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Tim Sargent, Paul Samson and Hector Torres discuss the cooperation imperative

David Kleimann *et al* consider how Europe should react to the Inflation Reduction Act

Bigtechs in finance. Agustín Carstens looks at the policy implications and forging a new regulatory path

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You reap what you sow

The rise and fall of the Western empire is being instigated by the so-called global elite (academics, politicians, international civil servants and executives in global companies, as well as successful high-technology entrepreneurs), who think alike and tend to view national loyalties and boundaries as residues from the past. When the planet's most wealthy and powerful individuals think alike, a warning from Adam Smith comes to mind: *"People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices."*

The strength of the West is its classical legacy, Christianity, the separation of church and state, the rule of law, civil society and capitalism. These pillars are being gradually eroded. Foreign policy is alienating wide parts of the globe, whether it is in the Middle East, or the pro-Ukraine sanctions and military aid pushed onto the rest of the world, or the move to protectionist trade policy. So much for the rule of law!

The world has moved from globalisation and harmonisation to localisation and isolation. We are in a world of change. For the past twenty years, connected via the internet, we have moved rapidly to a globally connected world; now, we seem to be reversing this progress and focusing the other way. The optimism at the beginning of the millennium of a new era of globalisation – a flattening of the world – that would enable the developing world to achieve their economic potential has now moved to a despair about the future.

The problem with this isolationist approach is that it destroys most of the progress of the last century. Instead of having reliable supply chains, the chains are broken. For example, the disrupted supply of wheat and other materials from the Ukraine is creating famine and fights in Africa. The Inflation Reduction Act is creating protectionism, countries are racing to subsidise the green industry.

The attempts to use the pandemic as a 'great reset' for transitioning the West from fossil fuels to 'green' energies are responsible for much of the harm. The controlled economy is wealth-destroying. One only needs to look at the post-war history of Europe, particularly the differences between East and West Germany, to realise the folly the European Union and the West in general is embarking on.

A radical geopolitical realignment is underway which is hastening the demise of Western global supremacy. The West will have to live as one pole of a multi-polar world. It is decoupling from the rest of the world.

The world is now increasingly fragmented. As *The Economist* says:

"Mutual benefit is out and national gain is in. An era of zero-sum thinking has begun." ■

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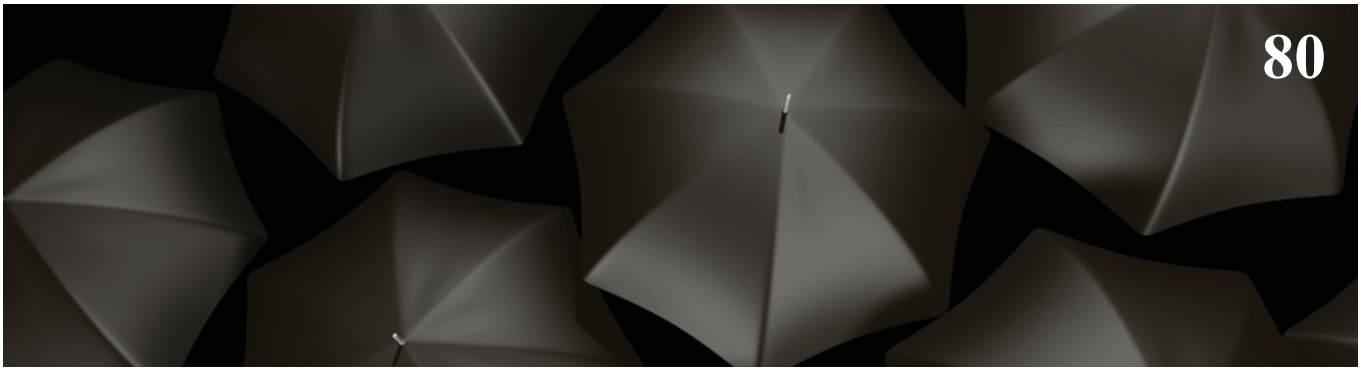

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How Europe should answer the US IRA

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

Summary

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

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

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

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

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

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

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

1 Introduction

The 2022 United States Inflation Reduction Act (IRA), a legislative package combining large-scale green subsidies with healthcare savings and new revenue measures, is a milestone in US climate policy.

While less effective than combining green subsidies with carbon pricing (Roy *et al* 2021), the IRA is expected to close two-thirds of the greenhouse-gas emissions gap between current policy and the US 2030 climate target. By driving down the cost of developing and deploying clean energy, the IRA would also make it easier to close the remaining gap (Jenkins *et al* 2022).

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

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

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

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

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

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

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

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

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

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

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

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

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

2 Unpacking the Inflation Reduction Act

2.1 What's in it?

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

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

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

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

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

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

Box 1. The IRA's green subsidies

Electric vehicles

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

Clean-tech production and investment

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

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

Electricity, hydrogen and clean fuels

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

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

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

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

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

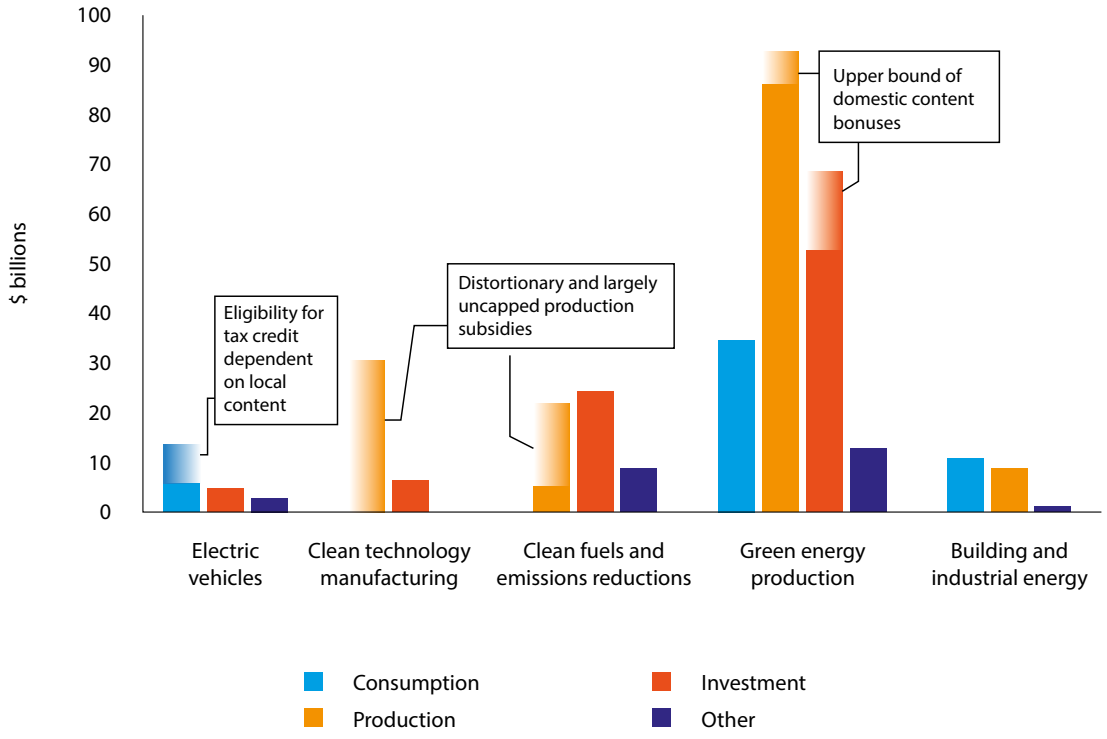
- Renewable energy producers are eligible for a 'bonus' subsidy linked to LCRs. If the steel and iron used in an energy production facility is 100% US-produced and manufactured products meet a minimum local-content share, the subsidy increases by 10 percent, with the required local-content share rising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

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

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

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

Figure 1. Breakdown of IRA subsidies



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

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

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

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

subsidies ($16 billion), and the share of subsidies for green-energy production and investment expected to include local content bonuses.

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

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

2.2 Comparing IRA and EU green subsidies

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

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

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

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

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

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

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

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

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

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

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

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

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

The main difference between the US and EU may therefore not be in the total expected volume of green subsidies (except on renewable energy, where the US is expected to continue to lag the EU), but rather on the qualitative side. First, IRA subsidies discriminate against foreign producers in a way that EU subsidies do not.

Second, the IRA provides its clean-tech manufacturing support in a particularly simple way – via tax credits covering

10 years – while comparable EU support is more fragmented, generally viewed as slower and more bureaucratic (see section 3), and sometimes shorter-term.

Third, in the clean-tech area, the IRA focuses mostly on mass deployment of current generation technologies, whereas EU level support tends to be more focused on innovation and early-stage deployment of new technologies.

3 The global and European impact of the IRA

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

3.1 Acceleration of global decarbonisation

The IRA will significantly accelerate decarbonisation in the US (though not as must as it would if combined with carbon pricing).

On decarbonisation in other countries, the IRA may initially have counterproductive effects by forcing the inefficient restructuring of supply chains into the US to meet IRA origin requirements, and by drawing to the US resources needed for decarbonisation elsewhere[15].

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

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

3.2 Direct trade and investment effects

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

Consumer tax credit for electric cars

The IRA's $7,500 consumer tax credit on electric cars could reduce the cost of an eligible vehicle of average price by about one fifth, to the detriment of electric vehicles presently excluded from the credits[19].

This could have a substantial impact on the ability of foreign automotive producers to maintain their present shares in the US market. For the EU, the consequence could be large losses of exports to the US[20].

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

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

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

Production and investment tax credits

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

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

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

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

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

Energy prices

Even before the COVID-19 pandemic and Russia's invasion of Ukraine, industrial electricity prices were lower in the US than in the EU (in 2019, by about 30 percent).

The war has led to a surge in European industrial electricity prices, which are now about twice as high as in the US[29]. These differences might be further magnified by IRA support for green electricity production, some of which has virtually zero marginal costs.

This said, green energy production subsidies do not translate directly into the prices that (industrial) consumers pay[30], and the duration of the energy crisis and the domestic roll-out of clean electricity generation will be more important than IRA subsidies for the competitiveness of energy-intensive industries in Europe.

It is unclear whether IRA subsidies have already led to a diversion of investment from the EU to the US. While a number of projects have been announced since the IRA

passed in mid-2022[31], some may have happened anyway. Evidence on whether these projects have been implemented to the detriment of competing investments elsewhere is so far lacking. An empirical analysis of the effects of the IRA on investments in the EU will therefore have to wait until a clearer picture emerges.

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

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

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

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

3.3 Impact on the multilateral trading system

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

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

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

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

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

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

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

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

4. How Europe should respond to the IRA

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

4.1 What not to do

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

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

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

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

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

Even in the darkest interpretation of its effects, the impact of the IRA does not amount to a *"serious disturbance to the economy of a member state"* anywhere near the magnitude of previous economic shocks that have justified this use of the

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

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

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

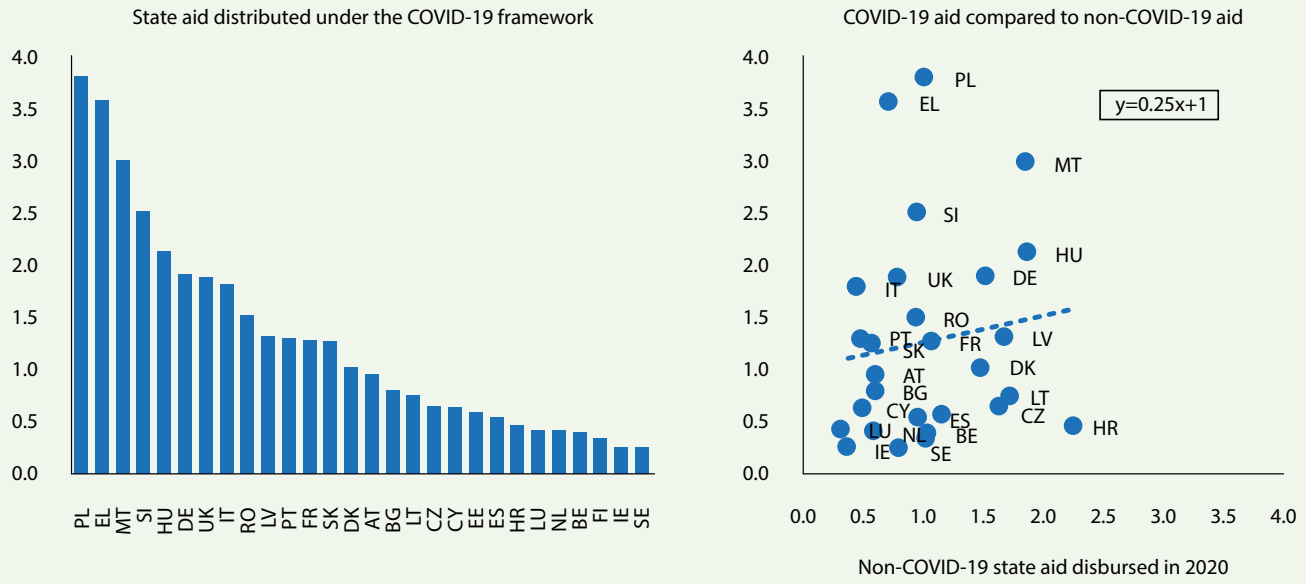
An additional exception to the prohibition of state aid is provided for *"aid to remedy a serious disturbance in the economy of a member state"* (Article 107(3)(b)). How far the remedy can go and what constitutes a serious disturbance can be regulated through guidelines and frameworks adopted by the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

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

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

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

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



Source: European Commission.

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

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

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

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

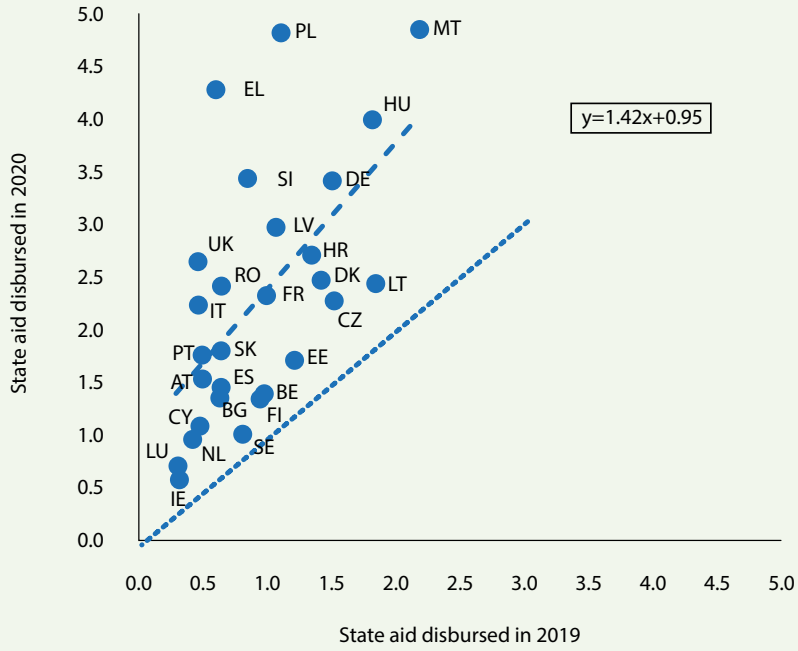
Second, the dispersion of COVID-19-related aid does not offset the dispersion of non-COVID-19 aid; if anything, it magnifies it. This is shown in the right panel, which shows that COVID-19 and non-COVID-19 aid was positively correlated (although the correlation is not statistically significantly different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

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

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

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

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



Source: European Commission.

Article, such as the global financial crisis, the pandemic and the energy price shock following Russia's invasion of Ukraine[36].

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

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

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

4.2 What the EU should do

It is easy to say what the EU should not do in response to

the IRA, but harder to say what it should do. An EU response can be explored under three main headings: (1) structural competitiveness improvements, (2) EU-level subsidies for green innovation, and (3) trade policy.

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

Other recommendations focus on the removal of obstacles or increased efforts in policy areas that have been long debated. This is the case, for instance, of the further development of single-market regulations favouring clean technology, the increased use of green public procurement and further development of the banking and capital markets union.

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

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

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

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

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

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

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

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

In particular, greater use of green public procurement would be important in sectors in which public purchasers make up a large share of the market, including transport and construction (Rodriguez Quintero *et al* 2019).

In such cases, the purchasing decisions of public authorities can encourage green innovation by giving start-ups access to economies of scale (Mazzucato, 2013).

Green procurement can also have an impact on competitiveness. By introducing sustainability requirements for clean technologies (for instance, by rewarding in tenders the use of electric cars that are produced following certain sustainability criteria, or based on certain innovation or environmental features), the EU could prioritise the deployment of clean technologies produced to European standards, without having any form of local content requirement[39].

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

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

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

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

As a first-come first-served scheme, this could encourage the accelerated deployment of renewables needed to lower

European industrial energy costs in the medium-term and to drive power-system decarbonisation.

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

Skills

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

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

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

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

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

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

Banking and capital markets union

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

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

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

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

Completing the banking union is necessary but not sufficient, and a properly defined set of actions on capital markets union must complement it (Véron, 2014).

Completing the banking union is best defined as breaking the vicious circle between banks and sovereigns and improving the EU's governance framework for resolving banks and managing banking crises (Beck *et al* 2022).

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

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

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

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

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

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

Given their complexity and political sensitivity, these objectives for banking union and capital markets union cannot

be met in the current EU legislative term. But they should be high on the list of priorities for the next EU leadership after the 2024 European Parliament elections.

EU-level subsidies for green innovation

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

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

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

The EU's current approach, based on the crossborder coordination of national projects through IPCEIs, or projects envisaged by the European Chips Act[45], may not be optimal.

Current schemes are bureaucratically heavy and end up mostly supporting a few large incumbent firms that have the ability and experience to propose and manage such projects, which typically take place in the EU countries that have sufficiently deep pockets to support them (Weil and Poitiers, 2022a; 2022b).

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

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

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

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

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

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

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

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

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

Trade policy

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

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

This deadline was extended to March 2023, which has been widely interpreted as an effort to accommodate some of the concerns of US trading partners.

The IRA regulatory process and the guidelines to be issued by US administration are particularly relevant for the electric vehicle tax credit and associated LCRs for battery and critical mineral components. If exempted, the EU's most pressing commercial and legal concerns about the IRA would reduce substantially.

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

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

The EU could immediately initiate a WTO dispute targeting the LCRs attached to the electric vehicle and clean-energy tax credits.

Pursuing this option would send an unambiguous political signal that the EU continues to invest in the WTO's rules-based system, values the balance of concessions codified in the WTO agreements, holds the US accountable for breaches of obligations, and seeks leverage for prospective bilateral negotiations with the US Trade Representative (USTR).

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

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

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

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

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

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

The challenge will be to define, negotiate and agree on permissible environmental subsidy practices that maximise environmental impacts while minimising trade distortions.

Various forums could host the technical and political negotiations necessary to generate an enabling and permissible environment for appropriate net global welfare enhancing subsidies[49]. The EU should provide much needed leadership by initiating this process.

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

5 Conclusion

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

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

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

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

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

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

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

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

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

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

It is happening when the international community badly needs greater cooperation to tackle perhaps its biggest-ever challenge, climate change.

Rather than seeking to maximise their competitive positions through beggar-thy-neighbour climate policies, the largest CO_2 emitters (China, the US, the EU and India, which together account for 60 percent of current emissions) should agree on rules that maximise the impact of their climate policies.

Senior US policymakers often refer to the rules-based international order as if American adherence to it was a self-evident fact (eg. Sherman, 2023). It is not.

The EU cannot force the US to correct course but it must demonstrate that adherence to international rules during the green transition is possible, and not a losing position. ■

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Annex I: IRA subsidies in the context of WTO law

Prohibited subsidies

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

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

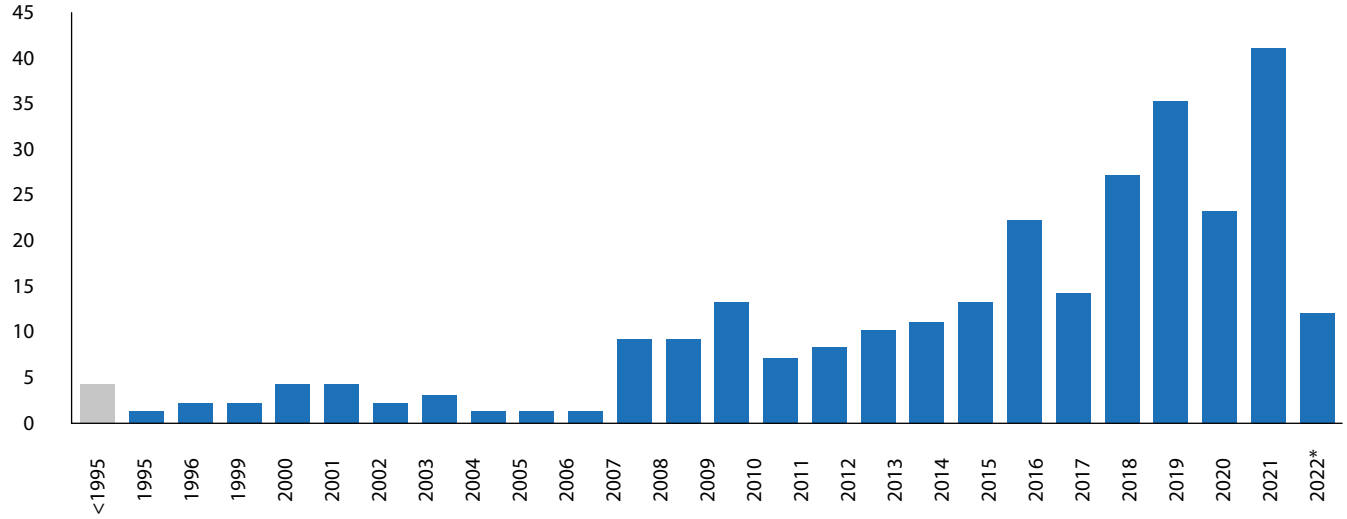
(1) extension and modification of credit for electricity from certain renewable resources; (2) extension and modification of the energy tax credit; (3) clean vehicle tax credit; (4) clean electricity production credit; and (5) clean electricity investment credit.

Actionable subsidies

The GATT exempts from its national treatment provisions the payment of subsidies exclusively to domestic producers. In other words, domestic production subsidies are generally permissible (Article 3:8(b) GATT). They are, however, 'actionable' under the ASCM if they confer a benefit and are made to a specific industry, as opposed to all economic operators. Actionable subsidies are only inconsistent with the ASCM if it can be demonstrated that they distort international trade generally, or in relation to the complaining WTO member specifically (Articles 5, 6 and 7 ASCM). Other than the relatively rare use of WTO dispute-settlement procedures to challenge 'actionable' foreign subsidies, an industry that is on the receiving end of an actionable subsidy may be subject to countervailing duties (CVD) imposed by a third-country government. The imposition of countervailing (anti-subsidy) duties requires a government agency's investigation in accordance with ASCM provisions, and a finding of injury to the domestic industry producing the like product, measured as effects on bilateral trade volume, price, revenue, sales, profits, productivity and capacity utilisation (Part V ASCM). Governments frequently employ countervailing duties against foreign subsidies, with a sharp increase over the past decade.

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

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



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

Annex II: IRA advanced manufacturing production tax credits

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

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

Source: IRA Title 26 USC §45X.

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

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

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

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

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

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

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

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

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

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

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

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

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

Except for the IPCEIs, the estimates presented in Table A2 do not include state aid, the largest subsidy category (green and not) in the EU by far. The Treaty on the Functioning of the European Union prohibits state aid but allows exceptions, including for IPCEIs, "to remedy a serious disturbance in the economy of a member state", and "to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest" (Article 107(3); see Box 1).

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

Renewable energy subsidies

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

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

Endnotes

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

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

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

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

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

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

7. Projects larger than 1 megawatt have to comply with apprenticeship and labour requirements 26 USC §45Y). Under the extended legacy rules, the subsidy for wind projects can be as high as $0.026/kWh. See https://www.epa.gov/lmop/renewable-electricity-production-tax-credit-information.

8. Projects larger than 1 megawatt have to comply with apprenticeship and labour requirements to be eligible for the full credit (26 USC §45E).

9. $0.006/kg of produced hydrogen, depending on the carbon emissions involved in the production; this can rise to up to $3/kg of hydrogen if certain labour conditions are satisfied. Clean fuels can receive up to $1.75/gallon in production subsidies (26 USC §45V).

10. See https://ustr.gov/trade-agreements/free-trade-agreements.

11. For offshore wind, 20 percent in 2025, rising to 55 percent in 2028. For all other renewable energy production facilities, 40 percent in 2025, rising to 55 percent in 2027.

12. The CBO (2022) estimates that for green energy production and investment subsidy that include domestic content, bonuses are $62.3 billion and $64.8 billion, respectively. This can be written as 56.6+56.6/10 for a 10 percent production domestic content bonus and 48.6 + 48.6/3 for the 10 percentage point investment domestic content bonus.

13. For this reason, Credit Suisse (2022) estimated that the budgetary costs of the IRA could be three times higher than projected by the CBO (2022). The discrepancy is particularly large for manufacturing tax credits, which Credit Suisse projects at $250 billion instead of $37 billion. This is based on the assumption that the subsidies will make US producers cost competitive in the manufacturing of wind and solar power equipment, capturing 90 percent of the respective domestic US markets by 2030.

14. How robust would this comparison be to the addition of state-level support on the US side and of (non-IPCEI) state aid on the EU side? With respect to electric vehicle purchases and renewable energy subsidies, the message would be much the same. California provides state-level electric vehicle subsidies of up to $2000 to the federal subsidy, making the average US subsidy level somewhat more generous than that in the EU. Renewable energy support at the state level would also add to the US total, but the overall US level would still appear to be much smaller than that in the EU. According to a 2020 report by the International Renewable Energy Agency, total renewable energy support amounted to $6.7 billion in the US in 2017, against €78 billion in the EU (Taylor, 2020). With respect to clean-tech manufacturing, we do not know the answer. Allocating both (non-IPCEI) state aid in the EU and state-level subsidies in the US to clean manufacturing requires an extensive data effort.

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

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

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

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

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

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

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

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

23. The production of raw materials that are can be used in clean tech receives 10 percent of their production cost as tax credits. The production of an electric vehicle battery would receive subsidies equivalent to roughly 30 percent of its 2022 price, while the production of components for a wind turbine can receive $0.15 per watt of capacity. The average price of a wind turbine in 2021 was around $900 per kW, meaning that this production subsidy would amount to 16 percent (see DOE, 2022).

24. At current cost, the $0.07/watt IRA production subsidy for solar panels would amount to 26 percent of the price of a solar panel (see https://ourworldindata.org/grapher/solar-pv-prices), giving a significant boost to US based manufacturing.
25. In the last decade, the price of solar panels has fallen by 95 percent, while the cost of electric vehicle batteries has fallen from $5/watt in 2012 to $0.27/watt in 2022.
26. In the case of clean energy subsidies there is a 10 percentage bonus on the tax credit received if components used come from the US, and an extra 10 percentage points in the case of a 30 percent investment subsidy.
27. See https://www.ipcei-batteries.eu/
28. For the first IPCEI on microelectronics, average funding was 28 percent of eligible project cost. See Poitiers and Weil (2022) for a discussion.
29. Between 2019 and 2022, industrial electricity prices increased from around $0.10/kWh in the EU and $0.07/kWh in the US to around $0.20/kWh in the EU compared to only $0.08/kWh in the US. Between 2019 and 2022, the spread between the EU and the US increased from $0.03/kWh to around $0.12/kWh.
30. In a simple market design ('merit order'), the price of electricity is set by the cost of the most expensive source that is needed to produce sufficient power (gas in many EU markets). The electricity price changes due to a change in the most expensive source still in the market, not by directly lowering the cost of renewable energy generation itself.
31. According to Bloomberg NEF, $27.7 billion in investments in electric vehicle and battery manufacturing in the US has been announced since the passing of the IRA.
32. Since the WTO's inception in 1995, its members have referred more than 600 disputes to the WTO dispute settlement mechanism, with 159 complaints filed against the United States by 29 WTO members, and 116 disputes launched by 30 WTO members against the European Union, its predecessors and member states.
33. Clea Caulcutt, 'Emmanuel Macron calls for "Buy European Act" to protect regional carmakers', Politico, 26 October 2022.
34. 2020 aid disbursed is a more reliable gauge of the potential distortionary impact of the temporary crisis framework than aid approved under the 2022 framework put in place after the Russian invasion of Ukraine. However, Commission Executive Vice-President Margrethe Vestager cited the aid under the 2022 framework in a widely-reported January 2023 letter to EU governments (see for example https://www.ft.com/content/85b55126-e1e6-4b2c-8bb2-753d3cafcbe5), though this refers to approvals of aid which may not in the end be granted by governments; if it is granted, it may be disbursed over several years. The shares of approved aid granted, and the length of the disbursement period may vary greatly between countries. Furthermore, aid approved refers to nominal amounts, mixing loans and grants, rather than to the aid content.
35. To adjust for differences in the magnitude of shocks, we ran a cross-sectional regression of the COVID-19 state aid shown in the left panel of Figure 2 on a measure of the economic shock, namely, the difference between the winter 2020 real growth projections published by the European Commission in February 2020, just before COVID-19, and the 2020 real growth outturns. The residual from that regression can be interpreted as the shock-adjusted level of COVID-19 aid. Consistent with the findings of Cannas et al (2022), the slope coefficient indicates a statistically significant correlation between the size of the shock and the level of COVID-19 aid. However, the regression fit is very low (R2=0.12), indicating that most of the variance of state aid is not explained by differences in the shocks. The difference between lowest and highest shock-adjusted aid level is 4 percentage points of GDP (even higher than in the raw data), and the standard deviation is 0.93 percentage points of GDP, almost as high as that of the raw data.
36. Case law supports a restrictive reading of 107(3)(b) TFEU ("serious disturbances"). The ruling in Freistaat Sachsen and Others v Commission of the European Communities (1999) found that "the disturbance in question must affect the whole of the economy of the Member State concerned, and not merely that of one of its regions or parts of its territory" (see https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61996TJ0132_SUM). Before COVID-19 and Ukraine, 107(3)(b) TFEU was used most extensively during the 2008-09 global financial crisis. We thank Armin Steinbach for pointing us to this case law and Commission practice.
37. See European Parliament press release of 9 December 2022: https://www.europarl.europa.eu/news/en/press-room/20221205IPR60614/batteries-deal-on-new-eu-rules-for-design-production-and-waste-treatment.
38. Such schemes already exist in EU countries, notably in Germany; see https://www.bmwk.de/Redaktion/EN/Dossier/regulatory-sandboxes.html. EU countries endorsed regulatory sandboxes in November 2020: https://www.consilium.europa.eu/media/46822/st13026-en20.pdf.
39. Environmental criteria in public procurement should be handled carefully, as they might expose officials to lobbying and electioneering (for instance, in view of protecting local producers against competition; Blanchard et al 2022). But this risk could be mitigated by using precise and easy-to-verify award criteria (eg. CO_2 emissions of cars or carbon intensity of electricity) rather than imprecise and hard-to-verify criteria (eg. environmental criteria related to the suppliers). This requires a clear categorisation of green criteria, as well as adequate investment in the training of public authorities that have to apply them (Sapir et al 2022).
40. The European Commission has said it will propose electricity market reform early in 2023.
41. Connall Heussaff and Georg Zachmann, 'Buying time for proper electricity market reform', Euractiv, 21 December 2022.
42. See https://news.industriall-europe.eu/Article/860.
43. See Paola Tamma, 'Eurozone countries kill banking union plan', Politico, 9 June 2022.
44. See European Commission press release of 7 December 2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7348.
45. See García-Herrero and Poitiers (2022).
46. See Tagliapietra and Veugelers (2021) on how to design such green-subsidy programmes at EU level.
47. This will be financed through the frontloaded sale of emissions trading system allowances (40 percent) and the resources of the Innovation Fund (60 percent). The distribution of these extra resources will take into account cohesion policy, EU countries' dependence on fossil fuels and the increase in investment prices. See https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-repowereu-chapters-in-recovery-and-resilience-plans.
48. Any such programme should take lessons past initiatives into account; see Claeys (2015) and Claeys and Leandro (2016).
49. Including the G7 and its climate club initiative, the G20, the Organisation for Economic Co-operation and Development, the WTO Trade and Environment Committee and WTO Trade and Environmental Sustainability Structured Discussions (TESSD), and the recently founded Coalition of Trade Ministers on Climate.
50. Article 107(3)(b) of the Treaty on the Functioning of the European Union states that "aid to promote the execution of an important project of common European interest" is compatible with the internal market.
51. The European Commission reports state aid disbursements in broad policy categories, several of which (including 'Environmental protection including energy savings', 'Regional development', 'Sectoral development', 'SMEs including risk capital' and 'Other') could in principle contain such support. European Commission (2022a), Annex II also lists the largest individual aid items in these categories disbursed in 2020, the most recent year for which this data is available. Except for the IPCEIs (reported in 'Other') we were not able to find any item in this list that specifically reflects clean-tech manufacturing support. However, some of the generic industry support packages reported in the categories 'Regional development' and 'SMEs including risk capital' could reflect disbursements to clean tech producers.

References

Autor, D, D Dorn and G Hanson (2021) 'On the persistence of the China shock', NBER Working Paper w29401, National Bureau of Economic Research
Beck, T, J-P Krahnen, P Martin, FC Mayer, J Pisani-Ferry, T Tröger, N Véron, B Weder di Mauro and J Zettelmeyer (2022) 'Completing the banking union:

Economic requirements and legal conditions', Policy Insight 119, Centre for Economic Policy Research
Blanchard, O, C Gollier and J Tirole (2022) 'The Portfolio of Economic Policies Needed to Fight Climate Change', PIIE Working Paper 22-18, Peterson Institute for International Economics.
Cannas, G, S Ferraro, A Mathieu Collin, and K Van de Casteele (2022) 'Looking back at the State aid COVID Temporary Framework: the take-up of measures in the EU', Competition State aid Brief 3/2022, European Commission, available at https://competition-policy.ec.europa.eu/system/files/2022-11/state_aid_brief_3_2022_kdam22003enn_coronavirus.pdf
Claeys, G (2015) 'Juncker plan: the EIB in the driver's seat', Bruegel Blog, 1 July.
Claeys, G and A Leandro (2016) 'Assessing the Juncker Plan after one year', Bruegel Blog, 17 May.
Clausing, K and C Wolfram (2023) 'Asymmetric Climate Policies and International Trade', mimeo
CBO (2022) Estimated Budgetary Effects of Public Law 117-169, to Provide for Reconciliation Pursuant to Title II of S. Con. Res. 14, US Congressional Budget Office, available at https://www.cbo.gov/ publication/58455
Credit Suisse (2022) US Inflation Reduction Act: A catalyst for climate action, Treeprint.
DOE (2022) Land-Based Wind Market Report: 2022 Edition, U.S. Department of Energy.
European Commission (2020) European Skills Agenda for sustainable competitiveness, social fairness and resilience.
European Commission (2022a) State aid Scoreboard 2021.
European Commission (2022b) 'Guidelines on State aid for climate, environmental protection and energy 2022', 2022/C 80/01.
European Commission (2023) 'A Green Deal Industrial Plan for the Net-Zero Age', COM(2023) 62 final.
Gallagher, K (2017) The Globalization of Clean Energy Technology: Lessons from China (Urban and Industrial Environments), MIT Press
García-Herrero A and N Poitiers (2022) 'Europe's promised semiconductor subsidies need to be better targeted', Bruegel Blog, 17 October.
Glachant, JM (2023) 'Reforming the EU internal electricity market in the middle of a huge energy crisis: an absolute short-term emergency or preparation for the future?' Working Paper, Florence School of Regulation, available at https://fsr.eui.eu/publications/?handle=1814/75239
Grau, T, M Huo, and K Neuhoff (2012) 'Survey of photovoltaic industry and policy in Germany and China', Energy Policy 51: 20–37.
Hoppmann, J, J Huenteler and B Girod (2014) 'Compulsive policy-making—The evolution of the German feed-in tariff system for solar photovoltaic power', Research Policy 43(8): 1422–41.
IEA (2022) Skills development and inclusivity for clean energy transitions, International Energy Agency.
Jenkins, JD, EN Mayfield, J Farbes, R Jones, N Patankar, Q Xu and G Schivley (2022) Preliminary Report: The Climate and Energy Impacts of the Inflation Reduction Act of 2022, Princeton University - Zero Lab.
Kleimann, D (2023) 'Climate versus trade? Reconciling international subsidy rules with industrial decarbonisation', Policy Contribution 03/2023, Bruegel.
Larsen, J, B King, H Kolus, N Dasari, G Hiltbrand and W Herndon (2022) A Turning Point for US Climate Progress: Assessing the Climate and Clean Energy Provisions in the Inflation Reduction Act, Rhodium Group.
Lazard (2021) 'LAZARD's levelized Cost of Energy ('LCOE') Analysis — version 15.0', Lazard.
Leggett, JA and JL Ramseur (2022) Inflation Reduction Act of 2022 (IRA): Provisions Related to Climate Change, CRS Report R47262, Congressional Research Service, available at https://crsreports.congress.gov/product/pdf/R/R47262
Mazzucato M (2013) The Entrepreneurial State. Debunking Public vs. Private Sector Myths, Anthem Press, London
Poitiers, N and P Weil (2022a) 'Opaque and ill-defined: the problems with Europe's IPCEI subsidy framework', Bruegel Blog, 26 January.
Poitiers, N and P Weil (2022b) 'Is the EU Chips Act the right approach?' Bruegel Blog, 2 June.
Rodriguez Quintero, R, C Vidal Abarca Garrido, H Moons, M De Oliveira Gama Caldas, O Wolf, I Skinner, A Van Grinsven, M Hoen and H Van Essen (2019) Revision of the EU Green Public Procurement Criteria for Transport, JRC Science for Policy Report, Joint Research Centre
Roy, N, D Burtraw and K Rennert (2021) 'Cost Analysis and Emissions Projections under Power Sector Proposals in Reconciliation', Issue Brief 21-15, Resources for the Future.
Sapir, A, T Schraepen and S Tagliapietra (2022) 'Green Public Procurement: A Neglected Tool in the European Green Deal Toolbox?' Intereconomics 57(3): 175-178.
Schlecht, I, L Hirth and C Maurer (2022) 'Financial Wind CfDs', Working Paper, ZBW – Leibniz Information Centre for Economics.
Sherman, W (2023) 'Remarks at Brookings Global China Event', 15 February.
Tagliapetra, S and R Veugelers (2021) 'Fostering the Industrial Component of the European Green Deal: Key Principles and Policy Options', Intereconomics 56(6): 305-310
Taylor, M (2020) 'Energy subsidies: Evolution in the global energy transformation to 2050', Technical Paper 1/2020, International Renewable Energy Agency.
Véron, N (2014) 'Defining Europe's Capital Markets Union', Policy Contribution 2014/12, Bruegel.

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Scaling up climate finance for EMDEs

Bo Li is a Deputy Managing Director at the International Monetary Fund

Let me first take stock of the wider economic context. We expect 2023 to be another challenging year for the global economy. In our latest IMF *World Economic Outlook*, we expect global growth to fall from an estimated 3.4 percent in 2022 to 2.9 percent in 2023.

In the euro area, the slowdown is even more pronounced — from 3.5 percent in 2022 to an expected 0.7 percent this year before a modest rebound to 1.6 percent in 2024. And despite the recent drop in energy prices, we expect energy security concerns will continue to loom large in Europe.

This speaks to the importance of the green transition—away from fossil fuels that are subject to supply disruptions and volatility, and towards renewables such as wind and solar energy.

The growing impact of global warming reminds us of the urgency. From heatwaves in Europe and wildfires in North America, to droughts in Africa and floods in Asia: last year saw climate disasters on all five continents. The effects of climate change are all around us.

Without decisive action, things are set to get worse because we are clearly not on the right trajectory for cutting global emissions. We need to cut global emissions by 25?50 percent by 2030 compared to pre-2019 levels to contain temperature rises to between 1.5 and 2 degrees celsius.

IMF analysis of current global climate targets shows, unfortunately, they would only deliver an 11 percent cut—less than half of the minimum reduction that is needed. And so we need higher ambition, stronger policies, and more finance for implementation. This last point is where I will focus my remarks.

Financing needed to meet adaptation and mitigation goals are estimated at trillions of US dollars annually until 2050. But so far, we are seeing only around $630 billion a year in climate finance across the whole world—with only a fraction going to developing countries.

This is particularly concerning—because emerging and developing economies have vast needs for climate finance. And it underlines why it's so important for advanced economies to meet or exceed the pledge of providing $100 billion per year in climate finance for developing countries.

This is not just the right thing to do, it is the smart thing to do. Why? Because under a business-as-usual scenario middle- and low-income countries are expected to account for 66 percent of global CO_2 emissions by 2030, up from 44 percent in 1990.

In other words, because climate change is a global problem, it requires coordinated global solutions. So, what can we do to boost financing?

First , focus on the policies that can redirect investment flows from high-carbon projects towards climate friendly opportunities. Here, think of smarter regulation, price signals and well targeted subsidies that incentivize low-carbon investment while paying attention to each country's unique fiscal and macro-financial characteristics.

The second priority is to build capacity. We need to strengthen public financial management and public investment management related to climate projects for policymakers to implement needed reforms. Countries need the capacity to identify, appraise and select good quality projects, as well as to manage relevant fiscal risks.

There is a significant scarcity of high quality and reliable data, harmonized and consistent set of climate disclosure standards, and taxonomies to align investments to climate-related goals.

So, capacity building is needed to strengthen the climate information architecture that will help develop and deepen the capital markets and improve the bankability of projects.

Innovative financial structures can also catalyze technical assistance programs to support the creation of new markets for climate finance by developing guidelines, providing training programs for local stakeholders, and facilitating the adoption of the principles and international best practices in emerging markets.

This brings me to my third priority: innovative financial mechanisms including de-risking instruments and a broader investor base.

At a more granular level, investors who want to deploy capital into emerging and developing economies must overcome a host of constraints. These include high upfront costs and long timeframes associated with climate investments, lack of liquid

markets, foreign exchange risk, and scarcity of well-planned and scalable projects.

Overcoming these obstacles requires a change of mindset – from the public sector, the private sector, and multilateral institutions – to revamp the financial architecture so more private finance is pulled towards climate projects.

That means being flexible -- ready to complement a national strategy with a regional strategy as appropriate; or adopt a programmatic approach in addition to the traditional project-based approach in implementation to suit institutional mandates and needs. Above all, public-private synergies will be critical.

Consider green bond funds that can tap into the vast resources of institutional investors by using relatively limited public resources. Such funds have great potential, as the example of the Amundi Planet Emerging Green One fund shows.

Set up with the support of the International Finance Corporation (IFC) and EIB, the Amundi green fund successfully leveraged private capital by several multiples. And let's not forget the investors who contributed to that success by taking calculated risks, including the IFC and EIB which invested in the equity and senior tranches of this fund.

But this isn't the only way that multilateral development banks can help. Blended finance can play an important role to crowd in public and private sector investors. Public sector, including national governments and multilateral development banks like the EIB, could provide first-loss investments, equity capital, or credit enhancements.

And by prioritizing equity over debt, development partners and multilateral development banks would also avoid adding to the sovereign debt burdens of developing countries.

At the IMF, we have stepped up and embraced the mindset change that is required to tackle climate change. We have put climate at the heart of our work – in surveillance, capacity development, lending, and in data and diagnostic tools, including the climate information architecture,

In collaboration with the World Bank, the Bank for International Settlements, and the OECD, the Fund is developing operational guidance on the G20 high-level principles for sustainable finance alignment approaches. And the new G20 Data Gaps Initiative will help develop detailed statistics on climate finance and forward-looking physical and transition risks indicators.

On the lending side, our new Resilience and Sustainability Trust (RST) will provide longer-term affordable financing for our vulnerable low- and middle-income members.

"To deliver on our shared climate goals, we must combine policy reforms, capacity development, and financing arrangements. What we need today is unprecedented cooperation and coordination"

Our goal is that – through the RST – policy reforms, capacity development, and financing arrangement can be delivered in a package used to improve the policy and capacity environment and scale up climate finance by crowding in large-scale private capital.

For example, capacity development can empower policymakers to better identify, appraise, and select good quality projects. And climate-friendly public financial management and public investment management promote accountability, transparency, and more effective spending.

Such measures can not only help governments manage potential relevant fiscal risks from the various financing options – they can also give investors greater certainty that their funds are spent effectively and bring in new, interested donors through improved transparency and governance.

In addition, with the IMF's expertise in macroeconomic and financial sector issues, we are hopeful that we can gather national authorities, multilateral development banks, and the private sector including institutional investors, export credit agencies, and others to identify and explore solutions to broaden the investor base and scale up private finance.

We are already working with some of these partners to see how the RST—by leveraging sound policies and creating additional fiscal space—can promote financing arrangements or facilities that could mobilize large scale private capital.

To deliver on our shared climate goals, we must combine policy reforms, capacity development, and financing arrangements. What we need today is unprecedented cooperation and coordination.

And each of us has a unique role to play – and we must all step up. Because if we do not deliver on the financing needs of emerging markets and developing economies, we cannot hope to meet the goals of the Paris Agreement. ■

This article is based on a speech delivered at EIB Group Forum, February 27, 2023.

Unprecedented opportunities

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Both digitalization and decarbonisation represent unprecedented opportunities for today's economies because they could bring about important co-benefits in terms of jobs, competitive and overall wellbeing.

The digital revolution is a largely ungoverned mega-trend that is predominantly fuelled by disruptive market forces and consumer preferences. While public support plays a crucial role in the development of digital technologies, the discovery and ubiquitous application of sensors, the internet of things, artificial intelligence, digital devices, cloud services and digital business model is promoted by private entrepreneurs and early technology adopters.

The 'just ecological transition' is often cited as grand challenge of our times, motivated by the need to address imbalances emerging from market forces alone, namely pressure on natural systems beyond what is feasible within planetary boundaries and the unequal distribution of resources both across and within countries and regions. While reducing our exposure climate risks, such transition should bring about better jobs and increase the quality of life.

Up to recently, discussions around the digital revolution and the just ecological transition were carried out separately, in different ministries at the national level and by different actors at the sectoral and local level.

Yet, there are strong reasons to argue that the digital transformation and the just ecological transition should be addressed jointly by firms, governments, and citizens.

First and foremost, a very heterogeneous body of research shows that there are strong mutual interactions between these two processes. Most notably, not addressing climate challenges implies that the digital world of the future will be characterized by high climate risks, and that economic wellbeing will be jeopardized.

Furthermore, the way in which the digital revolution will unfold strongly affects the prospects of a just ecological transition. The direction of this impact is in fact not clear.

One the one hand, digital technologies could increase emissions if they increase overall energy demand or generate digital waste; they could also increase inequality if their benefits accrue only to a minority of workers and of the overall population, leaving others behind. If this were the case, achieving a just ecological transition will be harder and costlier.

On the other hand, digital technologies could contribute to emission reductions through energy and material efficiency, by favouring demand-side management practices in energy use and by promoting citizens' education and participation in decision processes. If this were the case, the just ecological transition could be achieved faster and at lower costs than currently foreseen.

A second, subtler but equally strong, rationale for the joint consideration of these transformations lies in the asymmetry in their relation, which is due to their different nature and pace. The digital revolution progresses at extremely fast speed and is predominantly driven by market forces; digital innovation happens in several directions and at different scales.

The ecological and sustainability transitions are extremely slow processes, in which consensus building plays a critical role to move forward. It thus appears that digitalization has the potential to strongly affect the just ecological transition in the short term, while the opposite is only marginally true, if at all.

Importantly, as digitalization rapidly changes our economies and societies, agreed-upon processes and targets to achieve the sustainability transition may become obsolete or irrelevant very fast.

Both transitions will require significant proactive agency and policy support to achieve societal goals, but the nature and extent of this support is different. Deep decarbonization pathways should factor in the disruptive role of digital technologies.

Similarly, governing digitalization is a necessary requirement to ensure that digital technologies contribute to emission

reductions and to the achievement of other sustainable development goals.

Policy portfolios in support of the twin ecological and digital transition need to account for, and balance, these fundamental differences. Only through the joint consideration of the barriers and enablers of these two major transformations can technologies and market forces be harnessed to ensure that the benefits accrue to all citizens, firms and workers.

If we fail in this endeavour, we will have to face significant negative environmental and social consequences, while economics gains will accrue to a small share of the world's population, very concentrated both within and across countries.

Hence, the prospects of future economic growth and wellbeing strongly depend on the joint governance of both the digital and the ecological transitions.

Governance aspects become paramount to ensure that digital technologies can become multipliers of sustainable change and that societal co-benefits—ie. positive labour market outcomes, increased competitiveness, access to products and services—are achieved for all.

Both digitalization and decarbonization should unfold, in a mutually supportive way, and without impairing other ancillary benefits such as economic growth and inclusion.

A fundamental question then needs to be addressed: what are the necessary buildings blocks of a strategy to ensure that digital technological developments and breakthroughs offer a win-win solution to the potential tension arising between decarbonisation processes and economic growth in the context of a just transition?

There are many answers to this question, depending on local, regional, and national specificities, conditions and institutional settings. Yet, six important ingredients should not be missing:

1. The collection of key indicators at various scales (local, regional, national) measuring the progress of digitalization, its benefit and barriers, and allowing benchmarking.

2. Further research on the mechanisms governing digital low-carbon pathways towards sustainability and the specific conditions under which digitalization will act as an enabler towards sustainability in different regions, countries and sectors.

3. Strong government commitment to a just ecological and digital transition in the form of support for job creation; targeted public investments in low-carbon, digital and sustainable infrastructure; the promotion of changes in human behaviour towards reducing resource and emissions footprints.

4. Training programs to upskill and reskill workers, ensuring they can transition to more sustainable jobs, and benefit from the opportunities arising from the twin digital and ecological transitions.

5. Enhanced social safety nets to support those who may find it particularly difficult to adjust to new technologies and transition towards different jobs.

6. Just and inclusive processes of citizen and stakeholder engagement to co-design policies and measures and to generate a shared, strong and actionable vision of what a just transition looks like. ■

"The prospects of future economic growth and wellbeing strongly depend on the joint governance of both the digital and the ecological transitions"

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The end of ESG: an evolution from niche to mainstream

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ESG is both extremely important and nothing special. It's extremely important because it's critical to long-term value, and so any academic or practitioner should take it seriously, not just those with 'ESG' in their research interests or job title.

Thus, ESG doesn't need a specialized term, as that implies it's niche – considering long-term factors isn't ESG investing; it's investing. It's nothing special since it's no better or worse than other intangible assets that create long-term financial and social returns, such as management quality, corporate culture, and innovative capability.

Companies shouldn't be praised more for improving their ESG performance than these other intangibles; investor engagement on ESG factors shouldn't be put on a pedestal compared to engagement on other value drivers. We want great companies, not just companies that are great at ESG.

1. Introduction

Now is the peak of ESG. It's front and centre in the minds of executives, investors, regulators, business students, and even the public. Major corporations are appointing Chief Sustainability Officers to the C-suite, justifying strategic decisions based on their ESG impact, and tying executive pay to ESG metrics.

4,375 investors managing $121 trillion had signed the Principles for Responsible Investment (PRI) by the end of 2021, dwarfing the 63 investors overseeing $6.5 trillion who helped found the PRI in 2006.

Regulators are establishing taxonomies of which corporate activities may be labelled 'sustainable', and tiering funds by their ESG incorporation. Business schools are rushing to introduce ESG courses, establish ESG centers, and reinvent faculty as ESG experts. Newspapers are publishing dedicated ESG newsletters, and customers are increasingly basing their purchasing decisions on a company's ESG impact.

With this context, it seems crazy to title an article *The end of ESG*. But this title intends not to signal ESG's death, but ESG's evolution from a niche subfield into a mainstream practice. The biggest driver of this ascent is the recognition that ESG factors are critical to a company's long-term (financial) value.

But then all executives and investors should take them seriously, not just those with 'sustainability' in their job title. Considering long-term factors when valuing a company isn't ESG investing; it's investing.

Indeed, there's not really such a thing as ESG investing, only ESG analysis. The value relevance of ESG was how I got into the topic in the first place, back in my PhD days when ESG was still niche. My job market paper was a theory of how blockholders (large shareholders) enhance a company's long-term value (Edmans, 2009).

The model showed that blockholders don't just assess a company by its quarterly earnings; instead, they do a deep dive into its intangible assets, such as its corporate culture, customer loyalty, and innovative capability. Doing so is costly and time-consuming, but their large stakes make it worthwhile.

In turn, if a company knows that its key shareholders will assess it on long-term value not short-term earnings, this frees it to focus on the former and not fret so much about the latter.

Importantly, the shareholders were just that – shareholders. They weren't ESG investors; they weren't analyzing a company's long-term value because they were forced to by regulation or pressured to by clients.

They just wanted to beat the market, and you can only do so with information that's not already in the price. Quarterly earnings are publicly available, but it's long-term factors that are hidden treasure.

When seminar audiences asked me for examples of such investors, I'd reply Warren Buffett, Bill Miller, and Peter Lynch. None of these are ESG investors; they're simply long- term-oriented investors.

But there was one question I didn't yet have a good answer to. Why are blockholders needed at all – why companies can't just disclose the value of their intangible assets? I replied that intangibles were difficult to report credibly; there are few verifiable measures of items such as corporate culture. And even if there were, small shareholders might not understand their value relevance, or know how to change cell C23 in

their model upon learning that a firm actively encourages dissenting viewpoints.

Yet I only had common sense to buttress my responses; back then, there was no evidence either way. So in the final months of my PhD, I started a new paper. I took the *100 Best Companies to Work For in America* and found that they delivered higher shareholder returns than their peers over a 28-year period. The Best Companies list is highly visible.

If markets were efficient, the Best Companies' stocks would jump as soon as the list came out, preventing future outperformance. The superior returns imply that the market failed to fully incorporate employee satisfaction.

I initially published the paper in a finance journal (Edmans, 2011); a management journal then invited me to write a management-oriented version (Edmans, 2012). Neither article mentioned ESG even once. I didn't study employee satisfaction because it's an ESG factor, but because it's a value-relevant factor.

I wanted to show that the market overlooks important value drivers, and titled the finance paper *Does the Stock Market Fully Value Intangibles? Employee Satisfaction and Equity Prices*. Serendipitously, Lloyd Kurtz, who chaired the Moskowitz Prize for Socially Responsible Investing (SRI), invited me to submit my paper to the competition.

I'd never thought of my research as being about SRI, but did some digging after Lloyd's email and found that many SRI investors indeed scrutinize worker welfare. I added some SRI implications into the paper, but doing so opened a mini Pandora's box.

If the paper was about SRI, why study employee satisfaction and not other SRI screens such as Catholic values and animal rights? I stressed that human capital theories provide strong reasons for why employee satisfaction might be value-relevant, but there weren't as clear justifications for those other factors, so any correlation might result from data mining.

If ESG is a set of value-relevant factors, then it's both extremely important and nothing special. ESG is extremely important because any academic or practitioner should care about the drivers of long-term value, particularly (for investors) ones that are mispriced by the market.

Indeed, the title of this article is inspired by Thaler's (1999) *The End of Behavioral Finance*, which predicted that behavioural finance would become mainstream – to understand asset prices, it would become widely accepted that you need to study not only cash flows and discount rates, but also investor behaviour. The same is true for ESG.

Critics of capitalism argue that finance textbooks focus on short-term profit and need to be overhauled to incorporate ESG. As the new co-author adding ESG into a long-standing textbook (Brealey *et al* 2022), I'd love to claim I'm radically reforming business education. But *Finance 101* has always stressed how a company's worth is the present value of all its cash flows, including those in the very distant future.

"To be closed to the possibility of valid concerns is contrary to a culture of learning, and to assume that counterarguments are politically motivated is itself cynical"

A company's relationships with its employees, customers, communities, suppliers, and the environment are highly value-relevant; there's nothing particularly cultish, liberal, or – dare I say it – 'woke' in considering them.

But this article aims to go beyond just applying Thaler's analogy to ESG. And that's where the second point comes in – that ESG is 'nothing special'. This isn't meant to be disparaging, but to highlight how ESG is no better or worse than other factors that drive long-term value.

This matters for several reasons. First, ESG shouldn't be put on a pedestal compared to other value drivers. Companies and investors are falling over themselves to demonstrate their commitment to ESG, with company performance on ESG metrics given a special halo, and investors praised even more for engaging on ESG issues than productivity, capital allocation, and strategy.

In some cases, such as Danone and the very many ESG funds that underperform, this may lead to ESG being prioritized at the expense of long-term value.

Second, practitioners shouldn't rush to do something special for ESG factors that they wouldn't for other intangibles, such as demand that every company tie executive pay to them, or reduce them to simple quantitative metrics.

Third, many of the controversies surrounding ESG become moot when we view it as a set of long-term value factors. It's no surprise that ESG ratings aren't perfectly correlated, because it's legitimate to have different views on the quality of a company's intangibles. We don't need to get into angry fights between ESG believers and deniers, because reasonable people can disagree on how relevant a characteristic is for a company's long-term success.

On the flipside, if ESG is nothing special, then some practices we implement for ESG could be rolled out to other areas of finance. Regulators are cracking down on ESG funds that are greenwashing – and they should similarly scrutinize other investors who aren't doing what they say, such as actively-managed funds that are closet indexers.

This article discusses how our perspectives on topical ESG issues change when we view them through a long-term value lens – as drivers of long-term value, no more, no less – rather

than an ESG lens – as a magic set of factors that companies, investors, and even professors need to demonstrate their commitment to over and above other value drivers.

2. ESG metrics

Investors, regulators, and other stakeholders are increasingly demanding that companies report their performance along various ESG metrics. Many are calling for a common set that all firms be compelled to disclose, as well as standards to ensure they're all measured in the same way.

Under the ESG lens, this is a no-brainer. Companies need to report their ESG performance to prove they're walking the walk, rather than just talking the talk. And just like financial statements, they should be comparable so that shareholders can see how firms stack up to their peers. In turn, investors can demonstrate to their clients how truly green they are, if their portfolio ticks more ESG boxes than their competitors'.

It might seem that ESG metrics are also a no-brainer under the long-term value lens – if ESG drives long-term value, then investors need ESG metrics to be able to estimate long-term value.

Indeed, this was the solution that my job market audiences proposed. If companies disclosed measures of long-term value, then the market will focus on them rather than short-term earnings.

But if ESG drives long-term value, then it's no more special than any other intangible assets that do so. And it's particularly non-special since we've known for at least 30 years that the value of a company depends on more than just financial factors.

Kaplan and Norton (1992) introduced the 'balanced scorecard' which *"complements the financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and improvement activities – operational measures that are the drivers of future financial performance."*

Kaplan and Norton stressed the importance of reporting measures not because they're part of a framework or a box to be ticked, but because they *"are the drivers of future financial performance"* – their article is entitled *The Balanced Scorecard – Measures That Drive Performance*.

ESG has helped advance the balanced scorecard from Kaplan and Norton's time. It highlights how the value of a company depends not only on its financial and operational performance, but also its stakeholder relationships. But viewing metrics through a long-term value lens rather than an ESG lens shifts our thinking in two ways.

First, it widens our perspective, because many value drivers don't fall under the narrow umbrella of ESG. Companies should tune out the noise created by reporting frameworks and stakeholder demands and instead ask – what are the attributes that we ourselves want to monitor, because they're 'measures that drive performance'?

In other words, what are the Key Performance Indicators (KPIs), or leading indicators, that help us assess whether our company is on track? These KPIs will certainly include ESG metrics, such as carbon emissions for an energy company, but they'll also include other dimensions such as customer net promoter scores or new patent generation. This perspective moves ESG from a compliance exercise – a set of boxes to be ticked – to a value creation tool.

The most important broadening is that most ESG metrics capture 'do no harm' – the amount of damage a company inflicts upon society, such as water usage, particulate production and worker injuries.

That's certainly important, but long-term value is much more about whether a company 'actively does good'; in Edmans (2020) I refer to the latter as growing the pie, and the former as splitting the pie fairly.

The measures that track value creation will be specific to a company's strategy. Unilever gauges the number of citizens it reaches through its hygiene campaigns, Olam measures the number of smallholder farmers who participate in its sustainable farming programs, and MYBank reports the number of start-ups that it lends to who'd never obtained a bank loan before.

A common set of ESG metrics doesn't stop companies from going further and reporting additional bespoke factors. But common measures will likely get most focus, since everyone reports them – that's why some investors fixate on quarterly earnings, even though companies have been disclosing non-financial dimensions for decades.

In turn, if investors prioritize these common measures, this will encourage executives to do so too because they'll be evaluated on them, at the expense of the dimensions that actually create value (Edmans, Heinle, and Huang, 2016).

Common measures are also easy to compare as they don't require expertise. Even if I have no knowledge of basketball, I can still see which NBA players score the most points, even though they're only one dimension of quality. Similarly, an investor who knows little about a company's business model can still notice that eight tons of emissions are higher than five.

Indeed, some of the biggest calls for common metrics are from people late to the ESG bandwagon, because reducing an art to a number comparison exercise allows everyone to join the party.

Second, replacing the ESG lens with the long-term value lens focuses our perspective, as it suggests that companies should report ESG factors only if they 'drive performance' – a leading indicator is one that leads to future outcomes[1].

The first shift in thinking stressed that driving performance is a sufficient condition to report a KPI; it doesn't matter if it's an 'ESG' metric or not. This second shift highlights that it's also a necessary condition.

This focus is important, because there are literally hundreds of ESG metrics that companies could report. Not only would this divert a company's attention from actually creating value to reporting on value, it would ironically reduce transparency to investors and stakeholders as they won't know where to look.

2.1 ESG-linked pay

Many companies are going beyond simply reporting ESG metrics to linking pay to them. A PwC (2022) study found that 92% of large US companies and 72% of large UK firms are using ESG metrics in their incentive plans. Some investors, on both sides of the Atlantic, argue that all firms should tie executive pay, at least in part, to ESG. Regulators are contemplating requiring such a link.

Such ties make sense under the ESG lens. Companies obtain a public relations boost from linking pay to ESG, as it suggests they care so much about ESG that they pay for it. Investors who loudly call for every company to incorporate ESG metrics in bonuses are seen as ESG pioneers.

But under the long-term value lens, it's far from clear cut. The balanced scorecard stressed the important of paying close attention to non-financial metrics, but Kaplan and Norton (1992) never advocated putting them into compensation contracts.

Doing so is unnecessary – if ESG metrics are indeed relevant for long-term value, then tying pay to long-term value is sufficient to encourage executives to bolster them, as found by Flammer and Bansal (2017).

Even worse, they could backfire by prompting CEOs to focus only on the ESG dimensions in the contract, and not the myriad of other value drivers, as predicted by the multi-tasking model of Holmstrom and Milgrom (1991).

For example, paying an executive based on demographic diversity may discourage her from hiring white males who bring socioeconomic or cognitive diversity, or lead her to focus on diversity and not inclusion. Since only quantitative metrics can be put into a contract, ESG-linked pay may cause CEOs to focus on them at the extent of the qualitative. They'd hit the target, but miss the point.

For most drivers of long-term value, such as patents, net promoter score, and customer attrition, companies will report them – and scrutinize them very carefully, not just looking at whether they've gone up or down but understanding why. However, they'll stop short of linking pay to them. This should generally be the approach for ESG metrics[2].

2.2 The other motive for ESG

But there's an elephant in the room. I've explained that the main reason for the rise in ESG is its relevance to long-term value. Yet that's far from the only reason – we care about ESG because of the externalities it imposes on society.

A 2013 Trucost report estimated the environmental costs created by business at $4.7 trillion per year, and this figure has likely soared since then. Beyond the environment, business workplace practices can lead to burnout, physical injuries, and even deaths; whom companies hire and promote affects social inequality and inclusion.

By definition, externalities don't affect a company's profits, even in the long run. Thus, ESG advocates argue that we should require companies to disclose externalities, so they can be held accountable for reducing them; tying CEO pay to externalities will further incentivize such a reduction.

But intangible assets also have substantial externalities: Haskel and Westlake's (2017) book on intangibles highlights 'spillovers' and 'synergies' as two of their defining features.

An innovative new product creates consumer surplus above and beyond what customers pay for it, suppliers earn producer surplus from selling inputs for more than their cost, and competitors build on the innovation to launch their own versions.

Training employees increases their human capital, and many of the benefits won't be captured by the firm providing the training: they may leave for a competitor, relocate for family reasons, or be more likely to find another job if their current employer shuts down – attenuating the large social costs suffered when a major local employer closes (eg. Goldstein, 2017).

Turning to a negative externality, a sluggish executive team can impose huge costs on society – Kodak went bankrupt after missing the digital revolution; it had been worth $31 billion to its shareholders at its peak and employed 150,000 people at one point.

Just as for drivers of financial returns, ESG shouldn't be treated differently from other drivers of social returns. One could justifiably argue that the externalities arising from some ESG issues, such as climate change, are particularly important, but this changes the magnitude of the response, not the type.

All externalities are a market failure, and thus are best dealt with through government intervention to correct this failure. Governments can provide public goods themselves, or subsidize, tax, or regulate externality-producing activities, such as taxing carbon emissions, imposing minimum wages, and introducing diversity quotas.

It's the government that's best placed to address these ten externalities, since it's democratically elected by a country's citizens, whereas investors disproportionately represent the elites and thus may underweight, for example, the impact of decarbonization on blue-collar oil and gas jobs.

But real-life governments don't address all externalities. First, even if they're well-functioning, governments can't regulate qualitative factors such as corporate culture or management initiative, because they're hard to measure.

Investors thus have a particular role to play in monitoring these issues, but can only do so effectively if they don't reduce them to simple numbers. The government should regulate all

quantitative ESG issues, and so the only ones for investors to address are qualitative, highlighting the inconsistency of a metrics-driven approach.

Second, the government may not be well-functioning – it may fail to regulate externalities that the electorate cares about due to lobbying or sluggishness. As a result, companies could legitimately argue that they should pursue ESG, even it doesn't improve long-term value, due to its externalities.

This is the one case in which this article's thesis no longer applies – ESG investing is different from investing, and ESG is different from other value drivers, because it's pursued to achieve societal goals even at the expense of shareholder returns.

Then, the implications are quite different. Companies should be up-front that they're pursuing sacrificing shareholder returns pursue ESG, and thus need a clear mandate from shareholders to do so. Investors may be happy to give such a mandate – pension funds might rationally sacrifice a few basis points of financial return to reduce a company's carbon emissions, because pensioners care not only about their income in retirement but the state of the planet.

There is a trade-off, but shareholders believe that the trade-off is more than worth it. In turn, funds that intend to sacrifice financial returns to pursue societal goals should be transparent about this to their clients[3].

We've discussed how the defining feature of ESG is not its link to long-term returns, nor its positive externalities, both of which are shared with intangible assets. If, instead, the defining feature of ESG is the fact that it's sometimes at the expense of long-term value, then it might not be put on such a pedestal.

3. ESG funds

Money is pouring into ESG funds. In 2020, $17.1 trillion ($1 in every $3 under professional management) was invested in ESG strategies in the US – that's 42% higher than in 2018, and 25 times as high as in 1995 – with similar growth around the world. Hartzmark and Sussman (2019) find causal evidence that investors flood into ESG funds with higher Morningstar globe ratings.

One reason for their popularity is the belief that ESG investing systematically outperforms. The UK's largest retail broker emailed all its clients claiming that *"study after study that shown that businesses with positive ESG characteristics have outperformed their lower ranking peers."*

The evidence is far more ambiguous than claimed (see the survey of Matos (2020)), but even if it were clear-cut, academic research has documented a huge number of other investment strategies that outperform (see, eg. McLean and Pontiff (2016)). If savers are interested in alpha, then they shouldn't prioritize ESG over other characteristics that create alpha.

Of course, long-term financial returns aren't the only motive to invest in ESG funds. Another is to change company behaviour – improve its ESG performance, thus creating more positive externalities. Impact can be achieved through two channels: exit and voice (see the surveys of Edmans (2014) and Edmans and Holderness (2017)).

Exit involves divesting from an ESG laggard, driving down its stock price. Ex post, this increases its cost of capital and hinders its expansion; ex ante, the company might boost its ESG performance to avoid being sold (Edmans, Levit, and Schneemeier, 2022).

However, this channel works for all measures of performance, not just ESG ones. Investing in twelve innovative companies with great management teams and strong cultures helps them create more positive externalities, as well as encouraging firms to improve these dimensions in the first place.

Voice involves engaging with a company through voting, private meetings and – if necessary – public activism, to cut its carbon footprint or improve its employee diversity. Such actions can indeed create value for both shareholders and society (Dimson, Karakaş, and Li (2015); Hoepner *et al* (2022)), but so can engagement on other topics (Brav, Jiang, and Kim (2015); Brav, Jiang, Ma, and Tian (2018)).

Cutting unnecessary costs improves investor returns, reduces resource usage, and increases a company's resilience, but shareholders obtain far less credit for it than ESG engagement.

Regulators, the media, and investors are cracking down on ESG funds for not being ESG enough – for holding stocks in brown industries, and for sometimes voting against ESG proposals. But blanket divestment is often not the most effective way to improve corporate ESG behaviour (Edmans, Levit, and Schneemeier, 2022) and many ESG proposals do not create long-term value (Gantchev and Giannetti, 2021).

Even setting aside these concerns, funds should absolutely be held to account for doing what they say. Yet it's not clear why investors in non-ESG funds deserve any less protection. Any thematic fund claims to follow a strategy.

Does the Jupiter Global Financial Innovation hold only companies that are truly financially innovative? Does the Capital Group New World fund only invest in the most frontier economies? Should a value fund be punished for buying stocks that aren't actually good value?

What about a growth fund who owns firms that don't end up growing? Cooper, Gulen, and Rau (2005) find that funds that changed their name to match current 'hot' styles (eg. adding 'cautious' in a downturn or 'growth' in an upswing) enjoyed abnormal inflows of 28% over the next year – even if their actual holdings didn't change.

And it's not just thematic funds that make pledges – any actively-managed fund claims to beat the market. But a fund that underperforms the market 5 years in a row, costing its investors thousands of dollars in retirement savings, is unlikely to be as publicly shamed as a manager of a sustainable fund who opposes a high-profile ESG proposal.

Funds that consistently underperform, actively managed funds that are closet indexers, and thematic funds that persistently deviate from their theme, should be scrutinized as much as their ESG counterparts.

4. ESG controversies

4.1 ESG ratings

Viewing ESG as a set of long-term value drivers also helps defuse many of the controversies surrounding it. One is the significant disagreement between ESG rating agencies (Berg, Kölbel, and Rigobon, 2022). Critics interpret this as evidence that rating agencies are failing – why can't they agree about a company's ESG, like since S&P, Moody's, and Fitch do about creditworthiness?

But reasonable people can disagree about the long-term value potential of a company's ESG – which factors are relevant (will companies suffer financially from producing electromagnetic radiation?), how to assess them (how inclusive is a company's corporate culture?), and the relative weight to put on each. An ESG rating isn't fact; it's opinion.

Credit ratings aren't a good analogy as there's no ambiguity on what they're trying to measure – whether a company will repay its debt. There might be different views on how to assess it, but the object of the assessment is clear.

For ESG, it's not even clear which factors should be measured to begin with. The better analogy is to equity research reports, which also try to measure long-term value[4].

No-one would argue that stock analysts can't do their job because Goldman Sachs says 'buy' and Morgan Stanley recommends 'sell'. Indeed, another word for disagreement is 'diversity', ironically something ESG advocates should embrace rather than lament. A diversity of opinion is far more informative than if everyone said the same thing.

The main complaints are from ESG-by-numbers investors who want a single unambiguous ESG rating they can use for portfolio selection. But a mainstream investor would never automatically buy just because Goldman Sachs says so; she'd read the reports of different brokers, use her expertise to evaluate whose arguments are most convincing, and supplement them with her own analysis.

4.2 ESG classifications

Prior to Russia's invasion of Ukraine, many investors considered defense companies as 'non-ESG'. Afterwards, many did a hasty U-turn, rewriting their investment policies to redefine defence as ESG.

A *Financial Times* article, *Are Defence Stocks Now ESG?*, describes this binary thinking. The less black-and-white we make our classifications, the less inflexible they'll be, and the less back- tracking we'll need to make if the world changes.

It makes even less sense to classify stocks as ESG or non-ESG when we view them through the long-term value lens. Some companies might have more value-creation potential than others, but it's a continuum, not a binary classification.

Moreover, thinking of ESG as intangible assets reduces the temptation to see it in such a binary way. The value of any asset must be compared to its price. Yet many ESG advocates would give three cheers to environmentally-friendly, diverse companies that donate generously to charity without any regard for its price, which can lead to ESG bubbles (as we've seen with electric cars).

Some ESG factors may be best thought of as risks rather than assets. However, risks must also be compared against their price. A common phrase is 'climate risk is investment risk', and used to imply that investors are imprudent (from a purely financial perspective) if they don't completely decarbonize their portfolio.

But if climate risk is priced in, as found by Bolton and Kacperczyk (2021), then investors earn a return for bearing that risk. Holding stakes in young firms, tech companies, and fifteen emerging markets bears investment risk, but that risk is compensated for by a return.

If an asset manager wanted to avoid investment risk, it would ironically eschew clean energy and carbon capture. Even if ESG risks aren't fully priced in, they shouldn't lead to an investor automatically excluding an ESG laggard; it may remain a good investment if it has other valuable and unpriced intangible assets.

In 2021, Nasdaq aimed to prohibit firms without sufficient board diversity from listing on the market, claiming this would protect investors. The evidence for the value of board diversity is mixed or negative (Fried, 2021), but even if it were unambiguously positive, regulation wouldn't be needed to protect investors as non-diverse firms would trade at a discount.

Even if they didn't, there'd be no more reason to regulate diversity than any other less-than-fully-priced drivers of value. It's not clear why a company with a diverse board but poor capital allocation, strategy and innovation should be deemed investible but one with the opposite characteristics should not[5].

Similarly, classifications into ESG and non-ESG buckets are typically based on current status rather than future potential. This highlights another problem with the metric-driven approach: metrics only capture what's happened in the past.

Any analysis of long-term value would focus on a company's future potential; certainly, historic data is useful, but only to the extent it helps you forecast future cash flows. If ESG were viewed through the long-term value lens, assessments might not be so backward-looking.

Naturally, different investors (or rating agencies) may have different opinions about future performance, but this diversity is to be embraced rather than lambasted as inconsistent.

4.3 The politicization of ESG

Recognizing that ESG is no more or less than a set of long-term value drivers will hopefully defuse the worrying politicization

of ESG. ESG critics label its advocates as the woke Left; devotees accuse anyone who questions the value-relevance of ESG as being a conservative corrupted by lobbyists.

Reasonable people can disagree about how relevant a factor is for both financial and social returns. But views on ESG often move beyond opinion to ideology, and impugn nefarious motives to anyone sharing a different opinion.

A senior ESG practitioner who teaches at a top university messaged me *"Hiya Alex. You want to fight?! Me and Aswath Damodaran about to get in boxing match about his ESG takedown piece. Please consider co-writing a counterpoint op-ed with me?"*

But my initial instinct was not to fight; if someone dubbed the 'Dean of Valuation' has a differing view on the relevance of ESG for valuation, I'd like to learn from it. A Managing Director at a large investment bank wrote to me: *"See The Economist Special report on ESG this w/e – why do you think these papers give anti-ESG rhetoric oxygen? … They fan flames of the deniers."*

Yet those who recognize that ESG has cons as well as pros aren't necessarily driven by rhetoric; instead, they're able to see both sides of an issue. Most people aren't 'believers' or 'deniers' – language which focuses on ideology – but academics or practitioners who've developed their own view through a combination of evidence and experience.

It's unprofessional for ESG critics to label its supporters as 'woke', or portray them as hippies with no clue about business – in contrast, understanding ESG is critical to understand the value of a business. Some ESG sceptics pat themselves on the back for crushing the woke crowd, when they should view their contribution as providing a different perspective on what creates long-term value.

But respondents don't need to stoop to their level. One practitioner, whom I'll name Hugo, labelled concerns as 'just complete BS' that spread 'nonsense around ESG'. A professor whom I greatly respect and whose writings I've learned a lot from called sceptics 'Taliban' and 'Flat Earthers'; he titled a separate article *A Tutorial On ESG Investing In The Oil And Gas Industry For Mr. Pence And His Friends*.

In addition to slighting the target audience, suggesting they needed a tutorial but others don't, it politicized the issue, implying that true conservatives should be anti-ESG, thus reducing the article's effectiveness.

Research by the Yale Cultural Cognition Project (eg. Kahan (2015)) finds that the more you associate an issue with an identity (such as climate change with political affiliation), the less persuasive your arguments, as people base their view on their identity than your content.

Another practitioner wrote *"Thank heavens for this excellent piece from Hugo, who tells it like it is: "I don't know about you, but when I see the likes of Ted Cruz, Marco Rubio, Greg Abbott, Mike Pence, and Elon Musk railing against 'ESG', I know ESG must be doing something right.""*

But 'telling it like it is' involves using arguments based on facts, data, and evidence, not telling other people off. The criterion for the success of ESG is whether it creates long-term value for shareholders and society, not whether it riles conservatives. (The piece by Hugo was called *Why the Right Hates ESG* and the strapline began with *"It's all about them wanting to protect the fossil-fuel industry."*

Instead, sceptics may simply have healthy doubts, rather than hatred, and have reached their stance after considering both sides of the issue, rather than being oil and gas lobbyists.)

Unfortunately, many ESG supporters herald as heroes those who display the most extreme outrage rather than use the most convincing evidence. If you view ESG as understanding what drives long-term value, you celebrate the people who contribute most to your understanding, by helping you see both sides of an issue.

But if you view ESG as a political fight, you cheer the people who fight most aggressively. Another academic wrote an article that ended with *"Climate risk is investment risk. There is no credible other side, only an ideological opposition cynically seeking a wedge issue for upcoming political campaigns… Which side are you on?"*

But ESG is not a debate on which you have to take a 'side' – it's a subject, just like business is a subject; people's stance on a subject should evolve with the evidence rather than being anchored on a side. To be closed to the possibility of valid concerns is contrary to a culture of learning, and to assume that counterarguments are politically motivated is itself cynical.

It's surprising that academics contribute to this polarization since they should appreciate the value of scientific enquiry and the importance of listening to different viewpoints.

Indeed, there's an entirely credible other side – many people believe the core problem is that climate risk is not investment risk, because the absence of a global carbon tax means that companies can pollute with few consequences.

One justification of a streetfighter approach is that ESG issues are so important to society that we need to get them right. But topics such as unemployment, free trade, and government spending also have huge impacts on both people and planet; academics have punched hard, but not below the belt.

Critical fields such as environmental economics, health economics, and economics of children have been around for decades, and advanced through reasoned debate rather than hyperbole and point-scoring.

It's precisely that ESG is so important that we need to use the best evidence to guide us, which involves listening to other viewpoints – and doing so with the intent to understand, not the intent to reply.

Doing so isn't betraying our ideals; as is commonly attributed to Aristotle, *"it is the mark of an educated mind to be able to*

entertain a thought without accepting it." Even if 90% of what sceptics say is wrong, in our eyes, 10% might be right, and that 10% means we come away more informed than we were beforehand.

But if ESG is a political issue, we see any counterargument as a threat to our identity, just like a different perspective on abortion or gun control. Both sides can do better.

5. Implications for research

Viewing ESG through a long-term value lens has several implications for academic research. The first is to be more broad. The long-term value lens highlights how we can study issues because they create value, regardless of whether they fit into an ESG bucket – indeed, I stumbled into ESG by exploring whether investors can support companies' pursuit of the long term, and whether intangible assets are priced by the market.

Sometimes, intangible assets other than ESG may be more relevant for answering a particular question – for example, a company's responsiveness to a changing economic environment might depend on its human, organizational, or innovation capital more than its ESG.

Similarly, a broader perspective might warn us that a certain research topic is less promising as it's already been addressed in a general context. Lots of ink has been spilled repeating widely documented results for the specific case of ESG.

For example, it's well known that scandals worsen a CEO's reputation, so it's not too surprising that ESG scandals do too. If there's no clear reason why a result might not automatically extend to ESG, the contribution from explicitly extending it is relatively minor.

As we've discussed, a major reason for the rise in ESG is its impact on externalities, yet externalities aren't unique to ESG. Future research can similarly study the externalities created by companies and investors, even if their actions don't fall under the ESG umbrella.

This may involve studying the impact of corporate decisions on other stakeholders (eg. Bernile and Lyandres (2019), Cunningham, Ederer, and Ma (2021), and Testoni (2022) for M&A) or the spillover effects of engagement from non-ESG investors (eg. Agrawal and Tambe (2016), Bernstein and Sheen (2016), Cohn, Nestoriak, and Wardlaw (2021), and Fracassi, Previtero, and Sheen (2022) for private equity).

The second is to be more granular. Sweeping questions such as 'Does ESG work?' are unlikely to be fruitful. No scholar would write a paper entitled 'Does investment pay off?', because it depends on what you're investing in; similarly, the value-relevance of ESG depends on the type of ESG.

ESG is an umbrella term, capturing many potentially contradictory factors. E and S is primarily about stakeholders, whereas G often ensures that management act in shareholders' interest (rather than their own). Closing a polluting plant is good for the environment, but bad for employees (an S factor). In Edmans (2011, 2012) I had to explain why I was studying employee satisfaction and not other ESG factors – because there's a strong theoretical motivation for its link to long-term returns.

Similarly, future research could focus on the ESG dimensions most relevant for the research question being studied. Yet empiricists often use aggregate ESG scores, when the question or identification strategy focuses on a specific issue. For example, a paper might study how a company's response to climate change news depends on its ESG rating.

However, it may only be the E dimension that's relevant – and, within that E score, the components most relevant to climate change rather than other environmental factors such as noise pollution. Few researchers would use aggregate ESG scores to measure governance, yet many do so to gauge environmental stewardship[6].

The third is to be more situational. While granularity is about focusing on specific ESG dimensions, situationality involves studying the contexts in which a relationship hold and, equally importantly, where it doesn't. An early attempt was Khan, Serafeim, and Yoon (2016), who claimed that ESG factors are only linked to long-term returns if they are material for a company's industry.

While Berchicci and King (2022) later showed that these results disappear under different modelling choices, Khan et al.'s hypothesis that the value of ESG is situation-specific was worth testing. Edmans, Pu, and Zhang (2022) document that employee satisfaction is positively associated with long-term stock returns in countries with flexible labour markets, but not those with rigid labour markets, potentially because regulations already ensure a minimum standard for worker welfare.

Moreover, if ESG is like any other asset, then companies may over-invest in it – Servaes and Tamayo (2017) use 'social capital' to describe some dimensions of ESG, and the return on any form of capital can be below its cost.

Thus, the value created by ES may depend on G – Krüger (2015) finds that the market responds negatively to positive ES events that are likely to result from agency problems. Similarly, research can relate governance to ES practices, without ascertaining whether they are positive or negative for firm value. For example, Cronqvist *et al* (2009) find that entrenched CEOs pay higher wages.

The fourth is to be less monotonic. Many papers use an ESG variable assuming that more is always better (even within the same context) – higher ESG scores, more frequent votes for ESG proposals, or tying pay to more ESG metrics.

But, as discussed, companies can over-invest in ESG (Masulis and Reza, 2015), and investors might overly micro-manage it (Gantchev and Giannetti, 2021).

Moreover, in addition to U-shaped or hump-shaped results, insignificant results can significantly advance knowledge – as

is commonly attributed to Thomas Edison, *"I have not failed. I've just found 10,000 ways that won't work."*

To help companies and investors focus on the drivers of long-term value, it's important to identify the factors that are unrelated to long-term value.

However, under the ESG lens, we'd torture the data to squeeze out unambiguously positive or negative results, to attract the attention of ESG cheerleaders or naysayers.

The fifth is to be less quantitative. This, in turn, can lead to research in two directions. One is to gather qualitative ESG assessments, such as the *Best Companies to Work For* survey, just as qualitative analysis has been used for other indicators of long-run value (see Loughran and McDonald (2016) for a survey of the research on textual analysis).

Given that some investors are adopting ESG-by-numbers approaches, qualitative factors are particularly likely to be mispriced by the market and thus associated with long-term returns. The other is to still use numerical data, but to pay attention to quality rather than just quantity.

Using an example on intangible assets rather than ESG, Cohen, Diether, and Malloy (2013) measure the quality of innovation based on the payoffs from past R&D expenditures. This quality-based measure significantly predicts future stock returns, while the mere quantity of R&D spending does not.

The final potential direction is to consider interactions between ESG and other drivers of long- term value. If putting ESG on a pedestal leads to companies paying less attention to these other factors (similar to Schoar's (2002) 'new toy' effect when firms diversify away from their core business), then ESG might be a substitute for other intangible assets such as innovation.

In contrast, if a focus on ESG encourages management to look beyond short-term earnings to long-term value more generally, then it may complement other intangibles.

6. Implications for teaching

Some business school rankings are now evaluating the ESG content of courses, for example by asking core professors to report how many hours they dedicate to ESG. There are several problems with this practice, which parallel those for business.

First, it reinforces the impression that ESG is niche; courses need separate teaching hours tailored to ESG since the core material just isn't relevant. This is incorrect. As we've discussed, a basic principle of *Finance 101* is that a company is worth the present value of all its cash flows.

Thus, a carbon capture project or a wind farm can be analyzed by established finance techniques. Indeed, it can be justified by them – *Finance 101* stresses how projects should be evaluated with NPV, taking into account all future cash flows, rather than the payback period or accounting rate of return, which focus on the short term.

Another basic finance principle is that the relevant risk of a project is not its idiosyncratic risk, ie. its risk in isolation, but systematic risk that's correlated with the rest of the economy. Climate solutions bear significant technological risk.

But whether the technology fails or succeeds is unlikely to depend on the state of the economy; moreover, since these solutions are crucial for humanity, the need for clean energy should not be sensitive to whether we're in a boom or recession.

Teaching these core finance principles really, really well may encourage the future leaders of this world to invest in ESG

more than dedicated ESG content would. Certainly, there's a huge wealth of ESG-specific material that won't be covered in the standard core, such as ESG regulations and data sources. But such material may be better suited for electives. Particularly in a core class, carving out specific ESG material may backfire.

It gives the impression that the core business principles, that have been researched and taught for decades, don't apply to ESG, and so an executive or investor who wants to prioritize ESG has to swing in the wind. It also suggests that ESG is a separate topic from creating long-term value, and so it's only relevant for students who want ESG jobs.

A second concern is that the ranking inputs are entirely self-reported, and thus prone to greenwashing. A finance professor could teach how to calculate NPV of a car factory. Simply by adding a single word, so that it now becomes the NPV of an electric car factory, without changing any of the cash flows, he can now claim he's teaching ESG.

Or he can change the name of a protagonist in a case study to minority and count this as diversity and thus 'S' content. Such a superficial way to evaluate courses will allow schools to move up the rankings through window-dressing, rather than actually improving the content of their courses.

Third, rankings are entirely right to scrutinize the quality of business school teaching. But to adapt a phrase from earlier, as a society we want great teaching, not just professors who teach ESG. There are far more critical ways to improve teaching than adding more ESG content (see Edmans, 2022).

Most business schools put very little weight on teaching in tenure evaluations; some even put a negative weight, at least implicitly, by assuming that if you're winning teaching awards you can't be serious about research.

Teaching ratings predominantly reward entertainment and popularity rather than challenging and stretching students. They're also given straight after the course, rather than at the end of the degree which would allow students to evaluate whether core classes provided a good foundation for the electives, job interviews, and internships – indeed, one of the core principles of ESG is the importance of long-term outcomes.

There are no ratings for whether your teaching is based on rigorous academic research; whether it uses current, real-life examples; and whether it's practical rather than just theoretical.

If you teach the CAPM, you best create social value by teaching the CAPM really, really well – explaining where to get the inputs in the real world, when they're not handed to you in a homework problem; discussing what to do when the CAPM assumptions don't apply, such as investors being undiversified; and explaining how to make decisions when the CAPM predictions don't hold, such as the market being overvalued or undervalued.

Finally, rewarding core professors for teaching ESG disrespects the topic, by suggesting that anyone can teach it, regardless of expertise. One business school ranking has added the question *"How many of your core teaching hours contain climate solutions for how organizations can reach net zero?"*

Net zero is indeed important, but it's so important that it shouldn't be taught by a professor who reads *Wikipedia* for an hour to create a couple of new slides. How to reach net zero is extremely complex and many solutions are technological ones that should be taught by climate scientists or engineers.

There are certainly finance-related elements, but challenges such as the difficulty in even measuring 'net' or 'zero'; the

potential conflict between net zero and asset manager fiduciary duty (see Gosling and MacNeil, 2022); and the trade-off between net zero and other ESG issues, such as mass unemployment of energy sector workers, many of whom can't easily be retrained, require expertise.

Artificial intelligence, machine learning and fintech are also very important topics for the future, and thus could be considered core, but not all core professors should teach them.

Moreover, for the ESG issues that are finance-related, finance expertise is needed to teach them correctly. The professor who claimed that 'climate risk is investment risk. There is no credible other side' is a leading expert in other business fields, but has not published any papers in finance.

As discussed earlier, *Finance 101* tells us that risks are rewarded, so there's no financial reason to avoid emitting companies. Extremism and refusal to consider other viewpoints are sometimes used to compensate for lack of expertise.

7. Conclusions

ESG is both extremely important and nothing special. It's extremely important since it affects a company's long-term shareholder value, and thus is relevant to all academics and practitioners, not just those with ESG in their research interests or job title.

It also affects a company's impact on wider society. This is relevant for anyone who cares about more than just financial returns, as well as for ensuring that capitalism works for all and safeguarding the public's trust in business.

But ESG is also nothing special. It shouldn't be put on a pedestal compared to other intangible assets that affect both financial and social value, such as management quality, corporate culture, and innovative capability.

Like other intangibles, ESG mustn't be reduced to a set of numbers, and companies needn't be forced to report on matters that aren't value-relevant. Funds that use ESG factors to guide stock selection and engagement shouldn't be lauded over those who study other value drivers, and investors in the latter deserve the same protection.

We can embrace differences of opinion about a company's ESG performance just as we do about its management quality, strategic direction, or human capital management.

And, perhaps most importantly, ESG needn't be politicized. Aggression and hyperbole are signs of weakness, not strength; as Karl Popper noted, *"Whenever a theory appears to you as the only possible one, take this as a sign that you have neither understood the theory nor the problem which it was intended to solve."*

Instead, reasonable people can disagree with each other about the factors that create value for both shareholders and stakeholders. More than that, they can learn from each other, thus enriching our knowledge on some of the biggest challenges facing business and society today. ■

Endnotes

1. These need not be financial outcomes, but other outcomes (such as patents) that matter for long-term performance.
2. See Bebchuk and Tallarita (2022) for an extensive analysis of the potential problems with ESG-linked pay. The practice might be justified if there is one ESG factor that trumps all other factors, such as carbon emissions for an energy company, and there is little disagreement on how to measure it (Edmans, 2021).
3. For example, Barber, Morse, and Yasuda (2021) find that venture capital funds with both societal and financial goals earn 4.7% lower returns than traditional funds.
4. The two main differences are that equity research studies the long-term value of a company from all sources, not just ESG sources, and also compares the estimated value to the current price to make an investment recommendation.
5. One argument for regulating diversity in particular might be that it is easy to measure, and thus regulate. However, demographic diversity is a poor proxy for cognitive diversity, which many argue to be more relevant for firm value. Moreover, there are many measurable non-ESG factors that are positively or negatively correlated with firm value, such as diversification (Lang and Stulz (1994); Berger and Ofek (1995)).
6. How does "more granular" square with the suggestion to be "more broad"? The latter highlights the value of considering factors outside the ESG umbrella; the former emphasizes the importance of considering a focused set of factors – either a focused set of ESG factors or non-ESG factors.

References

Agrawal, Ashwini and Prasanna Tambe (2016): "Private equity and workers' career paths: The role of technological change." Review of Financial Studies 29, 2455–2489.
Barber, Brad M, Adair Morse, and Ayako Yasuda (2021): "Impact investing." Journal of Financial Economics 139, 162–185.
Bebchuk, Lucian and Roberto Tallarita (2022): "The perils and questionable promise of ESG-based compensation." Journal of Corporation Law, forthcoming.
Berchicci, Luca and Andrew King (2022): "Corporate sustainability: A model uncertainty analysis of materiality." Journal of Financial Reporting, forthcoming.
Berg, Florian, Julian F Kölbel, and Roberto Rigobon (2022): "Aggregate confusion: The divergence of ESG ratings." Review of Finance 26, 1315–1344.
Berger, Philip G and Eli Ofek (1995): "Diversification's effect on firm value." Journal of Financial Economics 37, 39–65.
Bernile, Gennaro and Evgeny Lyandres (2019): "The effects of horizontal merger operating efficiencies on rivals, customers, and suppliers." Review of Finance 23, 117–160.
Bernstein, Shai and Albert Sheen (2016): "The operational consequences of private equity buyouts: Evidence from the restaurant industry." Review

of Financial Studies 29, 2387–2418.
Bolton, Patrick and Marcin Kacperczyk (2021): "Do investors care about carbon risk?" Journal of Financial Economics 142, 517–549.
Brav, Alon, Wei Jiang and Hyunseob Kim (2015): "The real effects of hedge fund activism: Productivity, asset allocation, and labor outcomes." Review of Financial Studies 28, 2723– 2769.
Brav, Alon, Wei Jiang, Song Ma and Xuan Tian (2018): "How does hedge fund activism reshape corporate innovation?" Journal of Financial Economics 130, 237–264.
Brealey, Richard A., Stewart C. Myers, Franklin Allen and Alex Edmans (2022): Principles of corporate finance (14th edition). McGraw-Hill.
Cohen, Lauren, Karl Diether, and Christopher Malloy (2013): "Misvaluing innovation." Review of Financial Studies 26, 635–666.
Cohn, Jonathan, Nicole Nestoriak, and Malcolm Wardlaw (2021): "Private equity buyouts and workplace safety." Review of Financial Studies 34, 4832–4875.
Cooper, Michael J, Huseyin Gulen, and P Raghavendra Rau (2005): "Changing names with style: Mutual fund name changes and their effects on fund flows." Journal of Finance 60, 2825– 2858.
Cronqvist, Henrik, Fredrik Heyman, Mattias Nilsson, Helena Svaleryd, and Jonas Vlachos (2009): "Do entrenched managers pay their workers more?" Journal of Finance 64, 309–339.
Cunningham, Colleen, Florian Ederer, and Song Ma (2021): "Killer acquisitions." Journal of Political Economy 129, 649–702.
Dimson, Elroy, Oğuzhan Karakaş, and Xi Li (2015): "Active ownership." Review of Financial Studies
28, 3225–3268.
Edmans, Alex (2009): "Blockholder trading, market efficiency, and managerial myopia." Journal of Finance 64, 2481–2513.
Edmans, Alex (2011): "Does the stock market fully value intangibles? Employee satisfaction and equity prices." Journal of Financial Economics 101, 621–640.
Edmans, Alex (2012): "The link between job satisfaction and firm value, with implications for corporate social responsibility." Academy of Management Perspectives 26, 1–19.
Edmans, Alex (2014): "Blockholders and corporate governance." Annual Review of Financial Economics 6, 23–50.
Edmans, Alex and Clifford G Holderness (2017): "Blockholders: A survey of theory and evidence." Chapter 8 in Benjamin E Hermalin and Michael S Weisbach (eds.), Handbook of the economics of corporate governance, Elsevier: Amsterdam, 541–636.
Edmans, Alex (2020): Grow the pie: How great companies deliver both purpose and profit.
Cambridge University Press.
Edmans, Alex (2021): "Why companies shouldn't tie CEO pay to ESG metrics." Wall Street Journal.
June 27, 2021.
Edmans, Alex (2022): "The purpose of a finance professor." Financial Management 51, 3–26.
Edmans, Alex, Mirko S Heinle, and Chong Huang (2016): "The real costs of financial efficiency when some information is soft." Review of Finance 20, 2151–2182.
Edmans, Alex, Doron Levit, and Jan Schneemeier (2022): "Socially responsible divestment." Working paper, London Business School.
Edmans, Alex, Darcy Pu, and Chendi Zhang (2022): "Employee satisfaction, labor market flexibility, and stock returns around the world." Working paper, London Business School.
Flammer, Caroline and Pratima Bansal (2017): "Does a long-term orientation create value? Evidence from a regression discontinuity." Strategic Management Journal 38, 1827–1847.
Fracassi, Cesare, Alessandro Previtero and Albert Sheen (2022): "Barbarians at the store? Private equity, products, and consumers." Journal of Finance 77, 1439–1488.
Fried, Jesse M (2021): "Will Nasdaq's diversity rule harm investors?" Working paper, Harvard University.
Gantchev, Nickolay and Mariassunta Giannetti (2021): "The costs and benefits of shareholder democracy: Gadflies and low-cost activism." Review of Financial Studies 34, 5629–5675.
Goldstein, Amy (2017): Janesville: An American Story. Simon & Schuster.
Gosling, Tom and Iain MacNeil (2022): "Can investors save the planet? - NZAMI and Fiduciary Duty." Capital Markets Law Journal, forthcoming.
Hartzmark, Samuel M and Abigail B Sussman (2019): "Do investors value sustainability? A natural experiment examining ranking and fund flows." Journal of Finance 2789–2837.
Haskell, Jonathan and Stian Westlake (2017): Capitalism without capital: The rise of the intangible economy. Princeton University Press.
Hoepner, Andreas GF, Ioannis Oikonomou, Zacharias Sautner, Laura T Starks, and Xiaoyan Zhou (2022): "ESG shareholder engagement and downside risk." Working paper, University College Dublin.
Holmstrom, Bengt and Paul Milgrom (1991): "Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design." Journal of Law, Economics & Organization 7, 24–52.
Kahan, Dan M (2015): "Climate-science communication and the Measurement Problem". Advances in Political Psychology 36, 1–43.
Kaplan, Robert S., and David Norton (1992): "The balanced scorecard: Measures that drive performance." Harvard Business Review 70, 71–79.
Khan, M, Serafeim, G, & Yoon, A, (2006). Corporate sustainability: First evidence on materiality.
The Accounting Review, 91, 1697-1724.
Krüger, Philipp (2015): "Corporate goodness and shareholder wealth." Journal of Financial Economics 115, 304–329.
Lang, Larry HP and René M Stulz (1994): "Tobin's Q, corporate diversification, and firm performance." Journal of Political Economy 102, 1248–1280.
Loughran, Tim and Bill McDonald (2016): "Textual analysis in accounting and finance: A survey."
Journal of Accounting Research 54, 1187–1230.
Masulis, Ronald W and Syed Walid Reza (2015): "Agency problems of corporate philanthropy."
Review of Financial Studies 28, 592–636.
Matos, Pedro (2020): "ESG and responsible institutional investing around the world: A critical review." CFA Institute Research Foundation.
R David McLean and Jeffrey Pontiff (2016): "Does academic research destroy stock return predictability?" Journal of Finance 71, 5–32.
PwC (2022): "Paying for good for all."
Schoar, Antoinette (2002): "Effects of corporate diversification on productivity." Journal of Finance
57, 2379–2403.
Servaes, Henri and Ane Tamayo (2017): "The role of social capital in corporations: a review." Oxford Review of Economic Policy 33, 201–220.
Testoni, Marco (2022): "The market value spillovers of technological acquisitions: Evidence from patent-text analysis." Strategic Management Journal 43, 964–985.
Thaler, Richard H (1999): "The end of behavioral finance." Financial Analysts Journal 55, 12–17. Trucost (2013): "Natural capital at risk: The top 100 externalities of business."

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Africa's mineral resources are critical for the green energy transition

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The World Bank forecasts that the production of critical minerals would need to increase by nearly 500% if investment in renewable energy and other green technologies were ramped up to the levels required to avoid the worst impacts of climate change.

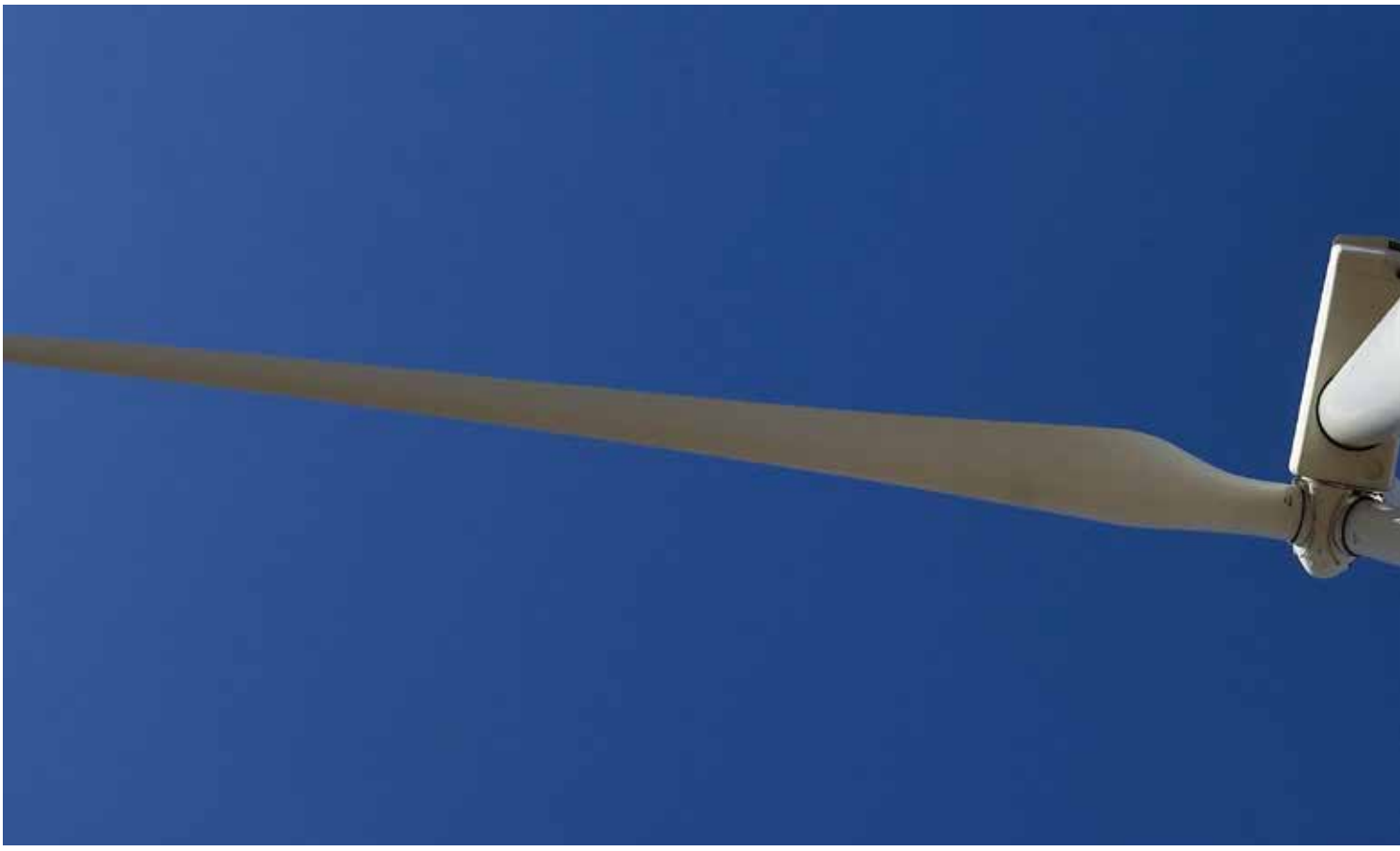
The twenty-seventh Conference of the Parties (COP27), the next round of global climate negotiations, is being hosted by Egypt from November 6 – 18. In the run-up to the conference, the United Nations (UN) warned that current climate responses are insufficient to avoid severe climate change.

To get on track, the transition from fossil fuel-based to renewable energy sources will have to be ramped up significantly. Africa's minerals will play a key part in this transition, but to what extent will the continent benefit?

Critical minerals are those minerals used to produce green technology, such as solar panels, wind turbines and batteries. These minerals include graphite, lithium, cobalt, copper, manganese, and rare earth metals.

The World Bank forecasts that the production of these minerals would need to increase by nearly 500% if investment in renewable energy and other green technologies were ramped up to the levels required to avoid the worst impacts of climate change.

The mineral intensity of the green transition has led to some debates on how 'clean' renewable energy truly is. It is true that renewable energy is highly reliant on key mineral resources, but this does not negate the importance of transitioning to renewable energy sources, as emissions from the mineral



production and operation of low-carbon technology is only 6% of the emissions from fossil fuels.

The issue of critical minerals has been highlighted in the global arena. The pre-COP27 United Nations Economic Commission for Europe (UNECE) Regional Forum stated that Europe and North America will not be able to deliver results on the Paris Agreement or the Sustainable Development Goals without a rapid shift to clean energy and renewables.

To this end, the forum emphasised the importance of increasing efforts to finance critical raw minerals and manage them sustainably. The UN Secretary-General's strategy for *Transforming Extractive Industries for Sustainable Development* also puts a spotlight on the sustainable management of critical minerals.

The African continent could stand to benefit from the shift to clean energy and technologies. The continent has 30% of the world's mineral reserves, including many minerals essential to the green transition.

For example, the Democratic Republic of Congo (DRC) produces about 70% of the world's cobalt, while South Africa has the largest share of manganese reserves. Madagascar and Mozambique have significant shares of graphite, and Zimbabwe has large deposits of lithium.

The challenge is that a very limited amount of Africa's critical minerals is processed on the continent. China is the dominant player in the processing of mineral ores, refining 73% of cobalt, 40% of copper, 59% of lithium, and 67% of nickel. A large share of these minerals is imported in unprocessed form from elsewhere, including Africa.

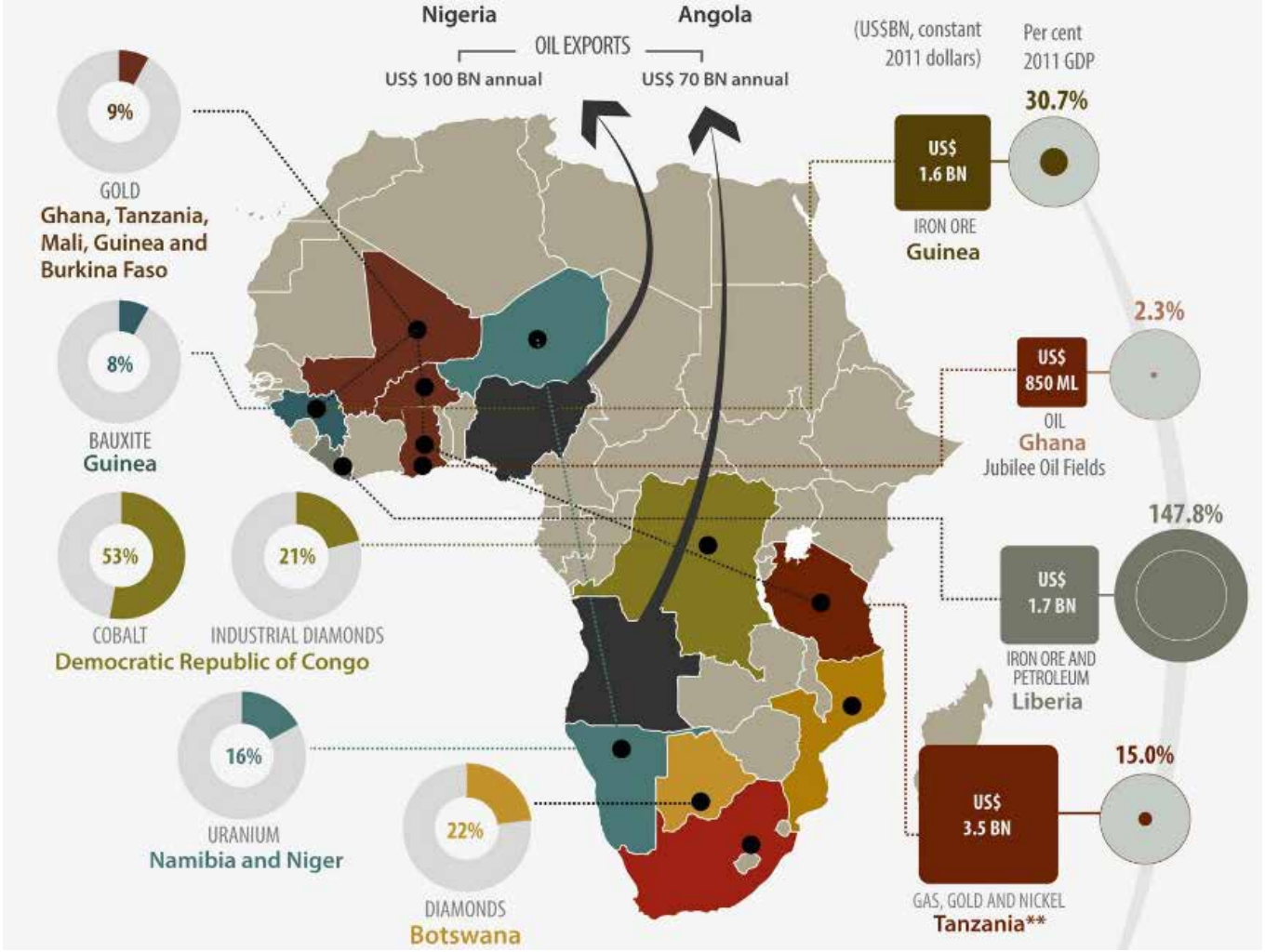
"The green energy transition and the rising demand for critical minerals makes this a key moment for Africa to strengthen its position in green technology value chains"

China also dominates green technology value chains, producing over 80% of the world's solar panels, and over 70% of the world's lithium-ion battery cells.

The US and the European Union (EU) have become increasingly concerned about China's dominance in critical mineral value chains and green technology production.

The COVID-19 pandemic and the Russian invasion of Ukraine have highlighted the vulnerability of global supply chains and risks associated with a reliance on imports, including of green technologies.

As the US and EU increasingly seek to compete with China in securing critical minerals supplies and onshoring green technology value chains, Africa risks becoming locked in as a supplier of minerals to other parts of the world.



In April 2022, US President Joe Biden invoked the Defense Protection Act to support the mining, recycling, and processing of critical minerals particularly those that are needed for batteries for electric vehicles and clean-energy storage systems.

In a further effort to reduce dependence on China by other major economic powers, the Minerals Security Partnership (MSP) was formed. The MSP is a multilateral initiative involving the US, the EU and other partners.

This initiative was introduced in June 2022 to *"ensure that critical minerals are produced, processed, and recycled in a manner that supports countries in realising the full economic development potential of their mineral resources."*

At the Ministerial Meeting of the MSP in September 2022, the US Secretary of State, Antony Blinken, stated that the MSP prioritises supporting mineral-producing countries and projects that adhere to strict environmental, social and governance standards. While the emphasis on responsible mining is welcome, it is less clear to what extent the MSP will support local value addition.

Africa may well ask what real benefit it would gain in shifting exports from China to Europe or the US, particularly when the continent is looking for ways to generate jobs and support industrialisation locally by leveraging its mineral wealth.

The African Development Bank (AfDB) is currently working on a critical minerals strategy, a theme that was also prominent at the recent African Forum on Mining, hosted in October 2022 by the African Union in Addis Ababa, Ethiopia.

There are many challenges to overcome, including securing the necessary skills base, ensuring reliable and adequate electricity supply and improving the investment climate. Additionally, green technologies require numerous inputs.

For example, electric vehicle batteries require lithium, nickel, cobalt, manganese, and graphite. Developing the DRC as a battery manufacturing hub cannot be built exclusively around its cobalt reserves.

Yet a study produced by BloombergNEF argues that there is a case to be made for battery manufacture in DRC. Regional value chains may be part of the solution, as with Zambia and the DRC's agreement earlier this year to jointly work on developing electric battery manufacturing capacity.

For too long, Africa has been predominantly a minerals exporter, with limited refining or linkages to domestic

industry. The green energy transition and the rising demand for critical minerals makes this a key moment for Africa to strengthen its position in green technology value chains. ■

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The cooperation imperative

The world's international economic institutions have helped reduce conflict and support growth. Tim Sargent, Paul Samson and Hector Torres discuss why we need to fix our international economic organizations

Since the Bretton Woods Agreement[1] of 1944, international economic organizations (IEOs) — including the International Monetary Fund (IMF), the World Bank Group (WBG) and the World Trade Organization (WTO) (and its predecessor, the GATT) — have laid the foundation of the rules-based system that has reduced economic conflicts and supported global economic growth.

They help countries to cooperate to address global challenges

For example, the IMF provides a way to pool financial resources so that a country can borrow when it falls into financial difficulty, helping to prevent and mitigate debt crises that could imperil growth across the world.

Similarly, the WBG provides a mechanism that promotes economic development and alleviates poverty. The WTO, through its negotiation mechanism, allows countries to lower trade barriers in a coordinated and reciprocal fashion, and through its dispute mechanism, prevents the escalation of trade disputes into all-out trade wars.

But these institutions are being undermined

Especially given current global challenges, the relevance of these institutions' policy objectives has not gone away, nor has the need for countries to cooperate to achieve them. However, the IEOs have come under increasing attack in recent years.

The IMF has been criticized for not reflecting the increased economic weight of large emerging economies

One quite valid criticism is that the IEOs are lagging behind changes in the world economy. They have not kept pace with the increasing weight of large emerging market economies. For example, the voting system at the IMF is based on quotas[2] that blatantly underweight large emerging market countries such as China and India.

And the WTO has also been criticized, for not recognizing that these same emerging economies are ready to compete on an equal footing, and for 'judicial activism' by its Appellate body

In stark contrast, at the WTO, some of these large emerging market economies, rather than assuming full trade responsibilities, cling to special and differential treatment[3] provisions reserved for countries that are not ready to compete on an equal footing.

As a result, many countries have lost faith in the WTO's capacity to foster further trade liberalization, preferring to negotiate their own deals with select partners. The WTO's dispute settlement function has also been questioned by countries that believe it has overstepped its mandate by indulging in 'judicial activism,' prompting Washington to virtually paralyze the dispute settlement process by holding up appointments to the Appellate Body.

Geopolitical polarization is straining IEOs and the pressure on them has only intensified in the past year or two.

- National security concerns linked to China-US rivalry, the Russian invasion of Ukraine and the initial trade restrictions applied by some countries during the COVID-19 pandemic have shaken confidence in the dependency and the reliability of global supply chains.

  Many economies are now promoting 'onshoring,' 'nearshoring' or 'friendshoring' of supply chains, which is inconsistent with extending most-favoured nation status to all partners — a fundamental principle of the WTO.

- The urgency to achieve climate change goals is being used to justify a resurgence in subsidies' local content requirements — for example, the recently enacted Inflation Reduction Act, which provides large subsidies to electric vehicles but only those produced in a country with which the United States has a trade agreement, thereby excluding most of the world. Such requirements, again, undermine the WTO's most-favoured nation and national treatment principles[4].

- Use of the global financial system as a foreign policy tool — for example, the proliferation of financial and investment restrictions that have raised concerns about the dollar's dominance of the international financial system — has led the developing countries of Brazil, Russia, India and China (the BRICs) and some other countries to explore parallel payment and reserve currency systems.

Rather than weakening these institutions, we need to make them more responsive to changes in the world economy

While IEOs will need to accommodate legitimate domestic policy concerns, policies that lead to further sidelining and undermining of multilateral institutions are counterproductive and will weaken economic growth, which in turn may effectively compel middle-power and developing countries to go against their economic interests and 'take sides' at a time when geopolitical tensions are escalating.

To avoid what the IMF calls 'geoeconomic fragmentation,'[5] we will need to buttress the rules-based trading system, making it more predictable, fair and effective in avoiding the escalation of trade disputes into trade wars.

We will also need to reinforce its global financial safety net, keeping the IMF at its centre by allowing the world's most dynamic economies to increase their contributions to its pool of financial resources.

Any changes must be incremental and carefully balanced

Updating and recalibrating the IEOs will not be easy. It will require building consensus on a package of incremental reforms that could be regarded as balanced — with something for advanced, emerging and developing countries alike.

Ideas are out there: what is needed is brokering consensus on feasible fixes

Fortunately, there are good ideas out there (see, for example, this piece by one of us, *The IMF and the WTO Need Symmetrical Reforms*[6]). The key question: how to get a group of systemic countries to buy into a policy dialogue aimed at identifying a

balanced package of incremental reforms? How to rekindle a kernel of hope for international cooperation so that countries could accept engaging in a quiet consensus-building dialogue?

The G20 should meet the challenge

We believe that as the premier forum for global economic cooperation the G20 needs to step up and provide a policy space to reconcile economic dynamism with multilateral rules. The G20 has the key economic players—the large economies and the main IEIs (it can also invite others to ad hoc meetings), and it can readily mobilize the expertise required to engineer innovative ways forward.

The New Delhi Leaders' summit should call for a policy dialogue to frame a set of actions

Leaders at the September 2023 G20 Summit in New Delhi, India, should call for an exploratory 'policy dialogue,' aimed at having a frank discussion to identify which reforms could restore confidence in the effectiveness of IEOs by making them more reflective of current economic realities.

The goal should be to come back to leaders with a set of incremental and balanced reforms that can command widespread support.

A kickstart on IEO reform could spark a renewed spirit of cooperation in other places it is desperately needed

Reforming the IEOs will not happen at once, nor will it eliminate the national rivalries playing out on the world stage. But if the world is able to come together on some sensible reforms to the IEOs, that renewed spirit of cooperation could breathe new life into other areas where international cooperation is desperately needed. ■

"Reforming the IEOs will not happen at once, nor will it eliminate the national rivalries playing out on the world stage"

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Endnotes

1. https://www.federalreservehistory.org/essays/bretton-woods-created
2. https://www.imf.org/en/About/Factsheets/Sheets/2022/IMF-Quotas
3. https://www.wto.org/english/tratop_e/dda_e/status_e/sdt_e.htm
4. https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm
5. https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2023/01/11/Geo-Economic-Fragmentation-and-the-Future-of-Multilateralism-527266
6. https://www.cigionline.org/articles/the-imf-and-the-wto-need-symmetrical-reforms/

Development debates in a historical perspective

José Antonio Ocampo is the Minister of Finance and Public Credit of Colombia

The concept 'development' was originally thought in strict economic sense – as rising per capita income. Under the United Nations leadership, it came to encompass its social and environmental dimensions: the International Labor Organization developed the concept of 'basic needs' in the 1970s, and the United Nations Development Program that of 'human development'.

The environmental dimensions of development were also gradually incorporated and led to a broad concept of 'sustainable development' that in the United Nations terminology includes the economic, social, and environmental dimensions, as incorporated in particular in the 'sustainable development goals' approved in 2015.

Development economics was born in the 1940s and 1950s in Eastern Europe and Latin America, the two regions of the developing world that had achieved an intermediate level of development. Paul Rosenstein-Rodan and Raùl Prebisch are clear examples. From the start, it was associated with broader intellectual economic debates, particularly on the role of the state in economic policy, which had made a push forward in the 1930s with the Keynesian revolution.

The United Nations played an important role in development thinking and in advising developing countries at the time. ECLAC was an early leader in this regard, with Prebisch as the intellectual leader. The UN also became the centre of the debates on the need to reform the world economic system. Since its creation, UNCTAD played a crucial role in this regard.

The ideas put forward by the new field of economics took place in a world economy that was already highly unequal in terms of levels of development, and characterized by a division of labour in which developed countries were exporters of manufactures and developing countries of primary goods.

This was behind Prebisch's view of the world system as a 'centre-periphery'. In his view and that of Hans Singer, one feature of that system was the tendency for the terms of trade to move against primary goods and, thus, of developing countries.

We should add that the basic conception of classical development economics was the need to industrialize to accelerate economic growth and technological change: the 'Industrialization Consensus', as I have called it, to borrow from the contrasting term which came to be called the 'Washington Consensus'.

In terms of macroeconomic issues, a major topic was how export fluctuations were a major source of periodic balance of payments crises in developing countries. Given their strong dependence on the imports of machinery, equipment and many intermediate goods, the availability of foreign exchange was also seen by some classical development economists as a long-term constraint to growth (balance of payments constraint on growth.

The strong role of external trade in the macroeconomic dynamics of developing countries, and the subsidiary role of domestic demand, the issue most underscored by the Keynesian revolution, is that I have come to be called 'balance of payments dominance', gain in contrast with the concept of fiscal dominance that has played a central role in the macroeconomic literature.

The 1960s and 1970s led to three significant changes.

a) The world economy started to offer developing countries increasing opportunities to export manufactures. This led to an increasing differentiation between those countries that were able to benefit from that trend and those that continued to depend on exports of primary goods.

b) Rise of a new brand of orthodox economics critical of state intervention. It included a strong criticism of import substitution. It was also critical of other forms of state intervention – eg., in the financial sector, against what this school referred to as 'financial repression'. The orthodox views were codified in what came to be known as the 'Washington consensus'.

c)The third trend was the return – for the developing countries particularly in the 1970s – of private international capital flows, which had collapsed with the Great Depression in the 1930s.

However, the volatility of those flows became a problem of its own and implied a return to boom-bust financial cycles and associated crises, starting with the Latin American debt

crisis of the 1980s. Such volatility became therefore a central element of the 'balance of payments dominance' that affects developing countries.

The first and third were part of a 'globalization' process, which offered very unequal opportunities to different groups of developing countries, with successful manufacturing exporters from East Asia leading the process but other countries experiencing slower growth, including processes of 'premature de-industrialization'.

Globalization also generated crises that involved a large number of countries: the 1997 East Asian crisis that spread to large parts of the developing world; and the North Atlantic financial crisis of 2008-09; the COVID-19 crisis, which was perhaps the most global, but its origins are not economic, and was followed by the current crisis.

The international division of labour and the terms of trade debate

In Prebish's 'centre-periphery' system, and the views Hans Singer, a major characteristic of the world economy was the tendency of the terms of trade of commodities – and thus of developing countries – to experience a long-term decline.

This represented a major break with the views of classical economics (David Ricardo, in particular), according to which the laws of diminishing returns in primary production and the increasing returns in manufacturing implied that the terms of trade of primary goods would show a long-term improvement vis-à-vis manufactures.

The Prebisch-Singer Hypothesis, as it came to be called, can be understood as involving two different theoretical variants.

The first drew on the negative impact that the low income-elasticity of demand for primary commodities – and particularly, agricultural goods – had on the terms of trade of developing countries.

The second – and, in my view, a more interesting one – was based on the asymmetric functioning of factor markets in the developed vs. developing countries: the fact that the second group of countries faced a labour surplus – what in Arthur Lewis terminology came to be known as an 'unlimited supply of labour'.

The fundamental difference between the two variants was that, in the first case, the downward pressure was reflected directly in the barter terms of trade, whereas, in the second, it was generated through factor markets – the factorial terms of trade – and only indirectly, through the effects of production costs on commodity prices.

Another important difference is that the first variant applied only to primary commodities, whereas the second should affect all goods and services produced in developing countries. Singer posed it very clearly in 1998: the terms of trade between standardized manufactures produced by developing countries would also tend to deteriorate relative to the innovative products of developed countries.

"The United Nations should be the centre of a revitalized multilateralism, both to manage the geopolitical but also the sustainable development challenges well captured in the SDGs, one of the major agreements in world history"

This meant that, even though developing countries could industrialize and produce manufactures, the fact that these products were standardized meant that they did not create new economic rents. Instead, the rents associated with innovations were captured by developed countries' entrepreneurs.

The concept of labour surplus fitted well the complementary terms-of-trade theory of Arthus Lewis, according to which the international terms of trade were determined by relative wages in developing versus developed countries, which were determined, in turn, by the levels of productivity in the production of food (or of subsistence goods in general) in the two groups of countries.

As pointed out, according to the second variant, the trend in the terms of trade was not associated with the types of goods produced but rather with the structural characteristics of the countries that produced them.

The North-South models developed in the 1980s, by Ronald Findlay and Lance Taylor, among others, formalized this analysis. A common feature of these models was that, due to differences in economic structures, wage increases in the North were proportional to the rise in productivity, while the unlimited supply of labour implied that real wages were not affected by technological change, which was then 'exported' to the rest of the world through lower prices.

The expansion of world trade also offered since the 1960s opportunities for the diversification of primary good exports towards goods of higher income elasticity of demand and value added. This included manufactured goods, as well as an array of perishables – fruit, vegetables, and flowers – the development of which required special transportation and handling.

On top of the now well-established view on the features of the centre-periphery system, the literature identified since the 1980s the risks of 'Dutch-disease' effects of commodity booms and, in particular, the de-industrialization processes that they could generate. Latin America is the best example of this process. But it also limits the industrialization of Sub-Saharan Africa.

In relation to the empirical validity of the P-S Hypothesis, the literature written up to the end of the 1970s was ambivalent.

A breakthrough was a World Bank 1988 paper by Enzo Grilli and Maw Cheng Yang, who showed that there was indeed evidence of a long-term deterioration in real non-oil commodity prices through the twentieth century. This paper became a milestone in the debate.

The later empirical literature has reinforced this conclusion, although indicating also that that the adverse trend of the commodity terms of trade was a feature of the twentieth century (particularly after World War I), not of the nineteenth or the twenty-first centuries.

In turn, the adverse trend in the twentieth century is largely explained by two major downward shifts: one after World War I and the other in the 1980s. In both cases, these adverse shifts represent the delayed effects of sharp slowdowns in world economic growth.

An additional conclusion is that the adverse price trend in the twentieth century was particularly strong for tropical agricultural goods. This literature also showed that, beyond short-term fluctuations, there are long-term cycles of commodity prices (as long as 30 years).

From the Industrialization Consensus to market reforms, and to a revival of industrial (production sector) policies
An important implication of the P-S Hypothesis is that the transmission of technological change in the world economy was 'relatively slow and uneven'.

Therefore, industrialization was the principal means at the disposal of developing countries to share in the benefits of technological progress, absorb surplus labour from the rural sector, and raise through both of these mechanisms the standard of living of their population. For the intellectual leaders behind this Hypothesis, the case for industrialization was thus broader than the issues associated the tendency of the terms of trade.

In Prebisch's view, it was essential to speed up technological transfer from the centre to the periphery, and in Singer's analysis to exploit the strong technological externalities generated by manufacturing. The terms of trade debate may have side-tracked the discussion from what remained for several decades a broader consensus on industrialization.

An interesting parallel discussion was Alexander Gerschenkron theory of 'late industrialization' of Western Europe. The major challenges required strong state intervention (but perhaps the industrialization of England also did, according to research by Ha-Joon Chang). But the challenges are greater for the 'late-late industrialization' of Latin America and Eastern Europe or Asia, and the 'late-late-late industrialization' of Sub-Saharan Africa.

Industrialization was, of course, a major challenge in many ways, as it took place in an unequal world economy. The first was that technology had to be imported, but also that there were learning process associated with technology transfer, a point strongly emphasized since the 1980s by Jorge Katz and Sanjaya Lall.

Additionally, imported machinery was more capital intensive than what made sense for the developing world, given their abundant labour supply and lower wage costs.

Industrialization also involved significant linkages among sectors, which required policies that could help develop them.

It also involved macroeconomic issues, particularly how to finance the long-term capital required by industrial sector, and using export income in order to finance imports of capital goods.

A central element of state intervention to support industrialization in the developing world at the time was protectionism. It had been at the centre of US policies since its independence.

And it became a rule in the last decades of the nineteenth century in many developed countries and in several politically independent developing countries, particularly in Latin America.

In turn, the Great Depression of the 1930s led to the explosion of protectionism worldwide and to the collapse of international trade. In this context, looking at the opportunities that domestic markets provided to encourage industrialization through import substitution was not only natural but, in a strong sense, the only alternative available.

The rising anti-colonialist movements in Asia and Africa and the de-colonization process that took place in the post-World War II years, gave industrialization and protectionism an additional political push in those parts of the world, as an expression of national self-determination.

Furthermore, the reconstruction of world trade after World War II concentrated initially on flows among industrial economies. The opportunities for developing countries, particularly for manufacturing exports, came only in the 1960s, and benefited those countries where industrialization was already underway, thanks to prior import-substitution processes.

The idea that the structural transformation of the economies implied industrialization was at the centre of the work of Simon Kuznets, and in relation to the development process of that of Hollis Chenery, who became the first Chief Economist of the World Bank in the 1970s.

This institution came to be one of the centres of analysis on this issue, as reflected in the first *World Development Report*, particularly the second, published in 1979, on *Structural Change and Development Policy*.

More generally, the link of industrial development to long-term economic growth became one of the strongest observed 'regularities' in development.

The implementation of the 'Industrialization Consensus' faced, of course, major challenges, some of which have already been mentioned. The first was that technology, and

the machinery and equipment in which it as embodied, had to be imported. An alternative was attracting the firms that controlled the technology through foreign direct investment.

Strong support for domestic firms, including with protection and export subsidies, was a necessary complement – in the latter case, when export opportunities opened up.

Additionally, given the capital intensity of imported technologies vs. abundant labour supplies, developing countries developed dualistic economic structure, in which some labour would be employed in the productive sectors, but a large proportion were left in the traditional agricultural activities or were absorbed in a growing urban informal sector.

To be successful, industrialization also required the creation of significant linkages among sectors, which generated externalities and required policies to help develop those linkages. This implied that the development process was characterized by major complementarities, in wide contrast to the emphasis on substitution (in the choice of consumers or the selection of production techniques) emphasized by neoclassical microeconomic theory. Albert Hirschman classified the associated complementarities as a mix of 'backward' and 'forward' linkages.

The idea that there are strong complementarities gave rise to another series of concepts that came to occupy a central role in classic development debates. The most important were Paul Rosenstein-Rodan's 'big push' (1943) and Ragnar Nurkse's 'balanced growth' (1961).

In both cases, the central idea was the need to design a policy package that involved the simultaneous development of complementary industries. In contrast, Hirschman argued that this required developing countries to implement policies that were beyond their capacities.

As an alternative, he formulated the view that the development process takes place through a sequence of imbalances, which implied that the policies it required were sequential rather than simultaneous (Hirschman, 1984). In his view, imbalances actually played a positive role if they generated policy innovations and induced investments to correct them.

The opportunities for export development, particularly from the 1960s, introduced a new element in the development debate. Chenery became in the late 1970s a leading thinker in arguing that the use of those opportunities was an important source of success in the developing world.

He claimed that sustained economic growth required a transformation of the structures of production compatible with both the evolution of domestic demand and the use of the opportunities provided by international trade.

The call for greater integration into international trade was made in a radical way by more orthodox thinkers, and particularly by his successor as Chief Economist of the World Bank, Anne Krueger, who argued that protectionism associated with import substitution policies generated inefficiencies, and particularly an 'anti-export' bias that reduced growth opportunities. Trade liberalization and full integration into international trade was thus essential for developing countries to accelerate economic growth.

An interesting contrast was made by development economist who studied the East Asian export experience. Alice Amsden argued that export performance generated a 'reciprocal control mechanism' that allowed incentives generated by government policies to be aligned with performance.

Her work, as well as that of Ha-Joon Chang and Robert Wade on the East Asian success stories indicated that they were associated with active government development strategies aimed at diversifying manufacturing exports towards sectors with higher technological contents.

Therefore, these success stories were export-led but also involved strong state encouragement of industrialization. Since the late twentieth century, China adopted, with a lag, similar policies, in equal or even more aggressive ways.

The contrast was that of the countries that did not, and followed the recommendation to stronger trade liberalization. This led to the experiences of 'premature de-industrialization', particularly of Latin America.

The opportunities for export development did not eliminate, therefore, the classical case for industrial policies, as part of active industrialization strategies, though they certainly changed the type of industrialization needed. The revival of industrial policies over the past decade or so, is behind this way of thinking.

My understanding of this issue is that, borrowing from Kuznets, Chenery and the classical development economists, growth is always a process of structural transformation. A successful policy must be based, therefore, on the dynamic efficiency, understood as the capacity to generate new waves of structural change.

This concept is in sharp contrast with static efficiency, the central focus of traditional microeconomic and international trade theories. It requires state intervention but also innovative ways of interaction between the public and the private sectors, as emphasized in her recent work by Mariana Mazzucato.

The dynamics of production structures may be understood, therefore, as the result of the interaction between two basic forces:

> *Innovations*, broadly defined as new technologies, new activities, and new ways of doing previous activities, and the learning processes that characterize their full realization and their diffusion through the economic system.
>
> The *complementarities* underscored by classical development economics, and the networks of

production activities that they generate – 'value chains', as they have come to be called. The public and private sector institutions required to enhance these structural processes are crucial, and also subject to learning.

No innovative process is passive: it requires investment and learning. This is an important lesson from the work of Jorge Katz and Sanjaya Lall.

As the recent work of Keun Lee emphasizes, climbing up the ladder in the world hierarchy entails shortening technology transfer periods, taking 'detours' to manage existing intellectual property rights and, most importantly, gradually becoming a more active participant in technology generation.

In broad terms, it requires national innovation systems to be built up, which should include an institutional framework to coordinate the various actors engaged in innovation and learning – research and development centres, universities, extension services, and the innovating firms themselves. And it requires, of course, strong state investments in science and technology.

Two final comments on global trends are in place. The first is that the ongoing shift away from manufacturing into services is transforming the global economy. The rise of modern services, especially those associated with Information and Communications (ICT) technologies is as essential as manufacturing and has been at the centre of recent successful development experiences.

We also know that at high levels of income the dynamics of services eventually overtake that of industrialization, and that the revolution in ICT has induced major changes in manufacturing itself. These issues, as well as the innovations that take place in primary sectors and the value chains in those sectors that were discussed in the previous section, should certainly be at the centre of development strategies.

There are, of course, other technological waves that are equally important, notably that to generate energy that is consistent with global climate change goals, and those that are associated with new biological technologies and their effects on both medical treatment and agriculture. This is why a prefer to talk about the need for 'production sector policies' and not only industrial policies, which in a sense focus on manufacturing.

The second is that world trade slowed down significantly since the 2008-09 North Atlantic financial crisis. To this we must add the disruptions of value chains generated by the COVID crisis (nearshoring) but also by new waves of protectionism, particularly the between the US and China. All of these have generated both threats to existing trade patterns, the effects of which are re-shaping globalization.

Macroeconomic policies and development

In the initial stages of development economics, the major macroeconomic issues were the availability of savings to finance the investment needed for industrial development, and as the foreign exchange required to pay for the imports of machinery, equipment, and intermediate goods that that process required.

With the return of capital flows and the growing role of domestic private finance, the attention increasingly focused on how to manage the boom-bust cycles in private flows, avoiding also possible domestic financial and international debt crises.

In the debates that characterized the early decades of development economics, the first of these issues involved the management of fluctuation in commodity prices and, from a longer-term perspective, how savings or foreign exchange gaps could affect the growth process. In relation to commodities, an important proposal was the possibility of moderating price fluctuations with the creation of international commodity agreements.

Although there were precedents since the 1920s, the creation of commodity agreements became a strong trend in the mid-1950s and early 1960s after the collapse of the commodity price boom that had taken place in the early post-World War II period, some with several consumer countries participating in those agreements.

The Organization of Petroleum Exporting Countries (OPEC) was created in 1960, but its decisions in the 1970s to reduce oil supplies, which generated two major price shocks, contributed to the lack of support of consuming countries for commodity price agreements in general.

Domestic stabilization funds are also essential to manage commodity price fluctuations. They save commodity export revenues during price booms to have them available when the succeeding crises hit.

One of their objectives was stabilizing domestic commodity prices, with taxes or forced savings imposed on producers during booms, matched with compensatory subsidies or refund of forced savings during crises.

A good example was the Colombian National Coffee Fund, created in 1940 to manage domestic effects of the Inter-American Coffee Agreement. The Norwegian oil fund is generally recognized today as the best instrument of this kind, but several oil exporting countries have similar instruments.

Another good example is also the series of Chilean stabilization funds for its main export, copper, the first of which was launched in 1987. But these stabilization funds are missing in most commodity-exporting countries.

From a long-term perspective, the essential issue is the possibility that the availability of foreign exchange would become a major constraint on economic growth.

A basic issue underscored by classical development economics was the effects of the asymmetry between the high income-elasticity of the demand for imports by these countries vs. the low elasticities of demand for their export goods, particularly for several commodities. Under these conditions, the availability of foreign exchange could become the basic determinant of economic activity.

The work of Anthony Thirwall has been the most influential in the analysis of this issue. This underscores the role that active export strategies and, more generally, structural diversification plays in overcoming possible foreign exchange gaps.

The development of national development banks, as well as public-sector investments in new industrial sectors came to occupy an important place in managing these issues in several developing countries.

A central issue today is how to manage capital account volatility. The literature on this topic has identified a sort of hierarchy of volatility of capital flows, with FDI being the more stable, and short-term bank lending and portfolio flows the more unstable, according to Dani Rodrik and Andres Velasco, among others.

In this context, the major risk that developing countries face is the possibility of a 'sudden stop' of volatile financial flows (Guillermo Calvo), which can generate 'twin crises' (ie. combined external and domestic financial crises) if the abundance of external financing has generated a parallel boom in domestic financing.

The management of external financial cycles require active counter-cyclical fiscal and monetary policies. In the first case, the best is the design of fiscal rules that determine the medium-term trajectory of the fiscal balance and debt ratios but allow for deviations around that trend to counteract positive and negative terms of trade shocks to smooth the fluctuations in aggregate domestic demand.

However, the domestic political economy tends to generate pressures in most developing countries to spend in good times, which in turn limit the policy space to adopt expansionary policies when crises hit. The limited availability and higher costs of financing may also constrain counter-cyclical fiscal policies during crises.

If austerity policies are adopted as a result, the political pressure to expand during the subsequent upswing in economic activity would be strong. For these reasons, and in contrast to developed countries, pro-cyclical fiscal policies tend to prevail in developing countries.

In the case of monetary policy, counter-cyclical policies face two major dilemmas. The first one is that, if domestic interest rate or monetary aggregates in a counter-cyclical way, they may increase rather than reduce the volatility of capital flows –ie. bring more capital flows during booms if monetary authorities increase interest rates to reduce domestic demand, and generate more capital flight during crises if they reduce interest rates.

For this reason, the recommendation of the traditional macroeconomic literature is to let exchange rates be flexible. Expressed in terms of the 'trilemma' of open economies, in economies with open capital accounts, the authorities can control the exchange rate or the interest rate, but not both.

However, this generates a second dilemma, because of the negative effects on growth that the appreciation of the exchange rate during booms may generate, both through the reduction of investment in tradables sectors in the short term but also to the unstable incentives generated by the instability of the exchange rate in the long term.

In other words, this policy may contribute to the 'Dutch Disease' effects of export booms. A growing literature has shown that long-term growth in developing countries is positively associated with the capacity to guarantee a competitive and relatively stable real exchange rate.

The limitations that monetary policy faces in open developing economies generate a case against full capital account liberalization and to actively use regulations to manage the associated volatility.

The broad agreement that capital market liberalization generates stronger business cycles in developing countries was supported by a major 2003 International Monetary Fund (IMF) study led by Eswar Prasad.

There is also strong evidence and a broad consensus in the literature that capital account regulations help improve the composition of capital flows toward less reversible flows and provide room for countercyclical monetary policies.

The IMF's 'institutional view' on capital account management, adopted in 2012, accepted that the full liberalization is not always desirable, and that regulations can play a positive macroeconomic role to manage capital account volatility.

Capital account regulations must be complemented at the domestic level with regulatory policies aimed at avoiding unsustainable credit booms and managing maturity and currency mismatches in portfolios. The provision of countercyclical financing at the national level is also crucial.

National Development Banks can play a counter-cyclical, aside from their long-term development goals, in fact counteracting the pro-cyclical character of private financing at the national level.

The current crisis

The current crisis has many dimensions, underscored by the concept of 'polycrisis', which has become a fashionable term.

I will concentrate on the economic dimensions, but many are associated with the geopolitical tensions, particularly of the war between Russia and Ukraine, but also the growing tensions between the US and China. In economic terms, they involve at least seven effects:

- The remains of the COVID-19 crisis, including because of large inequalities in the access to vaccines and the possible effects of the elimination of the Chinese on restrictions to mobility.

- The mix of inflation and interest rates, and the possible recessions (although not quite stagflation).

- The food crises in many parts of the developing world, largely generated by the effects of the war in Ukraine, but also to natural disasters associated to climate change.

- The worldwide rise of interest rates and rising risk margins that generated an outflow of capital from emerging economies in 2022.

- The high debt ratios generated by the COVID crisis but also by high interest rates, which has generated debt crises in many developing and emerging economies.

- The reversal of climate change policies generated also by the war in Ukraine, as well as the clearly insufficient efforts to adopt policies to reach the climate change goals reached in Paris in 2015.

- The changes in world trade that are taken place due to the slowdown in international trade, the disruptions of value chains generated by the COVID crisis (nearshoring) but also by new waves of protectionism, particularly the between the US and China. To this, we must add the inward orientation of China.

In the face of these events, let me end with comments on three urgent policy issues:

- The need to improve international tax cooperation, improving on the 2021 agreement in the OECD Inclusive Framework, in its two dimensions: limiting tax competition and fair taxation of multinational companies. To these we should add combating tax evasion.

- The need for counter-cyclical financing of developing and emerging economies, including in that regard the central role of Multinational Development Banks. To this add the need for my active Official Development Assistance and adequate funds to finance climate change mitigation and adaptation.

- Both permanent institutional frameworks to renegotiate public sector debts, but also a new ad hoc mechanism to manage the current debt crises.

We could add that globalization is changing, both due to economic and geopolitical events. A major issue, as argued by Dani Rodrik, among others, is that it should be more friendly to developing and emerging economies. The rupture of multilateralism is the major constraint in this regard.

I want to underscore that the United Nations should be the centre of a revitalized multilateralism, both to manage the geopolitical but also the sustainable development challenges well captured in the SDGs, one of the major agreements in world history. ■

This article is based on the UNCTAD Prebisch Lecture 2023, Geneva, 23 January 2023.

Sustainability leadership

Ed Bolen is President and CEO of the National Business Aviation Association (NBAA)

Business aviation's ability to link companies and communities around the globe became all the more apparent throughout the past three years. Even as our world has now largely settled into a new normal following the darkest days of COVID-19, our industry remains a vital part of the international travel landscape.

This is particularly evident throughout Europe, where business aviation enables point-to-point missions between communities with little or no airline service, and when other transportation alternatives offer undesirable tradeoffs in time, security or efficiency.

Indeed, our industry often provides a singular, invaluable economic link to communities of all sizes. That is true not just in the US, where the National Business Aviation Association (NBAA) advocates for our industry, but across the European continent as well.

That advantage also remains clear even as utilization continues to normalize following an unprecedented surge in business aviation activity throughout the pandemic. According to industry analytics firm WingX, business aviation activity remains higher today across the European continent than during the same period in 2019, even as year-over-year activity has decreased from 2022.

This indicates that many individuals and companies who came to business aviation during the pandemic have continued to utilize it. Figures from the European Business Aviation Association (EBAA), co-hosts with NBAA in the annual European Business Aviation Convention & Exhibition (EBACE), tell a similar tale.

Citing traffic counts from Eurocontrol, EBAA's January 2023 Traffic Tracker indicates overall European business aviation activity has grown 8.9% over the same period last year, with increases in intra-EU travel offsetting decreases in overflight activity and effects from the ongoing crisis in Ukraine.

As demand for business aviation remains strong, however, it's clear that we must also continue to address challenges

across several fronts, perhaps most notably in the matter of environmental sustainability.

Leaders in aviation sustainability

Despite fevered and even hostile attempts to portray our industry as environmentally irresponsible, in truth business aviation remains at the forefront of the global aviation industry's efforts to become more efficient and more sustainable.

One example of this work is the spirit of innovation that drives our industry. Business aviation manufacturers are constantly working to develop more efficient airframes and engines, which also helps to further reduce our industry's already low contribution to global aviation carbon emissions.

Business aviation also continues to lead efforts to increase use and availability of sustainable aviation fuels (SAF) derived from renewable feedstocks that can reduce lifecycle carbon emissions by more than 80 percent compared to traditional fossil fuels.

In 2021, global industry leaders committed to net zero business aviation carbon emissions by 2050, expanding upon an earlier plan to reduce those emissions by 50% over the same timeframe.

This effort – known as the Business Aviation Commitment on Climate Change – was reiterated last Fall ahead of the 41st International Civil Aviation Organization (ICAO) Triennial Assembly, where business aviation groups unveiled a set of policy principles to guide long-term reductions in carbon emissions reductions.

Even as we improve upon existing modes of business aviation transport, our industry is also hard at work to bring to market electrically-powered advanced air mobility (AAM) vehicles that stand to not only revolutionize point-to-point travel across urban areas, but to do so completely free of carbon emissions.

NBAA has made sustainability a top priority for years. Back in January 2019, NBAA showcased sustainable fuel with a day-long series of events, including demonstration flights featuring business aircraft using SAF, which had been announced at the 2018 edition of EBACE in Geneva, Switzerland.

Last year featured the inaugural EBACE Business Aviation Sustainability Summit, which highlighted the technologies and business models the industry is developing to meet that zero-emissions goal.

The summit also showcased the launch of the Forever Flight Alliance to Decarbonize Aviation, supported by the Lindbergh Foundation, X-Prize Foundation, NBAA and the Prince Albert II of Monaco Foundation.

Experience business aviation's innovative future at EBACE

This year's EBACE, taking place 23-25 May at Geneva's Palexpo, will again bring together business leaders, government officials, manufacturers, flight department personnel, avionics firms, fractional providers, charter/lease companies and others involved in nearly every aspect of business aviation.

"SAF can help drive down carbon emissions toward the industry's 2050 net zero carbon commitment"

EBACE will feature a sizable roster of exhibiting airframe and powerplant OEMs, product manufacturers and support providers showcasing the very latest in business aviation technologies. Among them will also be several zero-emissions AAM vehicles, many of which have already flown and are now advancing toward production.

Multiple EBACE sessions will help attendees to operate in more sustainable ways. For example, *A Basic Guide to Offsetting* will educate business aviation operators, charter companies and brokers to become carbon-neutral through offsets when carbon emissions are unavoidable, including an explanation of how voluntary offsetting works.

Another session will explore how SAF can help drive down carbon emissions toward the industry's 2050 net zero carbon commitment. Participants will learn how SAF is produced and distributed, as well as efforts, strategies and challenges facing this ground-breaking fuel.

This year's EBACE will also build on last year's introduction of SAF for outbound flights, further giving EBACE attendees and leaders the ability to truly 'walk the talk' when it comes to sustainability.

Initiatives and technologies enabling greater sustainability will also be front-and-centre throughout Palexpo, which has a decades-long commitment to sustainability. The facility has cut its electricity consumption by one third in a decade and reduces its carbon emissions by sourcing 95% of its products locally.

Geneva Airport, which will host the EBACE Outdoor Display of Aircraft, has a similarly impressive sustainability record, addressing matters from clean water and energy to responsible consumption of resources and careful oversight of 26 protected plant species on the airport property.

As you can see, business aviation has a powerful story to tell about sustainability, and this story will be shared throughout EBACE2023.

On behalf of NBAA and EBAA, I welcome readers of *World Commerce Review* to attend EBACE to experience the innovative thinking that drives our industry's exciting, and sustainable, future. ■

The fiscal case for Europe to 'go Dutch' on defence

Hanno Lustig is the Mizuho Financial Group Professor of Finance, Senior Fellow, Stanford Institute for Economic Policy Research, at Stanford University

If you start from the economic fundamentals, Russia's decision to invade Ukraine seems hard to fathom. A country whose GDP is roughly equal in dollars to that of Belgium, the Netherlands, and Luxembourg combined, and less than 5% of the combined GDP of the US and the EU, decides to invade Ukraine and indirectly take on the EU and the US.

But it is perhaps less surprising once you dig into the details. What matters for deterrence is defence spending. In 2021, the US spent 3.3% of its GDP on defence, but Germany spent only 1.1% of its GDP on military expenditures.

That's one-third of the US spending/GDP ratio. This puts Germany roughly in the middle of the EU pack. Countries like the Netherlands and France spend more, but others like Belgium, Austria, and Portugal spend even less.

All of these countries are NATO members. All have pledged to spend at least 2% of their GDP. Only the UK, Lithuania, Estonia, Latvia, Norway, and Greece kept their 2% promise in 2021[1].

Since the fall of the Berlin wall, the US has spent an average of 2.6% more of its GDP each year than Germany on defence. If Germany had spent as much as the US on defence over this period, then, all else equal, it would have been running large deficits in excess of 3% of GDP instead of small deficits of around 1% of GDP[2].

Germany has benefited tremendously from a large US defence subsidy, as have other NATO countries. Six decades of spending cuts reduced German defence spending from 4% of GDP in 1960 to 1% of GDP in 2021 (see Figure 1). These cuts have taken a toll.

When the invasion started in March of 2022, the commander of German Army forces, Alfons Mais, stated unequivocally that his troops were not battle-ready: *"And the Bundeswehr, the army that I am allowed to lead, is more or less broke. The options we can offer policymakers to support the alliance are extremely limited."*[3]

German soldiers even lacked basic equipment, such as helmets and backpacks. At the start of the Ukraine war, Europe's largest army, the Bundeswehr, was effectively declared to be of no practical use by its own commanding officer.

Putin may have made some mistakes in invading Ukraine, but underestimating Europe's defence posture was not one of them. Since then, the German Chancellor has announced significant increases in defence spending, but the German government has been slow to execute.

According to the Ukraine Support Tracker at the Kiel Institute for the World Economy, even now, the EU's overall support for Ukraine is barely keeping up with the US at about $55 billion in 2022, less than 0.3% of its GDP, even though Ukraine is in the EU's backyard.

And when it comes to direct military support, the EU countries' efforts again fall short compared to those of the US. Looking at bilateral aid as a percentage of GDP between January and August in 2022, the UK and the US outspent all other European countries except for those bordering on Russia (Estonia, Latvia, Poland, Norway, and Lithuania).

In spite of the rhetoric coming out of Paris, France itself spent less than 0.05% of GDP on direct aid to Ukraine, as did Italy and Belgium (Antezza *et al* 2023: 24).

Incentives matter. After WWII, many NATO countries decided to free-ride on US defence spending, betting that the protection afforded by the NATO umbrella renders their own national defence efforts moot. This is a textbook example of 'moral hazard'.

Joining NATO was like getting fire insurance. Once you have acquired fire insurance for your property, you might be less inclined to clear the brush around your house to prepare for fire season.

Some European countries failed to maintain and renew their fleet of military aircraft and helicopters, and their tanks. European countries have even pursued policies that have actively endangered their national security and that of others.

The German, Italian, and Austrian energy policies that fostered dependence on Russian gas are one example of

this. Another example comes from the shipping industry. Incredibly, for much of 2022, European shipping companies were transporting Russian oil to Asia, helping to fund Putin's war.

Going forward, the US-backed insurance policy may prove not to be as valuable, because the insurer's financials are less sound than they used to be. To understand why, the EU's defence ministers should start by studying the US federal government's fiscal situation. The US federal government is not on a fiscally sustainable path.

The US Treasury can borrow at lower rates than other governments because Treasuries play a unique role in the international financial system. Even after accounting for the extra seigniorage revenue the Treasury earns from its role of safe asset provider to global investors, it is hard to rationalise the current valuation of Treasuries (Jiang *et al* 2019).

Bond market investors desperately need safe assets, and this need may lead the bond market to ignore the country's own fiscal fundamentals for long periods of time. But eventually, bond market investors will return to the US' fiscal fundamentals.

That is what happened to the Dutch Republic at the start of the 18th century and the UK at the start of the 20th century. Both countries were the safe asset suppliers of choice in their respective eras (Chen *et al* 2022).

The fiscal fundamentals of the US are not sound. The US federal debt exceeds its GDP. Once you add state and local debt as well as unfunded pension liabilities, the US general government debt-to-GDP ratio exceeds that of most European countries[4].

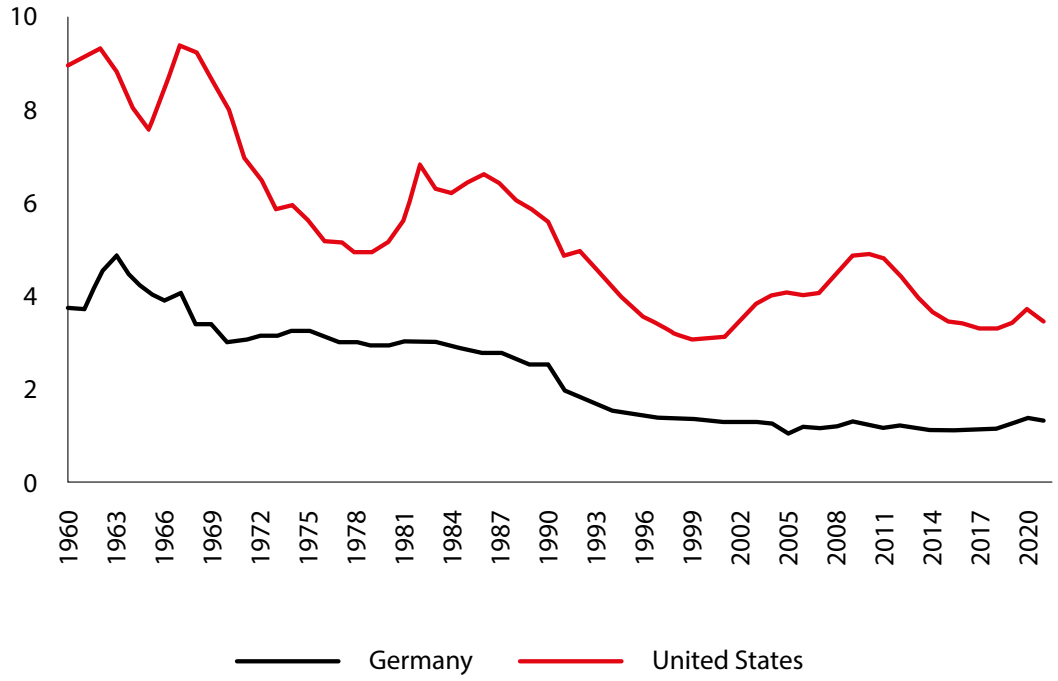
"It seems unlikely that US taxpayers will continue to subsidise Europe's defence when they face cuts to Social Security and Medicare. Politicians on both sides of the political aisle in the US are increasingly reluctant to spend US taxpayer dollars on foreign 'military adventures'"

The Congressional Budget Office (CBO) just released its latest budget projections for the federal budget a few days ago. Starting from the laws currently on the books, the CBO currently projects average federal deficits of 8% of GDP after interest expense, and a debt/GDP ratio of 195% by 2053[5].

These are projections of future spending and tax revenue based on current law. They are not the best forecasts conditional on all available information, but they still serve as a helpful benchmark. Over the past two decades, ten-year projections have been overly optimistic relative to what actually happened to the debt/output ratio and deficits.

These projections imply that Congress will likely have to consider unprecedented spending cuts in the near future. And

Figure 1. Defence spending as a percentage of GDP



Source: World Bank World Development Indicators, "Military Spending as % of GDP".

it seems unlikely that US taxpayers will continue to subsidise Europe's defence when they face cuts to Social Security and Medicare. Politicians on both sides of the political aisle in the US are increasingly reluctant to spend US taxpayer dollars on foreign 'military adventures'.

There are other reasons for Europeans to look askance at the US protective umbrella. The US faces more significant national security threats elsewhere. Its foreign policy continues to pivot to the Pacific, and away from the Atlantic.

The US political system has become increasingly polarised and dominated by populists on the left and the right, making each presidential election a high-stakes gamble that could portend the end of the US protection Europe has benefited from.

The invasion of Ukraine serves as a reminder to Europeans that there is nothing inevitable about the survival of liberal democracies. The most effective way to preserve the security and freedoms of future generations of Europeans is to permanently degrade the military threat posed by the Russian Federation.

Ukraine's defence forces have shown themselves to be willing and able to accomplish this task. Ukrainian soldiers are actively containing Russia, buying the rest of Europe time to get its own defences back in shape after years of underinvestment. It is hard to understand why the EU does not provide significantly more direct military support to Ukraine.

There is a clear self-interested fiscal rationale for Europe to invest more in its own defence, starting by stepping up its aid to Ukraine. It also happens to be the right thing to do.

When it comes to national defence, Europe has been behaving like that friend who always runs to the restroom when the check arrives. It's time for Europe to start picking up its own tab, beginning with Ukraine. It's time for Europe and the US to 'go Dutch' on defence. ■

Endnotes

1. OECD Data, "General Government Spending, Defence", 2021.
2. World Bank World Development Indicators, "Net lending and borrowing as % of GDP".
3. "Germany is ready to lead militarily," New York Times, 23 March 2022.
4. OECD Data, "General Government Debt", 2021.
5. Congressional Budget Office, "Long-Term Budget Projections", February 2023. Jiang et al (2022) provide an analysis of the US fiscal capacity based on CBO projections.

References

Antezza, A, A Frank, P Frank, L Franz, I Kharitonov, B Kumar, E Rebinskaya, and C Trebesch (2023), "The Ukraine Support Tracker: Which Countries Help Ukraine and How?", Kiel Working Paper.
Chen, Z, Z Jiang, HN Lustig, S Van Nieuwerburgh, and MZ Xiaolan (2022), "Exorbitant Privilege Gained and Lost: Fiscal Implications".
Jiang, Z, HN Lustig, S Van Nieuwerburgh, and M Z Xiaolan (2022), "Measuring U.S. Fiscal Capacity Using Discounted Cash Flow Analysis".
Jiang, Z, H Lustig, S Van Nieuwerburgh, and MZ Xiaolan (2019), "The U.S. Public Debt Valuation Puzzle", NBER Working Paper No. 26583.

Editors' note: This column is taken from a new CEPR eBook, Supporting Ukraine: More critical than ever, available to download at https://cepr.org/publications/books-and-reports/supporting-ukraine-more-critical-ever.

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Year in review: the evolution of Russia sanctions in 2022

Nancy Fischer and Steven Farmer are Partners, and Iris Karaman is an Associate, at Pillsbury Winthrop Shaw Pittman LLP

On February 24, 2022, Russia's entry into Ukraine set off an unprecedented wave of sanctions and export controls by a wide coalition of countries, including the United States, the United Kingdom, the European Union, Canada, Japan, South Korea, Australia, and New Zealand.

As the year progressed, these countries continued to coordinate and respond with increasingly severe sanctions and export controls, and each jurisdiction also imposed unique sanctions on targeted but not identical sets of Russian parties as well as products and services.

In designing and implementing these sanctions, Western governments have had to carefully tread between restricting strategic sectors of the Russian economy and crippling Russia's military capability, whilst also ensuring the protection of domestic, international and humanitarian interests.

Over the course of the past year, key US, EU and UK sanctions levied against the Russian aviation, financial and energy sectors have varied somewhat as government strategies have evolved. As we move into the second year of the conflict, the impact – both direct and indirect – of these coordinated sanctions on Russia is being felt in Russia and in the global economy.

Aviation sector

Many of the first measures that the US, EU and UK adopted against Russia in 2022 related to aircraft and international air travel. As the conflict broke out, each jurisdiction quickly prevented Russian actors from entering their airspace.

For example, the EU and the UK each prohibited aircraft registered in Russia or owned, chartered, operated or otherwise controlled by Russian airlines or other Russian parties from overflying, landing in, or taking off from their territories from February 2022.

Commercial flights into Russia by non-Russian airlines are still generally permitted, however there are complications associated with ensuring such flights are conducted in compliance with applicable sanctions and other restrictions.

Immediately following the start of the conflict, the US, EU and UK each also imposed expansive export controls on items related to the aviation industry (including aircrafts and parts), in the form of requirements to obtain advance permission (licenses) prior to export to Russia.

These measures had a significant impact on the EU's aircraft leasing industry, and the EU subsequently introduced a new basis for issuing a license allowing for the execution of aircraft financial leases concluded before February 26, 2022, when strictly necessary to ensure lease repayments to an EU party. With respect to the US, US sanctions assert jurisdiction over not only US-made aircraft and parts, but also non-US made aircraft and parts that contain certain levels of US-origin content.

The US, EU and UK also adopted restrictions on aviation-related services, including but not limited to maintenance, refuelling, repair and/or insurance and re-insurance. For example, the EU banned the provision of various aircraft-related services to any person in Russia or for use in Russia, namely overhaul, repair, inspection, replacement, modification or defect rectifications (with the exception of pre-flight inspection) in relation to aircraft and aircraft parts/technology.

Subsequent guidance clarified that 'in-and-out' operations (where an airline operates direct flights between a location outside of Russia and a location inside Russia) would not fall within the term 'for use in Russia' and services could therefore be provided to aircraft undertaking such flights.

In February and March 2022 respectively, the EU and UK also adopted restrictions on the provision of insurance and reinsurance relating to aircraft or other aviation and space items to Russia or Russian parties.

Financial sector

As an initial response to the conflict, the US, EU and UK each imposed sanctions through asset freezes against key Russian and Belarusian financial institutions. In the US, these measures were imposed by designation on the Specially Designated Nationals and Blocked Persons (SDN) List of the Treasury Department's Office of Foreign Assets Control (OFAC). US persons are prohibited from entering into any transaction with SDNs, or with entities that are owned 50% or more by one or more SDNs.

"Whether the sanctions will ultimately achieve their goal of curtailing Russia's aggression in Ukraine remains to be seen, but the sanctions appear to have had some impact on Russia's economy"

Similarly, the EU and the UK added Russian and later Belarusian financial institutions to their consolidated lists of financial sanctions targets, and asset freeze measures extend to entities directly or indirectly more than 50% owned or controlled by listed financial institutions.

In a further effort to cut Russia's financial sector off from wider markets, the US, EU, and UK banned certain Russian banks from the Belgian-based Society for Worldwide Interbank Financial Telecommunication (SWIFT), which serves as the primary messaging network for international payments.

Practically speaking, these measures effectively prevent sanctioned Russian financial institutions from transacting in major currencies and engaging in transactions and transfers in Western–and, to some extent, Asian–markets.

In addition, in late February of 2022, the US adopted a prohibition on all transactions with the Central Bank of Russia (CBR), whilst the EU and UK prohibited supplying financial services to the CBR for the purpose of foreign exchange reserve and asset management.

Russia holds a significant share of its foreign currency reserves in other countries including the US, EU and UK, and so these measures had the effect of making it more difficult for the CBR to access much of its foreign reserves.

In addition, western countries also adopted measures aimed at prohibiting individual transactions rather than cutting off entire financial institutions. For example, the EU adopted restrictions preventing the acceptance of deposits from Russian companies (or Russian owned non-EU companies) and Russian nationals/residents where such deposits would bring the account holder's balance above €100,000 per financial institution (across all accounts).

As the conflict progressed, the US, UK and EU sought to restrict how their own citizens may provide financial services to Russian entities. In early 2022, the EU and UK banned certain financial services to Russia, including for example the provision of credit rating services and central securities depository services.

As the year progressed, further prohibitions to inhibit the Russian financial sector were introduced. In May 2022, the US prohibited the export of certain services to the Russian Federation, including accounting, trust and corporate formation, and management consulting services.

Later in the year, the EU and UK followed suit and prohibited the provision of trust, accounting, business, and management consulting services to Russian companies (there is also an EU prohibition on legal services).

Energy sector

As Russia's largest industry, the Russian energy sector has been a focus of US, EU and UK sanctions. These sanctions impact not only trade in Russian oil and gas, but also new equity and debt and investment in energy projects, exports to Russia of equipment and parts used in energy production, as well as designations of specific companies and individuals in the sector.

In designing and implementing these sanctions, Western governments have had to carefully thread between restricting the Russian energy sector and ensuring the satisfaction of domestic energy needs.

Early on in 2022, the UK, EU and US took steps to restrict the import of Russian energy products. However, due to varying Russian energy needs and dependencies among countries, the implementation of the import bans varied.

The US was the first to ban the import to the US of Russian crude oil, petroleum, liquefied natural gas and coal, on 8 March 2022. The EU followed suit with a ban on the import of Russian coal on 8 April 2022 and Russian crude oil and petroleum products on 3 June 2022.

Notably, the EU oil import ban was subject to country-specific derogations for certain EU member states particularly reliant on Russian oil and there was a general exception for most crude oil imports effective until 5 December 2022 and petroleum imports effective until 5 February 2023.

On 21 July 2022, the UK introduced prohibitions on the import of Russian coal and crude oil and petroleum products, which entered into force later in the year (10 August and 5 December 2022 respectively). Furthermore, on 28 October 2022, the UK introduced a ban on the import of liquified natural gas effective from 1 January 2023.

In addition to restricting the supply for Russian energy imports, the UK, EU and US each imposed additional export restrictions on equipment and parts used in energy production (such as products used for deepwater oil and gas exploration, extraction and oil refining), with the aim of curbing Russia's long-term ability to pursue oil and gas exploration and other energy projects. These followed measures originally introduced in 2014, following Russia's annexation of Crimea.

The UK, EU and the US have also each adopted measures aimed at hindering foreign investment and access to finance for Russian energy projects.

Most recently, the tension between the multilateral goals of prohibiting Russia from profiting from historically high prices of oil and gas and easing the international energy crisis contributed to the implementation of a coordinated price cap on Russian-origin oil and petroleum products traded between third countries.

Looking ahead

As time progresses, further sanctions targeting the Russian aviation, financial, energy and other sectors are likely. In addition, thwarting sanctions evasion and enforcement of the existing regimes is a priority for 2023 with agencies like the US Department of Justice focused on prosecuting sanctions evaders and the UK's Office of Financial Sanctions Implementation looking to use new powers to issue monetary penalties for sanctions violations on a strict liability basis to enforce Russia sanctions robustly.

Whether the sanctions will ultimately achieve their goal of curtailing Russia's aggression in Ukraine remains to be seen, but the sanctions appear to have had some impact on Russia's economy.

Data suggests that the Russian economy suffered in 2022 (it is estimated that Russia's GDP dropped by between 2.2%-3.9%). Looking ahead, their long-term impact will likely depend on various factors, including the market appetite of non-aligned jurisdictions, such as China and India, to engage in trade with Russia. ■

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Will a digital pound be needed by the end of this decade?

Sir Jon Cunliffe is Deputy Governor for Financial Stability at the Bank of England

As some of you may have seen, the Bank of England and the Treasury have published, as a *Consultation Paper*, the report of the Bank of England – HM Treasury Taskforce on the introduction in the UK of a central bank digital currency – a 'digital pound'. So I am grateful for the opportunity to set out some of the thinking behind the report and the next steps we propose.

First, however, I should set out the headline conclusions of the Taskforce.

Our assessment is that on current trends it is likely that a retail, general purpose digital central bank currency - a digital pound - will be needed in the UK. This would be a new, digital form of money, issued by the Bank of England for use by households and businesses for everyday payments.

A digital pound would be a very substantial financial infrastructure project that would take several years to complete. It would, as many in this audience know, have major implications for the way we transact with each other and, more broadly, for the financial sector and the economy in general. The Taskforce's conclusion is that we are not yet at a point where a firm decision can be made to implement a digital pound.

However, in view of the likely need and the lead time to introduction, the Bank and The Treasury, will now proceed to the next stage of detailed policy and technical development of the digital pound - including the development of a technical blueprint.

This stage will take around two to three years following which a decision will be made whether or not to proceed to the next stage and implement a digital pound in the UK. The work over the next two to three years will inform that decision and will reduce the lead time to launch should the decision at the end of this stage be to implement the digital pound in the UK, which could then be introduced in the second half of the decade.

In this next stage of detailed policy and technical work, including the development of a technical blueprint for the chosen model of the digital pound, we will work closely with private sector partners on proofs of concept, experimentation as well as on the development of the blueprint itself.

We expect that this research and development work will have important benefits for both the Bank and the fintech industry even if the eventual decision is not to introduce a digital pound.

In order to proceed to the next stage, we need clarity about the model of a digital pound to be developed. The report sets out for consultation the key features of the model we propose to take forward.

The report is accompanied by a *Technology Working Paper* that sets out an accompanying illustrative conceptual model and seeks feedback on potential approaches to key technology considerations.

Before I set this out in further detail, there is one important point I should make. Given all the attention that the cryptoasset world, with its attendant gyrations and failures, has received in recent years, it is perhaps understandable, that the digital pound can be confused in peoples' minds with cryptoassets such as bitcoin. I should take this opportunity to correct this misapprehension. Indeed, nothing could be further from the truth.

The majority of cryptoassets are highly speculative assets, whose value is extremely volatile, because there is nothing behind them. They have no intrinsic value. For that reason, they are not suitable and not used for general payment purposes. One can think of them as more akin to a bet than to trusted money.

The digital pound would be a safe, trusted form of money accepted for everyday transactions by households and firms, in the same way as Bank of England notes are today.

It is of course possible that some of the technologies developed in the crypto world might be useful in the development of a digital pound, but as I will explain later, there is a large range of technologies that are now under consideration.

Why is a digital pound likely to be needed?

There are a number of considerations behind our assessment that a digital pound is likely to be needed. The assessment is forward looking. It turns first on current trends in the way we use money to make payments and the potential of emerging digital technologies and second on the public policy response

necessary to ensure innovation and competition can flourish without jeopardising the safety and uniformity of the money we use in the UK.

Money is at its root a social convention[1] based on trust that allows us to store, transfer and settle obligations we hold on each other in society. It's safe and efficient operation is, as history has demonstrated, fundamental to social and economic stability.

The forms that money takes and the ways it is used have changed throughout history driven by changes in technology and the changing demands of ever more sophisticated and complex economies. However, trust in money is the bedrock on which that innovation is built.

Two forms of money are currently available to the public[2] throughout the UK. The Bank of England and the Royal Mint issue a physical form of money to the public – bank notes and coins, otherwise known as 'cash'. Private commercial banks issue predominantly digital money in the form of electronic transfers between bank deposit accounts[3].

We have seen major changes in recent years in the form of use of money to make payments. In the mid-1960s, most workers were paid weekly in cash, and around 70% of the population did not have a bank account[4].

Very few had access to credit or debit cards. Consequently, for every £100 of funds that people held to make payments, over a third would be held as cash. Nowadays, less than 5% is held as cash. Even 15 years ago, 60% of transactions in the UK used physical cash; pretty much everyone in this room would have carried enough for everyday transactions.

In 2021 only 15% of transactions involved physical money. Technology and the increasing digitalisation of everyday life has transformed the way we use money. Private commercial bank money accounted for 85% of the payments made by the public.

Within that, debit and credit card transactions accounted for 69% of transactions. Contactless payment has made such transactions much easier for everyday life. And the growth of internet commerce has required the use of digital money.

It is always challenging to forecast how technological advances and social trends will play out. Few at the turn of this century would have predicted the development and growth of a massive and dominant market and social platforms. Or how the advances in the functionality of the smartphone, as most recently seen during the pandemic, would transform daily lives.

But while we cannot know with certainty how current trends in payments and technology will play out, it would be complacent to assume that developments in money and payments will end with the status quo.

There are already in existence new digital technologies that are being applied to the digital representation, transfer and storing of money like obligations. These offer the prospect of new possibilities in the way money and payments can be configured to interact with digital processes.

"The digital pound would be a safe, trusted form of money accepted for everyday transactions by households and firms, in the same way as Bank of England notes are today"

Programmable money, for example, could enable the development of smart contracts which carry out specific actions based on pre-defined actions and conditions[5].

Moreover, money and payments are no longer the exclusive province of banks. New, non-bank players have already been successful in providing innovative payment services. Looking forward a wide range of non-bank payment firms, including bigtechs and some players from the crypto universe, are becoming increasingly interested in the possibilities of these new technologies in money and payments.

Our assessment that a digital pound is likely to be needed is grounded first in the view that further decline in cash use and further development in the digitalisation of money and payments is likely and second in the view that these developments raise important questions to which the Bank of England and the Government should respond.

As far as the decline of cash is concerned, the immediate response is to make sure cash will remain available to any and all that want to use it. The Bank has made clear that we will continue to produce it and the Government is taking powers under the Financial Services and Markets Bill to give the Bank of England and FCA new powers to ensure the future effectiveness, resilience, and sustainability of the cash ecosystem[6].

However, we cannot ignore the fact that the safest form of money, 'public' money, that it is to say money issued by the state for general use, will become increasingly less useful and useable and of shrinking relevance to a large part of the population. Nor can we ignore the likelihood that we will see the emergence of new forms of money, offering new possibilities and issued by new as well as established players.

This raises, particularly for the Bank of England, the question of how we can continue to ensure that all of the types of money used in the UK are denominated in Sterling, remain safe and that each is interchangeable on demand and to all of the other types of money without loss of value, including publicly issued, Bank of England money.

We ensure trust in money at present by regulation of the commercial banks that issue money, by requiring banks to settle amongst themselves in Bank of England money (ie. Bank

of England reserves) and, crucially, by requiring all private money to be exchangeable for Bank of England money, cash, on demand by the holder and without loss of value.

Alongside regulation, the provision of Bank of England money to the public and reserve money to commercial banks institutions anchors the confidence, uniformity and interchangeability of money in the UK. Our assessment is that future developments in payments and money will make it likely that, alongside regulation, we will in future need a digital pound, issued by the Bank of England to perform this anchor function.

The experience of digitalisation is that new products and services, enabled by new technology, can be adopted rapidly at scale. The Government has identified several characteristics of digital markets that may lead to concentration.

Such characteristics include network effects, economies of scale and scope and data advantages, which can act as barriers to entry. This suggests that the future development of private money issuance could tend towards a small number of firms taking a significant market share.

While concentration and market power are not inherently harmful and may reflect innovative products and services, they can damage consumer choice, competition and innovation. Dominant issuers of new forms of private digital money may create 'walled gardens' - payment systems that are not fully interoperable or restrict the development by smaller firms of payment services using the money they issue.

A digital pound issued by the Bank of England would provide an alternative, public, digital money - an open platform, which would be available to all developers of new digital payment services.

Moreover, if designed appropriately, a digital pound could complement and support new forms of private digital money and payment services, for example by acting as the 'bridging asset' between different platforms enabling convertibility.

By establishing technical standards available to all, it could help ensure interoperability between different platforms. Our assessment is that a digital pound, an alternative, publicly issued form of digital money, available to all, would help ensure competition and innovation and drive efficiency in payments.

There are other important potential benefits. There is scope for innovation to generate further efficiencies in payments, allowing for faster and/or cheaper payments. That improvement might be facilitated by new technologies and new entrants to payments markets offering new functionalities. For example, small and medium-sized merchants pay far higher fees for accepting card payments than larger businesses[7].

Although these costs are not paid directly by customers, they may feed into higher prices in the economy overall. And crossborder transactions in particular are often very costly. The average cost of a payment sent to another country is about 6% of the value sent[8].

The digital pound could also complement existing financial inclusion initiatives, for example if it were able to provide for offline payments. It could, with international co-operation, present an opportunity to improve crossborder payments.

And, by providing a highly resilient, alternative payment rail it could reinforce the overall resilience of the UK payments system. These motivations are explored more fully in the paper we have published.

The model for a digital pound

Our assessment, therefore, is that on current trends a digital pound would have benefits and is likely to be needed. However, the Taskforce concluded, that we are not at present at a point at which a firm decision could be taken to implement the digital pound.

Further work, especially detailed technical exploration and development is necessary to assess the feasibility and cost of what would be a very major public, financial infrastructure project.

We expect this intensive exploration and technical development phase to take around three years. It will produce a technical blueprint for the digital pound. The work will not delay but rather shorten the lead time to actual launch should a firm decision be taken in the future to implement the digital pound so that a digital pound could be introduced in the second half of the decade.

And during this next phase, we will be able to see more evidence of how the current trends and changes in payments and money are playing out which will help to inform a future decision.

In order to proceed to the next phase we need clarity about the model of the digital pound we wish to develop. We have today set out that model in detail for consultation. We are seeking industry and public views on the key design choices that determine the model.

The *Consultation Paper* is accompanied by a *Technical Working Paper* which sets out our current thinking on the relevant technology and seeks feedback on the approaches we propose to consider.

There is not time today to go through the model in detail, but I will briefly set out some of the most important details of what we propose.

We envisage the digital pound as a partnership with the private sector. The Bank would provide the digital pound and the central infrastructure, including the 'core ledger'.

Private sector firms – which could be banks or approved non-bank firms – would provide the interface between the Bank's central infrastructure and users by offering wallets and payment services. These private companies would be able to

integrate the digital pound, as the settlement asset, into the services they would offer to wallet holders.

The wallets would be operated on a 'pass-through' basis. That is to say, they would not constitute a claim on the wallet provider in the way that a bank account is a claim on a bank. Nor would they represent a custody arrangement.

Rather, the wallets would hold all of the customer related information and 'pass-through' the customers instructions to the Bank's infrastructure. All of the digital pounds would be held on the Bank of England's central ledger.

Privacy has been a major theme of the Taskforce's engagement with industry and the public. We intend that the digital pound would have the same (or stronger) privacy protections as bank accounts, debit cards or cheques which are now used for 85% of transactions in the economy.

Individuals' personal details and transaction records would be known only to their private sector wallet provider in the same way they are for bank account providers today (and subject to the same privacy protections). But individuals' details and records would not be known by the Government or the Bank of England. In this way, the digital pound would provide privacy while also protecting against fraud and financial crime.

The digital pound would not be an anonymous bearer instrument like cash, but physical cash would remain available to those who wanted to use it.

Neither the Government nor the Bank would program a digital pound or restrict how it was spent. Instead, the Bank would provide the infrastructure and minimum functionality for the private sector to provide programmability features for users. Those features would require user consent.

As with banknotes and many current accounts, no interest would be paid on a digital pound. Its purpose would be as a means of transaction - to make and receive payments - rather than as a savings product. Nor do we see the digital pound as a monetary policy instrument and as such it would, like cash, have neither positive nor negative remuneration.

In our 2021 Discussion Paper on *New Forms of Digital Money*, we explored the financial stability risks and impact on the banking sector of the emergence of non-bank digital monies. Modelling of an illustrative scenario suggested that retail deposit outflows into digital money would affect banks' funding and could lead to higher bank lending rates, although the impact was expected to be modest.

This modelling was based on assumptions, set to be highly cautious[9], about the amount of non- bank digital money households and businesses might want to hold and hence the scale of possible outflows from retail bank deposits.

We cannot, of course, know ex ante, how households and businesses would respond to a digital pound and how much they would want to hold. We therefore propose that to manage financial stability risks, initially at any rate, the digital pound would need to be designed in a way that enabled some restrictions to be placed on amount an individual or business could hold.

We propose a limit of between £10,000 and £20,000 per individual as the appropriate balance between managing risks and supporting wide usability of the digital pound. A limit of £10,000 would mean that three quarters of people could receive their pay in digital pounds, while a £20,000 limit would allow almost everyone to receive their pay in digital pounds[10], keeping outflows from the banking system broadly within the assumptions set out in the Bank's earlier modelling work.

We are, as I have said, also seeking feedback on the technical approaches for such a model of the digital pound. The Technology Working Paper accompanying the Consultation Paper sets out an illustrative and complementary conceptual model consisting of a core ledger, API layer, analytics and alias service.

The core ledger operated by the Bank might be centralised, running as a traditional database, or it might use Distributed Ledger Technology (whether a blockchain or another form of the technology).

The paper includes key questions which will be further explored in the next phase of work, including for example which privacy-enhancing technologies might support our policy objectives and what features of an API for the digital pound would best enable innovative use cases.

The digital pound within a digital payments landscape

Finally, I want to cover briefly how a retail digital pound, designed for use by firms and households in everyday transactions, might sit alongside a wholesale central bank digital currency, privately issued digital money, and also alongside central bank digital currencies issued by other jurisdictions.

On the question of a 'wholesale CBDC' the first point to emphasise is that for the Bank this is not a question of either one or the other of 'retail or wholesale'. We are working extensively on both areas, including through the renewal of the digital infrastructure we currently use to provide money to commercial banks in the form of Bank of England reserves.

Many of the technologies which I referred to above offer the potential for wholesale financial transactions to take place at lower cost, higher speed and with greater resilience. In many cases the same considerations around the potential benefits of new technological approaches, for example the deployment of smart contracts, atomic settlement or potential resilience benefits, apply to the wholesale world.

However, wholesale markets differ from retail in several respects and a digital pound designed for everyday use may not be best suited for wholesale financial markets. Our view is that for such markets there are other routes that might more quickly and effectively allow for new forms of digital

representation, the 'tokenisation', of central bank money to be used in financial transactions.

There is now a great deal of experimentation in this area among central banks, including the Bank of England, and within the private sector. Some of the approaches proposed would involve a greater role for the private sector, particularly the large financial firms that already have access to a form of digital Bank of England money, in the tokenisation and transfer of central bank money including between currencies[11].

Other experiments are testing the feasibility of networks of central bank digital currency systems for crossborder wholesale transactions[12].

The Bank is looking particularly at how we can exploit the capabilities of the new RTGS system we are building, with the new core RTGS settlement engine launching in 2024. We are examining features that could make it easier to connect to the RTGS service, including a broader range of APIs, improved availability, with near 24/7 operation and synchronisation of the RTGS system with other ledgers including those using distributed ledger technology and tokenisation of assets[13].

At the same time, the Bank of England is working with the FCA and HMT to establish a sandbox to explore innovative forms of digital settlement of wholesale financial market transactions. We are also actively engaged with the work of the BIS Innovation Hub, including through its London Centre, at experiments to look at the potential for improved settlement.

All of this work will proceed alongside the next phase of development of the retail digital pound. We envisage that much of the technical work in this phase will provide insights that will be of significant value to our work on the future digitalisation of wholesale financial markets.

The further development of the digital pound will also benefit the Bank's work on private sector stablecoins[14]. The Financial Services and Markets Bill (2023) provides powers for the Bank of England to regulate stablecoins used in systemic payment systems in the UK.

As with wholesale CBDC, this is not a question of whether we have a digital pound issued by the Bank of England or private sector stablecoins issued by private sector firms. In a future payments landscape, there could be opportunities for privately issued stablecoins, regulated to the same standards as we regulate other forms of privately issued money.

We envisage that these could operate alongside the digital pound and alongside commercial bank money and cash. The digital pound could act as a bridging asset between different types of privately issued digital money and establish standards for interoperability.

And, crucially, the requirement for privately issued digital money to be exchangeable on demand and at par for Bank of England digital pounds would help secure the interchangeability and uniformity of money in the UK. Finally, many central banks, across the globe are exploring the issuance of a central bank digital currency for both retail and wholesale purposes. A few have now been launched[15].

There is clearly a great opportunity and a great need for international cooperation in this area. Interoperability between national and regional central bank digital currencies could bring substantial benefits by reducing the cost and frictions in crossborder payments. At the same time, there are broader macro-economic and geopolitical issues that need to be considered.

The Bank of England is working actively on these issues with international counterparts through the Bank for International Settlements Committee on Payments and Market Infrastructures (CPMI), through the G7, the G20 and FSB and through close cooperation with a small group of advanced economy central banks[16].

Conclusion

To conclude, the *Consultation Paper* and accompanying *Technology Working Paper* marks the end of the first stage of the work of the Bank of England – HM Treasury Taskforce. It sets out: our assessment that a digital pound issued by the Bank of England is likely to be needed; the next phase of work necessary to enable a firm decision to be taken in the future

on whether to implement the digital pound; and consults on the model we now propose to develop.

The consultation will run for four months and end on the 7th June 2023. The Bank and the Treasury will then review the responses and consider whether changes to the proposed model are necessary. We will publish our response to the consultation.

We will then engage with private sector firms and other stakeholders on the next stage of work. This will include technological experimentation, particularly through collaboration with the private sector on proofs of concept[17].

This work will support the feasibility of the proposed model, the refinement of the associated technical requirements and the development of a technological blueprint for the digital pound. Such a blueprint will provide evidence that will allow us to evaluate the feasibility and costs of developing a digital pound. This will be the keystone of our assessment of whether or not to proceed to build.

We have made no decision yet on whether a digital pound would use DLT. Our technology working paper sets out high-level requirements for a ledger, and makes clear that in principle these could be fulfilled by conventional or DLT technology.

But it is clear that experimentation with DLT, whether private or public, will be important to ensure it is appropriately considered. We will be putting in place the capabilities and mechanisms to increase our technology expertise, and to enhance our ways of working with DLT technology providers and those seeking to deploy DLT in finance, both through the FMI Sandbox and the digital pound design phase.

Throughout the next phase we hope to continue to benefit from a wide range of views and expert advice on the digital pound. This consultation is an important element in that regard, as is the continued work of the Engagement and Technology Forums which have supported the Taskforce through the first stage of its work and which will continue.

The money we use and the way we pay has changed throughout history, driven by technology and the changing needs of society. We have seen significant changes in recent years and current trends suggest that we are likely to see further major change as technology and the digitalisation of everyday life advance.

The proposals set out are designed to ensure that the UK is well placed to take advantage of the benefits that these changes can offer, while ensuring that we preserve the safety and uniformity of money in the UK. ■

Endnotes

1. To function money relies on a shared understanding that the relevant instrument can be used to calibrate, exchange, store and settle claims. For further discussion on this point see recent speeches 'It's Time to Talk about Money' (2020) and 'Do We Need Public Money (2021)'.

2. The Bank of England also issues reserves to financial institutions. This is a form of wholesale money that allows regulated firms to hold claims on the Bank of England.

3. Only the Bank of England issues banknotes in England and Wales, but six banks in Scotland and Northern Ireland also issue banknotes, backed largely by assets at the Bank of England. See Scottish and Northern Ireland banknotes | Bank of England and the Scottish and Northern Irish Banknotes Regulations (2009) for further details.

4. he Payments of Wages Act 1960, as amended by the Truck Act.

5. Some examples of programmable functionality might include: instantaneous currency exchanges with reduced settlement risk; more efficient real estate purchases whereby all parties' transactions are executed simultaneously by a smart contract; or an automated payment made by a vehicle at a toll booth.

6. Financial Services and Markets Bill (2023). In December 2022, the Bank of England published a consultation, closing on 10 February, setting how it intends to use these new powers.

7. See for example Haldane, A: 'Seizing the Opportunities from Digital Finance' (2020).

8. World Bank (2022) – Remittances Prices Worldwide Quarterly.

9. The Illustrative Scenario assumed demand for the digital pound was around 20% of retail and business deposits, which was equivalent to nearly all transactional deposits in the banking system. This assumption is particularly cautious for higher interest rate environments when deposits would be expected to pay holders somewhat more interest than an (unremunerated) digital pound.

10. Specifically, a limit of £10,000 would allow 75% of UK income earners to hold their salary, pre-existing balances as well as an illustrative 10% bonus or overtime payment.

11. See for example the work the Bank of England has done with regard to omnibus accounts.

12. See for example BIS Innovation Hub projects looking at this topic - such as mBridge, Icebreaker, Dunbar and Jura.

13. Last year the Bank set out its thinking and approach on many of these elements through a consultation on the roadmap for RTGS beyond 2024. See also 'The road to enhanced payments' - speech by Victoria Cleland | Bank of England. As noted, this effort is complemented by work ongoing at the BIS Innovation Hub London Centre to look at the potential benefits from synchronisation under Project Meridian.

14. See Bank of England: 'New Forms of Digital Money (2021)' - Stablecoins are cryptoassets that aim to reduce volatility by pegging their value to government-sponsored – or 'fiat' – currencies.

15. For an overview see Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies.

16. See for example 'Central bank digital currencies: foundational principles and core features' (2020) and the series of reports on digital currency aspects (eg. financial stability, system design) published in 2021.

17. These are likely to involve testing individual components of the digital pound architecture (against standards built on the considerations set out in our Technology Working Paper). Project Rosalind, being run out of the London Centre of the BIS Innovation Hub is one example of the kind of work we envisage. That project is currently running a tech sprint and expressions of interest are open until 10 February.

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Bigtechs in finance: forging a new regulatory path

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Bigtechs and data

We at the BIS have been closely following large technology firms (bigtechs) and their advances into finance[1]. Bigtechs' reach extends across a wide range of industries, with existing core businesses grounded in e-commerce and social media, among others. From this base, they have expanded into finance.

To understand how bigtechs can easily make forays into finance, one must grasp the key role of data. Indeed, bigtechs have fully embraced the centrality of data in the digital economy. This is what distinguishes them from other firms. It also shapes their unique characteristics. Let me mention those that are particularly relevant for policymakers.

First, bigtechs can overcome limits to scale in financial services provision by using user data from their existing businesses. Their business model revolves around users' direct interactions and the data generated as a by-product of these interactions.

They use that data to offer a range of services that exploit the inherent network effects in digital services, a phenomenon where more users attract ever more users. In this way, bigtechs can establish a substantial presence in financial services very quickly through what we call the 'data-network-activities' (DNA) loop.

Second, bigtechs collect different types of data from the various business lines they straddle[2]. They are uniquely positioned to combine that data to uncover patterns and insights that can help them improve their services or offer new ones[3].

This combination of different types of data across sectors carries efficiency gains and is key to bigtechs' provision of digital services.

Third, bigtechs are unrivalled experts in data management and analysis. They devote significant resources to developing or acquiring state-of-the-art technologies. After all, access to large troves of data generates value only if you also have the technological capabilities to analyse it and monetise it.

Bigtechs have been pioneers in leveraging artificial intelligence techniques for this purpose[4]. To be sure, these capabilities have high fixed costs, but once that is overcome the marginal cost of handling more data is negligible. Therefore, bigtechs benefit from significant economies of scale in their use of data. For other firms, reaping the benefits of such economies of scale is a tall order.

Data management is thus at the core of bigtech activities, and the financial sector is all about managing information. Coupled with bigtechs' relentless drive to expand, their growing and already substantial footprint in financial services should come as no surprise.

Moreover, the trend towards greater digitalisation, which the COVID-19 pandemic has accelerated, has allowed bigtechs to fortify their market positions even further.

Public policy challenges

Given their size and customer reach, bigtechs' entry into finance could trigger rapid change in the industry, generating both opportunities and challenges. The potential benefits of bigtechs' entry into finance include improved customer outcomes, increased financial market efficiency and enhanced financial inclusion.

For example, BIS research has shown that access to innovative (QR code-based) payment methods provided by bigtechs helps micro firms build up credit history, and the use of bigtech credit can ease access to bank credit[5]. And there are many more examples.

But it's not all roses in the garden. The economic features that make bigtechs powerful in lowering costs and supporting financial inclusion also create new challenges for policymakers[6].

First, data governance. Bigtechs have large amounts of personal data, and their use comes with a trade-off between data efficiency and privacy. While detailed data may help align products on offer with consumer preferences and lower costs, there are risks to consumers, especially when sensitive data are shared.

Moreover, bigtechs can engage in price discrimination, making consumers worse off[7]. Restricting the use of data may help, but could have costs for allocative efficiency[8].

Second, competition is at threat in the presence of bigtechs. While bigtechs can initially bring greater competition, network effects allow them to quickly build positions of dominance in specific market segments, for example by increasing user switching costs or raising barriers to entry.

And the resulting concentration dynamics have a direct effect on market contestability and consumer welfare. Thus, new entry may not increase market contestability. Moreover, in the case of network industries market failures and externalities may arise.

Last, but certainly not least, there are important financial stability considerations which fall squarely within the mandates of central banks and financial regulators. Let me elaborate on specific concerns around the financial stability risks arising from bigtechs in finance.

One concern centres on bigtechs' potential systemic importance. Financial services currently represent a relatively small part of bigtechs' overall activities, but this can change rapidly through the DNA loop. They may quickly become 'too big to fail'.

This gives rise to concerns about the emergence of dominant firms with excessive concentration of market power and a possibly systemic footprint in the financial system.

A second concern is emerging around the risks from substantive interdependencies inherent in bigtech activities[9]. These arise between bigtech entities because they share data and provide relevant services to each other. They also share technological platforms and applications and use a common payment infrastructure[10].

Meanwhile, interdependencies with outside parties arise from joint ventures with financial institutions in providing financial services. These partnerships can entail an opaque distribution of responsibilities that diffuses accountability and hinders adequate oversight. They also have the potential to intensify operational, reputational and consumer protection risks as well as moral hazard issues.

Then there is a third concern around the role of bigtechs as providers of critical services. Financial institutions have come to heavily depend on bigtech technology services, and this is exacerbated by bigtechs' tendency towards market concentration.

While these services bring many advantages, the widespread dependency on them is forming single points of failure, and hence creating new forms of systemic risk at the technology services level. This type of risk is particularly evident in the market for cloud computing, which is highly concentrated and now dominated by a handful of bigtechs[11].

As a consequence, disruptions in the operations of one bigtech could have a substantial impact on the financial system[12]. In other words, greater operational risks can translate into greater financial stability risks, especially when critical services are highly concentrated.

"Innovation never rests, as recent advancements in artificial intelligence and the emergence of quantum computing make clear. But I am confident that the international community will find ways to address current and coming challenges"

The concerns I have just discussed are aggravated by shortcomings in the current regulatory approach, which is not fully fit for purpose to deal with the unique set of challenges arising from bigtechs' entry into financial services.

The current regulatory approach and its shortcomings

Most financial activities in which bigtechs engage are governed by sectoral regulations. And the existing ones can at best partially address the risks I outlined earlier.

These regulations are grounded on the main supervisory concerns in each sector, be they the protection of depositors, policyholders or investors. They were not designed with bigtechs in mind and therefore are not geared towards possible spillover effects across all the activities bigtechs perform, or their potential systemic relevance.

And yet they determine the applicable regulatory treatment for bigtechs' financial activities, the width of the regulatory perimeter and the reach of supervisory oversight.

Importantly, such regulations tend to follow an activity-based approach, where providers must hold licences for specific business lines[13]. Activity-based regulation constrains an activity on a standalone basis by imposing restrictions on how it can be performed.

It does not vary according to the type of entity that performs the activity. It also does not consider possible spillover effects from other activities performed by the same entity[14].

In contrast, entity-based regulation constrains a combination of activities at the entity level by imposing restrictions on an entity's characteristics that affect the likelihood and repercussions of its failure. Such combinations of activities affect an entity's resilience.

The financial stability risks of such combinations cannot be addressed by constraining individual activities, without any controls on the critical interactions across bigtech entities and their activities. In short, a purely activity-based framework for regulation is ill suited to address the policy challenges bigtechs pose.

Forging a new regulatory path

Without a doubt, a regulatory re-think is warranted, and we need a new path to follow. One that considers the key role of

data in bigtechs' DNA-based business model. One that strikes the right balance between benefits and risks.

We at the BIS have argued for some time now that we have to go one step further and regulate bigtechs directly[15]. More concretely, we need to consider how best to complement existing activity-based rules under sectoral regulations with group-wide entity-based requirements that would allow authorities to address financial stability risks emerging from the interactions between the different financial and commercial activities that bigtechs perform[16].

It is high time to move from theory to practice and consider tangible options for regulatory actions. Now let me attempt to put forward a blueprint for thinking about what such options could look like.

Recent BIS publications have identified three regulatory approaches that could serve as a basis for a new regulatory framework for bigtechs in finance[17].

First, the restriction approach would prohibit bigtechs from engaging in regulated financial activities. It follows the logic inherent in the traditional separation of commerce and banking that prevails in many jurisdictions.

This approach radically alleviates financial stability concerns as bigtechs would be left only with their non-financial business lines. Yet it would deprive them from using big data to solve asymmetric information problems, for example assigning credit scores to small and opaque firms that do not have collateral[18]. It would therefore remove the numerous benefits that bigtech services in finance have brought.

Second, the segregation approach would require a bigtech's financial services to be grouped together under the umbrella of a financial holding company. This financial subgroup would have to meet prudential and other requirements. And it would be ring-fenced to mitigate the potential for contagion effects from non-financial to financial activities.

This could be achieved by banning the use of common group-wide technological platforms and any form of data-sharing between the financial and non-financial parts of the bigtech group.

This approach is conceptually simple, increases the transparency of a bigtech's organisational structure and facilitates oversight. Yet it would prevent bigtechs from realising synergies and economies of scale, and from generating insights from data generated across sectors.

It would therefore come with some of the shortcomings of the restriction approach. In all likelihood, this would lead – at least some – bigtechs to exit financial services altogether.

Third, the inclusion approach would make bigtechs with significant financial activities subject to group-wide requirements on governance, conduct of business, operational resilience and, only when appropriate, financial soundness.

This is because most bigtech risks are not strictly related to their financial soundness but their data-driven business model. Requirements would be levied on the group as a whole, including the bigtech parent.

This approach is tailored to existing business models. It acknowledges the fundamental role of data within bigtech groups and their tendency to use them to achieve dominant market positions.

As such, it would not prevent bigtechs from making efficient use of data collected from different activities, like the previous two approaches, as long as they observe sound data governance principles and effective pro-competition rules on a group-wide basis.

However, the inclusion approach is more complex than the segregation approach, as it requires effective monitoring of global groups that conduct a large variety of activities.

The segregation and inclusion approaches are to some extent mutually compatible, and in practice a combination of both may be desirable. Such a holistic approach could combine a prudential sub-consolidation of the financial part of a bigtech

group (as under the segregation approach) with group-wide requirements on governance, conduct of business and operational resilience (as under the inclusion approach). Importantly, it would avoid efficiency losses in the use of data that (too) tight ring-fencing measures could cause.

Regardless of the approach chosen, the implementation of any comprehensive entity-based regulatory framework for bigtechs is beset with challenges and raises a host of practical questions. One is how to ensure effective cooperation and information-sharing between financial, data and competition authorities at the local and crossborder level.

Another is whether any one authority has the expertise required to serve as lead supervisor for global groups that engage in a wide set of data-driven financial and non-financial activities.

Yet another is about enforcement and extraterritoriality, especially when bigtech services are performed by entities incorporated in foreign jurisdictions. This, together with unavoidable political considerations, may also explain why progress towards a new framework has been slow[19].

And, I'm afraid to say, as we are working on devising an adequate policy response to bigtechs, challenges will continue to emerge. Innovation never rests, as recent advancements in artificial intelligence and the emergence of quantum computing make clear. But I am confident that the international community will find ways to address current and coming challenges.

Conclusion

To support the search for answers, a thorough international policy debate is essential. After all, international standards are the only way to shape a consistent policy response.

As the saying goes, policymaking is poetry, implementation prose. But before we can even think of implementation, we need to consider the right policies. ■

Endnotes

1. The BIS and the Financial Stability Board (FSB) define bigtechs as large companies whose primary activity is digital services. See BIS, "Big tech in finance: opportunities and risks", Annual Economic Report 2019, June, Chapter III; and FSB, FinTech and market structure in financial services: Market developments and potential financial stability implications, February 2019.

2. For example, bigtechs with a dominant presence in e-commerce collect data from vendors, such as sales and profits, combining financial and consumer habit information. Bigtechs with a focus on social media collect data on individuals and their preferences, as well as their network of connections. Bigtechs with search engines do not observe connections directly, but typically have a broad base of users and can infer their preferences from their online searches.

3. Data from e-commerce platforms can be a valuable input into credit scoring models, especially for small and medium-sized enterprise and consumer loans. Bigtechs with a large user base in social media or internet search can use the information on users' preferences to market, distribute and price third-party financial services (like insurance).

4. For example, bigtechs leverage sophisticated artificial intelligence-based tools as part of their credit scoring systems. They have also invested in emerging technologies such as quantum computing. See JC Crisanto, J Ehrentraud, M Fabian and A Monteil, "Big tech interdependencies – a key policy blind spot", FSI Insights on policy implementation, no 44, 2022.

5. T Beck, L Gambacorta, Y Huang, Z Li and H Qiu, "Big techs, QR code payments and financial inclusion", BIS Working Papers, no 1011, 2022; and K Croxson, J Frost, L Gambacorta and T Valletti, "Platform-based business models and financial inclusion", BIS Working Papers, no 986, 2022.

6. A Carstens, "Regulating big tech in the public interest", speech at the BIS conference "Regulating big tech: between financial regulation, antitrust and data privacy", 6–7 October 2021; and F Boissay, T Ehlers, L Gambacorta and HS Shin, "Big techs in finance: on the nexus between data privacy and competition", BIS Working Papers, no 970, 2021.

7. See O Bar-Gill, "Algorithmic price discrimination: when demand is a function of both preferences and (mis)perceptions", University of Chicago Law Review, no 86, 2019.

8. See Boissay et al, op cit.

9. See Crisanto et al, op cit.

10. Bigtechs' ecosystems rely on common technological infrastructures including physical (servers, computers, facilities, hard drives etc.) and non-physical (software, applications, cloud structures, data lakes etc.) elements that support the storage and transmission of data, and other operations of bigtechs.

11. The top four providers (Amazon Web Services, Microsoft Azure, Google Cloud and Alibaba Cloud) control around 70% of the global market across all sectors. See Synergy Research Group, "As quarterly cloud spending jumps to over $50B, Microsoft looms larger in Amazon's rear mirror", 2022.

12. Two significant outages of bigtech services in 2021 substantiate the argument that these operational vulnerabilities are not merely a theoretical consideration.

13. The exception is banking and insurance. See A Carstens, S Claessens, F Restoy and HS Shin, "Regulating big techs in finance", BIS Bulletin, no 45, 2021.

14. See F Restoy, "Regulating fintech: what is going on and where are the challenges?", speech at the ASBA-BID-FELABAN XVI Banking public-private sector regional policy dialogue "Challenges and opportunities in the new financial ecosystem", Washington DC, 2019; F Restoy, "Fintech regulation: how to achieve a level playing field", FSI Occasional Papers, no 17, 2021; and C Borio, S Claessens and N Tarashev, "Entity-based vs activity-based regulation: a framework and applications to traditional financial firms and big techs", FSI Occasional Papers, no 19, 2022.

15. See Carstens, op cit.

16. See Restoy, op cit.

17. See J Ehrentraud, J Evans, A Monteil and F Restoy, "Big tech regulation: in search of a new framework", FSI Occasional Papers, no 20, 2022.

18. See L Gambacorta, Y Huang, Z Li, H Qiu and S Chen, "Data vs collateral", BIS Working Papers, no 880, 2020.

19. A few jurisdictions have started to insert entity-based rules in their regulatory framework to cope with selected risks presented by bigtechs. See JC Crisanto, J Ehrentraud, A Lawson and F Restoy, "Big tech regulation: what is going on?", FSI Insights on policy implementation, no 36, 2021; and F Restoy, "The digital disruption: the role of regulation", speech at the virtual conference by the Asia School of Business and BIS "Digital disruption and inclusion: challenges and opportunities", 2022.

I would like to thank Iñaki Aldasoro, Juan Carlos Crisanto, Johannes Ehrentraud, Leonardo Gambacorta, Fernando Restoy and Raihan Zamil for their input. This article is based on a speech delivered at the BIS conference 'Big techs in finance – implications for public policy' Basel, Switzerland, 8–9 February 2023.

Navigating international trade through economic turbulence

Dr Graham Bright is Head – Compliance & Operations, at Euro Exim Bank

As the logistics of trade become smoother and returning to pre-COVID levels, new threats are emerging, requiring all players in the trade ecosystem to take notice and act.

Political upheaval, wars, rising energy prices, raw material shortages and transport costs have compounded to make the past six months the most challenging, not only for major economies, but in emerging economies also. This is no longer an isolated issue, but a global situation.

International trade is complex enough, and the immediate problems and how these may be navigated can be categorised as follows.

Proximity

Buyers and sellers are geographically distanced, never meet, must establish trust, agree modes of operation, agree timelines for order placement and delivery and contend with high transport costs and risk.

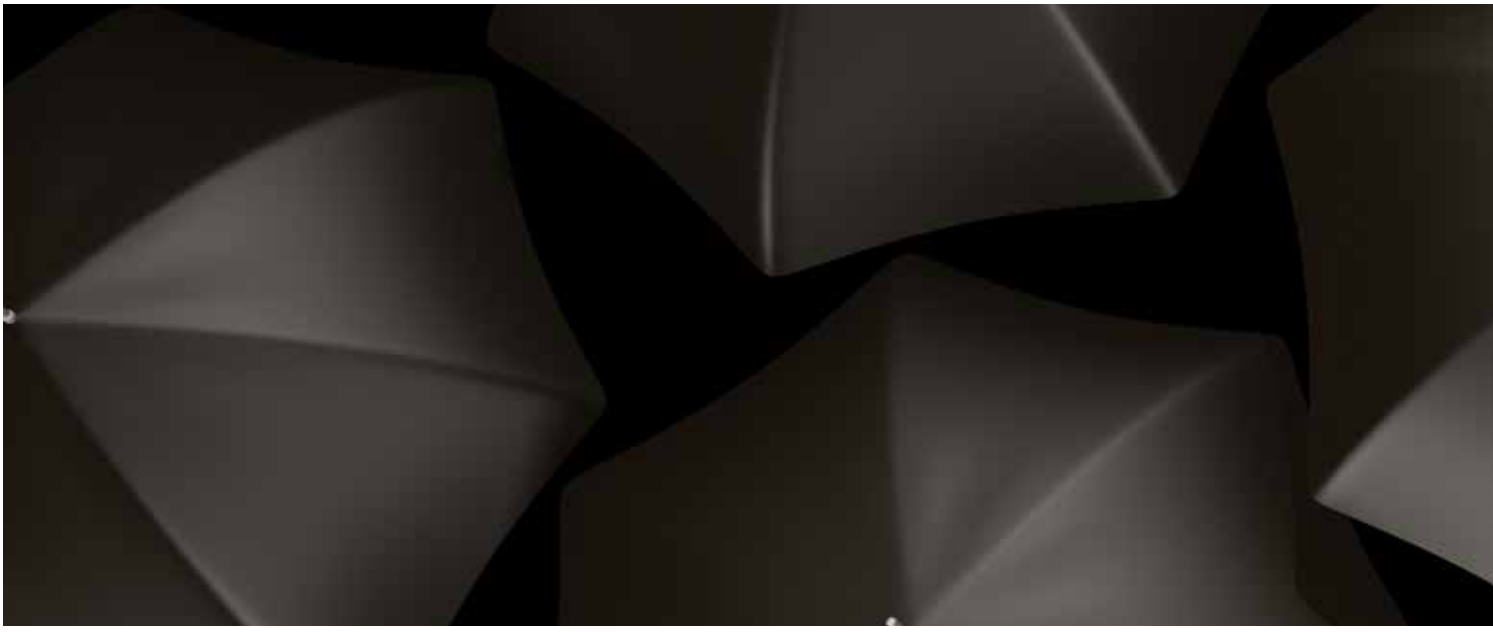
There are few solutions to help here, although companies are actively seeking more local providers, or at least countries with closer borders or ports. The rising cost of import from some countries traditionally thought of as cheap, has led to buyers actively seeking out new markets, not only for closer product but with shorter transit times and a better view of all the players involved, through the lifecycle of transactions.

Language

With emerging markets and with many spoken languages, even though English may be the most common language in trade, as is the US Dollar for settlement of deals, documents must be translated and interpreted to ensure that the conditions required and goods you order are the goods received according to agreed contracts.

Just as SWIFT and the ISO collaborated to standardise the format and meaning of structured financial instructions, the international trade arena is yet to find a common language for proforma invoices, sales contracts etc as buyers will still require local language and nuances in each document for their purchases and contracts.

The top four languages spoken in the world are currently English, Mandarin, Hindi and Spanish, followed by Arabic and French. As a financial institution, to assist our clients with their local documents, we recommend authorised and certified translation services into English, still the most common language used in international trade.



Transport

Container prices have risen substantially, as has the fuel for trucks to physically transport them. Critical raw materials such as precious metals for batteries are also in short supply. This is further affected by the conflict in Ukraine, displacement of containers and rising general material costs including food.

With every crossborder transaction comes risk. Whether by road in countries with poor infrastructure to the high seas, where freak storms, piracy, loss or damage of cargo and even sinking are thankfully rare, these are still substantial risk events.

Whilst there is insurance available to cover such risks, there is the inevitable increase in cost.

Know your foreign customer

Do we really know enough about our customer 5,000 miles away? With no direct relationship, the issue of identity, the critical requirements of means and intent to pay always arises.

Databases of financial information to assist in working out creditworthiness do exist, and are extensively used, however there is always a doubt on authenticity of paperwork, reputation of banks providing proof of funds and potential collusion between parties to defraud financial guarantors etc.

This is especially difficult in some emerging markets jurisdictions where there is no equivalent of a Companies House or official register, use of trusts to mask the true beneficial owners, shareholders and directors.

In trying to ascertain the true extent of credit risk, EEB use the additional network of agents and partners to meet the client, procure the financial statements and ensure collateral, trust and confidence are obtained.

Our use of blockchain in ensuring the validity of documents and identity for KYC and compliance as golden records also assists in this area.

"With every crossborder transaction comes risk. Whether by road in countries with poor infrastructure to the high seas, where freak storms, piracy, loss or damage of cargo and even sinking are thankfully rare, these are still substantial risk events"

Trade restrictions

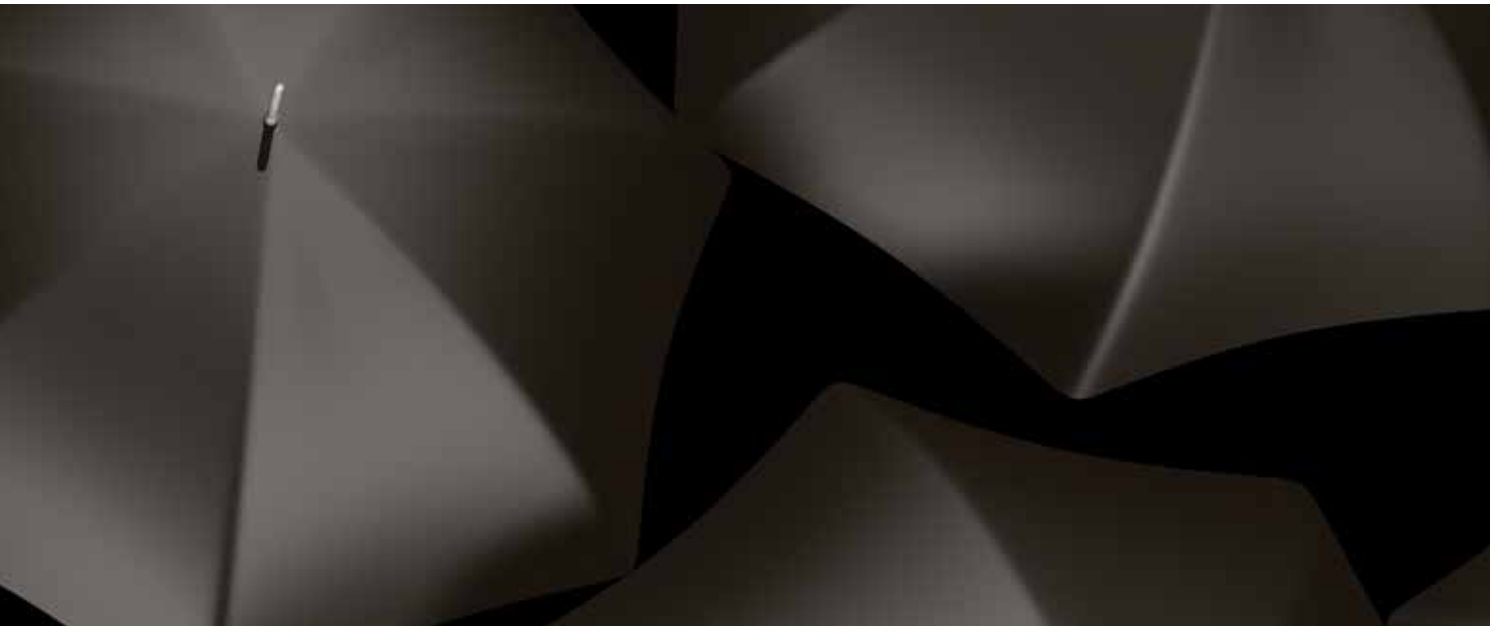
Whether to preserve home industries or prevent financial flight in low liquidity economies, all countries have customs duties on imports and suffer tariffs on exports. In addition to these restrictions, each country has its own regulations, which are changing frequently and usually in isolation.

Firms need to be aware of the International Chamber of Commerce recommendations, all geared around trying to standardise the way in which all players in the ecosystem are armed with the same information, details, rules agreements, conditions and contract terms to facilitate rapid, secure, electronically backed trade.

Documentation

We have talked about the complexity of rules, and documentation is no different. Trade documents have unstructured data, with the addition of Free Trade Agreements, many of the trade barriers are being swept away by the introduction of the Model Law on Electronic Transferable Records (MLETR) aimed to enable the legal use of electronic transferable records both domestically and across borders.

This model law is of critical importance, adopted by the United Nations Commission on International Trade Law



allows the use of transferable documents and instruments in electronic form, such as bills of lading, warehouse receipts, bills of exchange, promissory notes and cheques. Importantly it allows title and possession to pass instead of waiting for paper documents.

This key piece of legislation, which will benefit all economies will allow merging of logistics and supply chains, and regulatory documents, in a single electronic transferable record.

Foreign markets

While we always think about KYC elements, knowing the market is also key to successful trade, especially as we deal in over 150 countries. Even if they are geographically close, each market is different, with their own customs, regulations, type of goods, consignees, middlemen, agents, weights and measures, minimum and maximum deal size, etc.

As a financial institution we analyse the goods, the market conditions, which instruments are acceptable, so understanding foreign markets is essential. Again, having people on the ground, well versed in how local commerce works, the local players, regulation and custom is vital to sustainability of healthy business.

Payment and liquidity

Apart from bad debt risk, companies in many economies are now constrained by the high value of the US dollar, costly and often prohibitive exchange rates vs local currency, lack of liquidity where local banks are unable or unwilling to support foreign transactions, and few payment channels supporting remittance to foreign countries on an exceptional basis, again attracting major fees.

In some cases we hear of charges being so punitive that small buyers are discouraged from buying from abroad and being disintermediated in international trade deals. To counter this, our institution assists clients by mitigating their risks and requirement for 110% of collateral required by major banks for the entire period of a trade.

Imagine you are a small SME wanting to import goods for USD 250,000, but your bank demand you lock those funds in an escrow account for one year. This is clearly untenable for smaller clients as this effectively kills their cashflow, the lifeblood of business.

So, as one example of how we assist, we take a more proactive approach in charging fees for issuance of instruments, assigning title after receipt of full settlement at the end of the transaction. Their business is preserved, enabling them to remain competitive and to build more sustainable transactions.

In conclusion, despite market fluctuations, foreign exchange pressure, liquidity, transport cost rises, identity, paperless digitised trading and regulatory pressures being as strong as ever, additionally influenced by geopolitical, environmental and governance issues, EEB remains ever vigilant, confident and well positioned to understand, and manage the constantly changing environment in which the world of trade finds itself tackling every day. ■

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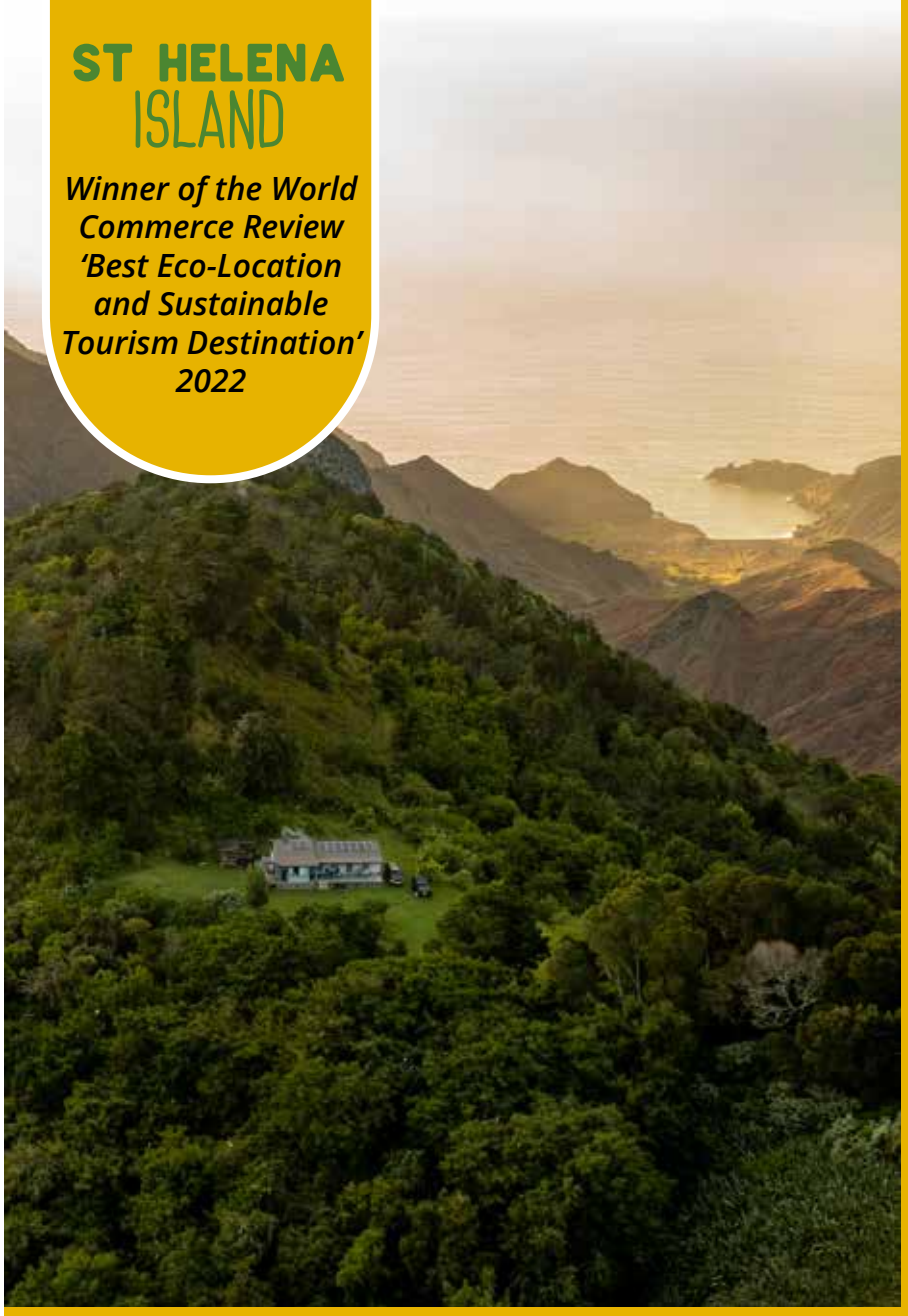

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Is it now time for industry 4.0?

Richard Markoff is a Supply Chain Researcher, and Ralf Seifert is a Professor of Operations Management, at the International Institute for Management Development (IMD)

It's nearly a decade since the term 'fourth industrial revolution'[1] was coined[2], yet many people won't have heard of it, or know what it refers to. Also known as industry 4.0, it's a way of describing how connecting together different advanced technologies could transform how we make things. An example of this could be putting artificial intelligence (AI) into factory robots.

Although there's no formal agreement we are living through this new age, it's a sign of the importance with which many people regard these developments and their potential.
The previous industrial revolutions were: the rise of steam power[3] in the late 18th century, the use of electricity[4] to power machines at the end of the 19th century and the shift to digital electronics[5] that started in the 1970s.

These were defined by clear milestones. But many emerging technologies could claim to be part of industry 4.0. These include virtual reality (VR) to simulate what's going on in an assembly line, and 3D printing.

There are also lesser known developments such as digital twins – virtual models that accurately reflect the behaviour of physical objects such as wind turbines or aircraft engines.

Any technology that is 'smart' or 'cyber-physical' — where the lines between the digital and physical worlds are blurred — can claim to be part of the fourth industrial revolution.

But many companies appear to have been slow to take advantage of these developments. Here, we'll show why that

could be and the changes that may be necessary to ensure that transformative technologies live up to their potential.

A stalled revolution?

A supply chain describes the entire system for producing a product, from raw materials to delivering the finished article to a consumer. So it's useful to look at the impact industry 4.0 technologies have had on these chains.

It's difficult to measure how much of an effect specific technologies might be having on the economy. However, one thing we can do is see what impact they have made on decision makers in companies.

One of us (Ralf Seifert) recently published a survey[6] of several hundred senior executives conducted. The survey asked the executives their views on managing supply chains.

None of the top priorities listed by the executives relate to industry 4.0. Headline-grabbing technologies strongly associated with the fourth industrial revolution, such as AI and machine learning, the internet of things, robotics and 3D printing are in the bottom third of priorities.

A look at online trends also reveals that searches for 'industry 4.0' peaked in 2019, but have since dropped to a significantly lower level. There could be a number of potential reasons for this disappointing embrace of industry 4.0 by companies.

In 2020, a survey[7] by the accounting giant KPMG showed that, of all industry 4.0 technologies, only cloud computing had reached an advanced — though still incomplete — level of implementation.

For many businesses, the benefits of other important technologies remain obscure. The daily pressures of service and cost take precedent, so it takes effort to move away from familiar solutions.

This is consistent with the dip in searches for industry 4.0 — even as global supply chains have been disrupted by the coronavirus pandemic[8], the blockage[9] of the Suez Canal shipping lane in 2021, floods[10] hampering rail transport and a shortage of shipping containers.

The KPMG report from 2020 found that less than half of business leaders had a good understanding of the term 'fourth industrial revolution'.

High risk, high scrutiny

A lack of awareness is one hurdle for the adoption of industry 4.0 technologies. Another is the need to build the business case[11] for expenditure on new technological solutions.

The more ambitious the technology, the higher the risk and scrutiny. Not every company has leaders ready to champion and sponsor innovation in the face of uncertain or less tangible outcomes.

Industry 4.0 initiatives can also lead to resistance to change among workers. IT departments, trained for years to seek out large enterprise solution providers, hesitate to recommend niche solutions from small companies — especially for

"The very supply chain dysfunctions that made headlines and arguably slowed the short-term progress of industry 4.0 may yet prove to be the engine that finally delivers its promise"

technologies they're not familiar with. One way to address this is to commit resources to building separate teams tasked with identifying and prioritising industry 4.0 capabilities. Even then, however, there must be an alignment with the broader business strategies of a company.

From crisis to opportunity

The unprecedented supply chain disruptions over the last two years have pushed executives to consider reconfiguring their supply chains. More often than not, however, they are opting to do this in a conventional manner.

Reshoring (returning manufacturing to the company's original country) and nearshoring (transferring manufacturing to a closer-by, rather than more distant, country) have become popular options for companies looking to build the resilience[12] of their supply chains.

Industry 4.0 technologies have a role to play in this transition. For example, the rethinking of global supply chains came about through a need to reduce labour costs.

Driverless forklifts, or automated guided vehicles (AGVs), are one example of the way robotics can mitigate rising costs elsewhere. Additive manufacturing — the industrial name for 3D printing — can simplify and reduce the cost of production processes that involve two or more costly steps.

For supply chains that cross international borders, there will be an added incentive to use digital platforms for improving the ability to track inventory — a term covering everything from raw materials to finished products — and to help transport goods. This will help companies identify unplanned disruptions more quickly and react to them appropriately.

The very supply chain dysfunctions that made headlines and arguably slowed the short-term progress of industry 4.0 may yet prove to be the engine that finally delivers its promise. ■

Endnotes

1. https://en.wikipedia.org/wiki/Fourth_Industrial_Revolution
2. https://en.acatech.de/project/industrie-4-0/
3. https://en.wikipedia.org/wiki/Industrial_Revolution
4. https://en.wikipedia.org/wiki/Second_Industrial_Revolution
5. https://en.wikipedia.org/wiki/Digital_Revolution
6. https://www.imd.org/ibyimd/supply-chain/the-supply-chain-agenda-keeps-growing-how-will-you-adapt/
7. https://assets.kpmg.com/content/dam/kpmg/au/pdf/2020/fourth-industrial-revolution-benchmark.pdf
8. https://www.whitehouse.gov/cea/written-materials/2021/06/17/why-the-pandemic-has-disrupted-supply-chains/
9. https://www.cnbc.com/2021/03/29/suez-canal-is-moving-but-the-supply-chain-impact-could-last-months.html
10. https://www.cnbc.com/2021/07/27/floods-in-europe-and-china-disrupt-global-shipping-supply-chains.html
11. https://www.europeanbusinessreview.com/the-real-industry-4-0-challenge/
12. https://www.bloomberg.com/news/articles/2022-07-05/us-factory-boom-heats-up-as-ceos-yank-production-out-of-china

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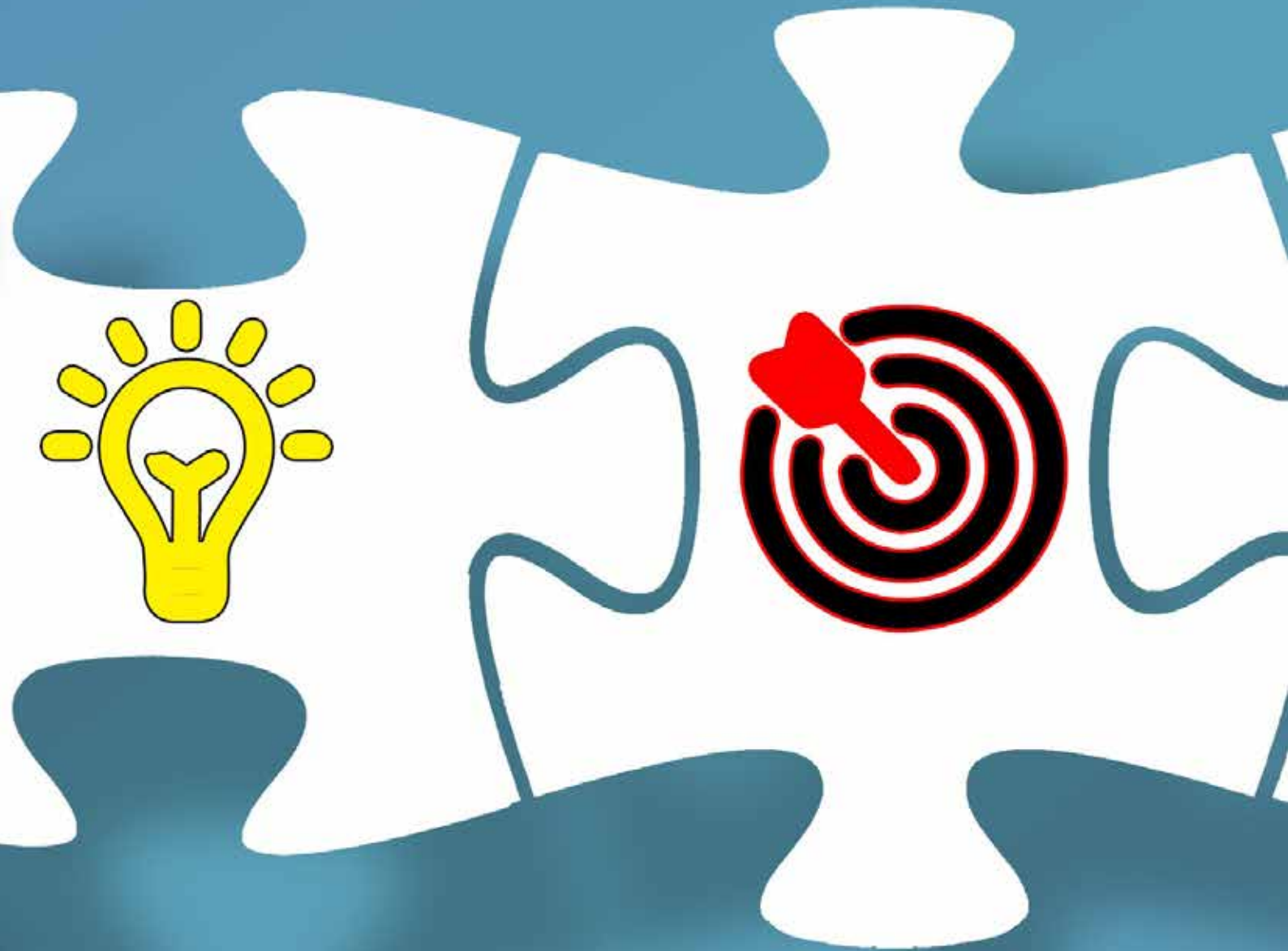
Driving change



It has become more critical for senior and aspiring leaders within organisations to 're-set' their understanding of markets, organisations, customers, and citizens. Mike Cooray and Rikke Duus investigate

They cannot rely on the historic insights, tacit knowledge, and practices of the past to make decisions about the future. IMF forecasts that global growth will slow from 6.0 percent in 2021 to 3.2 percent in 2022 and 2.7 percent in 2023, while we see turmoil in international trade, and increasing unease within the political landscape.

Therefore, it is of heightened importance for next-gen and senior leaders to actively acquire new insight and understand current forces that affect an organisation's ability to operate, compete and thrive.

We believe that given the current complex and uncertain business environment, business schools can add significant value to organisations by enabling participants on MBA and other executive programmes to undertake an Applied Strategic Project (ASP) that is driven by participants' investigations into key strategic issues.

There should also be the opportunity for executives to undertake an ASP independently, guided by business school academics and as part of their executive learning and CPD initiatives.

Applied Strategic Projects

Applied Strategic Projects give participants and organisations current insight into their industry sector, the competitive landscape, and internal organisational opportunities and challenges, leading to actionable recommendations for the organisation to take forward.

An ASP is an in-depth, research-based project undertaken over a period of a few months by participants in the context of the organisation within which they work.

Participating executives become 'embedded' researchers as they explore a relevant and clearly defined strategic business challenge occurring within or in relation to their organisation.

As such, participants have access to secondary data and strategic reports with the opportunity to conduct their own primary research, specifically related to the strategic challenge they are investigating.

As the final outcome, participants submit a comprehensive report, which includes research evidence, detailed analysis, visualisations, mind maps and frameworks. The report is assessed and evaluated by academic faculty and presented to senior management.

During the development of the project, each participant is supported by a dedicated academic supervisor who provides ongoing feedback and guidance. When delivered as part of a degree programme, it makes up a significant proportion of the overall credits, typically 30% to 40%.

The ASP is designed to provide participants with contemporary research skills, the ability to analyse and make sense of complex data, to present persuasive arguments and deliver a set of evidence-based strategic recommendations to drive impact and change for the organisation and its key stakeholders.

Figure 1. Applied Strategic Project Process

Some business schools have moved away from this type of ASP on programmes such as postgraduate masters, MBA and Executive MBA programmes. This is often because these projects can be complex to deliver and resource-intensive to manage, especially with large cohorts. When the project is removed from programmes, it is typically substituted with multiple smaller taught modules, specialist electives or a group-based project.

The Applied Strategic Project process

In the following, we share our insight and experience of how to design ASPs with the aim of equipping participants with the ability to design, plan and execute complex research-based projects that drive new value and accelerate change for their organisations.

Our research with participants who have completed the ASP shows that the vast majority feel they have enhanced their ability to collect, analyse, and make sense of primary and secondary data, write persuasive strategic proposals, and develop well-supported academically underpinned arguments.

They also highlighted the enhanced confidence they have gained by reaching out to senior managers and other colleagues within the wider ecosystem and thereby being able to help drive innovation and change within their organisations.

Figure 1 highlights the four key stages of the ASP process, which entails:

1. Scoping and gathering insights
2. Undertaking critical analysis
3. Engaging in critical discussions and debates
4. Driving change through value creation

Before the ASP kicks-off, we support participants through a 2½ day Virtual Live Session which focuses on scoping the project, defining the objectives, and selecting appropriate research methods and data collection techniques.

This is followed by multiple live webinars that help participants to extract insight from academic literature, collect and analyse primary data, write an impactful critical discussion, and bring new insight together to make viable recommendations for change and innovation.

Participants are also assigned a dedicated academic supervisor who engages with the participant through a series of structured dialogue meetings. These meetings are used to discuss progress, share recommended insights, and guide the participant on the next steps.

This role is critical for participants to make sustained and proactive progress towards the completion of the project. To assist the participant from the 'inside', they are also supported by an organisational mentor, who helps the individual with access to research participants, assists with identifying existing secondary data and reports available within the organisation, and meets with the participant to share progress.

"Given the current global challenges, businesses must re-set their strategic approach, accelerate innovation, enhance internal and external collaboration, and embrace digital technology to reach wider audiences and optimise operations"

A key strength of the ASP is that it is delivered online using multiple digital tools and platforms, combining synchronous and asynchronous guidance, content, and discussions. This provides busy executives the flexibility they need to complete an ASP alongside their busy work schedules and personal commitments.

Moreover, participants from across geographical regions can be offered the opportunity to undertake an ASP and be encouraged to form virtual self-managed study groups, helping to inject cultural and contextual learning.

1. Scoping and gathering insights

When starting an Applied Strategic Project, one of the first tasks is to scope the research area and determine what the ASP will set out to explore. This can be a challenging task as participants often wish to focus on a number of different strategic challenges facing the organisation.

It is therefore critically important that an effort is made to converge on exactly the key strategic challenge that will be investigated. Participants can assess possible project viability by considering their access to primary and secondary data, relevance to the organisation, timescales, and feasibility amongst other consideration criteria.

We suggest that an ASP must not have more than 3 to 4 objectives. These objectives usually start with verbs such as, 'Explore', 'Identify', and 'Understand', followed by 'Design', 'Develop' and 'Recommend'.

This approach enables participants to first ascertain the 'current state' and the challenges facing the organisation; and then subsequently determine and recommend implementable strategic actions to drive change and develop new value.

Once the objectives and expected deliverables are set, participants have a clear 'lens' through which they can gather secondary data from reliable sources. As a first step, we recommend that participants access secondary data from sources such as the Office for National Statistics, the OECD, the World Economic Forum, the World Health Organisation and other such reliable data-rich sources, before tapping into their own organisations' annual reports, strategic plans and other readily available datasets.

This engagement with secondary data with the aim of mapping out current trends, drivers of change and other

important shifts affecting the organisation, helps the participant to plan their collection of primary data.

We encourage participants to use well-established data collection methods, such as in-depth interviews, focus groups and surveys, but also highly recommend the use of more dynamic tools, such as photo-elicitation, digital diaries and virtual collaboration boards.

These enable participants to dive deeper into relevant issues and understand contemporary challenges. Depending on the research area, typical research participants include senior colleagues, front-line staff, external partners, customers, and other ecosystem contributors.

This encourages participants to go beyond their immediate department or working environment, expanding their spheres as they engage with colleagues, partners, competitors, and other stakeholders. From this, they gain a broader understanding of internal and external complexities, which is essential when working in a dynamic and fast-evolving environment.

Planning and undertaking primary research are central to the ASP as it enables participants to gather original and up-to-date insight that is specifically relevant to their set research objectives.

2. Undertaking critical analysis

The second stage of the ASP process requires participants to make sense of the primary and secondary data they have gathered. Data collected through quantitative methods, such as surveys, is analysed using advanced Excel and by using statistical packages such as SPSS.

For qualitative data, it is customary to use a multi-filter theme analysis, which helps participants to delve deeper into the opinions, perspectives, and experiences of their research participants and extract key themes.

The ability to make sense of complex data is an essential skill for emerging and senior leaders to acquire, especially when operating in a constantly changing environment.

Many participants undertaking an ASP have not had the opportunity to acquire such skills prior to their study programmes and these skills are not typically developed to this extent by undertaking a series of taught modules.

Importantly, when participants design, develop and undertake their own collection and analysis of data, they can engage deeper in the process of sense-making and can contextualise their findings to their own organisation's sector.

Whilst participants undertake their own research, they also acquire new knowledge from reading academic and practitioner-focused journal articles on topic areas that relate to their ASP.

These topics could be 'driving innovation and change', 'strategic planning and competitiveness', 'leadership and organisational behaviour', and 'digital transformation and new competence development', to mention a few.

We recommend peer-reviewed journal articles that are written with the practitioner in focus from journals such as *Harvard Business Review*, *Business Horizons*, *Journal of Business Research*, *California Management Review* and *MIT Sloan Management Review*, typically published in the last 2-3 years.

Participants broaden their understanding and proactively move beyond their own assumptions, tacit knowledge, and specific organisational context, to identify how the key issues they are exploring are also affecting other organisations and why that is. These new perspectives help to inform and shape the debates participants have as they come to present their key themes of discussion, aligned to the set research objectives.

3. Engaging in critical discussions and debates

In the third stage of the Applied Strategic Project process, the focus is on bringing together the most relevant insight gathered from the analysis of the secondary and primary data and the engagement with academic literature.

This is a critical part of the ASP and is often the most challenging for participants. Here, participants return to the previously set research objectives and use these to guide the discussion, typically organised in 3 or 4 main themes.

Importantly, the key arguments participants put forward need to be underpinned by the insights previously gathered and analysed. The credibility of this part of the project is reliant on the participant's ability to generate evidence-based discussions and debates, which can lead to the presentation of viable proposals and recommendations for change initiatives and innovation within the organisation.

In this part of the ASP, participants can include creative and visualised outputs, central to presenting the key arguments in their critical discussion. We encourage participants to use digital tools and software, such as Mural and Flourish, to create these visualisations.

This has led to comprehensive, impactful, and interactive partner ecosystem maps, using Kumu.io, and detailed customer and patient journeys mapped out with Lucidchart.

Using such digital tools assist participants to communicate and share their new insight effectively and help them to pinpoint where new strategic and operational opportunities for the organisation may exist.

Importantly, participants acquire new digital skills and competencies, which they can take forward into their day-to-day work.

4. Driving change through value creation

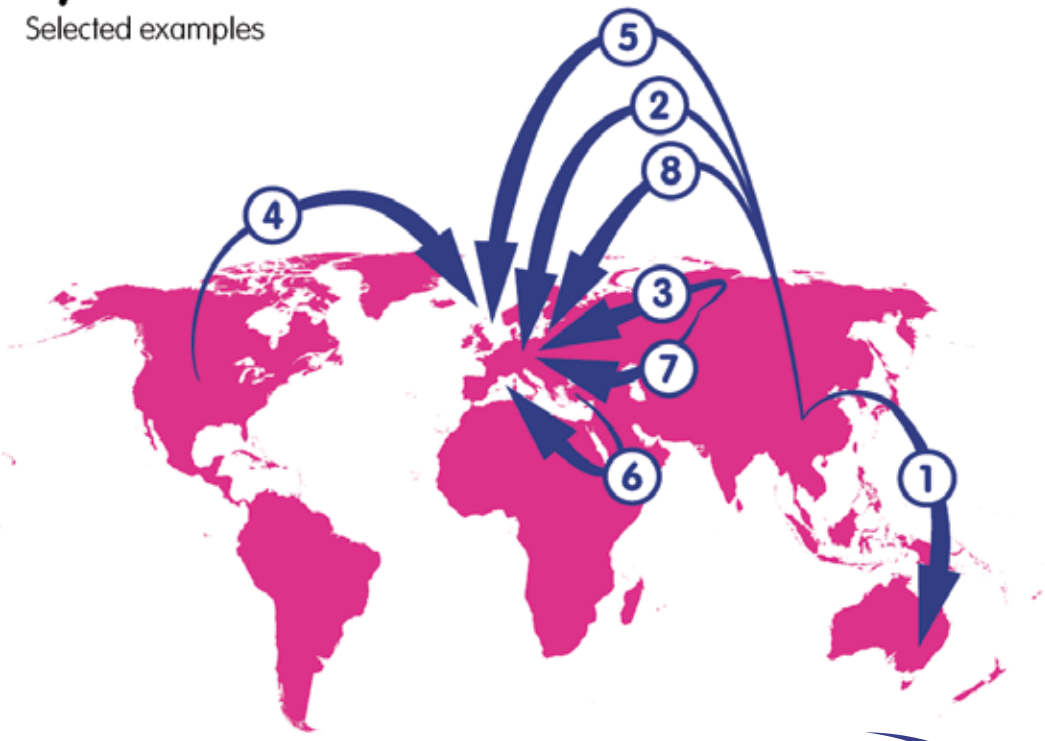
As ASPs are comprehensive and underpinned by secondary data, primary data, and academic literature, they are effective in pushing forward change and innovation within organisations. We have seen many examples of how

EUROPEAN COUNCIL ON FOREIGN RELATIONS ecfr.eu

The Power Atlas

The EU is increasingly threatened by economic coercion

Selected examples



1. Chinese curb on Australian exports to push back against an investigation into the origins of covid-19 (2020)
2. Chinese threat of car tariffs to pressure Germany into accepting Huawei's 5G infrastructure (2019)
3. Russian ban on Polish imports of fruit and vegetables following EU sanctions over the war in Ukraine (2014)
4. US threat of section 301 tariffs to prevent France and other European countries from levying taxes on digital services (2020)
5. Chinese 'popular boycott' of EU companies (such as Adidas and H&M) following EU sanctions on Chinese officials involved in human rights violations in Xinjiang (2021)
6. Turkish boycott of French-labelled goods following President Emmanuel Macron's announcement of policies to combat extremism (2020)
7. Russian threat to ban Czech beer imports following Czech government's declaration of links between Russian intelligence services and the 2014 Czech warehouse explosions (2021)
8. Reported Chinese suspension of rail freight to Lithuania and block on export permits for Lithuanian producers in reaction to the announcement that a Taiwanese Representative Office would open in Lithuania (2020)

Power is now defined by control over flows of people, goods, money, and data. Many states use economic tools to enhance their geopolitical power.

Check out ECFR's Power Atlas and navigate through the battlegrounds of a networked world: ecfr.eu/power-atlas

participants have gone on to implement their recommended strategic initiatives that have emerged from the ASP.

Many participants who undertake the ASP have successfully presented to their board of directors to secure the funding required to implement their proposals and have been able to garner support from cross-functional teams for the execution.

Along the way, participants have acquired new skills and competencies that enable them to launch and execute strategic action faster and in a more structured manner, heightening the rate of success for their organisation. The rigour of the ASP provides much required confidence amongst the completers to drive change and lead from the front.

It is also not uncommon for participants to achieve career progress during or upon completion of the project. Many gain heightened visibility and exposure within their organisation, often from their engagement with senior leaders who take part as research participants, but also from the opportunity to present and share new strategic initiatives.

Equipping next-gen leaders

Applied Strategic Projects can be used as a versatile tool for organisations to develop new products, services, and solutions, explore innovative business models, scan the wider ecosystem for 'white spaces', and develop cross-functional teams across regions.

The ASP can also be an effective way to support next-gen leaders, especially when undertaken in a triangular format, supported by an external academic and an internal mentor.

Given the current global challenges, businesses must re-set their strategic approach, accelerate innovation, enhance internal and external collaboration, and embrace digital technology to reach wider audiences and optimise operations.

ASPs can be the vehicle to test and experiment, while equipping the next-gen leadership cadre with the essential skills and knowledge required to drive change at pace.

A significant challenge that stands against the ASP, especially when embedded within postgraduate degrees and MBAs, is the cost of delivery. This leaves business schools with an informed decision to make about the value ASPs deliver to participants and their organisations versus the cost to the institution to offer them.

While ASPs will often be more costly to deliver than a series of taught modules, the credibility of the degree programme and the institution will, no doubt, benefit significantly from the success of those who complete the project and go on to accelerate organisational change and innovation and take on new leadership roles.

These individuals will help to carry the academic institution's reputation forward by being respected alumni who will contribute positively to their own organisations and drive wider societal change in years to come. ■

ABOUT THE AUTHORS

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