratic control over climate technologies and the potential for inequality to develop between companies and citizens. Ultimately, although private companies have invested enormous amounts of capital in the development of climate technologies, they should not have the sole authority to determine what kind of technologies are developed and how they are deployed.

According to Susskind (2018), there are three fundamental differences between governments and businesses that must be considered when discussing the concentration of technology in the hands of the private sector. First, government power in a parliamentary democracy is controlled by citizens through the parliament; businesses, however, are not subject to democratic control. Therefore, Susskind argues that if decisions on technological innovation are concentrated in the private sector, this will limit people's democratic recourse over the future of technological development. The democratic ideal of freedom asserts that

people are free when they can exert meaningful influence on the rules they must abide by. In the democratic sense, "freedom" implies that power must always be subject to democratic control and cannot be held by a few individuals or private corporations (Susskind, 2022). Likewise, climate technology must also be subject to democratic control and public scrutiny. Yet, this is not always the case. For example, in the case of the Microsoft Planetary Computer, it is Microsoft that determines who has access to the trillions of climate data points and who receives funding for which projects. Researchers have already spoken out about the lack of transparency regarding how projects and organisations are selected to receive support (Nost & Colven, 2022).

Given that climate technologies can reinforce power imbalances and exacerbate inequality between individuals within a single country, between countries and between countries and companies, there is an urgent need to democratise the development and application of climate technologies to protect people's democratic freedoms and ensure that climate technologies are implemented in accordance with fundamental rights and freedoms.

These researchers have warned that companies are taking advantage of the climate crisis by using it as an opportunity to train AI and to bring new products to the market (Ibidem, 2022). This relates to a second fundamental difference between the government and the private sector identified by Susskind: Although the state essentially serves the public interest, large corporations are usually beholden to the wants of shareholders, who do not necessarily prioritise public interest. The danger is that climate technology will be primarily shaped by the interests of technology companies. Moreover, the interests of the global public are at stake. For example, tech companies have invested millions of dollars in experimental algae-growing operations in the ocean to offset their CO_2 emissions. Critics of climate technologies fear that if financial interests become the leading factor in making decisions about tech deployment, these experiments will continue regardless of scientists' warnings about potential dangers, such as ocean acidification and biodiversity collapse (Temple, 2022).

The third difference between the state and big tech firms is related to the legal framework that limits the power of big tech (Susskind, 2018). According to Susskind, big tech companies and the "code" they develop – such as the algorithms that shape, amongst other things, social media feeds – can be created swiftly, change quickly, and differ between companies. Susskind then asserts that, in contrast, mature legal systems in democratic countries take centuries to develop. This might pose a challenge for legal systems that try to make "big tech" function in accordance with public values and the interests of its citizens.

Currently, there is no clear legal framework for governing climate technologies. In April 2021, the European Commission presented the AI Act, which included rules to bring AI applications in line with fundamental rights and European values. It classified certain technologies, such as biometric identification, as "high risk" because they can impact health, safety and fundamental human rights. Climate technology is not explicitly categorised as "high risk" and is thus not covered by this new legislation. Moreover, the effects of geoengineering can be global, which implies that international organisations such as the UN have a role to play in setting standards for geoengineering technologies.

Democratising Climate Technology

In this article, I have argued that climate technologies can help in solving the climate crisis; however, they do not offer a "quick fix". Given that climate technologies can reinforce power imbalances and exacerbate inequality between individuals within a single country, between countries and between countries and companies, there is an urgent need to democratise the development and application of climate technologies to protect people's democratic freedoms

and ensure that climate technologies are implemented in accordance with fundamental rights and freedoms. For this purpose, I present the following three proposals:

First, in order to increase citizens' democratic freedoms and ensure democratic oversight, citizens and researchers should be granted equal access to climate data. Democratic participation in climate technology should not be available only for people in the Global North; that is, it is crucial that participation be extended to people in countries where the impact of climate change is the greatest. This starts with sharing knowledge and expertise on existing climate technologies, such as solar and wind, with countries in the Global South. This may require intellectual property reforms to guarantee that the countries in need of climate technologies are able to access them. The EU should learn from its experience lifting COVID-19 patents and implement innovative intellectual property reforms to enable knowledge and expertise sharing related to climate technologies with countries in the Global South. Establishing open-data frameworks for climate technologies would be a positive step forward. Organisations such as the UN Climate Technology Centre and Network are already involved in transferring technologies to countries in the Global South; and therefore, the EU should take a proactive role in expanding and promoting the work of this network. For instance, the EU could increase its funding.[105] EU countries should also pressure the Green Climate Fund to invest in the development of climate technologies in the Global South and ensure that decisions on climate technologies are implemented democratically.

Second, rules and regulations governing climate technologies should be urgently developed via fair and democratic processes. Clear international agreements must be reached regarding climate engineering to ensure that large tech corporations cannot simply experiment with the global climate, potentially unleashing unknown consequences. For instance, "reversibility" could be established as a requirement for implementing a climate technology.

Third, climate technologies should feature prominently in platforms that enable public discussion on the climate, such as the Citizens Convention for Climate, which took place in France in 2019 and 2020, and the convention that the Dutch minister for Climate and Energy announced for 2023.

Europe must urgently adopt an attitude toward the development of climate technologies that emphasises democratic control and citizen oversight. The question of whether climate technologies will contribute to solving the climate crisis or simply make it worse depends on crucial political decisions.

REFERENCES

AbdulRafiu, A., Sovacool, B. K., & Daniels, C. (2022). The dynamics of global public research funding on climate change, energy, transport, and industrial decarbonisation. *Renewable and Sustainable Energy Reviews*, 162, 112420. https://doi.org/10.1016/j.rser.2022.112420

Bronzwaer, S. (2022, December 5). *Terwijl grote techbedrijven duizenden werknemers ontslaan, komen er bij "groene" start-ups juist banen bij*, NRC.

Clark, P. (2022, November 22). Climate tech to save the planet: Techno-optimism or greenwashing? *Financial Times*.

Climavision. *'Investing in the Future'*, Retrieved December 23, 2022. https://climavision.com/

COM. *2021/206 final*.

Haikola, S., Anshelm, J., & Hansson, A. (2021). Limits to climate action – Narratives of bioenergy with carbon capture and storage. *Political Geography*, 88, 102416. https://doi.org/10.1016/j.polgeo.2021.102416

Hao, K. (2019, June 6). Training a single AI model can emit as much carbon as five cars in their lifetimes. *MIT's Technology Review*.

Herweijer, C., Combes, B., & Gillham, J. (2019). *Artificial intelligence and the fate of planet Earth, PwC*.

IEA. (2022). Data centres and data transmission networks. https://www.iea.org/reports/data-centres-and-data-transmission-networks.

IPCC, Ar.6 WG III.

Lahsen, M. (2020). Should AI be designed to save us from ourselves?: Artificial intelligence for sustainability. *IEEE Technology and Society Magazine,* 39(2), 60–67. https://doi.org/10.1109/MTS.2020.2991502

Lee, W. J., & Mwebaza, R. (2020). The role of the climate technology centre and network as a climate technology and innovation matchmaker for developing countries. *Sustainability*, 12(19), 7956. https://doi.org/10.3390/su12197956

Milman, O. (2022, October 18). There's lithium in them thar hills – But fears grow over US "white gold" boom. *The Guardian*.

Muench, S. et al. (2022). *Towards a green and digital future*. Publications Office of the European Union.

Mytton, D. (2021). Data centre water consumption. *npj Clean Water*, 4(1). https://doi.org/10.1038/s41545-021-00101-w

Nost, E., & Colven, E. (2022). Earth for AI: A political ecology of data-driven climate initiatives. *Geoforum*, 130, 23–34. https://doi.org/10.1016/j.geoforum.2022.01.016

O'Lear, S., Hane, M. K., Neal, A. P., Stallings, L. L. M., Wadood, S., & Park, J. (2021). Environmental Geopolitics of Climate Engineering Proposals in the IPCC 5th Assessment Report. *Frontiers in Climate,* 3, 718553. https://doi.org/10.3389/fclim.2021.718553

Gonzalez Otero, B. (2022). IP in times of climate crisis – A problem or a solution? IIC – *International Review of Intellectual Property and Competition Law*. ICC, 53(4), 501–505. https://doi.org/10.1007/s40319-022-01192-9

Pope, F. D., Braesicke, P., Grainger, R. G., Kalberer, M., Watson, I. M., Davidson, P. J., & Cox, R. A. (2012). Stratospheric aerosol particles and solar-radiation management. *Nature Climate Change*, 2(10), 713–719. https://doi.org/10.1038/NCLIMATE1528

PwC. (2021). *State of Climate Tech 2021: Scaling breakthroughs for net zero*.

Rogoway, M. (2022, December 21). *Google's water use is soaring in the Dalles, records show, with two more data centers to come*. Oregon Tech.

Roeser, S., Taebi, B., & Doorn, N. (2020). Geoengineering the climate and ethical challenges: What we can learn from moral emotions and art. *Critical Review of International Social and Political Philosophy,* 23(5), 641–658. https://doi.org/10.1080/13698230.2020.1694225

Rubin, A. J. (2022, August 28). Cloud wars: Mideast rivalries rise along a new. Front. *The New York Times*.

Taebi, B. (2021, September 21). *Nuance in the quest for climate solutions*. TU.

TU Delft. https://www.tudelft.nl/en/stories/articles/nuance-in-the-quest-for-climate-solutions.

Susskind, J. (2018). Future politics: *Living together in a world transformed by tech*. Oxford University Press.

Susskind, J. (2022). *The Digital Republic: On Freedom and Democracy in the 21st century*. Pegasus Books.

Temple, J. (2022, June 16). Running Tide is facing scientist departures and growing concerns over seaweed sinking for carbon removal. *MIT's Technology Review*.

Timmerman, A. (November 28, 2022). The dirty road to clean energy: How China's electric vehicle boom is ravaging the environment. *Rest of world*.

From Green Deals to Green Bubbles

Time to Question Brussels as an Entrepreneurial State

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Abstract

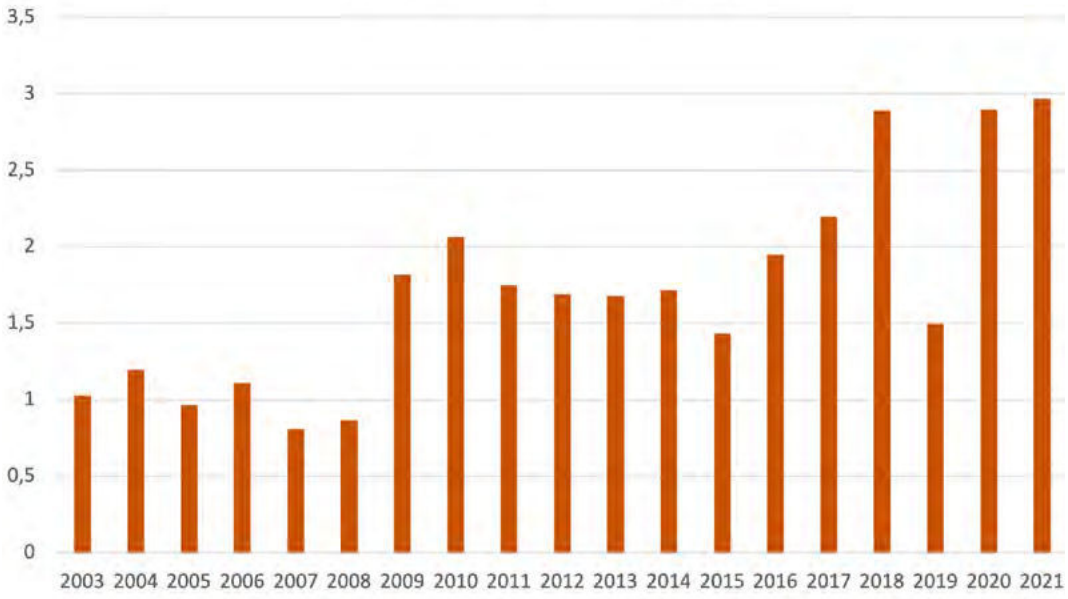
This paper discusses the notion of an entrepreneurial state and questions the European Union's (EUs) increasingly interventionist industrial policies. The EUs green deal is a massive effort to steer the economy in new directions. Unfortunately, green deals have often resulted in green bubbles, i.e. overinvestments that fail to generate any sustainable businesses or industrial transformation in the long term. This paper presents a couple of illustrative examples of failed green deals and synthesises some of the main findings. A couple of factors jointly explain the persistent failure of green deals, including (1) if something sounds too good to be true, it is too good to be true; (2) governments lack incentives and capabilities to act as entrepreneurs; and (3) allocation of large sums of 'free' money to innovation and entrepreneurship distort behaviour. Green transitions become more successful when policymakers impose laws and regulations to deal with negative externalities.

Introduction: The return of industrial policy

The financial crisis and the prolonged euro crisis paved the way for a revival of interventionist industrial policies. Many countries in the Western world learnt their lessons the hard way in the 1970s and 1980s – when active industrial policies did not work. Billions of taxpayer money were thrown into declining industries, and wishful thinking has made policymakers fall into the trap of supporting firms that lack the ability to compete. Money has been squandered and ended up in the hands of crony capitalists and non-performing businesses.

In the 1990s and early 2000s, the focus of policies shifted towards the internal market, setting up fair and free competition across the European Union (EU). However, after the financial crisis, the lessons from the 1970s and 1980s have been completely forgotten.

Figure 1 Turnover of SEA over time (billion SEK).



Brussels is increasingly championing its role as an entrepreneurial actor driving innovation and sustainability across the continent. The EU Commission has been largely inspired by scholars in innovation systems and professors such as Mariana Mazzucato, who wrote the book *The Entrepreneurial State* (2013) and argued for more government intervention The EU is currently treading towards corporatism at the expense of a free and fair market economy.

In this policy brief, I argue that the EU's and von der Leyen Commission's move towards progressively more interventionist industrial policies is a mistake that will not only destroy the continent's competitiveness but also result in environmental degradation and continued decay of the EU's electricity system (see Wennberg and Sandström, 2022).

Green deals: The convergence of environmental and industrial policies

Recent decades have witnessed a shift in environmental policies in the Western world. Environmental policies used to be about fixing what economists refer to as negative externalities. Regulation and taxation have historically interacted with industrial development, resulting in considerable environmental progress.

Although the heavy industry has resisted these efforts at times, we have still witnessed substantial improvements. Out of the 26 pollutants measured by the Swedish Environmental Protection Agency (Naturvårdsverket), 24 declined from 1990 to 2020. While GDP nearly doubled during this period, pollution per unit of GDP was reduced by nearly 75%. Data for Swedish imports from 2008 onwards indicate a similar pattern. Several pollutants such as lead, sulphur dioxide, cadmium, arsenic, and mercury are almost entirely vanished, experiencing absolute declines of more than 95%. Regulations, technological advancements, and bans have interacted and resulted in this development (Grafström and Sandström, 2021).

This more conventional division between states and markets has been largely replaced by the convergence of environmental and industrial policies. Environmental policies are increasingly about the state making targeted and proactive efforts towards certain technologies. Sweden experienced a fair share of such efforts in the 2000s.

In Sweden and many other countries, increasing amounts of resources are being poured into the so-called shifts to sustainability. Figure 1 depicts the annual turnover of Sweden's Energy Agency (SEA), which has more than tripled since the early 2000s. Often, these resources are matched with EU funds, so in effect, the amount of 'free money' available for firms is much higher.

Figure 2 Number of ethanol cars in traffic in Sweden (Sandström and Björnemalm, 2022)

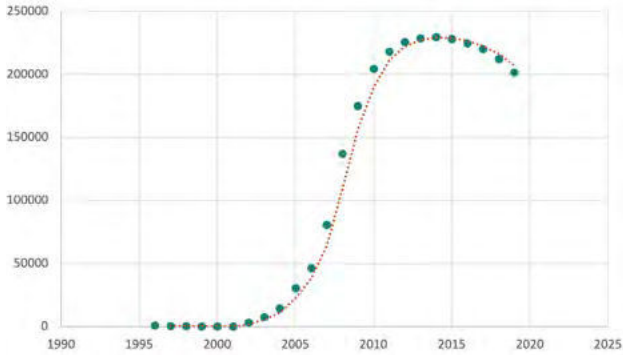


Figure 3 Number of ethanol cars sold in Sweden (Sandström & Björnemalm, 2022)

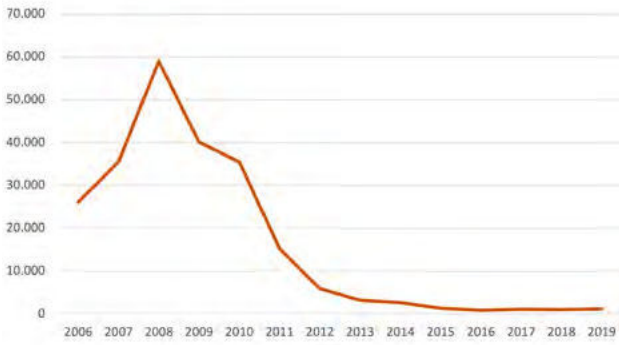
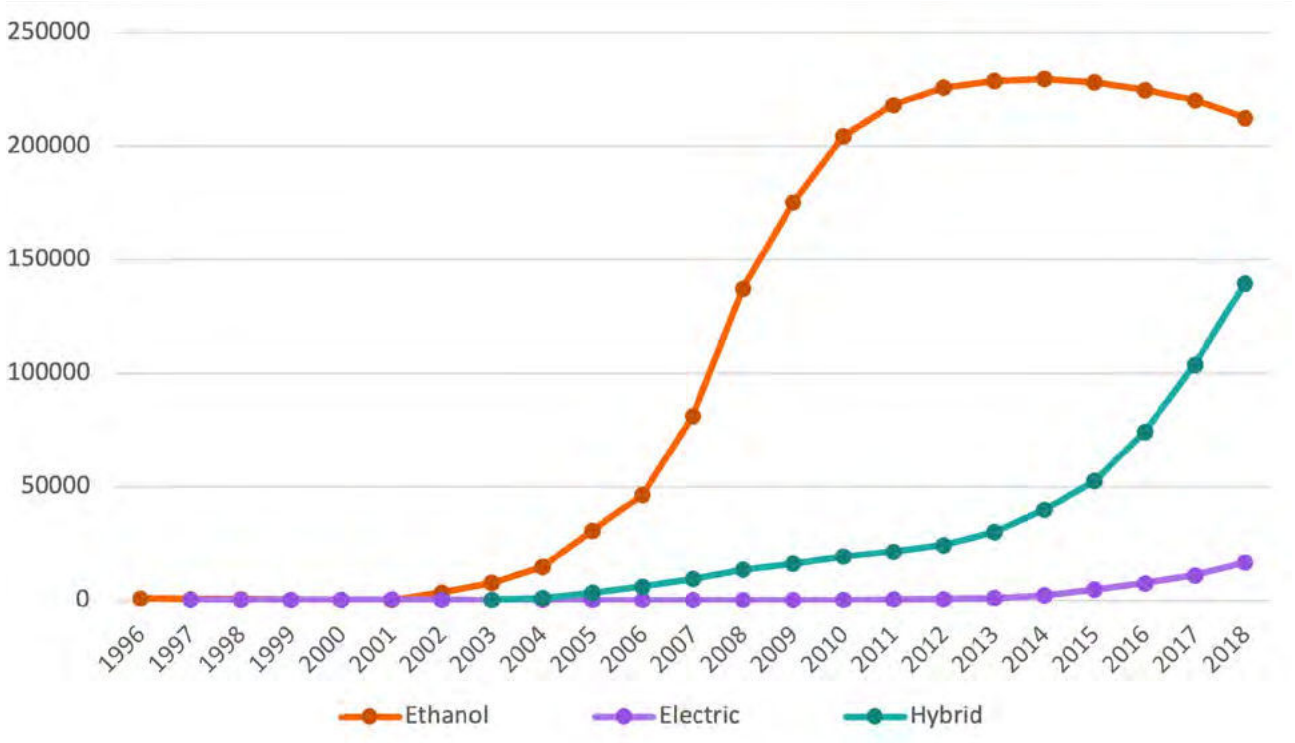


Figure 4 Number of ethanol cars sold in Sweden (Sandström & Björnemalm, 2022)



The ongoing failure of green deals

What experience do we have with green deals, and what lessons can be learnt? The Swedish bubble in ethanol cars and ethanol production serves as an illustrative example.

THE SWEDISH ETHANOL CAR BUBBLE

As depicted in Figure 2, the steep growth in ethanol cars levelled off rapidly. Ethanol car sales peaked in 2008. At that time, 20% of all cars sold in Sweden ran on ethanol. Figure 3 depicts how this bubble collapsed in the following years.

There were several reasons why ethanol never became a viable alternative. First, many engines ran poorly on ethanol and broke down after a while. When they broke down, consumers became upset and blamed politicians, who in turn put the blame on car manufacturers. Second, by 2008, reports criticising ethanol started to be published worldwide. It was increasingly argued that ethanol production took so much land into use that food prices were affected in developing countries. Thus, ethanol was considered less ethically attractive.

The ethanol car bubble had its origins in a directive from the EU Commission in 2003, which compelled member states to make sure that 5% of their fuel consumption came from biofuels by 2010. Swedish policymakers were forced to act swiftly, so several laws and support structures were put in place from 2003 to 2008. Gas stations were forced to supply biofuel – in this case ethanol. Ethanol cars were made tax deductible and did not need to pay congestion taxes. All these targeted supports for this technology fuelled rapid growth from 2004 to 2008.

In the next phase, engines broke down, political support collapsed and concerns about the sustainability of ethanol increased. As depicted in Figure 4, all the support targeted towards ethanol cars discriminated against alternative cars, such as hybrid or electric vehicles, which did not grow in these years.

A BUBBLE IN ETHANOL PRODUCTION

Due to ethanol cars, Sweden also experienced a bubble in ethanol production. In the late 1990s, Prime Minister Göran Persson wanted to transition the economy towards more sustainable development. One part of this strategy was to provide targeted and specific support to set up factories to make biofuels.

The Swedish Farmers' Association managed to negotiate tax exemptions and other supportive measures to set up a factory. The company was named Agroetanol, and its facilities were set up in the early 2000s and supplied ethanol for E5 and E10, i.e. gasoline cars that use 5% or 10% ethanol.

Figure 5 Turnover and profits for Swedish ethanol production (the teal bar represents turnover, and the orange represents profit (loss)).

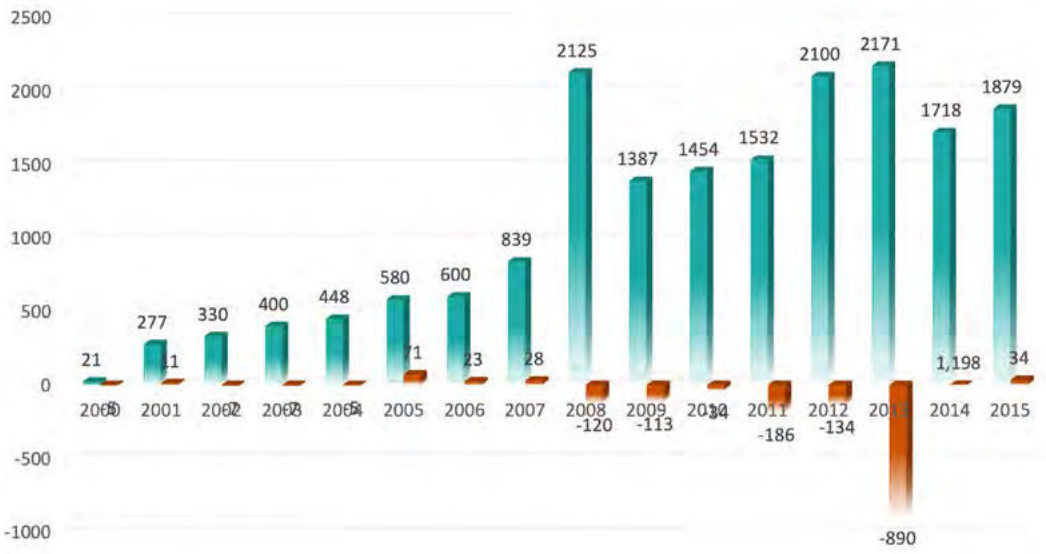


Table 1 Costs of Sweden's domestic ethanol production (own calculations)

Type of cost	Amount (MSEK)
Tax-exempts	1500
Investments in the plant (1999–2000)	500
Investments in expansion (2007–2009)	1500
Tariffs	15000
Accumulated losses	1700
Total	20200

Tariffs were introduced to shelter the facility from foreign producers. Brazilian ethanol was about half as expensive, and ethanol from the United States was also much cheaper.

As directives for including ethanol in gasoline changed, the market for Agroetanol grew. However, profits were still low as the prices of wheat and ethanol kept fluctuating in ways that were not advantageous for the firm, which also struggled to gain critical economies of scale. Moreover, the looming threat of removed tariffs was present all the time. As depicted in Figure 5, despite the tariffs, tax exemptions, and other considerable supports from agricultural policies, Agroetanol made losses for many years and margins were small.

The cost for this facility and Sweden's domestic production is summarised in Table 1, amounting to 20.2 billion SEK.

A BUBBLE IN ETHANOL PRODUCTION FROM CELLULOSE

In Örnsköldsvik in northern Sweden, several municipalities have accumulated billions of SEK in debt because of failed investments in making ethanol from cellulose, i.e. from the forest. It all started in 1994 when the municipality inaugurated an ethanol gas station. After continued small investments over the years, the activities gained momentum in the early 2000s. In 2004, Prime Minister Göran Persson took part in the formation of an industrial plant to make car fuel from cellulose.

SEA—Energimyndigheten—played a special role in the government's enactment of industrial policies, with a special emphasis on energy and sustainability. In 2001, SEA provided Sekab—a municipally owned company—with a 112 million SEK grant to build a pilot plant to make ethanol out of cellulose. Municipalities, as well as several local universities, also took part in funding the building of this plant.

Sekab lobbied hard from 2006 to 2008 to obtain more government grants and scale up their pilot plant into a demonstration plant. The mayor of Örnsköldsvik, Elvy Söderström (Social Democrat), did not only announce that the municipality was willing to put up resources but also made it clear that she would like to see extensive state involvement. None of the expectations to create new jobs, new technology, and re-industrialise the rural north materialised. On the contrary, the municipalities involved ended up with huge losses and mounting debt in the subsequent years (Sandström and Alm, 2022).

OTHER GREEN BUBBLES IN SWEDEN

Sweden experienced several other green bubbles in the 2000s; they were not only related to ethanol but also to biogas. In Göteborg, the municipal electricity and energy company, Göteborg Energy, set up a project to make gas from branches and trees. The Gobigas project attracted funding from government agencies and the EU. It obtained 222 million SEK from SEA and, later, more than 500 MSEK from the EU. These resources were combined with resources from the municipal company, which indirectly also belonged to taxpayers. In effect, tax money was put next to other tax money.

A facility was built, but technological challenges persisted and were hard to solve. Having invested more than two billion SEK in the project, the government finally terminated it because it turned out to be futile. Write-downs were now necessary, and the total cost for taxpayers amounted to about two billion SEK.

Explaining the emergence of green bubbles

Are the examples presented above just exceptions or are they necessary failures that are part of a technological evolutionary process? Are they systemic and related to overarching incentive structures that are bound to create dysfunctional results? A closer look at these green bubbles suggests the latter. There are patterns in these bubbles, and some factors recur consistently in these different cases. These factors are briefly outlined below.

IF IT SOUNDS TOO GOOD TO BE TRUE, IT IS TOO GOOD TO BE TRUE

Green deals have provided policymakers with a 'pipe dream' as they have promised everything at the same time. Grand speeches about the green industrial revolution, 'transformation', and 'sustainable development' were combined with hopes of new jobs being created in rural and depopulated areas. Facilities and plants were inaugurated, and politicians

received positive press coverage to increase their likelihood of being elected and re-elected.

GOVERNMENTS LACK INCENTIVES AND CAPABILITIES TO ACT AS ENTREPRENEURS

The public sector cannot function as an entrepreneur as it has no real market and faces no risk of its own (Larsson, 2022; Sarasvathy, 2022; Elert and Henrekson, 2022). It is less likely for it to act as a competent owner as it faces a limited downside (and upside) (Foss et al., 2022; Grafström, 2022). Politicians have little experience in setting up businesses or functioning as competent owners.

LARGE SUMS OF 'FREE' MONEY RELATED TO INNOVATION AND ENTREPRENEURSHIP DISTORT BEHAVIOUR

The examples above illustrate that innovation grants and other forms of soft loans or 'free' money distort incentives and motivate firms to pursue initiatives with limited potential. When someone else pays, there is no need to make careful assessments of feasibility. Therefore, green bubbles emerge with large costs for the environment and economy.

INNOVATION AND ENTREPRENEURSHIP HAVE BECOME A MATTER OF APPEARANCE

In a society where everyone is obsessed with innovation and entrepreneurship as the main tools to accomplish renewal and competitiveness, it has become increasingly important among policymakers at all levels to be supportive. We, therefore, see an over-supply of support funds; support structures, such as science parks and incubators; and the emergence of an industry aimed at attracting people into innovation and entrepreneurship. The consequence of these efforts is more talk than ever about entrepreneurship while having less renewal and productive entrepreneurship (Brattström, 2022; Hunt et al., 2017).

THE PRIMARY BENEFICIARIES OF INTERVENTIONIST INDUSTRIAL POLICIES ARE TODAY'S VESTED INTERESTS

Large industrial projects imply that incumbent firms and other powerful interest groups as well as policymakers can appear taking action to accomplish large societal goals. With more resources today – in terms of money, relations, and ability to persuade policymakers – today's mighty interest groups are bound to gain the upper hand in large governmental programmes aimed at innovation, sustainability, recovery, or any other noble mission that is formulated by policymakers (Bergkvist et al., 2022; Sandström and Alm, 2022).

In a society where everyone is obsessed with innovation and entrepreneurship as the main tools to accomplish renewal and competitiveness, it has become increasingly important among policymakers at all levels to be supportive.

The Agroetanol case precisely illustrates this pattern. With close connections to the political powers of Sweden, the firm managed to negotiate tax exempts, tariffs, and vast support, which happened at the expense of foreign manufacturers of ethanol and Swedish consumers.

The EU's current Green Deal

With the terrible history of green deals described above, one can expect that the EU had learnt something from these experiences and backed off from the interventionist approach. Unfortunately, the contrary is true.

Broadly speaking, the EU Green Deal (EGD) covers the following areas:

- Climate
- Environment and oceans
- Energy
- Transport
- Agriculture
- Finance and Regional Development
- Industry
- Research and Innovation

Such a list of areas makes it clear that the EGD is a huge effort as it covers so many different parts of the economy. The EGD is a step away from

conventional economic wisdom on the role of states and markets. Here, the idea is that the state should direct efforts. It is also clear that Mariana Mazzucato has played an instrumental role in shaping the EGD.

'The Mazzucato Report[106], presented in February 2018, detailed the rationale for EU-level R&I mission, expanded the concept, put forward key criteria for the selection of missions, and outlined important considerations for their successful implementation' (EC, 2018, p. 10).

In 2022, Mazzucato and her colleagues wrote the following for the European Commission:

'Public authorities must steer investment-led economic development across many different sectors and instead of picking the winners, governments should rather support the 'willing' and the 'innovative', those companies willing to partner, transform and innovate towards the new green and social paradigm[107]' (EC 2022, p.17).

'Fixing markets is not enough. We have to actively shape and create them and tilt the playing field in the direction of the growth we want'.

According to Paleari, the EGD can be broken down into 68 different objectives, where 80% of them should be met by 2030. Hydrogen has received extensive support in the EGD and will thus be discussed in greater detail below.

A BUBBLE IN HYDROGEN?

Regarding the green bubbles in Sweden, it is clear that many of the underlying factors giving rise to green bubbles are consistent with the EU's efforts in hydrogen.

First, the principles of technology neutrality have been disregarded as 430 billion euros are specifically earmarked for hydrogen. Both private and public organisations can apply for and obtain funds for hydrogen-related projects. If municipalities, government agencies, and corporations start talking about hydrogen as the new rock star of sustainability that they have never paid any attention to, the underlying reason is probably that there are large sums of free money that can be obtained for doing so.

These large sums of supposedly 'free' money result in a form of systematic subsidy entrepreneurship, where nobody is asking any critical questions simply because someone else is footing the bill. Municipalities establish 'hydrogen strategies' and invest in charging stations and other elements of government agencies, municipal firms, and state-owned companies. Other subsidy entrepreneurs are now attracted to hydrogen and have started engaging in various activities.

An alternative path

If green deals are bound to fail and result in green bubbles, what approach is then to be preferred?

GETTING MORE FROM LESS

In the past decades, many parts of the Western world have experienced a decline in pollution while growing their economies. We take a brief look at the Swedish experience, see Figures 6-8 below.

Since 1990, Sweden's population increased by just over 1.6 million and the economy almost doubled. Moreover, carbon dioxide emissions declined by 27% from 1990 to 2018. GDP per carbon dioxide unit decreased during the same period by 60%.

From 1990 to 2018, the total emissions from passenger cars decreased by 21%. Total emissions from cars decreased despite the number of cars increasing by 1.2 million (Sandström and Grafström, 2021).

Total electricity usage increased by 2.8% since 1990. Per capita and electricity use per unit of GDP decreased. Emissions of greenhouse gases from Sweden's electricity and district heating production decreased by about 25% since 1990.

Air in Sweden has generally become cleaner since 1990. Out of the 26 air pollutants that the Swedish Environmental Protection Agency has mapped, 24 decreased in absolute numbers. However, selenium and polychlorinated biphenyls increased. After the 1995 ban on lead in petrol, lead emissions decreased by 95%. From 1990 to 2018, the annual lead emissions in the air decreased from 354 tonnes to less than 10 tonnes.

The change in air pollution (index) is presented in Figure 9. The comparison year is 1990, and a value lower than 100 means that Sweden emitted less than that in 1990. Emissions of sulphur dioxide, nitrogen oxides, volatile organic compounds, particles, and heavy metals have fallen sharply. The rate of decline has slowed in recent years, which may be because falls from high levels are relatively faster than a large fall from something that has already declined considerably. For some of the pollutants (see Figure 9), emissions have decreased by up to 80% from 1990 to 2018.

HOW DO WE GET MORE FROM LESS?

While the data above do not suggest that environmental concern is unwarranted, the figures indicate that prudent optimism is perhaps warranted. In these cases, an interaction

Figure 6 Total GDP in billion on the left axis and carbon dioxide emissions in thousand tonnes on the right axis (source: Swedish Environmental Protection Agency and Statistics Sweden)

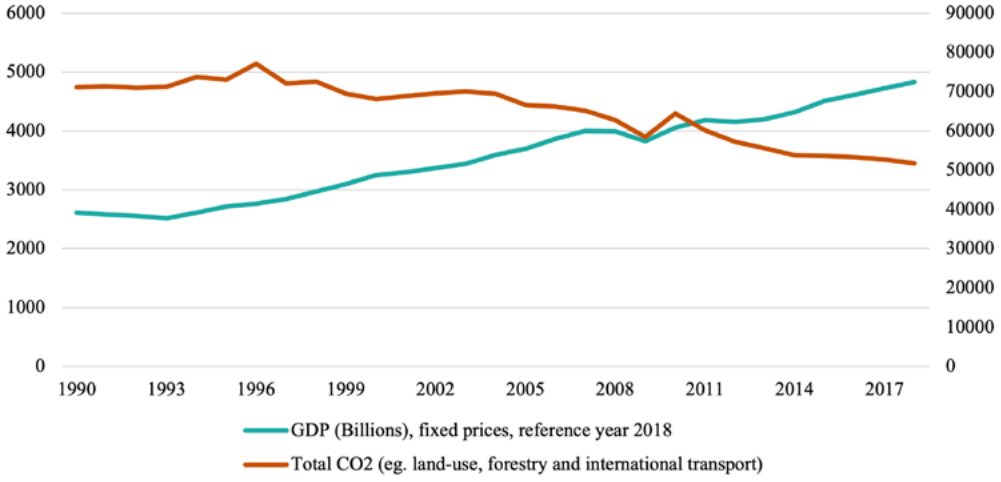


Figure 7 Index of carbon dioxide usage per GDP unit in Sweden (source: Swedish Environmental Protection Agency and Statistics Sweden and own calculations)

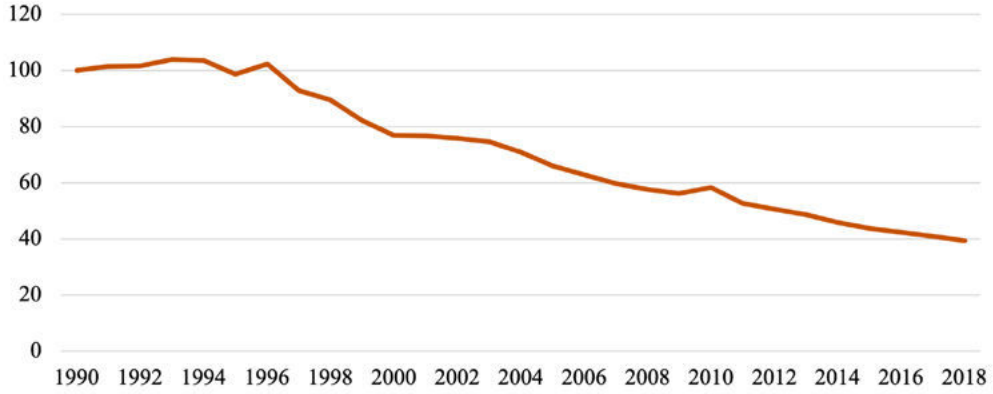


Figure 8 Fuel consumption (kilometres per litre) for petrol and diesel cars (source: the Swedish Environmental Protection Agency (2018))

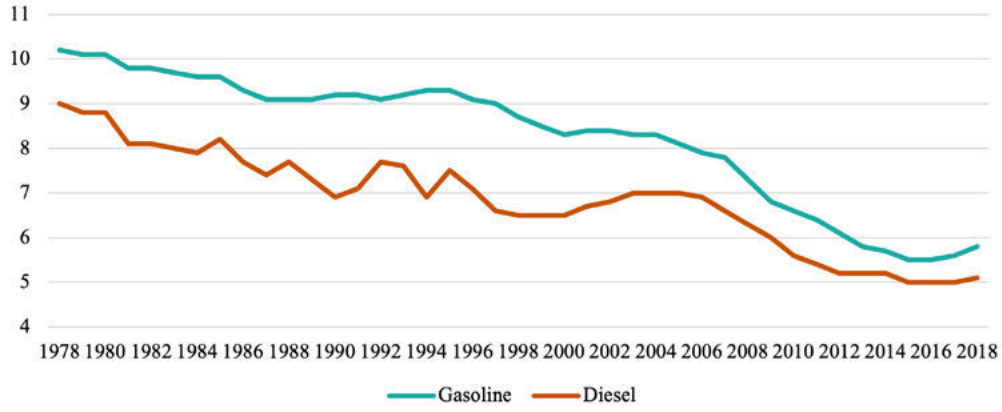
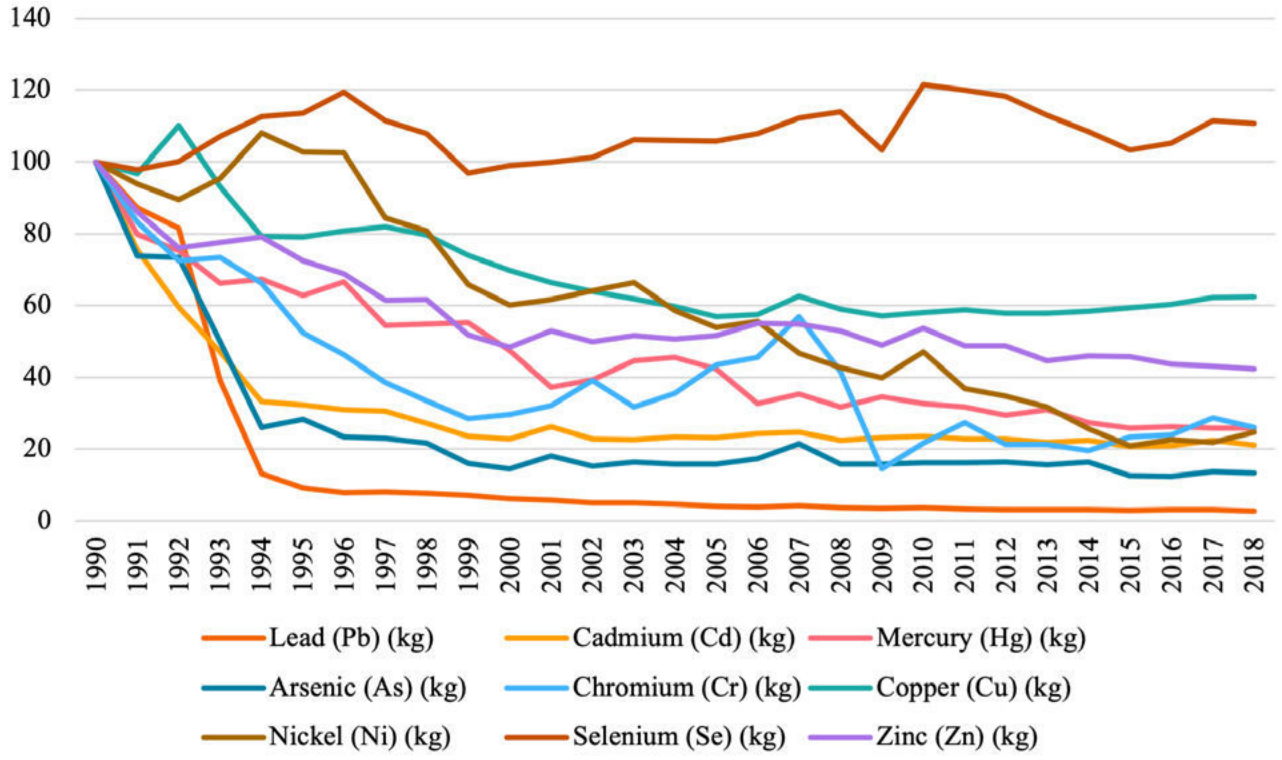


Figure 9 Emission of pollutants in Sweden from 1990 to 2018 (Grafström and Sandström, 2021)



With the terrible history of green deals described above, one can expect that the EU had learnt something from these experiences and backed off from the interventionist approach. Unfortunately, the contrary is true.

between regulation, competition, and technological advances seems to have contributed jointly to firms using fewer resources to obtain more output (Porter and van der Linde, 1995). How do we explain these results?

First, any input used by a firm in a capitalist economy will be subject to rationalisations. As firms want to maximise their profits, they are keen to lower costs. One way to do so is to use fewer resources. An aluminium can used to weigh about 60 grams in the 1950s, but, today, it weighs about 15 grams. In a competitive market, firms are rewarded by using fewer resources.

The exception to this pattern is when a third party is affected, i.e. when externalities are present. If production gives rise to pollution that is harming the environment but is not reflected in price, it becomes rational for firms to destroy the environment. With the emergence of tougher environmental legislation since the 1970s, we have witnessed several improvements in this area. Taxes, regulations, and prohibitions of certain substances such as lead have paved the way for a cleaner economy. Historically, the constructive interplay between regulators, consumers, and firms has paved way for a green transition.

Taxes, regulations, and prohibitions of certain substances such as lead have paved the way for a cleaner economy. Historically, the constructive interplay between regulators, consumers, and firms has paved way for a green transition.

The ban on lead in petrol is a good illustrative example. As indicated above, air-borne emissions of lead are virtually gone today, and this shift constitutes a vast improvement since the 1980s. The ban was announced well in advance and has been a part of the international debate for many years. Softer instruments such as taxes were progressively increased in the 1980s, and a ban did not come until the mid-1990s when unleaded petrol was already on the market. The main challenge for policymakers has been to ensure a consistent path, setting stable institutional arrangements in which firms can operate. The key lesson from the ethanol debacle in Sweden is perhaps the inability of policymakers to impose consistent and technology-neutral regulations over time.

In summary, these improvements have little to do with the government taking an active interventionist role in the economy. States and transnational bodies such as the EU have played an important role in enforcing standards and controls of pollution.

Conclusion: Time to question the entrepreneurial state

In 2009, Harvard professor Josh Lerner published the book Boulevard of Broken Dreams. It documented a vast collection of government failures related to innovation and entrepreneurship. Lerner stated the following: ***'for each effective government intervention, there have been dozens, even hundreds, of failures, where substantial public expenditures bore no fruit'*** (p. 5).

Lerner's work provided a word of caution regarding innovation and industrial policy. Unfortunately, policymakers have chosen not to listen to this cautionary advice. Instead, they have wholeheartedly embraced the idea of an entrepreneurial state (2013) and Mariana Mazzucato's idea of a mission economy (2021).

The findings reviewed here from the book *Questioning the Entrepreneurial State* (2021) revealed that this is a mistake. In this book, 32 scholars provided critical perspectives, theories, and empirical descriptions, which together point to the dangers of proactive, interventionist innovation policies. These findings have been summarised into five overarching lessons:

- If it sounds too good to be true, it is too good to be true
- Governments lack the incentives and capabilities to act as entrepreneurs
- Large sums of 'free' money related to innovation and entrepreneurship distort behaviour
- Innovation and entrepreneurship have become a matter of appearance
- The primary beneficiaries of interventionist industrial policies are today's vested interests

REFERENCES

Bergkvist, J. E., Moodysson, J. and Sandström, C. (2022). 'Third-generation innovation policy: System transformation or reinforcing business as usual?'. In K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State. International Studies in Entrepreneurship,* 53, 201–217. Springer.

Grafström, J. and Sandström, C. (2021). 'Mer för mindre?'. In *Tillväxt och hållbarhet i Sverige.*

Porter, M. E. and Van der Linde, C. (1995). 'Toward a new conception of the environment-competitiveness relationship'. *Journal of Economic Perspectives,* 9(4), 97–118.

Sandström, C. and Björnemalm, R. (2022). 'Hur uppstår gröna bubbler? Lärdomar från etanolbubblan som sprack'. *Ekonomisk Debatt,* 50(5), 65–71.

Sandström, C. and Alm, C. (2022). 'Directionality in innovation policy and the ongoing failure of green deals: Evidence from biogas, bio-ethanol, and fossil-free steel'. In Wennberg, K. and C. Sandström (eds.), *Questioning the Entrepreneurial State. International Studies in Entrepreneurship,* 53, 251–269.

Wennberg, K. and Sandström, C. (eds.) (2022). *Questioning the entrepreneurial state. International studies in entrepreneurship* (Springer).

ENDNOTES

Section 2

70 In its 2018 ruling on NBTs, the ECJ itself states that mutagenesis techniques "have conventionally been used in a number of applications and have a long safety record". See Court of Justice of the European Union, 2018.

71 See also EUPVP – Common Catalogue Information System, Raad voor plantenrassen.

72 See, for example, European Commission, 'EU Marketing Requirements'; Euroseeds.

73 The UK is about to pass a Genetic Technology Bill which covers precision-bred plants and NBTs and makes the distinction with GMOs (UK Government, 2023).The Swiss parliament decided to ease restrictions on genetic engineering in agriculture (SWI, 2022). Finally, Canada announced in June that genome editing (GEd) technologies used to develop new food products will be regulated as equivalent to conventional technologies and will not require any additional regulatory oversight (Mukhopadhyay, 2022).

74 C. Daugbjerg and P. H. Feindt (2017), ‚Post-exceptionalism in public policy: transforming food and agricultural policy', Journal of European Public Policy, 24(11), 1565–1584.

75 G. Pe'er et al. (2019), ‚A greener path for the EU Common Agricultural Policy', Science, 365(6452), 449–451.

76 E. Erjavec, M. Lovec and K. Erjavec (2015) ‚From „Greening" to „Greenwash": the drivers and discourses of CAP 2020 reform' in J.F. Swinnen (ed.) The Political Economy of the 2014-2020 Common Agricultural Policy: An Imperfect Storm (London and Brussels: Rowman & Littlefield and CEPS), 215–244.

77 For an overview see M. Lovec (2016), The European Union's Common Agricultural Policy Reforms: Towards a Critical Realist Approach (Basingstoke: Palgrave). E. Erjavec and M. Lovec (2017), ‚Research of European Union's Common Agricultural Policy: disciplinary boundaries and beyond', European Review of Agricultural Economics, 44(4), 732–754.

78 C. Daugbjerg and A. Swinbank (2009), Ideas, Institutions, and Trade: the WTO and the Curious Role of EU Farm Policy in Trade Liberalization (Oxford: Oxford University Press).

79 C. Daugbjerg and A. Swinbank (2004), ‚The CAP and EU enlargement: prospects for alternative strategy to avoid the lock-in of CAP support', Journal of Common Market Studies, 42(1), 99–119.

80 G. Skogstad (1998), ‚Ideas, paradigms and institutions: agricultural exceptionalism in the European Union and the United States', Governance 11(4), 463–490. I. Garzon (2006) Reforming the CAP. History of a Paradigm Change (Basingstoke, UK: Palgrave Macmillan).

81 J. Pokrivcak, C. Crombez and J. F. M. Swinnen (2006), ‚The status quo bias and reform of the common agricultural policy: impact of voting rules, the European commission and external changes', European Review of Agricultural Economics, 33(4), 562–590.

82 C. Crombez, L. Knops and J. F. M. Swinnen (2012), ‚Reform of the common agricultural policy under the co-decision procedure', Intereconomics, 6, 336–342.

83 M. Lovec and E. Erjavec (2015), ‚The Co-decision Trap: How Co-Decision Procedure hindered CAP Reform', Intereconomics, 50(1), 52–58.

84 C. Daugbjerg and A. Swinbank (2016), ‚Three decades of policy layering and politically sustainable reform in the European Union's agricultural Policy', Governance, 29(2), 265–280.

85 K. Lynggaard and P. Nedergaard (2009), ‚The logic of policy development: lessons learned from reform and routine within the CAP 1980–2003', Journal of European Integration, 31(3), 291–309.

86 K. Erjavec and E. Erjavec (2015), ‚Greening the CAP- just a fashionable justification? A discourse analysis of the 2014–2020 CAP reform documents', Food Policy, 51, 53–62.

87 European Commission (2018a), A Modern Budget for a Union that Protects, Empowers and Defends, The Multiannual Financial Framework for 2021-2027, COM/2018/321 final.

88 European Commission (2018b), Proposal of Strategic plans regulation, Horizontal regulation and CMO regulation. COM/2018/392 final - 2018/0216 (COD).

89 The methodology upon which this claim was based was controversial, as it treated various instruments green by definition, regardless of the (or even against) evidence.

90 ECORYS (2017), Modernising and Simplifying the Common Agricultural Policy: Summary of the results of the Public Consultation.

91 uropean Court of Auditors (ECA) (2018), Opinion No 7/2018: concerning Commission proposals for regulations relating to the Common Agricultural Policy for the post-2020 period. M. Lovec, T. Šumrada and E. Erjavec (2020), ‚New CAP Delivery Model, Old Issues', Intereconomics, 55(2), 112–119.

92 European Commission (2020a), Farm to Fork Strategy for a fair, healthy and environmentally friendly food system. COM/2020/381 final.

93 European Commission (2020b), Biodiversity Strategy for 2030 Bringing nature back into our lives. COM/2020/380 final.

94 European Commission (2020c), The EU budget powering the recovery plan for Europe. COM/2020/442 final.

95 Fondation Robert Schuman (FRS) (2021), ‚The Common Agricultural Policy 2023–2027: change and continuity', European issue no 607.

96 J. Wesseler (2022), ‚The EU's farm-to-fork strategy: An assessment from the perspective of agricultural economics', Applied Economic Perspectives and Policy, 44(4), 1–18.

97 Animal sector and the Land Use and Land Use Change and Forestry (LULUCF) are at the centre of discussions of the impact of agriculture on climate change (and at the centre of climate-oriented CAP reform). There are ongoing discussions on the emissions by agriculture due to the unstable nature of livestock production-related methane emissions accounting for the bulk of the total GHG emissions and the complex methodologies to measure the impact of LULUCF.

98 European Commission (2022), Special Eurobarometer 2022 520: Europeans, Agriculture and the CAP.

99 I would like to express my appreciation to the reviewer for taking the time and effort to review this article and for thoughtfully commenting it. I would also like to thank İzel Biçerel for taking the time to support with the translation of the Dutch version of this article.

100 To read more about the environmental and human rights consequences of big tech's supply chains, see also Crawford, K. (2021). Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence, Yale University Press, and De Vries, L. (2022). De Psychische en Planetaire Pijn achter onze Tijdlijn, Idee, and Mr. Hans van Mierlo Stichting.

101 Behnam Taebi, Professor of Energy & Climate Ethics, elaborates on this in a podcast https://www.bnr.nl/podcast/de-technoloog/10455541/ www.bnr.nl, 1.50-2.25.

102 See for instance https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1467.

103 The statement can be found at https://www.solargeoeng.org/.

104 See also the interview with Professor Behnam Taebi and Professor Peter-Paul Verbeek in NRC, in which Taebi elaborates on reversibility as a requirement for climate technology https://www.nrc.nl/nieuws/2020/06/19/wie-mag-er-straks-draaien-aan-de-aardse-thermostaat-a4003374.

105 Currently, the EU's funding to the CTCN lies at 13,4 million euros, which is about 0,008 percent of its total expenditur; see https://www.ctc-n.org/about-ctcn/donors and https://en.wikipedia.org/wiki/Budget_of_the_European_Union.

106 M. Mazzucato (2018), 'Mission-oriented research & innovation in the European Union: A problem-solving approach to fuel innovation-led growth', Report for the Directorate-General for Research and Innovation of the European Commission https://publications.europa.eu/en/publication-detail/-/publication/5b2811d1-16be11e8-9253-01aa75ed71a1/language-en

107 M. Mazzucato, R. Kattel & J. Ryan-Collins (2019) 'Challenge-Driven Innovation Policy: Towards a New Policy Toolkit', Journal of Industry, Competition and Trade. https://doi.org/10.1007/s10842-019-00329-w

SECTION 3

INDUSTRIAL POLICY, TECHNOLOGY AND THE GEOPOLITICS OF STANDARD-SETTING

Ongoing Healthcare Revolution

Building Trust in AI-Driven Medical Applications

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Abstract

Artificial Intelligence (AI) is speedily growing in prominence in digital Europe, with applications ranging from facial recognition software, smart homes, and self-driving cars to content streaming, text prediction, and digital assistants. One of the most promising fields for AI is unarguably medicine, where machine learning can be used to improve disease detection, medical imaging, and more precise treatments. However, despite the potential benefits of AI, there is still a trust deficit among citizens, with concerns about how we will interact with AI in the future, how safe its use is, and what other AI applications could benefit society. It is critical to avoid sacrificing technological advancement, better care, and the right to privacy. As AI has enormous potential to improve the lives of people, particularly in the field of medicine, a more informed and productive public debate about the benefits and risks associated with AI is needed. This paper thus seeks to provide insights into the overall scope of AI and its future applications, the current and future implications of using AI systems and techniques like Machine and Deep Learning.

Introduction

Artificial intelligence (AI) systems are pervasive in modern life, powering a wide range of tasks such as spam detection, face recognition, text prediction, streaming of content, and web browsing. These

systems employ the machine learning (ML) paradigm, which has resulted in faster, more efficient processes, lower costs, and reduced human effort.

The success of these algorithms in many fields is due to faster and more efficient processes that reduce costs and human effort. AI-based systems have seen significant improvements year after year in accuracy, elaboration capability, and speed, with task-specific algorithms, developed to improve the functionality of platforms or services.

Unfortunately, the interpretability of systems (i.e., how to interpret the decisions of ML systems) can be sacrificed in exchange for other features or to improve functionality. While users may not need to understand how an algorithm works in everyday tasks, this is not the case when ML is used in more sensitive domains, such as transportation, legal applications, and healthcare. In these cases, privacy is jeopardised, and the misuse of AI technology can have disastrous consequences. Thus, users may perceive AI systems as less trustworthy, potentially undermining trust in AI. It is critical to understand the potential risks associated with AI-based systems and to ensure that interpretability is not sacrificed in favour of other features. Prioritising transparency and accountability can foster greater trust in AI and its applications, ensuring that the benefits of AI are fully realised while mitigating the risks.

Artificial Intelligence, Machine Learning, and Deep Learning

AI encompasses a wide range of algorithms that allow computers to mimic human intelligence. It includes everything from basic if-then rules and decision trees to ML and deep learning. Machine learning (ML) is a subset of AI that includes computer algorithms that are trained to classify, structure, or predict data without being programmed to do so. ML is classified into supervised and unsupervised learning. Deep learning (DL) is a subset of ML that includes algorithms for training software to train itself by exposing multi-layered neural networks to massive amounts of data. The main difference between DL and ML is that DL algorithms eliminate the need for human intervention even during the feature extraction phase, which is carried out automatically and requires for example, only the training instances (signals, images, vectors, etc...). There are Artificial Neural Networks specialised for various tasks, such as Convolutional Neural Networks for image recognition, object or image classification, and face recognition (IBM, 2020). These programmes are commonly used in computer vision. In most cases, DL-based systems outperform traditional ML algorithms, especially when dealing with large amounts of Data.

DEFINITIONS

Artificial Intelligence: "It is the science and engineering of making intelligent machines, especially intelligent computer programs" (J. McCarthy)

Machine Learning: "the science and art of programming computers so they can learn from data"; in practical terms, a family of algorithms capable of learn from data and reproduce decisional patterns to achieve various tasks such as predict a class or a continuous value.

Deep Learning: branch of the machine learning where the algorithms' structure wants to mimic the brain structure, the base system of such algorithms are the neural networks, and the term deep come from the multiple layers of data elaboration. There is nowadays a big variety of deep learning layers and structures specialized for various tasks (e.g., longitudinal data, images, etc...)

Neural Networks: family of algorithms who want to mimic human brain behavior and are inspired to the biological neurons. A neural network is composed of many layers composed themselves of neurons, all these are densely connected, and the connection have specific weights mimicking the activation patterns of biological networks.

Supporting human decision-making: medical applications

The current era is one of unprecedented dedication to healthcare, with strong political support for significant reforms, such as the digital and data-related transformation of healthcare. The European data and AI landscape is rapidly changing, as evidenced by the publication of numerous transformation policies and legislative proposals aimed at data governance, access, and sharing (as in the case of the European Health Data Space, EHDS), anti-trust and competition law, and digital transformation such as AI, digital twins, and quantum computing. These developments will have a long-term impact on the European healthcare landscape, representing a once-in-a-lifetime opportunity to improve the quality, accessibility, and affordability of healthcare in Europe.

This transformation will be heavily reliant on the development and deployment of cutting-edge technologies such as

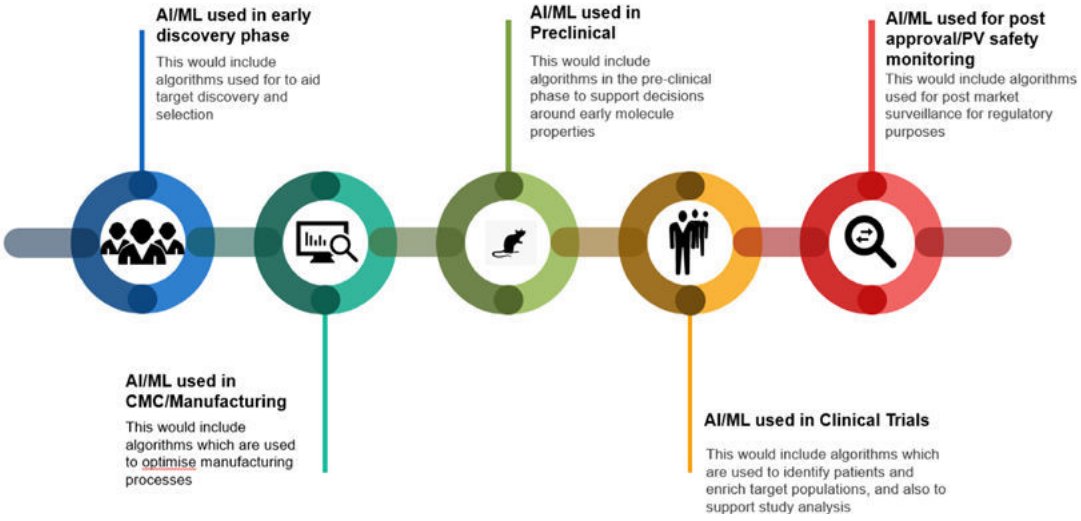
AI, digital twins, and quantum computing, which will revolutionise healthcare delivery and research. It is critical to ensure that these new technologies are developed and deployed responsibly, with a focus on transparency, accountability, and patient privacy. By embracing the opportunities presented by these technologies while also managing the potential risks, we can build a more efficient, effective, and equitable healthcare system.

The implementation and advancement of new medical technologies and procedures over the years have allowed average life expectancy to rise significantly. AI is widely used in medicine, to improve healthcare and therapeutic capabilities. During the Covid-19 pandemic, for example, algorithms were designed and implemented in AI-supported applications for diagnosis and prevention. The use of AI for trend analysis and the creation of models and projections for the pandemic resulted in a broad implementation of technology efficiency (Whang et al., 2021). The use of computer-based knowledge can also reduce or prevent incidents caused by human errors, which are still a risk in the medical field (Helo & Moulton, 2017). In this context, the introduction of computers and robotics has already resulted in significant benefits, such as robotic-assisted surgery, a field that has seen significant development in recent decades for microsurgery and nanotechnologies, wearable robotics, and rehabilitation (Dupont et al., 2021). This has resulted in numerous advancements and opportunities, including the deployment of fully automated robots capable of performing surgery autonomously (Saeidi et al., 2022).

The main application of AI in healthcare is Clinical Decision Support Systems (CDSS), which are algorithms that assist physicians in various tasks, such as highlighting specific areas in biomedical images or other practical applications. The overarching goal of decision support systems aimed at assisting clinicians with computer-based clinical knowledge is to improve the quality of treatments or procedures by inserting additional data into an existing model, allowing for more precise, advanced, or tailored analysis of a medical case. The data to be analysed may vary, including the life situations and cultural backgrounds of patients during the decision process (Heyen, 2021). Not only can these tools improve medical practice, but in some cases, AI applications can even match the evaluation performance of medics. For example, in the field of medical imaging and radiology (Rodriguez-Ruiz et al., 2019), it has been evidenced that DL is particularly efficient when dealing with medical imaging-based diagnosis, where machines demonstrate a high degree of accuracy while reducing the burden of manually analysing dozens of images.

AI research has also proven effective in the design of new drugs, resulting in a significant reduction in the cost and time required to bring new medicines to the market (Payel Das et al., 2020). Furthermore, Choudhury and Asan emphasised how relying on properly deployed AI-enabled CDSS can improve the safety of patients by improving drug management and increasing clinical error detection.

Figure 1 AI/ML is being used in the development of medicines across the entire lifecycle



AI in medicines concerns the use of AI/ML systems/algorithms in the development of medicine at various stages throughout the development lifecycle. This could include the:

- manufacturing phase (for example to support production efficiencies),
- the preclinical phase (for example in the predication of molecule properties),
- the clinical trial phase (for example to support the design of clinical trials such as patient population identification or analysis of trial data) for regulatory purposes,
- or the post-marketing phase (for example to support safety signal detection).

The International Coalition of Medicines Regulatory Authorities (ICMRA) has released a report with recommendations to assist regulators in addressing the challenges that the use of AI poses for global medicine regulation (ICMRA, 2021).

The ICMRA report on AI lists the emerging applications of AI in the development of medicine (see section 1.3.1 'AI in medicines development and use') and lists the following:

- **Target profile identification and validation:** using AI to associate genotypes with a disease, predicting chemical interactions and therefore 'drugability' of targets (such as for COVID-19).
- **Compound screening and lead identification:** Compound design to achieve desirable properties and its synthesis reaction plans.
- **Preclinical development:** Biomarker identification and response biosignatures.
- **Clinical development:** Digital endpoints, determination of the cellular microenvironment and response through cellular phenotyping and analysis of digital pathology, and even clinical data in clinical trials to provide decision support systems to investigators.
- **Regulatory application:** Regulatory intelligence and dossier preparation – extracting data and pre-filling forms.
- **Post-marketing requirements:** AI to extract and process adverse event reports (Schmider et al., 2019).

Scary algorithms?

AI implementation is expected to increase in future digital health systems over the next few years. However, to ensure the safe and effective use of AI in medicine, standards, and a common framework must be established. AI has the potential to help professionals with their tasks by ensuring consistency over time and producing faster and more precise results. However, many everyday users of AI systems are unaware of the safety of algorithms when applied to a new set of applications. To address this issue, a trustworthy set of best practices and rules must be established to make AI-based systems safe and reliable in terms of data, privacy, performance, security, and safety. Depending on how it is implemented, an AI-based system can be considered risky.

The European Union presented an AI Strategy in 2018, outlining potential risks and policies to be implemented for specific AI governance. The General Data Protection Regulation (EU 2016/679) has addressed the privacy-related risks of AI and CDSSs to some extent. Recently, the European Commission developed a risk-based approach with categories ranging from 'minimal' to 'unacceptable' risk to determine whether the use of AI poses a risk for users. It is critical to prioritise the safe and ethical deployment of AI in healthcare to maximise its benefits while minimising potential risks. By establishing clear standards and guidelines, we can ensure that AI is implemented in a safe, effective, and trustworthy manner for both healthcare professionals and patients. (European Commission, 2022). Member States are implementing their AI strategies (Larsson et al., 2020), relying on the White Paper on AI published in 2020 by the European Commission (COM(2020) 65 final) and the recommendations of the AI High-Level Expert Group (European Commission, 2019).

Notably, these risks are dispersed across various fields depending on the applications. For example, in the fields of justice and autonomous vehicles, safety and bias issues can lead to unbalanced classification or injuries, respectively (Lo Piano, 2020). The example of the Correctional Offender Management Profiling for Alternative Sanctions system, which predicts the risk of violent recidivism (Brennan et al., 2008), has been criticised for alleged bias based on the race of accused people. Given the growing number of technology applications, the need for a solid framework for the implementation and control of AI systems is critical.
As expected, when it comes to AI in healthcare, implementing CDSS can help to reduce the risks associated with human errors. However, ensuring the quality of a system's implementation is critical because CDSSs influence healthcare practitioners' decision-making, potentially harming individual or public health. Furthermore, the sensitivity of the data used can violate human rights in certain contexts (Sikma et al., 2020). In this regard, the literature in this field emphasises the need for much more research to develop a standardised framework and evaluation measure to ensure patient safety (Choudhury & Asan, 2020).

Other concerns about the use of AI in medicine revolve around ethical considerations. Because ML algorithms are data-dependent, they cannot base their generalisation properties on features other than those provided during the training phase. For example, if an algorithm is trained to make a decision based on a person's age and gender, it will

not accept any deviation unless the training phase is repeated with new data. This raises concerns about the processing of personal data. When it comes to AI systems that deal with privacy, the question raises more concerns. In some cases, personal data is part of the features from which the machine must learn and is required to train or feed the algorithm, and thus cannot be removed without reducing efficiency. In this sense, the implications and risks may vary greatly depending on the application under consideration, though technical solutions to ensure the reliability of an AI system, such as encryption of sensitive data or reshaping studies to consider larger groups of instances rather than single subjects, already exist.

Ethical implications for thinking machines

AI systems provide numerous benefits to our society; however, some potential users may remain sceptical. Elderly people, for example, may find it unsettling that their doctor is basing their therapy on computer-generated suggestions. Teenagers may be concerned if their friends' recommended playlists contain the same songs, and households with voice-controlled speakers may be concerned if social media ads offer discounts for a travel destination they discussed at dinner the night before. These fears may stem from a naive interpretation of technology, which leads users to believe that machines have control over their emotions and freedom.

However, it is important to remember that AI is intended to assist humans in decision-making processes and to make tasks more efficient, accurate, and reliable. AI systems are tools that can improve our lives by enhancing our capabilities; however, it is critical to ensure that their use is transparent, ethical, and responsible. By addressing the potential risks and concerns associated with AI and educating the public on its benefits and limitations, we can help promote greater trust and confidence in these systems. As AI continues to evolve and become more integrated into our daily lives, it is critical to prioritise transparency, accountability, and privacy to ensure that these technologies are used in a way that benefits society as a whole.

Beyond sci-fi, technicians and people involved in the development of AI technologies are aware of all the risks associated with the use of ML. The most common occur during the design phase, resulting in biased data, overfitting or underfitting training models, and unbalanced datasets. These types of 'errors' are more likely when the procedure for gathering data and controlling its distribution and homogeneity is lacking. The main issue with risks to individuals and their rights is that algorithms can be manipulated. This occurs when certain outputs or features are 'flavoured', resulting in a boosted weight in the decision pattern. To be compliant with a human-centred AI, such a system should adhere to rigid design patterns and strategies that are free of malicious activity. It is not a matter of being afraid of technology itself, but rather of how it is used. Programmers and developers must have standards to follow.

People and potential users must be aware of the pros and cons of how algorithms can help them take advantage of the technology while also being aware of its potential drawbacks. This should motivate a critical, yet open-minded, examination of the outcomes and services provided by these systems. For example, video-on-demand platforms provide users with 'personalised' recommendations. Knowing that popularity plays a crucial role in classifying the platform's content as 'potentially interesting', a user can choose to avoid the suggested video in favour of a more detailed and precise search.

AI implementation is expected to increase in future digital health systems over the next few years. However, to ensure the safe and effective use of AI in medicine, standards, and a common framework must be established.

Notably, CDSS is, as the acronym suggests, support systems rather than doctors 'made of circuits'. Demonstrating the efficacy of a therapy path after the use of a support system may inspire patients to be open to this mixed approach and gradually build trust in it. However, all of these aspects must be accompanied by a solid and transparent privacy policy to ensure that the

AI applications will have a growing impact on our societies in the near future, but there is a need to build trust in these systems by implementing specific and widely accepted standards, as well as strict (yet flexible and future-proof, not overly prescriptive) legislation.

data that forms the basis of ML is kept safe, ciphered, and extremely difficult to access.

Many ML-based systems are already used and have proved efficient while still carrying the above-mentioned critical aspects. CDSSs have been used in both Europe and the US (European Commission, 2018; Thomas, 2022) since 2006, and EU institutions have licensed software as medical devices (European Commission, 2007). Since 2017, this category has included software that does not directly affect the body, such as AI and other systems (European Commission, 2017). Specific regulations have been developed for the classification of medical software, and to be legally allowed into the European clinical market, software applications must comply with specific technical standards (Harvey, 2017).

Despite the EU legal framework's endorsement of such software and the growing interest in AI-driven systems and their benefits, public trust in AI applications in the health environment remains low (Kerasidou et al., 2020). Interpretability, ethics, responsibility, and other factors must be considered in smart system legislation. Furthermore, bringing such technologies closer to people and making them more aware of the impact, usefulness, and safety measures taken during the design and development of these systems in risky fields is critical (Lockey et al., 2021).

As expected, European institutions have recently taken significant steps toward releasing a unified plan for AI, including new rules and regulations (Aifa, 2021; EMA, 2021; WHO, 2021). The rules imposed will be associated with any risk category associated with the system. Applications that fall into the 'unacceptable risk' category will be rejected entirely. Applications classified as 'high-risk' must adhere to stricter guidelines to be allowed on the market. Examples of such measures include risk assessment, mitigation systems, and future-projected requests such as 'clear and adequate information to the user' or 'appropriate human oversight measures'. Applications with limited- or minimal- risk must adhere to a stricter set of rules and conditions.

Conclusions and recommendations

While our societies continue to grapple with the global issues brought on by the COVID-19 pandemic, telemedicine, home AI-based systems, and home monitoring can provide many solutions, assist in more easily overcoming certain challenges, and relieve the hospitals' burden during times of crisis. Doctors can communicate with patients and monitor their health using software and web solutions. Introducing AI in this field could also help relieve the burden of family doctors as well as the challenges associated with hospitalisation during a health crisis. However, for people to accept AI at home, there is a critical need to build public trust in such technologies. Every step toward increasing European citizens' openness to AI and assisting them in understanding what it means for our future is a step toward the realisation of ethical and safe integration of technology into our daily lives.

AI applications will have a growing impact on our societies in the near future, but there is a need to build trust in these systems by implementing specific and widely accepted standards, as well as strict (yet flexible and future-proof, not overly prescriptive) legislation. Given that the use of AI in medicine development is still in its early stages, we believe it would be premature to develop guidance; however, this could be developed in the future once the use of AI in this context has become more established. This entails, first and foremost, promoting EU-wide harmonisation while avoiding overregulation to assist system developers and industries in meeting their goals of adequately implementing these systems. Additional regulatory requirements for medicinal products should not be added simply because AI/ML approaches were used in development. Rather, requirements and regulatory oversight are deemed necessary because a tangible link between the algorithm and regulatory decision-making can be established, with an impact on the benefit-risk of the medicine.

The best compromise is to define standards, protocols, and documentation on the general operation of the software, its performance, limitations, risk, and fundamental information about the algorithms used. Furthermore, the transparency and interpretability of the system and the used data sets are critical in building trust in AI, and because data is at the heart of the technology, broad Data Governance is a critical aspect that should be constantly updated and assessed. Overall, current EU data regulations should consider the need to incorporate AI into the legal framework, particularly when updating existing regulations (such as the future GDPR). European regulators should engage in early dialogue with other global regulators to ensure, where possible, that any new guidance is as harmonised as possible to avoid unnecessary complexity and divergent requirements.

Once this is accomplished, the user, after being adequately educated about these general concepts (translated into

understandable language) will be able to better understand the operation of an AI-based system. However, given the proliferation of AI applications, many of these are invisible to users. In the near future, citizens may have little choice about whether to use an AI system or not. As a result, awareness and a clear set of practices and procedures to ensure individual rights are becoming increasingly important.

While absolute safety is impossible to achieve, the technical criteria underlying the systems must (and can) become increasingly strict in managing the risks associated with the use of a given system. In the most critical sectors, such as healthcare, the clarity behind algorithms, the technologies applied, and the way data is used should be assessed by experts and control personnel, both in the design phase and during the implementation.

Finally, even if a technology is considered neutral, its (mis) use can result in some fundamental rights violations. Due to the amount of information and speed of thinking machines, AI can increase the risks. However, no trade-off should ever be made between technological advancement, better care, and the right to privacy. Instead, AI-based systems should be implemented and technically designed in the EU based on specific conditions as well as clear harmonised guidelines and certifications. As a result, the designers of these 'scary' algorithms can easily make ethical use of them while increasing the efficiency of medical practice. As the saying goes, 'health comes before anything'.

REFERENCES

Brennan, T., Dieterich, W. § Ehret, B. (2008). 'Evaluating the predictive validity of the Compas risk and needs assessment system, criminal justice and behavior'. *Criminal Justice and Behavior,* 36(1), 21–40.

Choudhury, A. § Asan, O. (2020). 'Role of artificial intelligence in patient safety outcomes: systematic literature review'. J.M.I.R. *Medical Informatics*, 8(7), e18599.

Dupont, P.E., Nelson, B.J., Goldfarb, M. et al. (2021). 'A decade retrospective of medical robotics research from 2010 to 2020'. *Science Robotics*, 6(60), eabi8017.

European Commission (2007). *Directive 2007/47/EC of the european parliament and the council amending council directive 90/385/EEC on the approximation of the laws of the Member States relating to active implantable medical devices, Council Directive 93/42/EEC concerning medical devices and Directive 98/8/EC concerning the placing of biocidal products on the market*, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0047&from=EN.

European Commission (2017). *Regulation (EU) 2017/745 of the European Parliament and the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and Repealing Council Directives 90/385/EEC and 93/42/EEC,* https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0745&from=EN.

European Commission (2018). 'PredictND: Clinical decision support system for Dementia". Press Release, Projects Story', https://digital-strategy.ec.europa.eu/en/news/predictnd-clinical-decision-support-system-dementia.

European Commission (2019). 'Ethics guidelines for trustworthy artificial intelligence'. *High-Level Expert Group on Artificial Intelligence,* https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai.

European Commission (2022). *Regulatory framework proposal on artificial intelligence*, https://digital-strategy.ec.europa.eu/en/node/9745/printable/pdf.

Harvey, H. (2017). 'How to get clinical AI tech approved by regulators'. *Towards Data Science*, November 7.

Helo, S. § Moulton, C.E. (2017). 'Complications: acknowledging, managing, and coping with human error'. *Translational Andrology and Urology,* 6(4), 773–782.

Heyen, N.B. § Salloch, S. (2021). 'The ethics of machine learning-based clinical decision support: an analysis through the lens of professionalisation theory'. *B.M.C. Medical Ethics,* 22(1), 112.

IBM (2020). 'Convolutional neural networks'. *Cloud Education,* 20 October https://www.ibm.com/cloud/learn/convolutional-neural-networks.

ICMRA (2021). *Informal Innovation Network. Horizon Scanning Assessment Report – Artificial Intelligence.* 6 August, https://www.icmra.info/drupal/sites/default/files/2021-08/horizon_scanning_report_artificial_intelligence.pdf.

Kerasidou, C.X., Kerasidou, A., Buscher, M. et al. (2022). 'Before and beyond trust: reliance in medical AI'. *Journal of Medical Ethics,* 48(11), 852–856.

Larsson, S., Bogusz, C.I. § Andersson Schwarz, J. (2020). *Human-Centred AI in the EU* (Brussels; European Liberal Forum), https://liberalforum.eu/wp-content/uploads/2021/07/AI-in-the-EU_final.pdf.

Lo Piano, S. (2020). 'Ethical principles in machine learning and artificial intelligence: cases from the field and possible ways forward'. *Humanities and Social Sciences Communication*, 7(1), 9.

Lockey, S., Gillespie, N., Holm, D. et al. (2021). 'A Review of trust in artificial intelligence: challenges, vulnerabilities and future directions', Proceedings of the Annual Hawaii International Conference on System Sciences, *Proceedings of the 54th Hawaii International Conference on System Sciences, Conference Paper* https://www.researchgate.net/publication/349157208_A_Review_of_Trust_in_Artificial_Intelligence_Challenges_Vulnerabilities_and_Future_Directions.

Rodriguez-Ruiz, A., Lång, K., Gubern-Merida, A. et al. (2019). 'Stand-alone artificial intelligence for breast cancer detection in mammography: comparison with 101 radiologists'. *Journal of the National Cancer Institute*, 111(9), 916–922.

Saeidi, H., Opfermann, J.D., Kam, M. et al. (2022). 'Autonomous robotic laparoscopic surgery for intestinal anastomosis'. *Science Robotics,* 7(62), eabj2908.

Sikma, T., Edelenbosch, R. § Verhoef, P. (2020), 'The use of AI in healthcare: A focus on clinical decision support systems', *Recipes*.

Thomas, M. (2022). *'16 Machine Learning in Healthcare Examples: These companies embrace machine learning technology in healthcare'*, builtin.com, 11 July, https://builtin.com/artificial-intelligence/machine-learning-healthcare.

Wang, L., Zhang, Y., Wang, D. et al. (2021). 'Artificial intelligence for COVID-19: A systematic review'. *Frontiers in Medicine,* 8, 704256.

AIFA (2021). *Guide to the submission of a request for authorisation of a Clinical Trial involving the use of Artificial Intelligence (AI) or Machine Learning (ML) systems,* https://www.aifa.gov.it/documents/20142/871583/Guide_CT_AI_ML_v_1.0_date_24.05.2021_EN.pdf.

EMA (2021). *Guideline on computerised systems and electronic data in clinical trials,* https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/draft-guideline-computerised-systems-electronic-data-clinical-trials_en.pdf.

WHO (2021). *Ethics and governance of artificial intelligence for health*, https://www.who.int/publications/i/item/9789240029200.

Note from the Industry

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Future of healthcare

Imagining the future where cancer, cardiovascular diseases (chronic diseases) and rare, genetic disorders can be either prevented or cured

Good health is the foundation of vibrant lives, thriving communities, and forward movement. It is the backbone for prosperity, recovery, and societal transformation.

Over the past decades, healthcare innovation and collaboration among the different healthcare stakeholders have resulted in astonishing medical and scientific progress. We will see more innovation addressing currently unmet needs in many disease areas and bringing benefits to patients and society over the next decades, too.
We have unprecedented opportunity to design healthcare systems fit for the future where societal and patients' unmet medical needs are at the center of decision-making. Patients should be the only North Star for healthcare systems' meaningful evolution.

EU-level healthcare policies

The European Union's legislation, policies, and funding dedicated to overcoming healthcare disparities have played – and should continue to play – an important role in the healthcare systems' evolution.

For example, until today, EUR 40 billion have been set aside in EU Member States' Recovery and Resilience Plans to support health investments and reforms by 2026. In parallel, the EU4Health program will fund actions aimed at building stronger and more sustainable health care systems that deliver better care for EU patients.

Non-communicable diseases continue to account for 80% of the overall burden of disease in Europe. To address this issue, in 2021 the European Commission launched *Europe's Beating Cancer Plan* setting out a new EU approach to cancer prevention and treatment. Later the same year, it was followed by the EU *'Healthier Together' Non-Communicable Diseases Initiave,* which aimed at identifying politicies and action to reduce the burden of other major non-communicable diseases (NCDs).

Challenges: reduced life expectancy, belated treatment, overwhelmed medical workforce

Despite these positive developments, the COVID-19 crisis has outlined many structural healthcare systems' challenges created by years of underfunding and systematic inefficiencies, such as delayed diagnosis and access to treatment and healthcare providers' shortages.
According to the OECD *Health at Glance report 2022*, the pandemic led to a reduction of more than one year in life expectancy in the EU in 2021 compared with the pre-pandemic level – the largest drop observed since World War II. Furthermore, delayed cancer diagnoses and treatments come at high costs, both for patients and for health systems. Delaying surgical treatment for common cancers increases the risk of death by about 7%, while delaying chemotherapy or radiotherapy by four weeks increases the risk of death by up to 13% (Hanna, 2020).

'Missing patients' for cancer care, as reflected by lower numbers of both hospital stays and cancer-related operations, are in most cases related to fewer new patients entering the cancer patient pathway because of delayed diagnoses. Depending on the procedure, it fell by 10% to 20% on average. We are likely to feel the consequences of this for years to come, especially with regards to patients' outcomes and survival rates (Maringe, 2020).

Furthermore, WHO projects a global shortfall of 15 million health workers

by 2030. Countries face difficulties in the education, employment, deployment, retention, and performance of their workforce.

The International Council of Nurses (2022) warns of a rise of nurses' strikes in response to 'government failure to tackle the root causes of weakened and collapsing health systems'. Salaries and working conditions as well as recognition of the profession and lack of upskilling and training are the key complaints from the nurses' unions.

More specifically in Europe, we also have ageing workforce as one of the key concerns: 13 of the 44 countries have a workforce in which 40% of medical doctors are aged 55 or older.

Cross-border collaboration among stakeholders and policymakers will help address unmet needs of European patients

Despite the challenges, innovation and multistakeholder collaboration have the potential to create a fit-for-the-future healthcare ecosystem where all major chronic, rare, and genetic disease may be cured or prevented in the long-term. The way forward requires a holistic approach that includes increased public investment in disease prevention, early detection, timely access to best treatment options (better uptake of procedures and medicines), transformation of patient pathways, better working conditions for healthcare providers, and incentives rewarding and facilitating health innovation.

Shift is needed towards integrated and outcomes-driven patient care. In many European countries, this shift may also need re-adjustment of treatment centers, creation of additional excellence centers to provide best possible treatment options and increased cross-border collaboration among neighboring countries. The EU Cross Border Healthcare rules, best practice sharing, benchmarking, and increased EU funding could support this shift.

Investing in the future: technology, data, and public policy

Policymakers and healthcare stakeholders should also leverage technology, data, and public policy to increase evidence-based decisions and reduce inefficiencies and wastage in the healthcare systems. The EU's ambition to facilitate European Health Data creation has a great potential to unlock the value of health data, improve patients' outcomes, and inform better treatment decisions. However, in order to truly serve patients, this plan will require substantial commitment and investment in infrastructural set-up.

Transformation of patient pathways alone will not be sufficient in addressing the unmet needs. More funding is needed to ensure early diagnosis, screening programs, effective access to treatments and attract and retain best HCPs talent. Health expenditure per capita increased by over 5% on average across EU countries in recent years, according to the annual data provided by the World Bank and OECD. However, this is not sufficient in the context of the ageing and inflation. Healthcare needs to be seen as an investment rather than a cost, as it is a key strategic sector for the EU growth and job creation. New healthcare financing sources and models should be further analyzed and explored to be fit for future healthcare systems.

There are great opportunities in front of us to improve Europe's health through better prevention, curing, and intercepting diseases. Healthcare industry plays a key role in delivering breakthrough and incremental innovations in addressing the unmet medical needs and partnering with healthcare providers and policymakers for this challenge.

REFERENCES

European Commission (2021a). Europe's Beating Cancer Plan, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12154-Europes-Beating-Cancer-Plan_en.

European Commission (2021b). The EU 'Healthier Together' Non-Communicable Diseases Initiative: Reducing th Burder of non-communicable diseases, https://health.ec.europa.eu/system/files/2022-07/ncd_initiative_factsheet.pdf.

Hanna, T. P., King, W. D., Thibodeau, S. et al. (2020). Mortality due to cancer treatment delay: systematic review and meta-analysis. BMJ (Clinical research ed.), 371, m4087.

International Council of Nurses (2022). 'ICN: Increase in Strike Action by Nurses is a Symptom of Global Healthcare Crisis'. Daily Nurse, July 12, https://dailynurse.com/icn-increase-in-industrial-action-by-nurses-is-a-symptom-of-global-crisis/

Maringe, C., Spicer, J., Morris, M. S., et al. (2020). The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study. Lancet Oncology, 21(8), 1023–1034.

OECD/European Union (2022). Health at a Glance: Europe 2022: State of Health in the EU Cycle. Paris: OECD Publishing, https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2022_507433b0-en.

The New Geopolitics of Technical Standardisation

A European Perspective

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Abstract

Technical standard-setting, long a domain of cooperation and competition among primarily private actors, has increasingly turned into a central arena of geopolitical rivalry. Technical standards are not a natural subject of geopolitical rivalry since they are essentially a piece of voluntary private self-regulation. But the growing footprint of China in international standardization based on the People's Republic's state-centric approach has contributed to a politicization of standard-setting. This has consequences far beyond technological development. The impact of standardization influence ranges from economic competitiveness to legal impact, national security and a discreet transformation of values enshrined in technologies. The European Union, a traditional technical standardization power needs to adapt to the new geopolitical realities without adopting China's state-centric approach.

Introduction

Competition over technological leadership in emerging and foundational technologies, particularly those that enable digital transformation, has become the central arena of great power rivalry between the United States (U.S.) and the People's Republic of China (PRC). As part of this trend, technical standardisation, traditionally a field of cooperation and commercial competition predominantly between private sector actors, is undergoing a process of politicisation. This is not to say that technical standards have been nonpolitical in the past. However, for several decades, states largely neglected technical standardisation as a field relevant to great power competition.[108]

The new geopolitics of technical standardisation has three driving factors. First, digital transformation has penetrated many products and technologies. The growing interconnectedness of an ever-larger volume and diversity of things requires interoperability. Technical standards facilitate such interoperability, thereby becoming a central feature of a leading megatrend shaping our time.

Second, China has identified the immense relevance of technical standard-setting and, accordingly, has increased its influence on standardisation. Furthermore, the country has also adopted a state-centric approach to standardisation. In the past, all major standardisation decisions followed a largely private-driven approach that generally shielded technical standardisation from direct political influence. In contrast, the PRC closely links policy goals to the development of technical standards.[109]

Third, China's growing footprint in technical standardisation and its state-centric approach have not gone unnoticed in the West, principally in the U.S. Policymakers on both sides of the Atlantic are concerned about Chinese standardisation power, posing a risk of overreaction, namely, that the West will overestimate China's power and modify its own approach in a way that further threatens the existing standardisation system.[110]

The new geopolitics of technical standardisation pose a particular dilemma for the European Union (EU) and its member states. Actors based in the EU, mostly companies, hold a strong position in many international standard-developing organisations (SDOs). While the EU must adapt to the situation, it also must ensure that it does not adopt China's more political approach, as this would undermine its strengths and might even corrupt a system that has so far played to the EU's advantage.

This paper explains the new geopolitics of technical standardisation and presents the implications of this development for the EU. First, it discusses why the new geopolitics of technical standardisation are counterintuitive and a threat to the existing system. It then introduces the core features of China's technical standardisation approach and assesses the PRC's growing influence in international SDOs. The paper then elaborates on the relevance of technical standardisation for public actors, states, and the EU, distinguishing four dimensions in which technical standards entail political implications. Among these dimensions are the recently discussed legal, security, and value implications as well as the impact on competitiveness arising from the distribution and valuation of standard-essential patents (SEPs). The paper closes with a discussion of the policy implications for Europe.

The new geopolitics of technical standardisation

That standardisation has become an instrument of geopolitics is counterintuitive to those who have studied or participated in technical standard-setting in recent years. This is primarily due to the three features that characterise technical standards: their *technical nature*, the *inclusivity* of standard-setting, and their *legally nonbinding* status.

The growing interconnectedness of an ever-larger volume and diversity of things requires interoperability. Technical standards facilitate such interoperability, thereby becoming a central feature of a leading megatrend shaping our time.

TECHNICAL NATURE

Technical standards are omnipresent. They shape our lives, mostly without us even recognising them. We often only notice technical standards when they are not functioning properly. Take the example of power plugs. To this day, we need a power adapter to use electronic devices in some countries. We may be familiar with the names of other standards from their use in our everyday language. We hardly notice that USB, Wi-Fi, or A4 paper are all names of technical specifications adopted as international standards. The new mobile communications standard 5G or standards for artificial intelligence algorithms are

less well known but are gaining ever more prominence in political debates.

This is anything but obvious since the examples of USB, Wi-Fi, or 5G specifications already suggest that technical standards are highly technical. However, just as technology is not valueless, technical standards are political in nature. Largely invisible and unnoticed, they have far-reaching influence on national security and the protection of human rights in the digital age (see below).

INCLUSIVITY OF STANDARDISATION

Technical standards are universally accessible specifications that ensure interoperability and basic safety. They enable products and technologies to be used regardless of the manufacturer and across national borders. For example, we can only use mobile phones globally because there are technical standards for mobile communications. Therefore, standards promote trade and innovation and, in many cases, competition. Moreover, even if technical standards include patented technology, patent holders are obliged to licence it under fair, reasonable, and nondiscriminatory (FRAND) conditions; that is, technical standards cannot exclude anyone from access.

Similarly, the process of standard development is inclusive. A high degree of transparency, openness, and consensus shape most SDOs; indeed, these criteria are required even when an SDO is considered international under global trade law, as defined by the Agreement on Technical Barriers to Trade (TBT) under the World Trade Organization (WTO).[111]

From this, it can be concluded that the origin of technical standards is irrelevant. Technical standard-setting is inclusive and transparent, and the resultant standards are available to all. However, in reality, the ecosystem in which technical standards are developed does matter as it shapes the content of standards and the distributional effects can be significant even under FRAND terms.

LEGAL STATUS

Technical standards are not legally binding. *Formal standards* are developed by private standardisation organisations, primarily representing the private sector's interests. The consensus principle applies to many of them. *De facto* standards are the result of market dominance. The operating systems of Microsoft and Apple are so widespread that software must be compatible with Microsoft and Apple specifications to avoid becoming niche products. Windows and iOS are, therefore, considered de facto standards.

Thus, while standards might be nonbinding, they have enormous force, particularly once they gain market acceptance and are broadly applied.

In sum, technical standards may not be an obvious dimension of great power rivalry since they are highly technical, inclusive, and nonbinding. However, because their political importance is not evident at first glance, they have taken on a particularly discreet form of political influence. Due to the long-lasting nature of technical standards, they are discreet and potentially transformative.

China's state-directed standardisation and its influence

The PRC has developed into an international technical standardisation power. This is the result of China's growing technological innovativeness and internal reforms of the domestic standardisation system. China has carefully studied Western standardisation practices, learned selectively, and prioritised standard-setting.[112] China's leadership has understood the strategic relevance of technical standardisation. For example, in a highly unusual move, the PRC's new "Standardization Outline," the country's standardisation strategy, was published by the government jointly with the Central Committee of the Chinese Communist Party, which seldom issues papers on such detailed and technical issues.[113]

In recent years, China has transformed from a state-controlled to a state-centric approach to technical standardisation. Previously, technical standardisation in China was fully controlled by the party-state. Since 2018, China has introduced a two-tier standardisation system that combines the state and the market.[114] This reform results from China's understanding that its previous system would not have allowed for significant international influence. As a result, the PRC has carefully studied the successful U.S. and European approaches and adapted them to its own state-driven economy.

At the same time, all segments of China's technical standardisation system remain under the close guidance of the party-state, which uses formal and informal mechanisms to steer all standardisation activities and actors involved. Examples range from formal coordination mechanisms in strategic sectors, such as wireless mobile standardisation, to financial incentives, such as subsidies and stipends, or informal standardisation guidance from party-state officials to private-led standardisation organs. This allows China's policymakers to link strategic policy objectives to domestic technical standard-setting.[115]

China has understood that technical standardisation inherently works by a cooperative logic of action. However, the PRC skillfully exploits growing innovativeness and injects strategic objectives into the process. Foreign enterprises continue to face an uneven playing field. In a recently published comprehensive study, European companies operating in China reported a long list of obstacles to their participation in domestic standardisation within the PRC. Foreign-invested companies are provided selective access to domestic standard-setting where it is in China's strategic interest.[116]

In sum, technical standards may not be an obvious dimension of great power rivalry since they are highly technical, inclusive, and nonbinding. However, because their political importance is not evident at first glance, they have taken on a particularly discreet form of political influence. Due to the long-lasting nature of technical standards, they are discreet and potentially transformative.

China's internal reforms have boosted its international ambitions since more involvement by private sector actors enhances Chinese influence, while the party-state's coordination and facilitation helped China to submit a high number of proposals that would find unified support from Chinese actors. As a result, China's influence on international technical standardisation has increased significantly; nevertheless, this growth has not occurred evenly in all international SDOs or on all fronts regarding de facto standard-setting. Consider the following examples:

- China's influence in the International Telecommunications Union (ITU) is unparalleled. In the ITU's most central institution for standardisation, the ITU-T, China is well positioned. In the study period lasting from 2022 to 2024, China filled one of the 11 study group chair positions. Only Japan and South Korea have received more chairmanships (two each); the remaining six chair positions are distributed among the six states. Of the much higher number of study group vice-chairs, China secured 8.7%, ahead of South Korea (7.7%), Argentina, Japan, and India (5.8% each). China's share of leadership positions in the ITU-T working groups (including the Conformity Assessment Steering Committee) is even greater. With 24.2%, China has the largest share of chairmanships, followed by Japan (15.2%) and South Korea (12.1%). If the vice-chairs are taken into account, China's leadership becomes even clearer. While China's share amounts to 23.5%, Great Britain (9.8%), Argentina, and Tunisia (7.8% each) follow at a great distance. Compared to the previous study phase of 2017–2021, China has maintained its influence in the ITU-T, despite losing the chairmanship of a study group, and its share of vice-chairs in the study groups falling minimally from 9.1% to 8.7%. But in the working groups, China could still slightly expand its share. As a result, by 2021, China held 23.3% of chairmanships and 18.4% of vice-chairmanships.[117] Study groups and working groups of the ITU-T both develop standards and technical recommendations, albeit at different layers of technical specificity.

- In the International Standardisation Organisation (ISO), the International Electrotechnical Commission (IEC), and the Third Generation Partnership Project (3GPP), China's influence has also grown, although it does not dominate. The ISO is the world's leading International Standardisation Organisation with a broad technical mandate. The IEC is the most important international standard-developing organisation in the electrotechnical field. 3GPP, in turn, shapes technical standards in the telecommunications field. China holds a growing share of the technical leadership positions in the technical committees, subcommittees, and working groups where the standards are developed. As of August 2022, China had 76 secretariats in the ISO and 12 secretariats in the IEC. These are significantly fewer secretariats than those held by leading Western countries. Germany, for example, has 131 ISO and 37 IEC secretariats, the U.S. has 92 (ISO) and 27 (IEC) positions, and France holds 81 (ISO) and 22 (IEC). Japan (80 in ISO, 23 in IEC) and Great Britain (76 ISO secretariats and 20 positions in IEC), as well as Italy in the case of the IEC (14 secretariats), also rank ahead of China. Nevertheless, China's influence is growing. From 2011 to 2018, the proportion of China's ISO secretariats in technical committees and subcommittees increased from 5.0% to 8.21%. By 2022, this share had risen again to 9.43%.[118] However, China's influence has tended to be more limited in international industry consortia that develop technical standards, such as the IEEE or the IETF.[119]

- The PRC has invested enormous resources in its international standardisation efforts outside established SDOs. This represents Chinese efforts to establish

de facto standards internationally. As part of the Belt and Road Initiative (BRI), China has established plans to promote Chinese technical standards and has concluded bilateral standardisation agreements with BRI countries.[120] When the results have been mixed, China increasingly incorporated technical standards into concrete BRI projects. Nevertheless, since this may create lock-in dependencies (see below), recipient countries have grown sceptical of such practices in recent years.

That China has gained influence across the board, although to different degrees, is changing the nature of standard-setting. China is externalising its state-directed approach by active party-state involvement. Unlike most other international efforts, Chinese standardisation is shaped by the party-state's agenda.

RISKS RESULTING FROM CHINA'S TECHNICAL STANDARDISATION POWER

China's technical standardisation power enables the party-state to surpass mere technical standard-setting in at least four different ways.

- *Economic competitiveness:* Although technical stan-dards are widely available, they come with significant distribution effects. Growing interconnectedness requires interoperability provided by information and communication technology (ICT) standards. A high degree of ICT standards is patented—approximately 55%.[121] While it is true that patent holders are obliged to licence them under FRAND conditions, the fees can be substantial. For example, the U.S. technology giant Qualcomm generated about €5.2 billion from licensing in 2017,[122] representing more than 20% of the company's profit. Both the distribution of and the value of these SEPs will be significant for future competitiveness as they may become a de facto global tax on all types of connected devices. Chinese tech giants are well-placed to gain an tremendous share of these royalty payments.

  In addition, companies whose technological innovations have not been promoted to the level of technical standards must pay licence fees and bear adaptation costs. This is because technologies and products can only become internationally competitive if they are redesigned to be compatible with the technical standards of global markets. These technical adaptation measures can be costly and lengthy.

- *Regulatory and legal influence:* Technical standards of large markets can unfold extraterritorial effects, particularly when closely aligned with regulations, since multinational companies seek to avoid several parallel modes of production that adapt to different standard ecosystems. China has only recently proclaimed that it will further increase the citation of technical standards in laws and legally binding regulations.[123] This means compliance with these laws and regulations will be considered a given when the respective technical standards are implemented. Compliance with laws and regulations while circumventing technical standards is possible, yet often very costly. Since companies with global operations want to avoid manufacturing the same product based on divergent standards, it is not uncommon for the strictest standards to be adopted as the benchmark and applied across their global production. Although voluntary, technical standards have an impact that extends far beyond the jurisdiction in which the standard was developed (extraterritorial effect).

International standards are also references in disputes regarding TBT under international trade law. According to the WTO's TBT Agreement, compliance with international standards is an indication of the nondiscriminatory facilitation of free trade. Deviations must be explained. Given that technical standards and related regulations apply to more than 80% of globally traded goods, international technical standards play a significant role in shaping world trade law.[124]

- *Security implications:* In international SDOs, standards have a transparent review mechanism. Built-in security flaws are difficult to hide from international peers; when successful, vulnerabilities in international standards spread globally. Decisions regarding which components of a technology are standardised and which are not can have crucial security implications. Generally, companies that have developed technology have the most comprehensive technical knowledge, including its weaknesses and vulnerabilities. When a technical solution becomes an international standard, it often spreads globally. Should the now globalised standard contain security vulnerabilities, it is possible that the actors who developed it will be able to exploit these vulnerabilities particularly effectively, which could undermine the cyber, network, or even IT security of critical digital infrastructure.[125]

  Where standards are not global in nature, they can create politically impactful lock-in dependencies, particularly in critical infrastructure standards. Standards create markets, but only lead to interoperability in the geographic areas where they are applied. If technical standards are global, they create a global market; however, when competing technical standards are applied in different geographical locations, the world becomes divided into several independent technological spheres. In some cases, divergent standards

are a nuisance, but only hinder the exchange of technologies and goods to a limited extent.[126] Different global electrical plug standards can be overcome with adapters. Different railway gauges mean that goods have to be loaded from one train to another or onto a truck. But other cases are more complex with potentially far-reaching consequences. For example, the existing discrepancies in global railway signalling standards mean that railway networks can only be interconnected if they use identical standards. Divergent standards for transferring data prevent companies from offering their services globally. China strives to actively export its technical standards, not least by means of the BRI. If critical infrastructure is based on a specific standard that is only used by providers from one State, then dependencies arise in the maintenance and further expansion of that particular infrastructure. In cases where the deviations in standards are complex, both can only be delivered by providers from the country that has built the corresponding critical infrastructure based on its own national standards. Resulting technological dependencies on state-owned or state-affiliated enterprise can also be used to achieve security policy goals. It is questionable, for example, whether a country whose maintenance of critical infrastructure depends on Chinese state-owned enterprises can take a critical position toward the PRC in matters of core Chinese interests.

- *Discreet value transmission:* Just as technology is not value-neutral, technical standards discreetly spread political and societal values. A few years ago, for example, two technical standards for wireless area network (WLAN) technology were competing for international recognition. The already established Western Wi-Fi standard promised to better protect privacy, but performed less well than its Chinese competitor WAPI. Had WAPI prevailed, not only would a lower level of privacy have been widely incorporated into devices, but this would also have been widely regarded as normal. This is one of the reasons why technical standards have been described as social institutions.[127] The acceptance of Chinese standards can spread China's values regionally or even globally, and once adopted, standards and their inherent values remain largely unchallenged.

  As the digital transformation permeates greater areas of public and private life, the ethical aspects of technical standards are becoming increasingly central. In particular, questions regarding artificial intelligence standardisation face ethical challenges, with standards for algorithms being the best-known examples. Chinese efforts to standardise artificial intelligence-based facial recognition, for example, have attracted attention.[128] As the political, social, ethical, and legal beliefs and frameworks in China on surveillance are fundamentally different from those in Europe, there is concern that international standards may not be compatible with Europe's liberal values. In this case, Chinese technical standards could globalise acceptance for comprehensive surveillance and also bring it to Europe. Even more fundamental is the problem that artificial intelligence is not static, but constantly evolving. Developing standards for dynamic processes and certifying them is still an unresolved challenge. Another example is the effort to create a new internet protocol. Admittedly, the much-discussed fears in 2020 that China could impose a new, more centralised internet protocol quickly were exaggerated.[129] However, fundamental differences in ideas about how a new internet protocol should be designed and how governments should exercise control are evident.

These four dimensions point to the transformative politicisation of technical standard-setting of China's state-directed approach. This could result in further fragmentation of the global standardisation system that—apart from the above risks—may result in shrinking market opportunities and less global innovation.

Policy recommendations to the EU

Technical standard-setting has become a central dimension of great power rivalry. The EU's traditional strength in technical standardisation stems from its private sector-driven approach in a fairly nonpolitical standardisation system that is currently at risk. The challenge for the EU is to adapt to the existing challenges without adopting China's state-directed approach that would further politicise the system, eroding the EU's strengths.

Given that technical standard-setting has enormous implications for the competitiveness of European companies, carries legal and security implications, and shapes values, EU policymakers need to act. The European Commission has taken the first step by publishing a new European Standardization Strategy in February 2022 that is now to be implemented.[130] This process could profit from the following recommendations:

- *Adapt a multistakeholder approach to the new realities:* As part of its new strategy, the European Commission will establish a new High-level Form on Standardisation that consists of an annual ministerial summit and brings together private and public stakeholders. The success of such activities will be crucial since Europe will need to preserve the private-led system but also inject policy priorities. This requires

close coordination between the private sector and European policymakers. Europe's future success hinges on all sides taking the new Forum seriously.

- *Establish alert trackers for China's domestic and international standardisation activities:* Since most aspects of technical standard-setting have no political relevance, European policymakers must properly identify areas of relevance, i.e., those that carry significant implications for one of the above-introduced four dimensions. This requires tracking and analysing Chinese standardisation activities. Ideally, this could be done in close coordination with like-minded partners, including the U.S. Given the highly technical character of standard contributions, it is not always easy to identify their political implications. The EU should invest in tracking mechanisms and closely exchange information on domestic and international standardisation contributions from the PRC as part of the Trade and Technology Council (TTC).

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- *Inject policy concerns in standard-setting without corrupting the system:* Based on such tracking, the EU must inject policy concerns without turning a highly technical and inherently cooperative standardisation system into a platform for political rivalry with the PRC. Intra-EU processes of stakeholder coordination with all actors of the standardisation community aiming to raise awareness could be coupled by a similar transatlantic process. Where private stakeholders turn out to be unwilling or incapable of properly addressing policy concerns, either private nonprofit organisations should be funded or technically capable government officials should be sent to relevant international SDOs. This requires attracting more technical expertise to the European Commission and EU member state bureaucracies.

- *Coordinate relevant regulation of emerging technologies wherever possible:* While regulatory preferences do and will remain not fully aligned on both sides of the Atlantic, early signalling of regulatory frameworks can effectively steer international standardisation. This is more effective if the transatlantic partners succeed in aligning their regulatory preferences.

- *Develop a common, balanced EU approach to SEPs:* Striking a balance between limiting the burden of SEP royalties for a broad range of products and adequately monetising groundbreaking innovation is difficult and will turn out to be one of the major issues shaping global competitiveness in the digital age. A balanced position is difficult to achieve within the EU and requires coordination with like-minded partners. If Europe and like-minded partners succeed in developing a common approach that considers strategic objectives, it could shape the global environment in line with European interests. Alignment on China's anti-suit injunction, i.e., the legal claim that disputes over SEPs can only be brought before Chinese courts, could be a start to cooperate in a complex field. The Chinese anti-suit injunction is worth challenging because it will favour Chinese companies and China's judiciary is not independent.

- *Incentivize R&D in emerging technologies and the development of standard contributions:* The EU must improve its innovation ecosystem in which technical standardisation contributions are being developed. This will require a broad set of policy instruments from increased R&D funding to deregulation or tax incentives for innovation. These measures should be

coupled with direct incentives for turning innovation into standard contributions.

- *Invest in technical standardisation education:* While China has invested massively (though not always effectively) in technical standardisation education, western companies increasingly face a shortage of qualified personnel. The EU should coordinate investments in systematic standardisation education through advanced training and as an integral part of existing engineering education.

- *Incentivize China's participation in existing international SDOs and insist on reciprocity:* China is an innovation powerhouse that will shape international technical standards, whether the world likes it or not. Thus, it is in our interest to keep China within the existing institutions and make it play by established rules. The PRC continues to be interested in western support that should be provided under the condition of strict adherence to international rules and practices, coupled with a demand for reciprocity. Part of the engagement process could also be advocating for China to develop agreements with the ISO and the IEC that resemble the Vienna and Frankfurt Agreements of the European Standardisation Organisations.

Europe is in the relatively comfortable position of punching above its economic weight in technical standard-setting. Coupled with the fact that technical standardisation inherently requires a certain degree of cooperation, Europe's strength is an incentive for both the U.S. and China to cooperate with the EU. However, European interests will never be completely fulfilled. China might move closer to reciprocity but will not provide equal access to European actors. Standardisation cooperation with the U.S. is progressing and is often named one of the most successful tracks within the TTC. However, the U.S. and European approaches will never fully align. For this reason, Europe must protect the strengths of its own system through several measures, some of which have been listed above.

REFERENCES

Arthur, W. B. (1989). 'Competing Technologies, Increasing Returns, and Lock-In by Historical Events'. *The Economic Journal*, 99(394), 116–131.

Bonardi, J.-P. § R. Durand (2003). 'Managing Network Effects in High-Tech Markets'. *The Academy of Management Journal,* (17)4, 40–52.

Chinese State Council (2021). '中共中央 国务院印发《国家标准化发展纲要》' [The Central Committee of the Communist Party of China and the State Council issued the "National Standardization Development Outline"]. *Xinhua*, 10 October, http://www.news.cn/politics/zywj/2021-10/10/c_1127943309.htm.

Dackö, C. (2021). 'What makes a Technical Specification a WTO Compliant Standard?'. *Mannheim Swartling*, 13 April, https://www.mannheimerswartling.se/app/uploads/2021/04/what-makes-a-technical-specification-a-wto-compliant-standard.pdf.

European Commission (2022). 'An EU Strategy on Standardization - Setting global standards in support of a resilient, green, and digital EU single market'. *European Commission*, 1 February https://ec.europa.eu/docsroom/documents/48598.

Godehardt, N. § Voelsen, D. (2020). ‚NewIP – Grundstein für ein globales Internet nach chinesischen Vorstellungen?' [NewIP – Foundation for a global internet with Chinese characteristics?], *Stiftung Wissenschaft und Politik*, 7 May, https://www.swp-berlin.org/publikation/newip-grundstein-fuer-ein-globales-internet-nach-chinesischen-vorstellungen.

Krislov, S. (1997). *How nations choose product standards and standards change nations* (Pittsburgh: Pittsburgh University Press).

Synge, J. § Liu, N. (2020). 'From AI to Facial Recognition. How China is Setting the Rules in New Tech'. *Financial Times*, 7 October, https://www.ft.com/content/188d86df-6e82-47eb-a134-2e1e45c777b6.

Medin, M. § Louie, G. (2019). 'The 5G Ecosystem. Risks and Opportunities for DoD'. *Defense Innovation Board*, 3 April, https://media.defense.gov/2019/Apr/03/2002109302/-1/-1/0/DIB_5G_STUDY_04.03.19.PDF.

Ministry of Industry and Information Technology (2018). '工业和信息化部关于工业通信业标准化工作服务于"一带一路"建设的实施意见' [231 Opinion on the Implementation of Standardization of the Industrial Communication Industry for Construction of the 'Belt and Road']. Law-lib.com, 5 November 2018, http://www.law-lib.com/Law/law_view.asp?id=636486.

OECD (2019). 'Regulatory Reform and International Standardisation'. Working Party of the Trade Committee, TD/TC/WP(98)/FINAL (1999).

Pop, V. et al. (2021). 'From Lightbulbs to 5G, China Battles West for Control of Vital Technology Standards'. *Wall Street Journal,* 8 February, https://www.wsj.com/articles/from-lightbulbs-to-5g-china-battles-west-for-control-of-vital-technology-standards-11612722698.

Rühlig, T. § ten Brink, T. (2021). 'The Externalization of China's Technical Standardization Approach'. *Development & Change*, 52(5), 1196-121.

Rühlig, T. (2020). 'Technical Standardization, China, and the Future International Order'. *The Böll Foundation*, 3 March, https://eu.boell.org/en/2020/03/03/technical-standardisation-china-and-future-international-order.

Rühlig, T. (2021). 'The Shape of Things to Come. The Race to Control Technical Standardization'. *European Union Chamber of Commerce in China,* 2 December, https://static.europeanchamber.com.cn/upload/documents/documents/The_Shape_of_Things_to_Come_English_Final%5b966%5d.pdf.

Rühlig, T. (2022). 'Technical Standardization and Innovation in a Changing Geopolitical Landscape'. In Deiaco, E. § Wernberg, J. (eds.), *Rethinking boundaries and revisiting borders. Conditions for innovation, entrepreneurship, and economic integration in an interconnected world* (Stockholm: The Swedish Entrepreneurship Forum), 105-132.

D. Russel and B. H. Berger (2021), 'Stacking the Deck: China's Influence in International Technology Standards Setting', *Asia Society Policy Institute*, 3 November, https://asiasociety.org/sites/default/files/2021-11/ASPI_StacktheDeckreport_final.pdf.

Seaman, J. (2020). 'China and the new geopolitics of technical standardization'. *Ifri*, 27 January, https://www.ifri.org/sites/default/files/atoms/files/seaman_china_standardization_2020.pdf.

Standards Administration of China (2018). '标准联通共建"一带一路"行动计划 (2018-2020年)' [Harmonization of Standards for Construction of 'BRI' Action Plan (2018–2020)], SAC, http://www.sac.gov.cn/zt/ydyl/bzhyw/201801/t20180119_341413.htm.

State Administration for Market Regulation (2021). '"十四五"推动高质量发展的国家标准体系建设规划' ["14th Five-Year" Plan for Promoting the High-Quality Development of the National Standards System"], *SAMR*, December, https://gkml.samr.gov.cn/nsjg/bzjss/202112/W020211215387457412370.pdf.

Strumpf, D. (2019). 'Where China Dominates in 5G Technology'. *The Wall Street Journal,* https://www.wsj.com/articles/where-china-dominates-in-5g-technology-11551236701.

Suttmeier, R. P. et al. (2006). 'Standards of Power? Technology, Institutions, and Politics in the Development of China's National Standards Strategy'. *The National Bureau of Asian Research*, 1 June, https://www.nbr.org/publication/standards-of-power-technology-institutions-and-politics-in-the-development-of-chinas-national-standards-strategy/.

Tamm Hallström, K. (2004). Organizing International Standardization. *ISO and the IASC in quest of authority* (Cheltenham: Edward Elgar).

Teleanu, S. (2021). The Geopolitics of Digital Standards. China's Role in Standard-Setting Organizations'. *The Diplo Foundation*, 14 December, https://www.diplomacy.edu/wp-content/uploads/2021/12/Geopolitics-of-digital-standards-Dec-2021.pdf.

2023: Righting the 'Three-Circle' EU Industry Strategy

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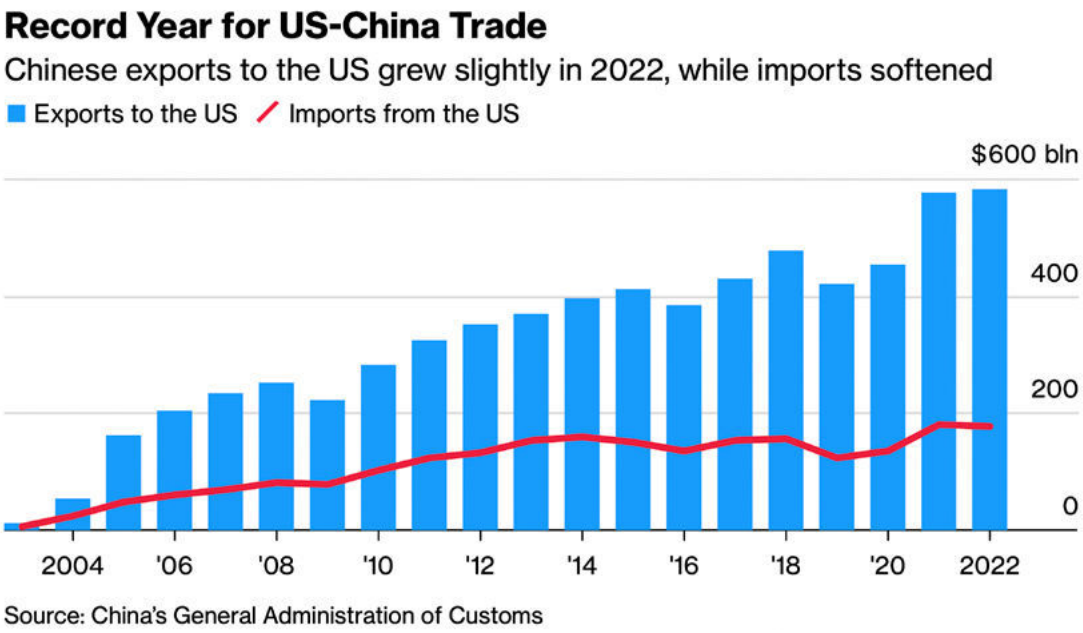
Introduction

In the last three years, the European Union (EU) has entered an obstacle race, confronting continuous and additive crises such as the COVID-19 pandemic, the Russian invasion of Ukraine, and the readjustment of its industries to changing and exacting international circumstances. In a previous ELF publication (Pogorel, Nestoras § Cappelletti, 2022) we introduced the notion that the EU must provide a consistent definition of its policies within a 'three-circle' framework: the Union Circle (the 27); the 'Friendship Circle', which consists of the EU and its allies in Europe, the Americas, and Australasia; and the 'Wisdom Circle', which involves the political and economic intricacies of dealing with 'rivals' such as China, autocracies in various continents, or even on-the-fence democracies including India or Indonesia.

In this concluding article, we will focus on the contemporary challenges in straightening out EU policies within the 'three circles' as hopes of consistently defining shared policies, particularly between the EU and the United States, emerged against diverging views and categorical imperatives of internal politics.[131]

The EU–U.S. conundrum – back with a vengeance

After years of bickering on trade issues with the previous U.S. administration, the EU–US Trade and Technology Council (TTC), established during the EU–U.S. Summit on 15 June 2021 in Brussels, seemed to pave the way towards resuming a coordinated approach across the Atlantic to address trade and



technology challenges. In the first phase, which took place in 2021 and early 2022, the 10 TTC working groups seemed poised to extensively review current and potential issues in the spirit of common understanding. Then, in August 2022, President Joe Biden signed into law the Inflation Reduction Act (IRA), a massive $369 billion industry support and climate bill. At a recent European Parliament event, a senior European industry executive emphasised that under the current European regulation, EU industries can receive a 3%–8% support for investments in innovative production whereas in the United States, investment subsidies of 50% are now offered for the expansion of facilities that implement current manufacturing technologies. Under these circumstances, it is not surprising that European companies, which are being actively lobbied to shift their investments to the United States, are considering doing so.

The EU has criticised the IRA as restrictively favouring U.S. and U.S.-based products and firms. In response, *'The U.S. Treasury Department* signalled some imported cars will qualify for electric-vehicle tax credits in the IRA, a move that could assuage Asian and European allies' concerns about the sweeping climate legislation' (Coppola § Condon, 2022). Europe's trade officials and their U.S. counterparts are actively negotiating EU exemptions to the law's domestic content requirements for electric-vehicle batteries, among other issues. Although the planned provisions have been put on hold in January 2023, the wording of the law is stringent, and it remains unclear what can be done to mitigate the 'make and buy in America' effect.

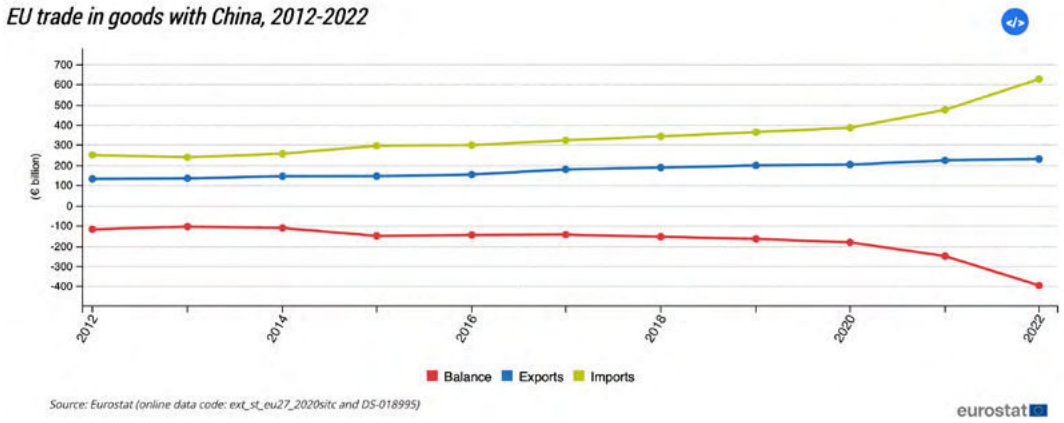
At Davos 2023, European Commission (EC) President Ursula von der Leyen declared, 'So, this is why we have been working with our United States friends to find solutions. For example, so that EU companies and EU-made electric cars can also benefit from the IRA. Our aim should be to avoid disruptions in transatlantic trade and investment. We should ensure that our respective incentive programmes are fair and mutually reinforced' (Euronews, 2023).

No 'decoupling' with China

Policy initiatives must be considered against the deeply critical background of the war at the heart of Europe and the cooperation/rivalry with China. At the outset of 2023, the United States and the EU must make difficult decisions regarding the industries under their charge that are intricately intertwined with China. Far from a 'decoupling' with China being on track, the United States in 2023 achieved a record-high value in its trade with China.

The same is true for EU–China trade. In 2021, the total value of trade in goods between China and Europe hit €696 billion, up 24% from 2019 (*Eurostat Statistics Explained*, 2023).

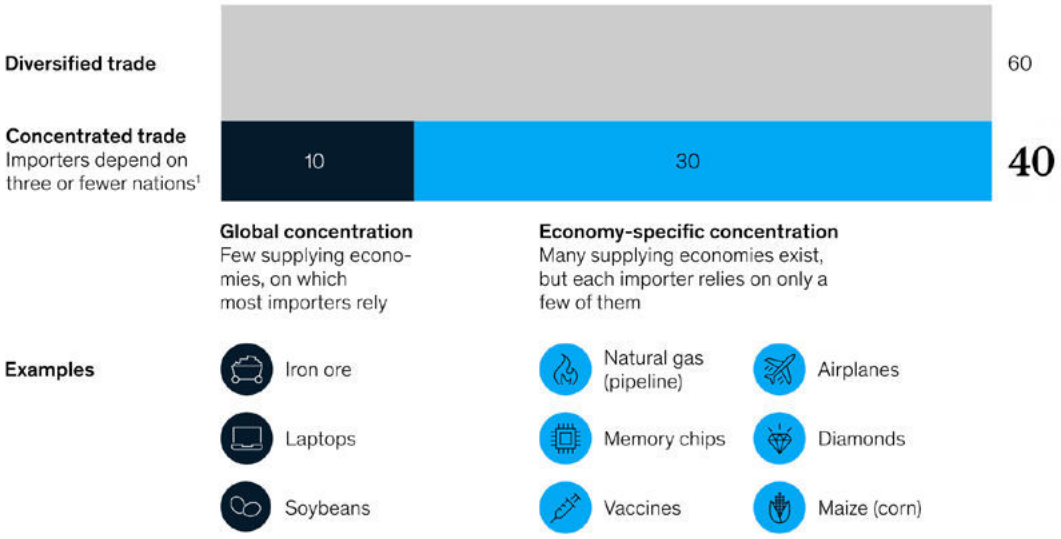
In this context, frequently cited differences in the political discourse in approaches to China, the United States tougher and the EU softer, are largely window dressing at the moment, although a sharp decline of foreign direct investments in China being observed in Q3 and Q4 2022



About 40 percent of global trade is 'concentrated,' mainly due to economy-specific factors.

Global trade value by type of concentration, 2021

Total goods trade
Proportion by type of concentration, %



[1]Concentration refers to the product-level concentration for the importing economy. In the underlying analysis, "concentrated trade" is defined as all imports with a Herfindahl-Hirschman Index (HHI) over 3,000; this approximately represents cases where a product is supplied to an importer by three or fewer economies. The 10% of trade corresponding to "few supplying economies" is defined as all products with a global export market HHI over 3,000.
[2]Non-exhaustive. Examples given are the largest, ordered by total value of concentrated trade, across a range of sectors.
Source: UN Comtrade, 2021; McKinsey Global Institute analysis

McKinsey & Company

(Nikkei, 2022) possibly announces a more drastic re-orientations of world trade and international division of labour.

Now should have been a good starting point for a coordinated response to a common problem. This did not happen. In a recent event hosted by the Washington-based Center for Strategic and International Studies, former U.S. Trade Representative Susan Schwab said, 'We've left out a very important component of a China strategy, which is we have to do a better job of working with our allies'. She added, 'You can't be conducting a trade policy that systematically alienates all of your other trading partners and then think they're warm and fuzzy about your China policy' (Baschuk, 2022).

Should Europe emulate the United States?

Structuring a realistic EU 'sovereignty' strategy is daunting. Decades of globalisation, the urgency of reaping the shared benefits of comparative advantages, and open borders have created an intricate network of supply–demand dependencies, which have been analysed, for example, in a recent McKinsey report (Baschuk, 2023).

The report, which examined trade flows for some 6,000 products among 120 countries, found that no region is close to achieving economic self-sufficiency. The reason is that countries continue to rely on trade with others for more than 25% of at least one important type of good. Francoise Huang, senior economist for the Asia Pacific at Allianz Trade, said, 'The EU is a key supplier for 300 critical goods to the U.S., but that represent only 4% of total U.S. imports, whereas with China it's 10%... Given that we have these critical dependencies in place – there are good reasons for the U.S. and EU to work even closer' (Baschuk, 2022).

IRA for Europe?

According to some analysts, the only opportunity in the current EU–U.S. context is for the EU to follow the path of the United States and emulate the IRA with a set of industrial policy initiatives.

For Europe, however, matching the U.S. IRA is a costly path, engaging in fragmentation trade among allies.

As stated by *The Economist* (2023),

> One problem is their extra economic costs. *The Economist* estimates that replicating the cumulative investments of firms in the global tech-hardware, green-energy and battery industries would cost $3.1trn–4.6trn (3.2–4.8% of global GDP). Reindustrialisation will raise prices, hurting the poor most. Duplicating green supply chains will make it costlier for America and the world to wean themselves off carbon. History suggests that vast amounts of public money could go to waste... Nobody expects America to go back to the 1990s. It is right to seek to preserve its military pre-eminence and to avoid a dangerous dependence on China for crucial economic inputs. Yet this makes other forms of global integration all the more essential. It should seek the deepest cooperation between countries that is possible, given their respective values.

The Economist concluded, 'The clock is ticking'.

Is there a choice? At Davos 2023, President von der Leyen explained the EU's intention to navigate an ocean of reefs. Such an effort combines a net-zero industry act, a critical raw materials act (16 March 2023), a temporary adaptation of EU state aid rules to accelerate and simplify procedures, simple tax break models, targeted aid for production facilities, and strategic cleantech value chains. The EU would also mitigate the

Structuring a realistic EU 'sovereignty' strategy is daunting. Decades of globalisation, the urgency of reaping the shared benefits of comparative advantages, and open borders have created an intricate network of supply–demand dependencies.

relocation risks of foreign subsidies by setting up a European sovereignty fund that 'will provide a structural solution to boost resources available for extreme research innovation and strategic industrial projects, but as this will take time, we will look at a bridging solution that is the most needed to provide fast and targeted support' (*Euronews*, 2023).

De-risking rather than decoupling?

At Davos 2023, President van der Leyen also defined the EU's industry and trade policy as a 'de-risking, rather than decoupling' (*Euronews*, 2023), thus recognising the realities of hard industrial interdependence, the commitment to the benefits of preserving an open international economy as much as possible, and the call for an analysis and mitigation of industrial risks.

Diplomacy is the backbone of the EU's long-term efforts to reap the benefits of open economy and trade while conducting a rationally assessed hedging of the risks and uncertainties at the fringe of the Friendship Circle and beyond.

With the extent and complexity of necessary decisions, risk analysis and hedging bets are a reasonable approach for the EU, in which policy imperatives and industry realities are carefully integrated – which is not an easy task. Some natural resources, not easily substitutable, have a limited number of suppliers, some of them 'risky'. Political risks also affect the Friendship Circle, within which the optimal approach should have been the preservation of the benefits of the open international economy and trade. However, because of the prevalence of U.S. internal political considerations, this has not happened in the past few months. The United States has been swept not only by rains, tornadoes, snowstorms, and floods but also by a super-wave of America-one-and-only policies. It remains preferable to coordinate among allies or at least not reintroduce the 'beggar-my-neighbour' policies of yore, setting aside arguably the most economically and politically efficient policy approach. Therefore, policies among allies in 2022 have gone awry. In early 2023, regardless of efforts from European diplomacy, the Biden administration seemed only moderately amenable to significantly reversing its policies, which were painfully enacted into law in Congress. In Europe, there are calls, particularly from the industry, to match tit-for-tat U.S. protectionist initiatives, not to mention similar protectionist policies in Asia (e.g. India and Indonesia). Regarding China, the only realistic path is for the Friendship Circle to optimise and hedge their bets. Risks to supply chains can be measured and their probabilities considered. They can be mitigated by first increasing inventories, multisourcing, and diversifying providers. Uncertainties, meanwhile, are more difficult to manage as they affect one-of-a-kind resources or markets, which are not substitutable. Uncertainties are also hardly predictable and measurable and might lead to major disruptive outcomes.

A McKinsey report stated that '[b]y having a clear-eyed view of concentration, decision-makers can decide when and where to double down, decouple, or diversify, and how to reimagine rather than retreat from their global footprints' (White, Woetzel, Smit, et al., 2023). As a caveat, however, some risks are also involved when stacking industrial public funding policies. In electronic components ('chips'), the much-heralded 'chips acts' were voted both in the EU in February 2022 and in the United States in July 2022. However, chips constitute a notoriously fickle and deeply cyclical industry. As soon as July 2022, Federico Rampini asked in the *Corriere della Sera*,

> Is the semiconductor shortage already over? Background of an alarm (and, perhaps, of an error that weighs in our pockets)
>
> The market was perhaps already solving the problem by itself, making the law of supply and demand work. That is, by adjusting production to consumption. The problem of scarcity would already be on its way out. South Korea, the world's second largest producer, has already announced that its stock of microchips has grown by 50%. Intel and Nvidia, two of the largest American manufacturers, have suspended new hires in anticipation of a slowdown in activity.

The symmetrical trans-pond chips acts, far from boosting investments in 2023, would bring a significant windfall to the semiconductor industry, with public money substituting their own corporate funding investments.

What can be done to improve the EU's industry and trade positions?

This article suggests some modest complementary actions alongside the EC president's announcements at Davos 2023, presented here for comments and discussions.

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REINFORCING THE EU'S DIPLOMATIC POSITION

Diplomacy is the backbone of the EU's long-term efforts to reap the benefits of open economy and trade while conducting a rationally assessed hedging of the risks and uncertainties at the fringe of the Friendship Circle and beyond. EU diplomats have a field day for their talent. There are no clear-cut rationale principles to help them cope with Russia's barbarian vagaries, China's tight-rope walking, the multiple variables that shape U.S. policies, the always more real-politik behaviours in the Middle East and Africa, and, of course, steering the navigation of a 27-member union.

Organisational change in the EU is more difficult and more time-consuming than in the United States. In this respect, the function of the famed EU 'social model' can be both positive and negative.

Our diplomacy must be reinforced by investing in reciprocal knowledge and understanding among allies. In an age where knowledge is universally and instantly available, the EU and the United States have faced reciprocal misunderstandings of their policies. For some time, the United States has characterised Europe as having a benign neglect of its own defence, not spending enough, and relying on American military expertise. Meanwhile, Europe, against all evidence, has believed in a multilateralist, free-trade America while ignoring the deep social and industrial roots of American protectionism. Europe is now progressively ramping up its military expenditures. The Biden administration, state, and treasury seem eager to mitigate the provisions of the bill passed in Congress. The EU is working with its trading partners such as Canada and the United Kingdom to resolve issues and Mexico, New Zealand, and Australia to finalise agreements. However, a long-term perspective would be as follows:

> Recommendation: Strengthen reciprocal understanding among allies by engaging in more joint academic research and training programmes, which may include a trans-Atlantic and trans-Pacific module to the College d'Europe Pilot Programme of the European Diplomatic Academy managed by the European External Action Service.[132]

INNOVATIVE INVESTMENTS IN COMPETITIVENESS, R&D, AND SKILLS POLICIES

The EU and, before that, the EC, have implemented ambitious policies in competitiveness, research and development (R&D), and skills policies for one or even two generations. This is the opportune time to experiment moving forward and beyond what has been done.

> European countries must now 'jointly develop and measure progress on digital skills, digital infrastructure, and digitalisation of both private industry and public services' (see *European Commission*). The EC's new Digital Decade programme, which will be in effect until 2030, 'makes "digital transformation" in four areas – skills, infrastructure, business, and government – a collaborative initiative, also with the EU parliament and its 27 member states. Nominally, and explicitly, infrastructure covers connectivity. The Digital Decade agreement observes the commission's declaration on European Digital Rights and Principles, signed at the start of 2022' (Blackman, 2023).

> Recommendation: Complement the vision of the Digital Decade programme with radically single-market-minded tools for skills, R&D, and investments and instruments devoid of MS return provisions whether formal or de facto.

COMPLEMENT HORIZON R&D WITH LESS CONSTRAINED INSTRUMENTS

The EU, in parallel with its already crucial research efforts, could experimentally promote R&D projects with a European single-market spirit, devoid of cooperative constraints. One example is the GAIA-X Programme, which 'enables a federated and secure data infrastructure, whereby data are shared, with users retaining control over their data access and usage. It enables the creation of links between many cloud service providers in a wider, transparent,

and fair ecosystem to drive the European Data economy of tomorrow' (see *Gaia-X*).
Another example is the Joint European Disruptive Initiative's (JEDI) suggestion of a 'European advanced research projects agency, with a mission to bring Europe in a leadership position in emerging and breakthrough technologies. JEDI is launching Grand Challenges to push the frontiers of science and innovation, with a radical new method based on purpose-driven research, maximum speed, full focus on excellence, deep interdisciplinarity, and bold "moonshot" risk-taking' (see *JEDI*).

> Recommendation: Experimentally promote programmes similar to GAIA-X and R&D projects similar to JEDI's Grand Challenges with a European single-market spirit but without cooperative restrictions.

IMPLEMENT A MARKET-COMPLIANT ICT INVESTMENT INSTRUMENT TO OVERCOME GAPS IN ICT INVESTMENTS AND ACHIEVE PRODUCTIVITY GAINS IN THE EU

The 50% gap in the EU's investments in ICT systems as opposed to that of the United States is largely a product of the organisational transformation implications surrounding ICT investments, that is, structural changes in corporate and industry organisation management, job transformations, and losses. Organisational change in the EU is more difficult and more time-consuming than in the United States. In this respect, the function of the famed EU 'social model' can be both positive and negative. The EU's protective social net facilitates organisational innovation in some EU countries but makes it slow or impossible in others.

> Recommendation: Implement a cooperative instrument between the EC, the European Investment Bank, banks, and consultancies to promote investments in ICT systems in EU industries.

REFERENCES

'A Davos, Ursula von der Leyen présente le Green Deal Européen et affiche son soutien à l'Ukraine' (2023). *Euronews*, 17 January, https://fr.euronews.com/my-europe/2023/01/17/a-davos-ursula-von-der-leyen-presente-le-green-deal-europeen-et-affiche-son-soutien-a-lukr.

'China-EU – international trade in goods statistics' (2023). *Eurostat Statistics Explained,* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=China-EU_-_international_trade_in_goods_statistics.

'Europe's Digital Decade: Digital Targets for 2030', *European Commission*, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en.

'The College of Europe hosts and runs the Pilot Programme of the European Diplomatic Academy' (2022), https://www.coleurope.eu/college-europe-hosts-and-runs-pilot-programme-european-diplomatic-academy.

'The Destructive New Logic that Threatens Globalisation' (2023). *The Economist*, 12 January, https://www.economist.com/leaders/2023/01/12/the-destructive-new-logic-that-threatens-globalisation?utm_content=ed-picks-article-link-1&etear=nl_weekly_1&utm_campaign=a.the-economist-this-week&utm_medium=email.internal-newsletter.np&utm_source=salesforce-marketing-cloud&utm_term=1/13/2023&utm_id=1446810.

'The European Apra', https://www.jedi.foundation/about.

'What is Gaia-X?' (2022). *Gaia-X*, https://gaia-x.eu/what-is-gaia-x/.

Baschuk, B. (2022). 'Biden Hits Fresh Bumps in Plan to Smooth EU Trade Ties', *Bloomberg*, 28 October,

Baschuk, B. (2023). 'McKinsey Explores Hurdles Nations Face to Reach Trade Self-Reliance'. *Bloomberg*, 12 January, https://www.bloomberg.com/news/newsletters/2023-01-12/supply-chain-latest-trade-self-sufficiency-is-hard-mckinsey-says?cmpid=BBD011223_TRADE&utm_medium=email&utm_source=newsletter&utm_term=230112&utm_campaign=trade.

Blackman, J. (2023). 'Europe Sets Binding 2030 Targets to Boost Digital Skills, Infrastructure, Industry'. *RCRWirelessNews*, January 10, https://enterpriseiotinsights.com/20230110/policy/europe-sets-binding-2030-targets-to-boost-digital-skills-infrastructure-industry.

Coppola, G. § Condon, C. (2022). 'Treasury Signal Opening for Foreign Carsmakers on EV Subsidy'. *Bloomberg*, 29 December, https://www.bloomberg.com/news/articles/2022-12-29/treasury-delays-final-rules-on-manchin-ev-tax-credit-to-march?cmpid=BBD010323_TRADE&utm_medium=email&utm_source=newsletter&utm_term=230103&utm_campaign=trade#xj4y7vzkg

https://www.bloomberg.com/news/articles/2022-10-28/biden-hits-fresh-bumps-in-plan-to-smooth-trade-ties-with-eu#xj4y7vzkg

Nikkei https://asia.nikkei.com/Economy/Foreign-investment-in-China-slumps-to-18-year-low

Pogorel, G., Nestoras, A. § Cappelletti, F. (eds.) (2022). *Decoding EU Digital Strategic Autonomy. Sectors, Issues, and Partners. ELF Techno-Politics Series 1* (Brussels: European Liberal Forum), https://liberalforum.eu/wp-content/uploads/2022/06/Decoding-EU-Digital-Strategic-Autonomy_ELF-Study_Techno-Politics_vol.1-2.pdf.

Rampini, F. (2022). 'La scarsità dei semiconduttori è già finita? Retroscena di un allarme (e, forse, di un errore che pesa nelle nostre tasche)'. *Corriere Della Sera*, 22 July, https://www.corriere.it/oriente-occidente-federico-rampini/22_luglio_22/scarsita-semiconduttori-274119b2-09ce-11ed-8f44-5a1d0a96058f.shtml?

Translation - courtesy of Google translate.

White, O., Woetzel, J., Smit, S. et al. (2023). 'The Complication of Concentration in Global Trade'. *McKinsey Global Institute,* 12 January, https://www.mckinsey.com/mgi/our-research/the-complication-of-concentration-in-global-trade.

ENDNOTES

Section 3

108 J. Seaman (2020), 'China and the new geopolitics of technical standardization', Ifri, 27 January, https://www.ifri.org/sites/default/files/atoms/files/seaman_china_standardization_2020.pdf. D. Russel and B.H. Berger (2021), 'Stacking the Deck: China's influence in international technology standards setting', Asia Society Policy Institute, 3 November, https://asiasociety.org/sites/default/files/2021-11/ASPI_StacktheDeck-report_final.pdf.

109 T. Rühlig (2020), 'Technical standardization, China, and the future international order', the Böll Foundation, 3 March, https://eu.boell.org/en/2020/03/03/technical-standardisation-china-and-future-international-order.

110 T. Rühlig (2022), 'Technical standardization and innovation in a changing geopolitical landscape, in: E. Deiaco and J. Wernberg (eds.), Rethinking boundaries and revisiting borders. Conditions for innovation, entrepreneurship, and economic integration in an interconnected world (Stockholm: The Swedish Entrepreneurship Forum), 105-132.

111 C. Dackö (2021), 'What makes a Technical Specification a WTO Compliant Standard?', Mannheim Swartling, 13 April, https://www.mannheimerswartling.se/app/uploads/2021/04/what-makes-a-technical-specification-a-wto-compliant-standard.pdf.

112 T. Rühlig and T. ten Brink (2021), 'The externalization of China's technical standardization approach', Development & Change, 52(5), 1196-121. https://doi.org/10.1111/dech.12685

113 Chinese State Council (2021), '中共中央 国务院印发《国家标准化发展纲要》' ['The Central Committee of the Communist Party of China and the State Council issued the "National Standardization Development Outline"'], Xinhua, 10 October, http://www.news.cn/politics/zywj/2021-10/10/c_1127943309.htm.

114 J. Seaman (2020), 'China and the new geopolitics of technical standardization', Ifri, 27 January, https://www.ifri.org/sites/default/files/atoms/files/seaman_china_standardization_2020.pdf.

115 V. Pop et al. (2021), 'From Lightbulbs to 5G, China Battles West for Control of Vital Technology Standards', Wall Street Journal, 8 February, https://www.wsj.com/articles/from-lightbulbs-to-5g-china-battles-west-for-control-of-vital-technology-standards-11612722698.

116 T. Rühlig (2021), 'The shape of things to come. The race to control technical standardization,' European Union Chamber of Commerce in China, 2 December, https://static.europeanchamber.com.cn/upload/documents/documents/The_Shape_of_Things_to_Come_English_Final%5b966%5d.pdf.

117 All calculations are based on information obtained from the official website of the ITU.

118 All calculations are based on information obtained from the official website of the ISO and IEC.

119 S. Teleanu (2021), ,The geopolitics of digital standards. China's role in standard-setting organizations', the Diplo Foundation, 14 December, https://www.diplomacy.edu/wp-content/uploads/2021/12/Geopolitics-of-digital-standards-Dec-2021.pdf.

120 Ministry of Industry and Information Technology (2018), '工业和信息化部关于工业通信业标准化工作服务于"一带一路"建设的实施意见' [231 Opinion on the Implementation of Standardization of the Industrial Communication Industry for Construction of the 'Belt and Road'), Law-lib.com, 5 November 2018, http://www.law-lib.com/Law/law_view.asp?id=636486. Standards Administration of China (2018), '标准联通共建 "一带一路" 行动计划(2018-2020年)' [Harmonization of Standards for Construction of 'BRI' Action Plan (2018–2020)], SAC, http://www.sac.gov.cn/zt/ydyl/bzhyw/201801/t20180119_341413.htm.

121 Estimation according to the IPlytics webinar: "SSOs, IPR Policies, Patent Pools and SEP Licensing", 11 August 2020.

122 D. Strumpf (2019), 'Where China dominates in 5G technology', The Wall Street Journal, 26 February, https://www.wsj.com/articles/where-china-dominates-in-5g-technology-11551236701.

123 State Administration for Market Regulation (2021), '"十四五"推动高质量发展的国家标准体系建设规划' ["14th Five-Year" Plan for Promoting the High-Quality Development of the National Standards System'], SAMR, December, https://gkml.samr.gov.cn/nsjg/bzjss/202112/W020211215387457412370.pdf.

124 OECD (2019), 'Regulatory Reform and International Standardisation', Working Party of the Trade Committee, TD/TC/WP(98)/FINAL (1999).

125 M. Medin and G. Louie (2019), 'The 5G ecosystem. Risks and opportunities for DoD', Defense Innovation Board, 3 April, https://media.defense.gov/2019/Apr/03/2002109302/-1/-1/0/DIB_5G_STUDY_04.03.19.PDF.

126 J-P. Bonardi and R. Durand (2003), 'Managing network effects in high-tech markets', The Academy of Management Journal, (17)4, 40-52. W.B. Arthur (1989), 'Competing technologies, increasing returns, and lock-in by historical events', The Economic Journal, 99(394), 116-131.

127 R.P. Suttmeier et al. (2006), 'Standards of power? Technology, institutions, and politics in the development of China's national standards strategy', The National Bureau of Asian Research, 1 June, https://www.nbr.org/publication/standards-of-power-technology-institutions-and-politics-in-the-development-of-chinas-national-standards-strategy/. S. Krislov (1997), How nations choose product standards and standards change nations (Pittsburgh: Pittsburgh University Press). K. Tamm Hallström (2004), Organizing international standardization. ISO and the IASC in quest of authority (Cheltenham: Edward Elgar).

128 J. Seaman (2020), 'China and the new geopolitics of technical standardization', Ifri, 27 January, https://www.ifri.org/sites/default/files/atoms/files/seaman_china_standardization_2020.pdf. J. Synge and N. Liu (2020), 'From AI to facial recognition. How China is setting the rules in new tech', Financial Times, 7 October, https://www.ft.com/content/188d86df-6e82-47eb-a134-2e1e45c777b6.

129 N. Godehardt and D. Voelsen (2020), NewIP – Grundstein für ein globales Internet nach chinesischen Vorstellungen?', Stiftung Wissenschaft und Politik, 7 May, https://www.swp-berlin.org/publikation/newip-grundstein-fuer-ein-globales-internet-nach-chinesischen-vorstellungen.

130 European Commission (2022), 'An EU Strategy on Standardization - Setting global standards in support of a resilient, green, and digital EU single market', European Commission, 1 February https://ec.europa.eu/docsroom/documents/48598.

131 The analyses, suggestions, and recommendations presented in this article are strictly those of the author and do not represent any official stance by the ELF.

132 See 'College of Europe Hosts and Runs Pilot the Programme of th European Diplomatic Academy', College of Europe, https://www.coleurope.eu/college-europe-hosts-and-runs-pilot-programme-european-diplomatic-academy.

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