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FINANCE 21

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21ST CENTURY FINANCE

Foreword

Welcome to the Winter edition of **FINANCE21**, a *World Commerce Review* supplement. This publication has been prepared in response to readership demand for an overview of the financial sector in these turbulent and unique times.

All aspects of the sector are examined, with the most respected authors providing the reader with the most comprehensive information available. Our brief is to provide all the data necessary for the readership to make their own informed decisions. All editorials are independent, and content is unaffected by advertising or other commercial considerations. Authors are not endorsing any commercial or other content within the publication. ■

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Some lessons for crisis management from recent bank failures

Agustín Carstens discusses the lessons from the bank failures that occurred in March 2023, and argues that robust and proactive supervision is essential

Motivation

Recent bank failures in the United States and Switzerland have prompted a debate about the adequacy of the current prudential framework for preserving financial stability.

In particular, these episodes have shed light on how bank resolution frameworks are functioning. As you know, resolution frameworks are one of the key innovations that followed the Great Financial Crisis (GFC). Authorities adopted several measures to make bank failure management frameworks less dependent on public support.

In particular, the Financial Stability Board issued new international standards to enable the orderly resolution of global systemically important banks and other banks that are systemic in failure. These sought to ensure that failing banks' critical functions could continue, while keeping the involvement of national treasuries to a minimum.

The 2023 bank failures were the first significant test of those reforms. I think it's fair to say that their performance was mixed. The interventions by the Swiss and US authorities did preserve systemic stability – a key objective of resolution frameworks. But both involved public support. And in Switzerland, the authorities opted to impose losses on some creditors without using the resolution framework.

Against that background, national authorities and standard setters should take this opportunity to review the framework and understand how we can ensure that authorities have credible options for resolving banks.

The recent bank failures

Let me first recall some of the key features of the bank failures and the strategies that were adopted in the United States and in Switzerland.

In early March 2023, the US regional banking sector experienced severe stress. Two banks failed: Signature Bank and Silicon Valley Bank. Both had a high proportion of uninsured deposits. And both experienced large and rapid deposit outflows amid concerns about the sustainability of their business models. Over a couple of days, the FDIC took both banks into receivership, created temporary bridge banks and eventually sold the banks in the market.

This resolution strategy was possible only because the US authorities invoked a 'systemic risk exception'. This allowed authorities to override the usual limits on the amount of funds the FDIC can use to finance a resolution. With it, the FDIC could cover all deposits, including the large amounts that were not insured. Shareholders and certain unsecured debtholders were not protected.

Recent bank failures, and the measures taken by authorities, highlight the significant progress since the GFC in making bank resolution effective

A week after the US bank failures, following an acute liquidity crisis at Credit Suisse, the Swiss authorities announced that UBS and Credit Suisse would merge and provided liquidity support for this process. This was described as a 'commercial transaction'.

Importantly, the merger was supported by decrees enacted using emergency powers, which allowed the Swiss National Bank to provide liquidity support to UBS and Credit Suisse. The transaction also involved the contractual writedown, in full, of all the outstanding Additional Tier 1 (AT1) capital instruments issued by Credit Suisse. However, Credit Suisse shareholders retained some residual equity.

How resolution worked in practice in 2023 – lessons

These cases demonstrated that Switzerland and the United States had effective crisis management frameworks that enabled the authorities to deal with a range of cases.

The authorities were well prepared. They had sufficient powers, tools and funds to manage the failing banks in an orderly manner. And the frameworks gave them enough flexibility to adapt their responses to the prevailing conditions.

The latter is important since new technologies combined with social media can lead to a fast-burning crisis of liquidity and confidence, leaving the authorities with only a short window in which to make decisions and implement them.

Both the Swiss and US authorities provided funding through a combination of internal and external sources. Internal resources came through the writedown of at least part of the equity and hybrid capital. External support came from the deposit insurance fund and through public guarantees.

In the Credit Suisse case, the write-off of AT1 instruments substantially reduced the costs to taxpayers. It also proved, contrary to the fears of some observers, that a writedown of G-SIB debt instruments is feasible without destabilising markets in any deep or persistent way.

Nevertheless, while the responses were effective, the authorities had to depart from the expected approach. Let me highlight the main differences.

In the United States, the use of the systemic risk exception was required to mitigate the risk of systemic stress in the banking sector. However, the failing banks had not been considered systemic in life and were consequently subject to less stringent prudential requirements, including for resolution planning.

In Switzerland, the authorities decided not to use statutory resolution powers to execute the resolution plan. Instead, they opted for a merger transaction that they judged to be less disruptive to financial stability. Although writing down AT1 instruments delivered significant loss absorption, the resolution plan would have bailed in a wider set of liabilities and therefore involved less public support.

This approach also overturned the expected hierarchy of creditor losses that would have applied if Credit Suisse had been put into resolution. Although that was anticipated in the AT1 contracts, it nevertheless had significant, albeit relatively short-lived, repercussions in the market for AT1 instruments.

In both the Swiss and US cases, special facilities provided liquidity. The Swiss government used emergency powers to enable the central bank to provide liquidity with government guarantees. That liquidity was not fully collateralised. In the United States, the Federal Reserve created a new funding programme offering loans of up to one year against collateral valued at par.

We therefore end up with a somewhat mixed picture. The overall story is positive: the authorities' actions avoided the disruption that these bank failures might have triggered. But, to do that, the authorities had to resort to emergency powers or exceptional actions.

Given this difficult balance, let me highlight areas for improvement in our crisis management frameworks or their implementation.

First, banks' loss-absorbing capacity and the credibility of bail-in as a resolution tool. Even if the writedown of AT1 instruments helped reduce the costs to the public purse, greater loss-absorbing capacity in the failing banks would have been preferable.

A fundamental lesson of the GFC was that banks' shareholders and creditors should bear a large share of the cost of their resolution. Significant work has been carried out internationally over the past few years to make bail-in operational. But that work is incomplete. Authorities need to be confident that they can execute a bail-in and markets must believe that a preferred bail-in strategy is not just words on paper.

Importantly, banks should have sufficient liabilities to absorb losses in resolution. Currently, international standards require only the largest banks to maintain minimum gone-concern loss-absorbing liabilities.

To make further progress in this area, it is important that other banks can do the same. This is already the case in the European Union, where the requirement applies to all large and medium-sized banks.

Other authorities are also bringing forward related initiatives. For instance, in the United States, a consultation[1] is under way on a proposed requirement that banks should hold a larger amount of long-term debt, which can be bailed in to manage their failure.

A second area for improvement is the writedown of hybrid capital instruments.

The sale strategy for Credit Suisse wiped out holders of AT1 instruments. Many market participants were insufficiently aware of the contractual terms of individual AT1 instruments and the differences between the applicable frameworks in different jurisdictions.

As a result, there seems to be merit in pursuing work aimed at improving the disclosure and understanding of the terms and operation of AT1 instruments. This would reduce the risk of adverse market reactions[2].

A third set of lessons concerns the crossborder application of resolution tools.

In the resolution of any large bank, there will always be a crossborder dimension. Resolution actions in one country will need to apply to the bank's operations elsewhere. This is both a legal issue – how do resolution powers apply across borders? – and a question of cooperation between authorities.

Good communication with foreign counterparts is essential to effective resolution. This includes financial authorities in jurisdictions where the failing bank is locally systemic, even if those local operations are not systemic from the perspective of the failing bank or its home authorities.

When preparing for a possible resolution, it can be hard for authorities to maintain secrecy about the expected intervention while keeping counterparts informed. However, it can aid communication to involve all relevant parties in resolution planning and establish the necessary communication channels in advance.

Finally, there is clearly a need to review liquidity frameworks to ensure that there are adequate funding sources.

Liquidity played a significant role in recent bank failures, both as drivers of the failures and as a crisis management tool. Both the Swiss and US authorities provided liquidity support on special conditions.

However, ad hoc facilities are generally less desirable than an established framework. This suggests that further work is required on three aspects relevant to liquidity.

First, as is starting to emerge from discussions in various global forums, there is room to improve the supervision of liquidity risk.

Second, a review of the operational aspects of Emergency Liquidity Assistance (ELA) could be useful. For example, pre-positioning and assessment of collateral may ease the provision of ELA to stressed banks.

Third, countries need to have in place frameworks for the provision of liquidity in resolution. An established facility with terms that reflect the expected requirements of banks in resolution helps to provide authorities and markets with the assurance that sufficient liquidity will be available to support the effective resolution of bank failures with a systemic dimension.

Conclusion

Recent bank failures, and the measures taken by authorities, highlight the significant progress since the GFC in making bank resolution effective. Authorities took prompt and credible action to contain the crisis. In doing so, they preserved financial stability and prevented crossborder contagion.

But these episodes also remind us that the work is incomplete, and some elements of the framework require attention. Issues such as banks' loss-absorption capacity, the practical execution of bail-in and the crossborder challenges it involves, and the provision of liquidity in resolution are not new, or a surprise to the authorities working over the last decade to build robust resolution frameworks. However, the recent failures give added impetus to the ongoing work at the international level on those matters.

Of course, authorities cannot anticipate all the issues that may arise in a bank failure. They may need to depart from script. However, sound planning can help them to respond quickly and flexibly, and to adapt their strategies to the circumstances of the failure.

Furthermore, we should not forget that resolution frameworks and resolution planning cannot replace supervision. Where the root cause of a bank's weakness is an unsustainable business model, robust and proactive supervision is the more appropriate response.

I hope this article has given you the opportunity to consider how we can make bank resolution frameworks more solid, and I trust this discussion will continue. ■

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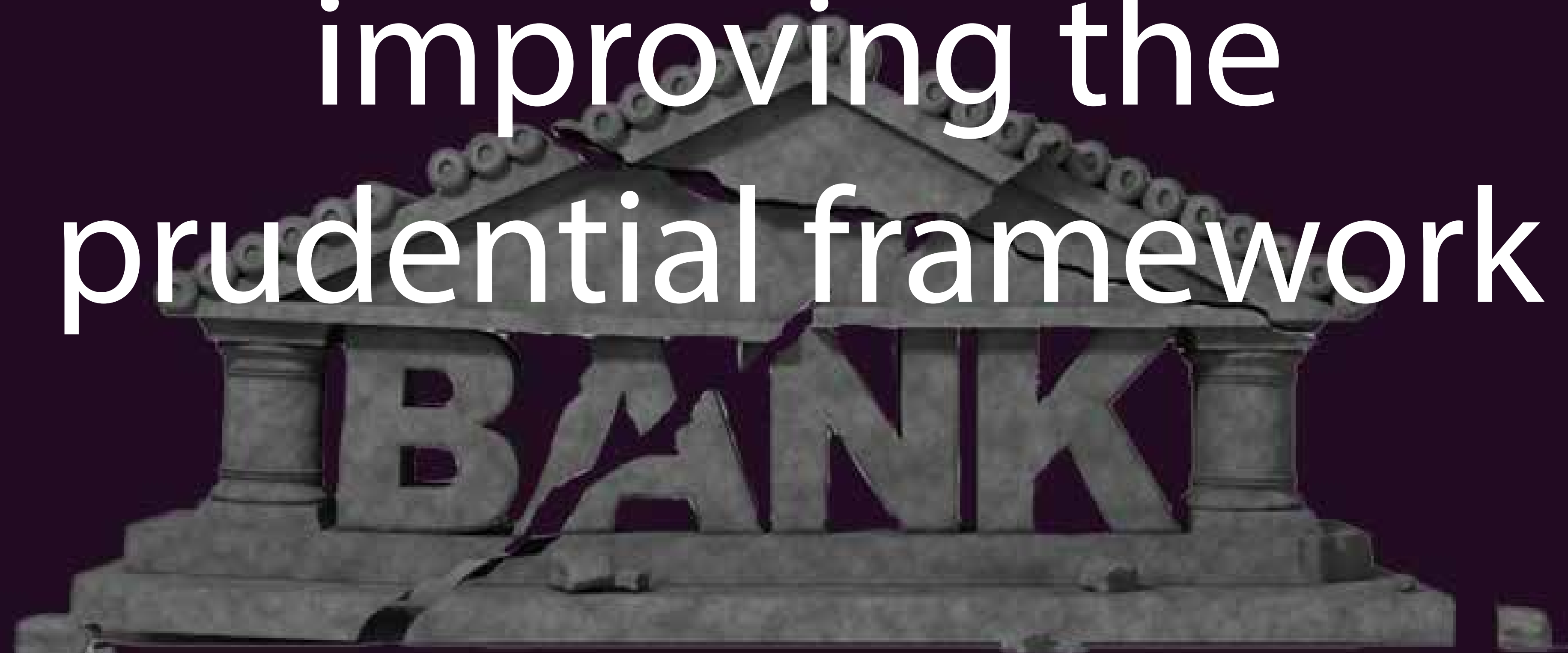
Endnotes

1. See Office of the Comptroller of the Currency, Department of the Treasury, Board of Governors of the Federal Reserve System and Federal Deposit Insurance Corporation: "Long-Term Debt Requirements for Large Bank Holding Companies, Certain Intermediate Holding Companies of Foreign Banking Organizations, and Large Insured Depository Institutions", August 2023.

2. For further discussion, see the R Coelho, J Taneja and R Vrbaski, "Upside down: when AT1 instruments absorb losses before equity", FSI Briefs, no 21, September 2023.

This article is based on a speech delivered at the high-level meeting on banking supervision of the Association of Supervisors of Banks of the Americas (ASBA), the Basel Committee on Banking Supervision (BCBS) and the BIS Financial Stability Institute (FSI), 19 October 2023, Panama City.

Bank failures and improving the prudential framework



Sam Woods discusses the 2023 banking failures, the lessons learnt and how the regulatory framework is doing its job

Introduction

It's been an extremely eventful year for banking regulators in the UK and elsewhere. The failures of Silicon Valley Bank (SVB) and Credit Suisse (CS) have prompted renewed public debate about prudential regulation and supervision, and the resolution framework.

I want to offer my perspective on these debates. What do recent bank failures say about the global and UK regulatory frameworks, and what should our priorities be going forward? In doing so, I will hopefully be able to tie the various strands of regulatory work into a coherent single picture.

There is a lot of work to be done to improve and refine the regulatory regime for banks. Recent events illustrate why.

At the same time, there is cause for optimism. Yes, we have seen some pretty dramatic bank failures. But those failures have not led to systemic crises and have been managed without taxpayers having to absorb banks' losses. Taken in the round, I count that as a success for the post-financial crisis reform effort.

But I would not be much of a prudential regulator if I focused only on the positives, rather than the downside risks! So the bulk of my comments will be focused on the important work underway to improve the prudential framework for banks.

The goals of the framework

Prudential regulators are sometimes accused of wanting to reduce risks of failure to zero. But that's not really accurate. In fact, it is an absurd suggestion when you consider that we allow the banking system to run at twenty times levered – or to put in another way, that the banking system's capital would be wiped out by a loss equivalent to 5% of the value of its assets.

Our goal is to make sure that banks are safe and sound[1] – but we have always been clear that does not equate to a 'zero-failure' regime, because we want banks to provide useful services such as lending which involve significant risks.

It has been a rocky year. But when I look back over the past 15 years of financial reform, I see a success story. We have built a regime that can withstand shocks including bank failures without falling over

In fact, a world with no bank failures would only be possible if we either:

banned nearly all risk-taking by banks[2]. That might save me some all-nighters – but it would massively curtail the real economy's access to credit from banks, and is not consistent with maintaining a major financial centre in the UK; or bailed out every bank that got in trouble. Needless to say that would be fiscally, socially and in my view morally unsustainable.

Fundamentally, a zero failure regime is incompatible with having a private banking system. The magic of a capitalist economy lies in competition – which drives down costs for customers, spurs innovation, and brings the best ideas to the top. But it's not much of a competition if the game is rigged so that nobody (except the taxpayer) ever loses[3].

So if we don't have a zero-failure regime, what do we have? A one-failure regime? A ten-failure regime? Our measure of success is of course not the number of failures: we are ultimately in the business of maintaining financial stability.

Financial stability is the ability of households and businesses to reliably access vital financial services, in bad times as well as good. It is the bedrock of a successful economy and fosters confidence and investment.

And while we don't have a zero-failure regime for individual firms, we do have zero appetite for systemic financial crises. If one firm fails, that cannot be allowed to turn into a domino effect that brings down the whole system.

To achieve this, we seek to ensure that bank failures are relatively rare, non-contagious, and well-managed.

The post-financial crisis regulatory regime aims to achieve that through a mixture of:

- microprudential supervision and regulation, that seeks to ensure firms have adequate financial resources and risk management – meaning failures are not frequent and that we can usually see problems coming well in advance;

- macroprudential policy, which targets system-wide risks and linkages across the system;

- resolution policy – which seeks to ensure that on the rare occasion that a bank fails, the failure is well managed, and losses are not borne by the taxpayer; and

- international coordination in all of these areas, reflecting our interconnected global financial system.

So how have recent events compared with that ideal?

Recent events

Recent events have been a major test of the regime. I will touch on some of them here.

We have seen a significant stress in US regional banks and the failure of a major global bank. The two most prominent firms to fail – Credit Suisse and Silicon Valley Bank – had significant UK subsidiaries. And all this has unfolded against a challenging background, with inflation, rate rises, and wider uncertainty including linked to Russia's invasion of Ukraine.

The detailed story of both failures has been told elsewhere. Both firms failed when depositors lost confidence in them, and began to pull their money out rapidly:

- Silicon Valley Bank was a relatively familiar story: a firm that took a very large interest rate risk, which got caught out when rates started to rise. It held very large unrealised losses on securities held for liquidity purposes, and when it did have to sell those assets to meet its liquidity needs, it began to realise those losses in a public and painful way.

  It tried and failed to raise capital to plug the hole, and the failure of that capital raise proved to be the final straw for depositors, the majority of whom were uninsured[4].

- Credit Suisse also suffered a loss of confidence, but the reasons were broader. A persistent lack of profitability, and serious recurrent conduct and risk management failures, led many to question the firm's viability.

  Ultimately a significant run began to develop over late 2022. And in the febrile days after SVB's failure, the firm made an announcement related to its published accounts and a significant CS shareholder implied publicly that they would not stand behind the firm in a stress – at which point the erosion of CS's deposit base turned into an unstoppable avalanche.

Once the stress happened, authorities needed to act quickly to deal with the situation. This was a moment of genuine risk: notwithstanding the overall strength of the banking system, a botched resolution could have seriously dented confidence. And it was certainly a rocky ride for those involved, including depositors, employees and other stakeholders of the affected firms.

But in the event, the system worked. We experienced the failure of two large banks – one of which was considered 'globally systemic', and both of which had material UK operations – without a systemic crisis.

SVB was successfully resolved, and CS was rescued in a transaction that was economically-similar to a resolution, without the need for a bailout[5]. Resolution and resolution-like powers were used to ensure that private investors, rather than taxpayers, paid the price for failure – as it should be. Depositors, and other customers and counterparties, were able to continue to access vital services following interventions by the authorities.

Contagion to the global banking system was limited. Following the failure of SVB, we did see some evidence of stress – and some further failures – in particular in other regional and mid-sized US banks. But we have not seen a sustained tightening in international bank funding costs – and we did not see any significant contagion into the UK financial system.

Certainly there are important lessons to be learned from these incidents, and we are not complacent about the potential for other stresses to emerge in a challenging macro-economic environment.

But equally, these events illustrate how far we've come. Without the post-crisis reforms, the failures of CS or SVB could have been the dominos that knocked over the entire global banking system. In the event, they were uncomfortable stresses – but no more than that.

Lessons learned

The regulatory regime may in these stresses have achieved its core goal of maintaining financial stability in the face of an adverse shock. But there are still important lessons to be learned. If we ignore these, then next time could well be uglier[6]. For me, these lessons fall into four categories:

- Measuring risk correctly. Our regulatory framework must put resilience in the places where it is needed most – and do so in a robust, credible and fair way.

- Money isn't everything. Financial resources are important, but they are not everything a firms needs to survive.

- Making a success of failure. There is more work to do to ensure that firms can fail in a controlled, non-contagious manner.

- The right regulation for the right firm. We should consider what the recent failures might mean for the regulation and supervision of smaller firms and international branches.

Measuring risk correctly

Capital requirements

Of all the post-crisis reforms, by far the most important has been the international effort to improve the quality and quantity of banks' financial resources – and in particular, the tripling of banks' capital levels, which means far more losses can be absorbed before a bank becomes insolvent. We now estimate that the UK banking system holds enough capital to survive a global recession worse than the 2008 crisis[7].

This underpins the whole system. It means investors and depositors can have confidence in firms, especially in bad times when that confidence is really needed. It also gives the authorities more options to manage stresses when they occur, by reducing the likelihood that taxpayers will end up on the hook for losses.

But capital only works if it is properly measured, and it is held in the right places. Or more precisely: capital should only include financial resources that could actually be used to absorb losses[8], and the 'risk-weights' that are used to calibrate capital requirements should be reflective of actual risks faced by firms.

The case of SVB illustrates this point. On paper its regulatory capital ratio was strong. But by building up large holdings of long-dated bonds, the US parent was taking significant interest rate risk – a risk that was not reflected in its capital requirements or in the measurement of its resources.

As rates rose, and the unrealised losses on that portfolio mounted, SVB's capital ratio continued to look rosy – but when it had to start selling the securities to meet withdrawals, the serious weakness in its balance sheet was exposed, and confidence in the firm evaporated, literally overnight.

This is a sobering story. It illustrates why, in the capital regime that applies to all UK banks, there is an explicit capital charge for interest rate risk in the banking book, and why the PRA requires firms to recognise unrealised gains and losses their 'available for sale' securities for capital purposes[9].

More fundamentally, it shows the importance of a credible and well-founded capital regime. Over time, policymakers and firms alike have incentives to allow risk-weights to drift down – whether to promote lending to a favourite sector, or to juice up returns on equity. But it would be a big mistake to succumb to this temptation. The resulting variability of risk-weights across firms and jurisdictions is confidence draining, as the 2008 crisis painfully illustrated.

If our capital regime is not perceived as credible, we will pay a big price in future stresses because financial markets and depositors will suddenly discover weaknesses when the system comes under pressure.

This is what the final set of international capital reforms are all about. We call these reforms 'Basel 3.1', to reflect the fact that they are a refinement of the existing Basel 3 standard, rather than a fundamental change[10].

For UK banks, I don't expect the reforms to move the dial in a meaningful way on aggregate capital levels – in stark contrast to previous rounds of reform[11].

That's not to say the reforms are unimportant. Their focus is not on the total amount of capital, but rather on ensuring risk is properly, and consistently, measured across firms of all types. Over time, this is essential insurance against 'risk-weight drift' and variability that could otherwise fundamentally undermine the regime's credibility.

To illustrate this point, consider the fact that when regulators ask a set of global firms to risk-weight exactly the same pool of assets under the current system, the difference in resulting capital requirements has sometimes been as high as 13 times. This is a nonsense, is not a foundation on which we should build our banking system and must be sorted out.

By maintaining confidence in our banks, Basel 3.1 will promote stable and reliable financing to the UK real economy. And by aligning with internationally-agreed minimum standards, our proposals also advance competitiveness by promoting confidence in the UK as a global financial centre.

But while these reforms are vital, we are also very mindful of the impact they may have on firms, and on firms' capacity to provide support to the rest of the economy – and we will be having very careful regard to the detailed evidence that firms have submitted as part of our consultation process.

We have already made one important change to our plans, in response to feedback from firms: we have moved back implementation by six months[12]. This should make implementation smoother for firms and aligns our implementation date with the current US timeline.

On the substance of the proposals themselves, we have noted the very clear feedback from firms on the treatment of topics like lending to unrated corporates, SMEs, trade finance and accounting provisions. It would be premature for me to announce changes to our proposals now.

But I am confident that we will be able to evolve them in a way that reflects legitimate concerns, based on the evidence and data firms have provided – while still ensuring that the core goals of the reform are achieved.

Liquidity requirements

Capital is one important part of the regulatory toolkit. But we cannot neglect the importance of liquidity, not least as both SVB and CS were brought down by extreme liquidity stresses.

Liquidity regulations play an important role in our framework. By requiring firms to use stable funding sources, and to maintain a significant stock of liquid assets, we can reduce the risk that firms have to take drastic and potentially damaging pro-cyclical actions to defend their liquidity in a stress.

But we also shouldn't kid ourselves. So long as banks continue to engage in maturity transformation, they will always be vulnerable to runs. Liquidity regulation in itself does not eliminate that risk, though it can reduce the probability that it crystallises. This is why the central bank has a vital role to play as lender to the banking system.

Ultimately I don't think the failures of SVB or CS could have been avoided by changes to liquidity regulation[13]. But the incidents do raise a couple of questions:

- Our current framework for liquidity regulation is very focused on the risks from flighty wholesale funding – with good reason, given the experience of the 2008 crash. But the evidence from SVB in particular is that certain classes of depositor can sometimes be just as flighty, particularly in a world of digital banking and social media. This issue can be exacerbated if the deposits are concentrated in a particular sector, as SVB's were. This may prove relevant to the calibration of requirements like the Liquidity Coverage Ratio.

- Alongside their own liquid assets, we should have close regard to firms' ability to access central bank liquidity, including via pre-positioned collateral at the central bank. Some commentators have suggested that such pre-positioning could obviate the need for most prudential regulation. I am very sceptical of that proposition, but I agree that this is one aspect of resilience that it's important to monitor, which is why this is well embedded in BAU activity for PRA supervisors and the Bank of England's Markets team.

Money isn't everything

This is a striking lesson from the case of CS. On paper, the firm had plenty of financial resources at group level before it began to experience a run. And unlike many bank failures (including SVB), the loss of depositor confidence was not prompted by an expectation of major losses on its lending or securities holdings leading to insolvency.

Rather, CS ultimately failed because investors lost confidence in its ability to sustainably make profits into the future. This reflected persistent low profits, a business model that was arguably ill-suited to the post-crisis landscape, repeated and highly damaging misconduct cases and very costly risk management failures.

Financial resources – capital and liquidity – do not solve these kinds of problems. I think that has two main implications for prudential regulators:

- First, it points to the importance of non-financial regulation and supervision, covering topics that could impact the credibility and profitability of the firm – things like governance and controls, risk culture, and operational resilience. The best regulatory framework in the world would be useless without effective supervision.

- Second, it serves as a reminder that firms are most resilient when they can make profits and sustainably generate capital. As supervisors we need to ask whether a firm has a viable business model. And while Boards are rightly responsible for their firms' business models, as regulators we have a duty to consider our own impact on the sector. This is particularly relevant now that the PRA has been assigned a new secondary objective by Parliament to facilitate the UK's economic growth and competitiveness, subject to aligning with international standards[14].

At the same time, we should be clear that supervision and regulation cannot often fix broken business models. In any competitive market, some firms – particularly badly-run firms – will not prove viable for the long-run. That's a normal part of life, and indeed we have enabled many firms to exit since the PRA was set up, without major disturbance to the rest of the market[15].

But it re-emphasises the need for robust, forward-looking supervision so that we are not often taken surprise by failures and can contingency-plan appropriately.

Successful failure

This brings me to the next area of lessons learned – making a success of bank failure.

The introduction of an effective resolution regime has in my view been a major success of the post-crisis reform agenda. In essence, this regime is a set of tools that allow the authorities to deal with the failure of major banks in an orderly way, without either bringing down the financial system or bailing them out.

Those tools include:

- Powers to restructure firms so that the economically important parts are preserved.

- Provisions to ensure that private creditors, rather than taxpayers, bear the costs of failure (this is often referred to as 'bail-in' as to distinguish it from a taxpayer 'bail-out').

- Frameworks to plan in advance how a major firm's failure would be managed[16].

- Mechanisms to ensure resolutions are coordinated internationally.

I've never been a purist about the resolution framework: every bank failure has idiosyncratic elements, and you cannot pre-ordain precisely which option will be most palatable and practicable in an inherently uncertain and fast-moving future scenario.

The point is that the framework provides authorities with options – so that they can respond flexibly, rapidly and effectively to safeguard financial stability. And it does so while also minimising risks to the public purse.

In both of the resolutions I was recently involved with (SVB UK and CS), the authorities had fully-worked-up plans which allowed for more than one option to be executed at the point when the firm failed. None of these plans or options were perfect. All had costs. But all were significantly better than the choices we faced in the 2008 crisis.

But while the progress has been significant, I am convinced that some additional tools are needed to fill out the resolution framework. This reflects my experience of operating the regime – both through the recent, high-profile failures, and other less dramatic exits of smaller firms over the past decade. If we don't learn as we go along, we will become less effective in future stresses.

Depositor continuity

The first reform I want to highlight is around access to deposits in a bank failure.

We already have a system of deposit insurance – meaning insured depositors will not suffer any financial loss if their bank fails, up to a limit of £85,000. But while important, that in itself does not guarantee that all depositors can continue to access their money the day after every sort of bank failure.

In some cases, a lack of continuity of access may have important ramifications. For instance, in the case of SVB UK, where many SMEs, particularly concentrated in the tech sector, faced the risk of not being able to make payroll on Monday morning.

In the event, that risk was averted by the sale of the firm to HSBC. But we cannot guarantee that a willing buyer will be available so quickly in all future cases, and there are all manner of complications that can scupper a rapid acquisition[17].

For firms above a certain size we already have another means of providing depositor continuity. By writing down the value of long-term debt held by the firm – a 'bail-in' – we can quickly recapitalise the firm after it has failed, replace its management and begin the process of restructuring its business over a longer time horizon, while maintaining depositor continuity without a bail-out.

But smaller banks do not have the kind of bail-in debt – referred to as MREL[18] debt – that is needed to pursue that strategy. In those cases, the only current option to keep a failed firm open would be having the Bank of England take over the firm directly.

This option is entirely workable but comes with the risk that any losses from the firm would eventually end up being passed to the taxpayer – exactly the kind of bailout we want to avoid.

We are therefore exploring with HMT options to maintain continuity of access to deposits in resolution for smaller firms, in a way that minimises the risk to public funds.

I have no doubt that there will be a lively debate as we bring these proposals forward.

Improving outcomes in insolvency

Just as in a more complex resolution, the authorities have an important interest in ensuring depositors are treated well in bank insolvencies. But in the case of an insolvency, our focus is not on keeping the failed firm open so that depositors can access their money – after all, the firm is being closed. Rather, the goal is to make sure that insured deposits are paid out promptly and smoothly.

This is what our workstream on improving depositor outcomes in bank insolvency is all about: simple improvements, like paying out electronically rather than relying only on cheques, which nonetheless could make a big difference to depositors in a failure.

Solvent exit

I've focused this speech on bank failure. But it might surprise you to know that most bank exits are 'solvent': a firm that has not failed but has nonetheless decided to shut up shop.

These are typically very small firms, and their decision to wind down can reflect various motivations, such as new firms that never captured enough market share to be economically viable for the long term.

If a firm is not viable long-term, there can be significant advantages to winding down while still solvent. From the perspective of creditors, it has the advantage that there is no black hole in the balance sheet to be filled, and shareholders may also receive a return.

And the process of insolvency can destroy value for the firm – in particular if assets need to be liquidated quickly at 'fire sale' prices. One estimate is that around 20% of a firm's value can be destroyed in this way – increasing the risks that things get messy, including for uninsured depositors[19].

So there are clear advantages to a more orderly, solvent wind-down for small firms[20]. But the process needs to be carefully planned, not least to avoid triggering a panic that flips them into an insolvent exit.

That's why the PRA is consulting on improving 'ease of exit' for these firms. The core of our proposals is to improve the quality of planning at firms. This is a small additional cost – but it can make a big difference when it comes to the crunch[21].

The right regulations for the right firm

The failure of SVB in particular has prompted furious debate on the concept of 'tailoring' regulations for different classes of firms. After all, the failure served as a timely reminder that risks can sit with firms of all shapes and sizes – and that has certainly been my own experience over the last two decades.

In a highly interconnected financial system, we cannot afford to ignore any class of bank. But that's not the same thing as advocating 'one size fits all' regulation. There are perfectly sensible ways to tailor regulation to business models, without watering down the overall strength of the regime. I want to touch on two classes of bank in particular: small domestic firms, and international branches.

Strong and simple

Our strong and simple project looks to simplify the regulatory regime for small domestically-focused banks, to ease compliance costs and remove rules that are redundant for this class of firms[22]. Consider this question: do you think that the PRA needs exactly the same regulations to supervise the safety and soundness of the Penrith Building Society, based in the UK and with total assets of £130 million as it does for supervising HSBC, with $3 trillion of assets in 62 different countries?

We are as committed as ever to this work and will in due course be bringing forward some material simplifications of the capital regime for these firms.

And we remain equally committed to ensuring that the small banking regime is 'strong' as well as 'simple'. We are not in the business of watering down the regime, and we will not propose any changes that weaken resilience.

Branches

My final lesson from recent events is about international branches. In essence, a branch allows an overseas bank to do business in the UK without setting up a separate (and separately capitalised) UK subsidiary.

These are a key part of the UK approach to hosting a financial centre: they significantly reduce the barriers to international banking business, are important for competitiveness and part of the City's lifeblood. That is not going to change.

SVB's UK operation had been a branch for ten years, but we then required it to subsidiarise as its retail and SME deposit-taking activities had grown. This proved extremely useful when the bank failed, as it allowed us to quickly implement a solution for the UK firm[23].

I'm enormously grateful to my supervision team for the excellent work they did to subsidiarise the firm. But I am nonetheless left with an uncomfortable question. Can we rely on our existing criteria on branch activities to spot and address other firms that might grow to resemble SVB UK?

The focus of our existing policy is limited to retail and SME deposits, in particular those that are insured by the FSCS. But when SVB UK failed we found that the authorities' concerns extended beyond this, to the importance of continuity for uninsured SME deposits above the £85,000 threshold, as well as some corporates that fall outside the strict SME definition but weren't big enough to have alternative banking arrangements.

As it turns out, SVB was relatively unique as a branch in how much of this sort of transactional banking it offered to UK mid-sized corporates, and also in how much one particular sector relied on it. But the focus of our existing criteria means that we can't necessarily rely on them to catch another branch that offers similar deposit and transactional banking services to UK SMEs.

For that reason, we are thinking about our approach to branching. I should emphasise that this is not about fundamental reform, but about whether there are any targeted areas for improvement. I expect the vast majority of branch business to be unaffected, and we are fully committed to the branching model.

As with our current policy on wholesale activity, we're also likely to have a different risk appetite for branches providing critical functions in the UK where we have a greater degree of assurance over resolution arrangements, such as will be the case for most global systemically important banks.

In short, wholesale firms with robust resolution regimes in their home jurisdictions should be managed in failure as a whole in the way CS was and we remain fully committed to 'single point of entry' resolution plans for these banks.

Conclusion

It has been a rocky year. But when I look back over the past 15 years of financial reform, I see a success story. We have built a regime that can withstand shocks including bank failures without falling over.

Nonetheless we must learn as we go along and there remains much to be done – and I hope I have managed to explain how our various reform strands fit together. These are about completing the mission we were set after the 2008 crisis, rather than fundamentally re-thinking regulation.

Looking ahead, we must remain alert. It's been a rough ride over the last 12 months, but we come through it stronger. ■

Sam Woods is Deputy Governor for Prudential Regulation and Chief Executive Officer of the Prudential Regulation Authority at the Bank of England

Endnotes

1. This speech is focused on banking – but I should note that we also have a primary objective on the protection of insurance policyholders.

2. One version of this is so-called 'narrow banking', where deposit-takers can only invest in assets like central bank reserves or gilts. This would clearly make bank failure more remote, although not impossible.

3. More confidence that firms can safely fail also allows us to be more confident in authorising new firms.

4. These issues were present at the level of SVB's US parent company, as opposed to the UK subsidiary. The issues are set out in detail in the Federal Reserve's review: The Fed - Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank.

5. While the CS rescue was not strictly speaking a resolution, the failure of the firm was addressed by its shareholders and bondholders taking losses which protected the public purse, while the firm was sold to UBS. There was some risk to (non-UK) public funds from the transaction but this did not crystallise and such risks may often be a feature of resolutions, due for instance to any need for some forms of liquidity support from the central bank.

6. I focus here on regulatory lessons, as opposed to lessons for firms, Governments or the non-regulatory arms of central banks.

7. The results of our most recent stress test of the banking system can be found here: Stress testing the UK banking system: 2022/23 results | Bank of England.

8. This is why our regulatory measures of capital are adjusted to exclude things like goodwill or software assets.

9. The PRA requires firms who are measuring securities at fair value through other comprehensive income to recognise any unrealised losses (and gains) in their common equity tier 1 capital resources. This is in line with the Basel standards.

10. In the US these reforms are referred to, slightly more dramatically, as 'Basel endgame'.

11. For more detail on Basel 3.1, see the PRA's consultation paper: CP16/22 – Implementation of the Basel 3.1 standards | Bank of England.

12. Timings of Basel 3.1 implementation in the UK | Bank of England

13. At least, not by reforms that stop short of full narrow banking – and for reasons explained above, I do not favour such a radical change to our banking system.
14. For more detail on this point, see Competitiveness and growth: continuing the conversation? speech by Victoria Saporta | Bank of England.
15. Specifically, we have supervised the solvent exit of nineteen banks, excluding branches of foreign firms, resolutions, mergers/acquisitions and licences surrendered as part of a wider group restructurings.
16. In the UK, a key element of this is the Resolvability Assessment Framework: Resolvability Assessment Framework | Bank of England.
17. For example, the need to make so-called 'fair value adjustments' to the book value of the acquired bank's assets can create a negative capital impact on the acquiring bank's balance sheet at the outset.
18. Minimum requirements for own funds and eligible liabilities.
19. This evidence is discussed in our consultation on the topic: CP10/23 – Solvent exit planning for non-systemic banks and building societies | Bank of England.
20. In principle this argument might apply to large, complex firms as well – but those firms are required to issue bail-in debt instead and in practice it seems less likely that we could pull off such a solvent wind-down for the whole of a large firm.
21. While this speech is focused on banking, I should note that we are undertaking similar work on ease of exit for insurers – taking account of differences in business models across the two sectors.
22. The PRA has consulted on the definition of a firm that would be in scope of the simpler prudential regime for small domestic-focused banks and building societies (these proposals were first consulted on in CP5/22 - The Strong and Simple Framework: a definition of a Simpler-regime Firm | Bank of England, and updated in CP16/22 – Implementation of the Basel 3.1 standards | Bank of England). For instance, a firm must have total assets (measured on a three-year moving average basis) of no more than £20 billion. The PRA has also consulted on simplifications to liquidity and disclosure

requirements for these firms in February 2023 (see CP4/23 - The Strong and Simple Framework: Liquidity and Disclosure requirements for Simpler-regime Firms | Bank of England).
23. And many of the future tools I've just discussed about continuity and outcomes in insolvency would also only be applicable to subsidiaries, not branches.

My thanks to Hugh Burns and colleagues across the Bank and PRA for their help in preparing this speech. This article is based on the speech delivered at the Mansion House, 16 October 2023.

Governance at a turning point

International governance has brough indisputable benefits, but mistrust has grown. Christine Lagarde calls for policymakers to focus on citizens' priorities whilst being courageous and accountable

Good governance is a crucial issue in these uncertain and challenging times. Two aspects of good governance are the protection of liberties and the need for integration. In my view, these aspects also apply to governance in a broader sense, particularly regarding individuals and governments. And they are especially important for supranational governance, as there is often a tension between the need for closer integration – which is likely to advance prosperity – and the wish for greater protection of liberties.

In fact, it's this tension that leads to rules-based systems and institutions emerging as countries work together voluntarily to forge supranational governance structures. And as international cooperation becomes stronger and more complex, supranational governance must also be strengthened to support it.

But in recent decades we have also seen an imbalance emerge between the authority delegated to supranational governance and its legitimacy in the eyes of citizens. That is partly because supranational governance, by promoting the expansion of economic integration, has also contributed to weakening its own legitimacy.

Today this lack of legitimacy brings us to a turning point where we must either deepen supranational governance or accept its decline. However, I am confident that we can find a way forward by meeting three essential conditions.

First, by aligning governance with, and focusing it on, people's priorities. This is what I will call the function.

Next, by using the right forms of governance to effectively respond to people's concerns. I will refer to this as the form.

And finally, by striving to fulfil that function and serve the public, with what I will describe as courageous and accountable leadership.

The development of global governance

When countries have objectives that they cannot achieve on their own, or face challenges that go beyond their individual capabilities, they are motivated to cooperate internationally. This leads them to voluntarily accept some limits to their autonomy.

Mistrust has materialised as protectionism, withdrawal, retreat and populist tendencies, eroding the foundations of supranational governance, leading to political movements seeking to regain control, and to our world fragmenting into competing blocs

It could, for example, involve reciprocal market access to promote international trade or a concerted ban on certain products or practices in order to protect the global commons.

But the more countries cooperate internationally, the greater the associated risks. Countries are exposed to unfair competition from trading partners, to spillover effects from other countries' financial markets and to non-compliance with agreements on protecting the global commons, such as treaties on the environment.

That is why supranational governance is needed to mitigate these risks and achieve fair outcomes for all involved. In this sense, governance resides in setting the 'rules of the game' in advance and then ensuring that they are fairly adhered to.

This type of governance can take different forms, ranging from creating international institutions to setting global rules and establishing standardisation bodies, or even more informal standards. But crucially, governments agree to this governance, submitting to certain constraints in return for a better response to a need they are unable to meet on their own.

However, there is an inherent correlation between the complexity of interactions among governments - particularly in terms of economic integration – and the authority that needs to be delegated to supranational governance to ensure that outcomes remain fair.

When international cooperation efforts remain fairly straightforward, the authority granted to global governance is often limited. After the Second World War, for example, the Bretton Woods agreements were signed globally, while the common market was set up in Europe.

However, these governance arrangements focused mainly on promoting a stable environment for trade in intermediate goods. This reflected the limited scope of economic integration at that time, characterised by capital controls, fixed exchange rates, and high tariff and non-tariff barriers for services.

As interactions become more complex, however, there is a need for that governance to deepen. Look at the EU, for example. To promote economic growth, the countries decided in the late 1980s to transform the common market into a single market, covering capital and services. But a single market is inherently riskier.

It exposes people to greater risks from harmful products or to unfair sales practices in jurisdictions that are less well-regulated, as well as to anti-competitive behaviours such as subsidies. And the risks of financial spillovers increase, too.

So the powers of competition authorities and financial regulators had to be strengthened. That's why in Europe we delegated authority for competition and external trade to the European Commission. Much later, and at the cost of suffering the consequences of not having it in place at the time of the financial crisis, we did the same thing for banking supervision. And we of course also launched a common currency to prevent the Single Market from being undermined by competitive devaluations.

Research has shown that the capacity of supranational governance to issue guidelines and interpret standards increased by around 50% over this period[1]. This triggered a self-fulfilling process, whereby greater economic integration led to deeper governance, which then led to greater economic integration – that is what we know as globalisation.

There have been multiple benefits: across a sample of 147 countries, a one-point increase in globalisation measures was associated with a 0.3% increase in the growth rate in those countries over five years, with lower- and middle-income countries benefiting even more[2].

Hundreds of millions of people in emerging markets have been lifted out of poverty. Europe has benefited from globalisation too. Between 2000 and 2017, jobs related to exports to the rest of the world increased by two-thirds to 36 million[3].

Tensions inherent to global governance

But at the time we were not fully aware of the tension inherent in this process. Michael Zürn, an expert on international relations understood it clearly, however, and he developed a conceptual framework in which the growing powers of global governance lead to a lack of legitimacy, followed by a descent into conflict[4].

All forms of governance need legitimacy. In other words, people need to feel that authority is being exercised wisely. But supranational governance cannot draw its legitimacy from the same sources as national authorities, such as elections or referendums. In practice, it must obtain its legitimacy through expertise and impartiality.

Expertise can confer legitimacy provided that supranational bodies are seen not only as competent, but also as uniquely able to build a framework for sustainable prosperity by virtue of having a supranational perspective that national governments lack.

Similarly, impartiality can confer legitimacy if supranational governance is seen as a way of ensuring that all parties respect the rules of the game and of adjudicating decisions fairly among all members, strong or weak – something that national governments cannot do either.

In this way, there may be long periods in which supranational governance is perceived as legitimate. After the Second World War, for example, public support for supranational governance was very strong, fuelled by the painful memories of the costs of non-cooperation.

A survey conducted in 1952 asked: *"In general, are you for or against efforts to unify Western Europe?"* The results revealed that 82% of West Germans embraced the idea, as did 78% of British respondents and 63% in France[5].

But compared with sources of democratic legitimacy, expertise and impartiality are rather fragile, as they can be weakened by major crises or shifts in power dynamics. By enabling deeper economic integration, supranational governance increases the likelihood of that weakness – as we have seen over the past 15 years.

First, we witnessed the great financial crisis, followed by the euro crisis, both of which led to volatile crossborder capital flows. These episodes undermined faith in the idea that free markets regulated by supranational bodies were essential for sustained prosperity. This mistrust was famously summed up in the declaration by UK government minister Michael Gove that people *"have had enough of experts."*

These crises caused the credit bubble that had fuelled growth in the early 2000s to burst, revealing the growing inequalities created by globalisation. Over the past 50 years the income gap between OECD countries has risen to unprecedented levels[6], exposing the limitations of resorting to debt to mask such disparities. This realisation was a further blow to the notion of legitimacy founded on expertise.

Global governance has also been a victim of its own success: the impressive increase in wealth and the growth in the international influence of emerging countries. These new powers, especially China, have legitimately demanded fair representation, becoming less inclined to submit to the governance of others.

This has led to the impartial nature of global governance being questioned on two fronts. On the one hand, emerging powers considered that global bodies overly favoured the interests of their main stakeholders and were too resistant to change.

On the other hand, the former powers considered that the newer powers had no intention of playing fair. They therefore considered the rules, institutions and standards of global governance to be inadequate.

And as the global economy expanded, climate change was accelerating behind the scenes, with various international agreements barely making a dent in global carbon emissions. This suggests that even in areas of clear common interest, supranational governance was falling short.

So supranational governance is under threat from all sides, as various groups seek to bend it to their own interests. This is a sign of our times: fragmentation of the global order, gridlock in many international fora, the emergence of populist parties and groups of states coming together to forge new agreements better suited to their interests.

Is there a way of countering this trend?

It is vital that we strive to do so, because global governance is a necessary condition for maintaining international cooperation. We will not be able to preserve its many benefits if we let all that we have achieved go into retreat.

But global governance has to address its legitimacy deficit. And since it cannot draw on democratic legitimacy, the only way of restoring it is to tackle the challenges – such as economic insecurity, climate insecurity and geopolitical tensions – to which it has partly contributed, and that have undermined its claims to expertise and impartiality.

To do this, let me describe three possible ways of responding: function, form and leadership.

Three conditions for strengthening global governance

Function

Let's start with the function of global governance. In order to thrive, global governance must offer solutions in the areas in which people feel most at risk today. If it doesn't, the logical response would be to erect new barriers and reverse international cooperation.

In Europe, we have already seen this process unfold. For example, when the global financial crisis and the euro crisis exposed vulnerabilities in the banking sector, some wanted to dial back on integration. But we instead collectively responded by making the EU responsible for banking supervision and by addressing the issues that had come to light.

Similarly, when Europe found itself facing another external shock in the form of a pandemic, we reacted by putting in place the European recovery plan and recovery fund (NextGenerationEU). These helped to avert the threat that the virus would have a deeply unequal impact on European economies – especially those most dependent on tourism – which could have caused a new rift in our Union.

In both cases, rather than reversing economic and financial integration, we strengthened our governance to make integration more secure. We made sure that the competences of the EU matched what Europeans expect of it. In doing so, we clearly bolstered the legitimacy of the EU. Today, support for the euro and for the EU stands at 79% and 65% respectively[7].

Can this be done with today's challenges? The good news is that many of the issues citizens feel most insecure about are precisely the ones where they want stronger European governance.

Around two-thirds of Europeans are convinced that the European Union represents a bastion of stability in a world in crisis. Almost nine in ten Europeans agree that tackling climate change can help improve their health and well-being, and the same proportion expresses support for the environmental objectives of the European Green Deal[8].

Citizens realise that, although some of these problems result partly from a more globalised world, the answer does not lie in turning in on ourselves, but in taking action at a level that best allows us to deal with the issues effectively. And this means deepening integration.

In the future, it will be crucial to harness this spirit of collaboration to confront new challenges in areas of common interest such as security, defence, climate or mass migration.

Form

After function comes form. The form should mould itself to the function, creating the conditions for supranational governance to deliver on the issues prioritised by citizens. This means great care should be taken when choosing an appropriate governance method.

We can build multilateral governance using either decentralised rules or centralised institutions. Although the first approach might appear to be the more attractive option owing to easy acceptance and because it keeps power at national level, it actually makes it more difficult to achieve governance objectives.

This is because rules are subject to a trade-off between credibility and flexibility. They are either rigid in order to be credible or vary according to circumstances in order to be flexible. But it is almost impossible to create a rule that successfully reconciles the two. All too often, attempts to find middle ground end up achieving neither.

Take the exchange rate mechanism as an example. It was created in the 1970s to stabilise exchange rates between European countries, initially operating according to strict rules that allowed a maximum fluctuation of 2.25% from the central rates. This system was severely tested in the 1980s, however, by increased capital flows and speculation. And it had to be made more flexible as a result.

But the system had to be relaxed to such an extent that it lost all credibility as a reference point for exchange rates, with fluctuation margins reaching 15% in 1993. This failure clearly showed the benefits of taking an institutional approach to European monetary integration, which then led to the adoption of the euro.

These benefits stemmed from the fact that institutions are not faced with that trade-off. When they have a clearly defined mandate and deliver on it, they become more credible. And when they have operational independence, they can be flexible and adapt to changing circumstances as they arise.

Let me illustrate this with the example of the ECB. Since it was created, the ECB has faced unforeseen challenges as it has carried out its mandate. But the Treaty combines our price stability mandate with discretion over the tools we can use to fulfil that mandate.

This enabled us to use unconventional policy tools during the financial crisis, the recession and the pandemic to ensure that inflation remained in line with our target. Managing these complex situations would have been difficult if we had strictly adhered to fixed rules or had been limited to using conventional tools.

However, I am not naive as to the difficulties in moving from a rules-based to an institutional approach. I recognise that creating or changing institutions requires considerable political capital. This poses a challenge in specific political circumstances or situations where progress has stalled.

But that cannot be used to justify inaction, because political courage can sometimes prevail over resignation and because there are other forms of governance, such as informal institutions, that can help us address the global challenges we are facing.

Llet me take climate finance as an example. Numerous initiatives have emerged in this area under the aegis of the G20, providing a powerful channel for collective action in the wake of the crisis. Initiatives such as the Task Force on Climate-related Financial Disclosures have been set up, creating a framework encouraging companies to disclose information on the climate change-related financial risks in their economic and financial activities.

Similarly, the Glasgow Financial Alliance for Net Zero, a global coalition of leading financial institutions, has committed to accelerating the decarbonisation of the economy. And the Network for Greening the Financial System, a coalition of central banks keen to align their actions with the pressing need to tackle climate change, circulates scenarios and analyses among all its members.

Although these are voluntary actions, their widespread adoption by thousands of organisations can create powerful incentives to address the challenges we face, bringing benefits such as speed, efficiency and adaptability.

It is crucial that such initiatives are led by players with a genuine concern for the common good, because if they are not, other entities motivated by profit gains or market share could quickly fill the void, sometimes with less clear motives.

Leadership

The third and final condition that I would like to mention is leadership. Even if we give governance the right function and implement it in the right form, this does not mean that the outcome will be the right one. Institutions need courageous and accountable leadership in order to take the right decisions.

Faced with complex and uncertain global challenges, the *"courage to act"*[9], as Ben Bernanke said, is essential. Leaders must show an unwavering determination to use all of the tools available to them, in line with their mandate, to achieve their goals.

This is a truth I have experienced throughout my entire career: as Finance Minister in France, as IMF Managing Director, and now at the helm of the ECB. Crises are insidious and unpredictable in nature, and every crisis is different. There is no textbook setting out the perfect approach to take. But time is always in short supply and risks inevitably have to be taken, while the outcome is inherently uncertain.

More recently, we faced an unprecedented crisis with the pandemic. These were extraordinary times, and the creation of the €1.85 trillion pandemic emergency purchase programme (PEPP) to shield the economy from the impact of the pandemic was an extraordinary response. But it was necessary to combat the deflation we could have seen if we had not acted.

Effective leaders must therefore give their institutions the resources they need to act, all the while being accountable for their actions. When taking decisions that break with precedent, leaders must always keep in mind that they will have to account for those decisions. This keeps them within the limits of their mandate and focused on the public interest, and it prevents them from being tempted to go too far.

We saw this again in the case of the PEPP, as we meticulously prepared for the implementation of the programme with this in mind. We strictly complied with the requirements and safeguards considered necessary by the Court of Justice of the European Union in its judgments on our past actions, thereby ensuring that our measures were fully compatible with the Treaty.

So, in striving for effective leadership, courage and accountability must go hand in hand.

Conclusion

International cooperation is a powerful force that has shaped our recent history. It has brought indisputable benefits, propelling the world towards unprecedented development, creating wealth, providing access to scientific and technical progress in an increasing number of countries and building multilateral institutions that have defined the post-war era.

But it would be a mistake to disregard the challenges that have arisen on this path. Inequalities, unresolved global crises and the loss of institutions' legitimacy have sown doubt in the minds of our fellow citizens.

This mistrust has materialised as protectionism, withdrawal, retreat and populist tendencies, eroding the foundations of supranational governance, leading to political movements seeking to regain control, and to our world fragmenting into competing blocs.

Today, the supranational governance that underpins international cooperation is at a critical turning point: either it is strengthened or it goes into decline. The choice is between a world that seeks to reconcile differences and create prosperity for all, or retreat into a world without cooperation, perhaps even one of confrontation.

I do, however, see a way forward. If supranational governance can be aligned with and focused on citizens' priorities, take the most effective form to achieve those priorities, and be led with courage while being held accountable, then it will be able to rise to the challenge it is facing.

But we should also remember that all supranational governance structures have emerged from an era shaped by the devastating consequences of a failure to cooperate and open conflicts between countries, while deep-rooted fears were taking hold.

In these decisive moments, I am inspired by the legacy of an eminent member of the Académie française and a pioneer in the fight for women's rights, Simone Veil. She chose to have her ceremonial sword engraved with the number 78651, representing her deportation to Auschwitz, alongside Europe's motto: *"United in diversity."*

Let us not forget our past. Let's work together for a fairer, more sustainable and more prosperous world. The choice before us must be guided by a shared vision of unity, cooperation and mutual respect, which our future generations deserve. ■

Christine Lagarde is President of the European Central Bank

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Finance21 is pleased to announce that Finance Isle of Man has been awarded the Best Finance Centre 2024.

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Challenges for monetary policy that make us think

Monetary policy is too important to rely on trial and error. Klaas Knot argues that central banks need data and research to fulfil their mandate, so that they can do the best possible job

Every year scientists, researchers, authors and economists all over the world eagerly await the awarding of the Nobel prizes. But did you know there is a satiric version of these prizes, called the Ig Nobels? Since 1991, the Ig Nobels have been awarded to honour achievements in scientific research that first make people laugh, and then make them think.

The Ig Nobels are organised by the satirical scholarly journal Annals of improbable research, the annual ceremony is held at Harvard University, there are ten prizes every year for a variety of scientific fields, presented by genuine Nobel laureates, and the prize is 10 trillion Zimbabwean dollars from a time of hyperinflation. And the honour, of course.

Yes, some of the winning research seems very trivial and totally irrelevant. For instance the project that concluded that black holes fulfil all the technical requirements for being the location of Hell… Or the discovery that fleas living on a dog can jump higher than fleas living on a cat. Or the winner of the 2005 Ig Nobel prize in Economics who invented Clocky: an alarm clock that runs away and hides, repeatedly, to ensure that people get out of bed and have a more productive day.

But there is a noble side to the Ig Nobels: history shows that seemingly trivial research sometimes leads to important breakthroughs. A good example is the experiment that won André Geim and Michael Berry an Ig Nobel in 2000: how to levitate a frog with magnets. It seemed weird and trivial, but the experiment showed that the magnetism of water is strong enough to counter gravity.

That insight became part of the inspiration for China's lunar gravity research. And of course, Geim won a real Nobel prize – for Physics – in 2010. We all know that every invention, every discovery, every research project has to start somewhere. Just like every change has to start somewhere. Mostly with events.

And recent years have been truly eventful. The euro area economy was rocked by several large shocks, – the Global Financial Crisis (GFC), the European sovereign debt crisis and a pandemic that kept the economy in lockdown. And more recently, Russia's unjustifiable war in Ukraine that caused energy prices to spike and inflation to soar.

Shocks that have challenged central banks all over the world in their quest for price stability. Shocks that have challenged us to find new instruments, to expand our toolkit to counter the deflationary dynamics and enable governments to engage in fiscal stimulus. A challenge that we met by deploying several unconventional monetary instruments, including forward guidance, asset purchases and longer-term refinancing operations.

We need data and research to fulfil our mandate, so that we can do the best possible job at what we must do best

Did they work? Yes, they certainly left their mark. Forward guidance and asset purchases lowered medium to long-term interest rates, making credit more affordable and boosting the economy. TLTROs significantly reduced banks' funding cost, and stimulated banks to pass on these favourable funding costs to businesses and households.

These measures are now an integral part of the central bank's toolbox; they add policy space when rates are at the lower bound, even though they are not unbounded themselves.

Yet, as we have found out, they also come with a challenge: the combination of instruments and the sequencing we ourselves imposed have created a very high degree of persistence in our monetary policy. In other words: it reduced our ability to 'turn the ship' when inflation flared up. Why was that?

The moment policy makers could effectively raise rates was delayed because we communicated that we would first stop with net asset purchases before raising rates. And stopping asset purchases takes time. They were a novel, untested instrument. And as Brainard argued: uncertainty regarding an instrument calls for smaller steps.

So, to 'turn the ship', we started by gradually reducing the net asset purchases to zero under the PEPP and APP. After that, in July 2022, we were 'free' to raise rates for the first time. What followed was a rise of policy rates at an unprecedented pace: between July 2022 to September 2023, policy rates increased by a total of 450 basis points from minus 0.5 percent to 4 percent today.

Restrictive policies will likely remain needed for some time to come to get inflation back down to target. Personally, and conditional on incoming data confirming the latest projections from September, I see the current level of our policy rates as a good 'cruising altitude' where they can remain for some time.

And that brings me to another challenge: the right calibration of our monetary policy to strike a balance between doing too much and doing too little. Why is that a challenge?

First, you are all aware of the long and variable 'transmission lag' of monetary policy between one and two years. In other words: the effects of the policy tightening on the real economy – think about investment, GDP, unemployment – will only be felt in about one year's time.

Hence, we should be a little patient and not raise rates too much to prevent choking off the economy. Second, even though inflation numbers have started to decrease, the risk still remains that high inflation may become entrenched if second round effects persist or inflation expectations de-anchor.

Therefore, we need the incoming data to continue to confirm our projections – which have not been the best in an environment of major shocks – if we are to have confidence in them.

There is one other challenge I want to mention: the size of the central bank balance sheets. More than a decade of implementing 'unconventional monetary policy' tools has increased central banks' footprint in financial markets in an unprecedented fashion. As we have stopped reinvesting the principal payments from maturing securities under the APP, the Eurosystem's balance sheet is now shrinking at a measurable pace.

Under both the APP and PEPP, we bought billions in sovereign bonds with an average maturity of about 7 years. Some of these bonds are now maturing: that means the 'principal' of our investments is flowing back to us. Through this process, excess liquidity is drained form the system. However, we currently still reinvest the principal payments for the PEPP, leaving the overall bond portfolio unchanged.

To date, this 'quantitative tightening' has been smooth and well-absorbed by financial markets. This is similar to what we see from our international peers, who – in fact – are reducing their balance sheet at a relatively faster pace.

That brings me to the challenge. While, clearly, the current balance sheet has to shrink, our future balance sheet size may need to be larger than it was before the Global Financial crisis. The reason is that structural changes in financial markets, including a higher demand for liquidity, will call for a larger central bank reserves in the future. In my view, refinancing operations represent the most efficient tool to provide such a level of reserves down the road.

Monetary policy is too important, too crucial for our economy and our general wellbeing, to rely on trial and error. The ECB, the central banks, would prefer to avoid the honour of receiving an Ig Nobel prize.

Yes, in the history of the Ig Nobel prizes some were also awarded as criticism wrapped up in a blanket of satire. For instance, in 2009, the Ig Nobel for Economics was awarded to the directors, executives, and auditors of four Icelandic banks for demonstrating that tiny banks can rapidly mushroom into huge banks, and vice versa, and for demonstrating that similar things can happen to an entire national economy.

So, to avoid that 'honour', we need data and research to fulfil our mandate, so that we can do the best possible job at what we must do best. Because in monetary policy, we cannot live by the slogan of the Ig Nobel prizes, also the closing remark of the annual ceremony: *"If you didn't win a prize – and especially if you did – better luck next year!"*

So, make us think! ■

Klaas Knot is the President of the Netherlands Bank

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Economic warfare: lessons from two World Wars

Present-day sanctions have their origins in economic warfare in the two World Wars. Mark Harrison reviews that experience and the lessons we can learn

What may sanctions be expected to achieve? This question is currently fraught for two reasons. One is the proliferation of sanctions since Russia launched a full-scale war against Ukraine in 2022. With 13,000 sanctions in place against Russia alone (Atlantic Council 2023), sanctions and countersanctions are now everywhere.

Another reason is that the war continues and shows no sign of coming to an end. There is uncertainty over whether sanctions might have avoided the war, whether they can now sufficiently punish Russia for its aggression, or if they can contribute to Russia's defeat.

While some have drawn attention to the costs to the West of imposing sanctions (Hinz and Crozet 2016, Schropp *et al* 2022, Mei *et al* 2022) and the scope for Russia to mitigate or even shrug off the consequences (Oegg and Elliott 2008, Nigmatulina 2022, Cecchetti and Berner 2022), others have argued that Western sanctions were becoming increasingly effective (Bergelijk 2012) and may now have severe consequences for Russia (Ongena 2022, Simola 2022).

Recent historical writing has noted that present-day sanctions have their origins in economic warfare in the two World Wars, reflected in the setup of the interwar League of Nations and postwar United Nations (Dehne 2019, Mulder 2022). In a recent paper (Harrison 2023), I review that experience, asking what economic warfare was expected to achieve and whether these expectations were matched by results.

To begin, two clarifications are useful. One is that the purposes of economic warfare then were narrower than those of sanctions now. According to Giumelli (2011), sanctions aim to constrain, coerce, or signal.

In the two World Wars, economic warfare had one purpose: to weaken the adversary's fighting power by constraining the supply of war (Vickers 1943). It was not expected to signal or incentivise any course of action except surrender. Thus economic warfare concerns 'constraining' sanctions, which are a relatively small subset of today's sanctions.

In peacetime, constraining sanctions cannot be relied on to act alone; they must be combined with deterrence. In wartime, economic warfare does not win battles, but it helps to decide who will win them when they are fought

The other thing is that the experience considered by the literature is much narrower than it should be. Most of it is the experience of Germany in two World Wars. For that reason, Stephen Broadberry and I are currently engaged in a parallel project to bring together research on economic warfare from a wider sample of periods and conflicts.

Lesson 1. Modern economies were tough targets

Both wars saw horrifying attrition on the battlefield. Leaders on each side looked for ways to win a quick victory and stop the slaughter. At the start of the 20th century, as the world became increasingly globalised and interdependent, influential observers (Angel 1912, Bloch 1899) argued that modern industrial economies were vulnerable to naval blockade.

They thought a blockade could stop essential imports of food and materials, causing unemployment, famine, and collapse. They imagined the threat of blockade as powerful enough to prevent war.

This view became popular (and has never gone away). However, two World Wars proved it to be wishful thinking. While global trade was thoroughly disrupted, and civilian welfare declined, both wars saw sustained economic mobilisation on both sides.

Contrary to Bloch's expectation, it was the less modernised, more agrarian economies that saw the worst food shortages. Countries that dropped out early did so because they were defeated on the battlefield, not because their economies collapsed.

Those who expected the supply of war to collapse in the face of a sudden trade shock had the wrong model of economic interdependence. They imagined it as a chain of fragile links: disruption at any point would cause the entire chain to fail.

In fact, the modern economy was a resilient network. Firms and households could adjust to sudden shortages by economising and substitution. As a result, no shock to supply had the catastrophic effect that seemed likely at first sight.

Lesson 2. Economic warfare took time

In the two World Wars, it was anticipated that economic action would be fast – implicitly, fast enough to deter or pre-empt military action. In the outcome, the pace of economic action was frustratingly slow.

The first reason was that action against the adversary's economy turned civilian property and lives into targets. This flew in the face of international norms that protected civilian interests and the rights of neutral countries to trade with both sides. To erode the leaders' scruples and fears took time.

This was not the only obstacle. Another constraint was the available means. In WWI, Germany took nearly three years to build its fleet of operational submarines. Almost half of all Allied and neutral shipping losses were inflicted as late as 1917.

WWII was widely expected to begin with devastating air attacks on cities, but the blows traded in the war's first three years were puny by comparison with what was to come. Three-quarters of Allied bombs on Germany's economic targets fell in the war's last year. Thus, economic warfare was slow to unfold.

Finally, the impact of economic warfare was delayed by the adversary's adaptation. Trade could be diverted through neutral neighbours. The war effort could be protected by cutting back on less-pressing civilian uses of fuel, textiles, and metal goods. Substitutes could be found for many foods and materials previously thought of as irreplaceable.

Faced with sudden shortages, both producers and consumers made extraordinary efforts to make do with less. No commodity was truly essential at the margin (Olson 1963, Harrison 2022). As a result, the immediate effect on fighting power of any attack on supply was always less than anticipated, and often zero.

Lesson 3. Economic warfare was powerful – eventually

When attacking the economy had no immediate effects on the battlefield, bored observers and analysts tended to withdraw attention, concluding that there was nothing to see. After 1940, Hitler decided to scale down Germany's air attack on Britain's cities on these grounds (Overy 1977: 47).

Like others, he lost sight of a key point: economic warfare took time and required patience. Its effects were slow but cumulative. Eventually, adaptation encountered limits. Once the limits were reached, economic warfare sped up and became fast.

The limits were found in the civilian sphere. The goal of economic warfare was to deny resources to the adversary's war effort. The adversary's countermove was to protect the war effort by shifting the costs of adaptation onto civilians.

In the short run, as a result, it was civilian resources and reserves that were gradually depleted by economic warfare. Somewhere there was a constraint on civilian cooperation. When the constraint was reached, the damage done by economic warfare would rebound into the war effort.

In the case of Germany, both World Wars gradually depleted civilian resources by restricting consumption and nutrition. WWI saw many hunger deaths. In WWII, Germany fed itself at the expense of the occupied territories, but there were still food shortages and, from 1944, signs of raised mortality.

For WWII there are numerous estimates of the effects of bombing on German war production and fighting power (US Strategic Bombing Survey 1945, British Bombing Survey Unit 1998; see also Overy 1983, Tooze 2006). Many are self-serving and few are well identified.

The most evidence-led estimates were made by the British Bombing Survey Unit (1998); they relied on a mix of direct calculations and differences in differences. While sample sizes were small and robustness tests lacking, they suggested that the period in which German war production was fully protected from the effects of relatively light bombing lasted through the second quarter of 1943.

From mid-1943, protection became partial (heavier bombing began to depress total output, while war production fell by less). The final collapse of war production was brought about by an overwhelming air campaign against German transportation from the third quarter of 1944.

Lesson 4. The threat of economic warfare was also powerful

If economic warfare proved to be powerful ex post, then it should also be powerful ex ante. Embedded in the League of Nations was the belief that a credible threat of blockade could deter aggression (Dehne 2019, Mulder 2022). Recall that sanctions can constrain (as in economic warfare), coerce, or signal. A threat does not constrain; it coerces and/or signals.

How did that work out? In the interwar period, the threat of blockade worked to deter smaller powers from making war on their neighbours. The story of the great powers is different (Mulder 2022). The expectation of blockade did not deter Germany from starting WWI, or Germany, Italy, or Japan from starting WWII.

The Axis Powers did not neglect the likelihood of blockade. Rather, they directed and timed their aggression to pre-empt it. They planned to conquer territories that would guarantee the war supplies they needed, leaving them self-sufficient. Thus, the threat of economic warfare became an accelerant of aggression, not a deterrent.

If the threat of sanctions was a powerful signal, the problem was that the signal received was not the signal sent. The signal sent was: *"Economically we are strong, and you are weak. Comply, or we will starve you."* The signal received was: *"Our enemies are strong economically but weak militarily. Strike them now."*

Conclusion

In both World Wars, economic warfare was at centre stage, not on the sidelines. It helped to decide what battles were fought and who would win them.

In both wars, economic warfare was unavoidable. It was a phase of attrition (O'Brien 2015), not an alternative to it. In wartime, economic and military actions were complements, not substitutes. In peacetime, without war readiness, attempts to constrain the adversary by economic sanctions invited violent escalation.

This is not an argument against sanctions. In peacetime, constraining sanctions cannot be relied on to act alone; they must be combined with deterrence. In wartime, economic warfare does not win battles, but it helps to decide who will win them when they are fought. ■

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Finding solutions to global challenges

The shifting regulatory, political, and economic landscape has brought challenges to companies and regulators. Elise Donovan considers the role of IFCs in an uncertain world

As 2023 comes to a close, it is clear that the 'permacrisis' hailed by political and economic commentators earlier this year is still very much at play. An evolution of the 'polycrisis' – a term widely used last year to describe the simultaneous occurrence of several significant crisis' in recent times – the 'permacrisis' is the acknowledgement that this period of global instability is proving to be more enduring than we had hoped.

Indeed, with increased geopolitical tensions, regional conflicts and economic fragmentation, the global economy in 2023 has been sailing in choppy waters, with high interest rates and sluggish growth being felt all the way from trading floors down to consumers.

We have also seen powerful pan-global trends shift our landscape. In the technology space, the stratospheric rise of AI sparked new possibilities for businesses and new concerns for regulators, while the crypto and digital assets sector struggled to overcome controversies. Elsewhere, record-breaking temperatures supercharged the efforts to fund the fight against climate change.

This shifting regulatory, political, and economic landscape brought challenges to companies and regulators. Looking forward, the role of International Finance Centres (IFCs) must be to find crossborder solutions that enable companies to overcome these challenges.

The British Virgin Islands (BVI) is well-versed in navigating complex global issues. For over 40 years, the international business and finance centre has remained a neutral centre point for crossborder transactions, investment and trade, bringing together world-leading practitioners and regulators to find solutions to challenges and identify new opportunities.

From climate initiatives to digital finance, the BVI is responding to these global changes in a forward-looking and innovative manner, navigating the fast-shifting landscape to remain steadfast in its commitment to facilitating global growth.

Responding to fragmentation

Last month, European Central Bank President Christine Lagarde warned the audience at the European Banking Conference that there was increasing signs that the global economy is *"fragmenting into competing blocs."*

IFCs make a significant contribution to the global economy and will be vital in facilitating crossborder business and investment in this period of challenged economic integration

This issue of economic fragmentation has been a much-discussed topic this year, as geopolitical tensions, sanctions, and weakened supply chains have resulted in trends such as 'friend-shoring', as nations increasingly diversify their supply chains and reduce dependency on certain nations.

How geopolitical shifts are changing the shape of globalisation was a topic explored earlier this year in a report commissioned by BVI Finance: *Beyond Globalisation: The British Virgin Islands' Contribution to Global Prosperity in an Uncertain World*. Authored by Pragmatic Advisory, the report laid out the value of the BVI to the world's economy and the role it plays in bringing clarity during a period of caution.

Central to the report was the recognition that the increasing economic integration we became accustomed to in recent decades has stalled, and explores three potential scenarios that will play out: weaker internationalism where globalisation continues but at a much slower pace and with more political obstacles to navigate; bloc economy, which will see economic and regulatory integration between countries based on diverging geopolitical alliances; and economic nationalism where countries reverse globalisation and become more protectionist, which in turn creates political obstacles.

We can see examples of all three occurring within our global community. A notable example of the formation of a bloc economy was seen at the BRICs Summit in August, which saw the five-nation BRICs group of emerging economies expand their membership and, for the first time, present themselves as a viable alternative to the G7 which can represent the real priorities of the developing world.

However, there has also been positive signs that this bloc economy will not be as divided as some commentators presumed, with positive meetings between United States President Joseph Biden and Chinese Premier Xi Jinping just last month, confirming the nations shared understanding of the benefits of continued globalisation.

Irrespective of the scenario, what is certain is that there will remain a need for IFCs, such as the BVI, to support crossborder trade and investment.

Analysis in the *Beyond Globalisation* report found that BVI business companies hold US$1.4 trillion of assets, equivalent to 1.5 per cent of global GDP. These holdings facilitate crossborder investment through physical, corporate, and financial assets, enabling real investment in essential infrastructure projects and industries.

This impact is felt across the world; investment mediated by the BVI supports around 2.3 million jobs worldwide, with China (including Hong Kong) accounting for one million and around 400,000 in Europe and North America. Analysis also revealed that the economic activity and incomes generated by these 2.3 million jobs contributed to over US$13.8 billion annually to government treasuries worldwide.

The global impact of BVI's financial centre is a result of a wide breadth of services offered. From incorporation, through to mergers and acquisitions, public listings, privatisation, digitalisation, restructuring, litigation, insolvency, and liquidation, the centre can cater to the needs of companies through every step of their business and investment journey.

The global reach and appeal of the BVI can also be attributed to its track record on financial regulation. As geopolitical events alter the regulatory environment, the BVI remains committed to achieving, the highest standards in tax information exchange, transparency, and anti-money laundering (AML) measures, working closely with international governments and bodies in a co-ordinated response to challenges. Through this, the BVI is ensuring that companies have access to the global economy, even in times of economic fragmentation and financial shifts.

Financing the fight against climate change

The threat of climate change is undoubtedly amongst the biggest challenges facing our global economies and societies. So much so, that the search for climate solutions is inspiring global collaboration even in times of geopolitical fragmentation.

This is evident in the recent COP28 Conference in Dubai whereby representatives from almost 200 countries came together to discuss how international action can be harnessed to tackle climate change and environmental degradation.

As an island-nation, this is an issue that hits close to home for the BVI. Our Caribbean region is of particular risk from tidal patterns, heavy rainfall, and extreme weather. Furthermore, extreme weather events threaten the local tourism industry, and the jobs which rely on it. The region has a unique vulnerability to climate change that inspires a commitment from the IFCs in the region to lead on mitigating these risks and driving real global change.

One of the ways this is being progressed is through the Bridgetown Initiative. Led by Barbados Prime Minister Mia Mottley, the initiative calls for the reform of existing institutions to finance climate resilience and the Sustainable Development Goals (SDGs).

Focusing on debt restructuring and climate financing, the initiative is steeped in the principle that a more equitable and fit-for-purpose global finance system must be created to allow developing nations to invest in their future and protect their nations from the effects of climate change, of which they are particularly vulnerable to.

It is also a recognition that the richer, developed nations who are responsible for the majority of carbon emissions and environmental degradation must also be responsible for financing the solutions.

The popularity of 'green finance' and 'blue finance' – a new financing structure to support projects focused on the sustainable use of ocean resources – is growing, and IFCs are at the forefront of this shift. For example, the BVI has established one of the first Climate Change Trust Funds in the Caribbean, allowing it to receive funding for climate-related projects and to explore how it can maximise the impact of funding.

The Caribbean region is emerging as a leader in the fight against climate change and, by harnessing its decades of knowledge and expertise in finance and investment, the BVI is in a unique position to act collaboratively with its neighbours and drive effective and innovative change on a global level.

Digital finance in a post-FTX world

Another shift seen in the financial sector over the last 12 months is how to respond to, and move forward from, events in the digital assets and crypto sector.

The collapse of FTX in November 2022, the subsequent trial and conviction of former Chief Executive Sam Bankman-Fried for fraud and conspiracy, and last month's guilty plea to criminal charges of cryptocurrency exchange Binance founder Changpeng Zhao were some of the most discussed business stories of the last 12 months. For many, the events served as a cautionary tale for under-regulated financial activity.

Digital assets and cryptocurrencies may have had a challenging year, but they are still considered a hugely promising step for the financial services industry. In fact, the total addressable market of digital assets is expected to be worth between US$8 trillion and US$13 trillion by 2030, and with major financial institutions such as BlackRock filing new applications with the US Securities and Exchange Commission for a crypto exchange-traded fund (ETF) in the last month, there are signals that the confidence in the sector is rebuilding. The FTX collapse, rather than being a death knell for the industry, is proving to be a stimulus for much-needed deeper regulation.

As we look to 2024, the BVI is exploring just that. Already a global leader in digital assets, with a world-leading regulatory environment and innovative ecosystem, the jurisdiction is committed to progressing the sector and embedding regulation into financial processes.

For example, since the Virtual Assets Services Providers (VASP) legislation went into effect in February this year, the BVI Financial Services Commission, the regulator, has received more than 60 applications from entities and businesses in the digital assets space eager to be established and regulated in the jurisdiction.

Creating a new legal framework for the registration and supervision of individuals engaged in virtual asset services, the new legislation has further enhanced the reputation of the BVI as a trustworthy home for digital assets.

Also, according to a report from PwC, the BVI overtook the United States as the second most popular location for crypto hedge funds to domicile last year. With the steady increase in applications in 2023, we expect its share of the global market to continue to rise.

Conclusions

In this uncertain climate, it can be useful to heed the sentiment of Heraclitus and remember that there is nothing permanent except change. It is how we respond to this global change that will determine future success and growth. In 2024, the BVI will continue to remain resilient and agile, responding rapidly to challenges and embracing the new opportunities that innovation and technology provide.

IFCs, such as the BVI, make a significant contribution to the global economy and, as outlined in our report: *Beyond Globalisation: The British Virgin Islands' Contribution to Global Prosperity in an Uncertain World*, will be vital in facilitating crossborder business and investment in this period of challenged economic integration.

This will be critical as the global community seeks to push forward on key issues such as regulation and climate change and the BVI will remain at the forefront of driving collaboration in these key areas. ■

Elise Donovan is the CEO of BVI Finance

Openness beats fragmentation

Andrew Bailey describes the benefits of openness and the risks posed by fragmentation for the world economy and financial stability

I am going to talk about openness and the risk of fragmentation, both in the world economy and the financial system. I will say at the outset, to avoid any doubt, that I am a strong advocate of free trade and open economies. It can sometimes be challenging when the economy is exposed to big external shocks – and we have been experiencing, and sadly continue to do so, some very big ones of late - but there are very substantial and continuous benefits from free trade, investment and open markets both in goods and in financial services.

That said, we have to recognise that today we live in a world economy which is experiencing fragmentation, and that is at risk of further such pressure. The World Trade Organization has recently reported that the share of so-called intermediate goods in world trade – these are the goods that form inputs to the final product – fell to 48.5% in the first half of this year, compared to an average of 51% in the previous 3 years. This is an indicator of pressure on global supply chains.

Covid was an important first shock to the supply chain system, and I will include in this the disruption to global supply chains that we saw in the early part of the recovery from the severe initial impact of COVID on the world economy.

It means that extended just-in-time supply chains have moved from being a perceived source of strength to a perceived vulnerability, hence the reduction in the share of trade accounted for by intermediate goods.

This is not, however, the end of the story on fragmentation in the world economy.

Russia's illegal and utterly reprehensible invasion and war on Ukraine has been a further source of economic disruption and fragmentation – notably in energy and food supplies – which has seriously disrupted supply chains and economic conditions.

Let me also add a comment which relates to events nearer to home. As a public official I take no position on Brexit per se. That was a decision for the people of the UK. It has led to a reduction in the openness of the UK economy, though over time new trading relationships around the world should, and I expect will, be established. Of course, that requires a commitment to openness and free trade.

To sum up this part of the story: we have moved from a state of affairs where the orthodoxy was to open up the world economy, to increase trade flows, and increase the flows of finance to support this trade. In doing so, yes

Fragmentation damages financial markets. But it doesn't just reduce the size of markets, it makes them inherently less stable. Fragmentation is a risk to financial stability there was an increase in interlinkages and dependencies around the world economy. Some of those interlinkages turned out to be less resilient than we had expected.

We can't ignore that for the sake of free trade idealism, because the threats that are behind it are sadly real. But, nor must we give up on openness. Diversifying supply chains to increase resilience does not need to involve protectionism.

Let me end this part of my remarks on a note of optimism. Recently, as part of my regular visits around the country, I was in Newry in Northern Ireland meeting firms and schools. It was a most enjoyable day, and I came away with a real sense of optimism of businesses taking up the opportunities of open economies.

In the rest of my remarks I am going to focus on openness in the world of financial services. The theme will however be the same, openness is a good thing. But in the world of regulated industries, we have to set out carefully what we mean and how it works.

Just as reducing openness does the same thing to economic growth, so fragmentation damages financial markets. But it doesn't just reduce the size of markets, it makes them inherently less stable. Fragmentation is a risk to financial stability.

Put simply, large markets and their infrastructures, which are run safely and to high standards, will support rather than endanger financial stability. A very good example of this is clearing and central counterparties. Fragmenting this type of market infrastructure creates rather than reduces risks in markets. It also increases the cost of market functioning.

I want to focus a little bit on the point about whether there is, or is not, good reason to restrict and fragment. Inevitably, with such financial infrastructures, they have to be located in a single place, and become the responsibility of that place in terms of their safety, soundness and stability. Yet they are, as the IMF has rightly said, a global public good.

So, the responsibility of those who operate and regulate such infrastructures is a large one, and one that must hold good at all times. This requires accountability and transparency. Likewise, it is important to have global standards for the operation and oversight of such infrastructures, and strong co-operation among the interested countries – not just where the operator is located but also those where firms which use the infrastructure and depend on it are located.

The UK – as home to multiple financial infrastructures which are systemic outside the UK, including some of the world's largest clearing houses – takes these responsibilities very seriously. And we have recently enshrined in law our commitment to consider the effects of UK standards on the financial stability of countries where our clearing houses provide services[1].

A necessary foundation for such openness in the financial system more broadly is robust global standards and trust. I think we have made huge steps forward on this front since the global financial crisis. The standards and expectations are stronger, and the co-operation is real and deep-seated.

At the heart of this is the global Financial Stability Board, and the so-called standard setting bodies, the Basel Committee for banks, CPMI and IOSCO for payments, infrastructure, securities and investment markets, and the IAIS for insurance. Our two central banks, in Ireland and the UK, work very closely together in these bodies.

The consequence of all this activity is much stronger standards, and in my view an overwhelming case for rejecting the false allure of fragmentation.

So far, I have focused on the big parts of the financial system which rather obviously give rise to risks to financial stability by virtue of their scale and prominence, the obvious things if you like. But I'm afraid that experience demonstrates that such risks to financial stability can arise in less prominent places too.

Let me give a recent example from the UK, the so-called LDI pensions issue of just over a year ago. There was a serious threat to stability caused by the need of these leveraged funds to meet margin requirements and collateral calls. The cause of these requirements was not the level of interest rates, but rather the volatility and speed at which market rates moved upwards, overwhelming the ability of many LDI funds to the meet the higher requirements. This created a particular financial stability threat, which at the Bank of England we dealt with via a market intervention.

It has, of course, caused us to look at the regulatory standards in this area, and recommend substantially greater resilience, which is now in place.

The point I want to draw out today is that responsibility for oversight of these funds rested both in the UK where they operated and in some EU countries, including Ireland, where they are typically domiciled. I want to thank the Central Bank of Ireland for the excellent assistance they have provided in tackling these issues.

Our strong working relationship has paid off. The work we are doing is no doubt important. Three current priorities for both of us illustrate this well. First, we are both putting in place stronger resilience standards for LDI funds.

Second, we agree on, and both emphasise, the pressing need for action to implement the Financial Stability Board's recommendations for enhancing the resilience of money market funds. And third, we are both committed to the review and, I believe, upgrade of the standards for managing risks in open-ended funds, where Sharon Donnery is co-leading the global work.

I take three very important lessons from all of this. First, strong co-operation and co-ordination is a much better approach than fragmentation. There is no reason to be restrictive when a much better alternative exists.

Second, I sometimes hear an argument made that the fallacy of this first conclusion is that no-one can credibly commit with certainty to this standard of co-operation at all times in the future. I reject this proposition.

Let's go back to the global public good of financial stability for a moment. The stakes are simply too high to throw away financial stability, and the global institutional structures now create the necessary commitment.

The third argument is part of the co-operation and commitment point, but sufficiently important to draw out separately. I am going to be direct here – I usually am. It is said that there is an over-dependence on the UK as an international financial centre. The over-dependence argument leads, wrongly in my view, to a belief that the dependency needs to be reduced. As I have already said, the responsibilities that go with a global public good argument point firmly against the logic of this point.

But, as the LDI case illustrates, there is a further argument against over-dependence, namely that it's a two-way street. The dependencies go many ways, and thus the incentives to co-ordinate and co-operate are much larger. In this world, fragmentation would be positively dangerous.

Underpinning the extensive co-operation and co-ordination are international regulatory standards. They provide a core of assurance to support open financial systems. To be honest, some areas are ahead of others. The Basel Committee has made most progress, though it is essential that we see a consistent implementation of the so-called Basel 3.1 package.

We have more to do in the various parts of the non-bank world, and the Financial Stability Board is very much on the case.

But this does not mean that in all jurisdictions the rules must be exactly the same. We are most interested in the outcomes. There will be differences to fit local markets, and again when that is done in a transparent and well understood way, it is sensible and fine.

All of that fits within a framework of public policy where the basic objective of financial stability is common, and there should be effective frameworks established through international regulatory standards underpinned by trust and co-operation.

To conclude, we must be alert to the pressure for fragmentation, both in the global economy and financial system. The costs that go with such fragmentation are real and undesirable. The better approach is strong articulation of a common public policy objective in terms of financial stability, accompanied by effective co-ordination and co-operation. These are not impossible ideals – we have real evidence of the system working. ■

Andrew Bailey is the Governor of the Bank of England

Endnote
1. Sasha Mills speech at the ISDA Derivatives and Trading Forum, 7 November 2023.

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Financial stability in uncertain times

The recent macroeconomic experience has presented both monetary policy and financial stability challenges for central banks. Michelle Bowman discusses how central banks can these vulnerabilities

It's a pleasure to discuss the role of central banks and financial regulators in effectively promoting a stable and resilient global financial system. I will discuss some of the financial system vulnerabilities and risks that I see as most salient. These risks and vulnerabilities are top of my mind but are by no means exhaustive of those monitored by the Federal Reserve[1].

I will then offer some thoughts on how the Federal Reserve, and other financial regulators and central banks, may be able to address and mitigate these financial system vulnerabilities and risks so that monetary policymakers are able to continue to pursue their monetary policy mandates.

The recent macroeconomic experience has presented both monetary policy and financial stability challenges for central banks. In many economies during the pandemic, supply chain disruptions coupled with strong demand as economies emerged from pandemic restrictions acted as catalysts pushing inflation up to very high levels.

Aggregate demand was also supported by accommodative monetary and fiscal policies, which served to bolster the balance sheets of households, businesses, and local governments; increased excess savings; and contributed to very tight labour markets.

Many central banks facing these dynamics have tightened monetary policy in an effort to bring demand and supply into better balance and to bring inflation back down to their targets. In the United States, over the past year and a half, the Federal Open Market Committee (FOMC) has increased the federal funds target range by 5-1/4 percent and has been reducing the Federal Reserve's securities holdings, which had increased substantially during the pandemic period.

We have seen some progress on lowering inflation over that time. However, inflation remains well above the FOMC's 2 percent target. Domestic spending has continued at a strong pace, and the labour market remains tight. This suggests that the policy rate may need to rise further and stay restrictive for some time to return inflation to the FOMC's goal.

Regulatory reform can pose significant financial stability risks, particularly if those changes to regulation fail to take sufficient account of the incentive effects and potential consequences

As they have confronted price stability challenges, central banks have also faced new financial stability risks, with some related to the sizable moves in interest rates in an environment with persistent, elevated inflation.

The recent experience has also highlighted how geopolitical tensions can pose financial stability risks, for example, through greater financial market volatility or, more indirectly, through their possible effects on economic activity and inflation.

Financial system vulnerabilities and risks

Like many other central banks, the Federal Reserve continually monitors for a wide range of emerging risks and vulnerabilities in the financial system. It is critical to acknowledge that we need to be responsive to changing conditions in our assessment of and response to financial stability risks.

As a case in point, in recent years, it seemed that many underappreciated interest rate risk and yet, it was poor management of this risk that created significant disruptions in the financial system this spring. With that in mind, I will discuss in more detail the financial stability risks and vulnerabilities on which I am currently most focused.

Banking sector

Starting with the banking sector, the events of earlier this year have underscored the strength and resilience of the overall US banking system. The vast majority of US banks are adequately managing their interest rate and credit risk and maintaining prudent capital and liquidity positions.

While the banking sector is expected to experience higher funding costs and some deposit outflows as a result of tighter monetary policy and higher interest rates, these outcomes can create vulnerabilities for some banks.

Banks relying on more expensive deposits and that also have large holdings of long-term assets like longer-dated loans or securities with low, fixed rates will likely continue to experience a drag on earnings, especially if interest rates stay higher for longer. Should a bank be forced to sell long-term assets, the realized losses can negatively impact regulatory capital.

A rising interest rate environment may also erode the credit quality of bank loan portfolios should economic activity and incomes soften, posing an additional source of risk to bank earnings and capital. It is important to monitor these evolving risks, and if necessary, take action to minimize the possible spillover effects on the wider banking and financial system.

In the United States, the Federal Reserve's recent stress test of the largest banks' capital positions featured a scenario with extreme declines in asset valuations and a steep rise in unemployment. All banks subject to this test passed[2].

In March of this year, we saw a run on the deposits of Silicon Valley Bank and other related banking sector stresses which highlighted banking system vulnerability to an erosion of confidence. This erosion of confidence—even when it starts at a single institution with its own unique and isolated issues—can pose risks to a larger set of institutions based on, among other things, similarities in size, business model, or customer base.

As we have seen in the past, an erosion of confidence can lead to sudden large deposit outflows. Today, social media and technology can accelerate the spread of fear among depositors and bank investors, exacerbating contagion risk.

Commercial real estate

Another concern relates to the potential decline in commercial real estate (CRE) property values and a resulting degradation of CRE loan quality in certain markets. Low return-to-office rates and a current trend toward businesses opting to reduce office footprints may lead to higher vacancy rates, which may put downward pressure on property values, especially in certain localities and sectors, including city centres and retail properties.

Should the economy slow considerably, CRE loan quality could deteriorate as interest rates stay high or property values soften. Since 2008, underwriting standards and loan-to-value ratios on most US CRE loans have become much more conservative.

However, there is still a risk that a decline in property values, reduced rental income cash flows, or other shocks could impair CRE portfolios, especially if those loans mature and are refinanced at higher interest rates.

While many banks are well-positioned to work with their borrowers to restructure loans or to mitigate risks of related losses, some banks with large undiversified and geographically concentrated CRE portfolios may be at greater risk.

I am also monitoring the potential financial stability implications of nonperforming CRE loans that are packaged as part of commercial mortgage-backed securities (CMBS).

It is much more difficult to restructure a nonperforming loan that is part of a CMBS pool when compared with nonperforming loans held directly by the lender. Pooled CMBS investments are often held in significant volumes or in concentrated shares by institutions that include large insurance companies and pension plans.

Were these institutions to suffer significant losses on their CMBS holdings, there could be broader effects on the securitization pipeline for CMBS and on the CRE market.

Nonbank financial institutions

I am also closely watching other financial stability vulnerabilities posed by large nonbank financial institutions. Hedge fund leverage remains elevated and prime money market funds, insurance companies, and some corporate bond mutual funds remain vulnerable to run risks.

In addition to this risk, it is also important to monitor the interest rate and funding vulnerabilities of these entities in the current macroeconomic and interest rate environment.

These are not novel vulnerabilities, however, as the nonbank financial institution sector continues to expand, monitoring these risks has become especially important.

US Treasury markets

US Treasury market stress events—including the repo-market stress in September 2019 and the March 2020 dash for cash—have raised concerns about the resiliency of US Treasury markets. Last year's government securities market stress in the United Kingdom also highlighted how disruptions in the functioning of these markets can disrupt central bank plans including the path of balance sheet reduction, even if temporarily.

Indicators of US Treasury market liquidity have remained stable, and Treasury markets have continued to function, but risks remain[3]. It will be important to watch for signs of impaired Treasury market functioning, especially as the Federal Reserve continues to reduce its holdings of Treasury securities and Treasury auction volumes expand to meet issuance needs.

Designing and calibrating policies to promote financial stability

As a general principle, central banks and other regulatory authorities may choose to proactively use supervisory and regulatory tools to mitigate financial stability risks and vulnerabilities. Should financial stability risks be realized, it may become necessary to implement central bank and other targeted emergency liquidity or lending facilities.

A central bank's implementation of monetary policy may influence the financial stability risks that are most salient. In many jurisdictions, including the United States, financial stability tools separate and distinct from monetary policy tools may be most effective to mitigate and address financial stability risks. The separation of these tools can allow monetary policy decision-making to remain focused on achieving central bank monetary policy goals[4].

That said, not all of the financial stability risks and vulnerabilities that I have highlighted require policy changes. In fact, it is possible that an overreaction in adjusting policies in light of recent stresses could worsen conditions rather than ameliorate them.

Balance of bank supervision and regulation

As we learned from the recent US bank failures, responsive, efficient, and effective bank supervision is a strong mitigant for financial system risks and vulnerabilities. The failures revealed that shortcomings in bank supervision can heighten financial stability risks.

The primary focus of supervision should be to address a bank's critical shortcomings in a timely way[5]. To effectively support financial stability, bank supervision cannot simply rely on pinpointing compliance issues, failed processes, or rule violations.

It must go further to examine a bank's risk exposures while prioritizing core safety and soundness issues in the context of the bank's financial condition.

If the supervisory process fails to identify and escalate critical risks, or to hold management accountable for known deficiencies, such as excess interest rate risk-taking, this raises the potential for supervisory shortcomings, including the ability to anticipate how the evolving macro-financial landscape can affect a bank's condition.

As the regulatory framework becomes more complex, we must ensure that supervisors and examiners are adequately equipped to implement and maintain the highest quality of supervision. Even as we focus on improvements to the bank regulatory framework, we should also ensure that supervision includes bank management and their boards of directors.

As changes are made to supervisory activities, these changes should be open and transparent, and should be implemented with an appropriate consideration of the trade-offs and unintended consequences. No regulatory or supervisory framework can be effective without accountability.

Regulatory capital requirements, no matter how conservatively calibrated they may be, are simply no substitute for sound risk management and strong, effective, efficient, and transparent supervision. The vast majority of improvements to supervisory functions could be accomplished without broad changes to the regulatory framework.

While some changes to the regulatory framework may be appropriate to promote financial stability, we should be careful to ensure that changes do not harm the long-term viability of banks, especially midsized and smaller banks.

In my view, regulatory reform can pose significant financial stability risks, particularly if those changes to regulation fail to take sufficient account of the incentive effects and potential consequences. Regulatory actions also have the capacity to depress economic activity through the reduced availability of credit or by limiting the availability of financial products or services.

These concerns are most acute when the reforms themselves may be inefficient or poorly targeted. For example, policymakers should carefully consider whether the contemplated significant increases in capital requirements in the United States related to the finalization of Basel III capital standards meet this standard for being efficient and appropriately targeted.

Regulatory approaches in the banking sector must also allow for innovation. Inhibiting innovation in the banking sector could push growth of certain products and services further into the nonbank sector, leading to much less transparency and potentially greater financial stability risk.

A comprehensive regulatory approach must include enforcing existing regulation through effective supervision, expanding the regulatory perimeter, and addressing regulatory gaps.

Nonbank financial institution supervision and regulation

A key component of fostering financial stability is to ensure that every institution that engages in similar financial activities with similar risks is treated similarly under supervisory and regulatory authorities.

Many nonbank financial institutions and products are subject to differing degrees of regulation, oversight, and monitoring. While it is important that the banking system is well-regulated and supervised, it is equally important that this is the case for other types of financial institutions, products, or services.

Developing effective frameworks for regulating and supervising common financial markets and products is important for ensuring the protection of consumers and for the stability of the financial system. The Federal Reserve appreciates the work that the Financial Stability Board (FSB) has undertaken in this area and the strong support Governor Klaas Knot has provided in his role as chair of the FSB.

With respect to Treasury market functioning, it is also important that the US continues to carefully consider proposals that could support Treasury market resilience and reduce the likelihood that the Federal Reserve would need to step in to restore market functioning during stressed conditions.

For example, in the US the largest banks are subject to a leverage ratio and global systemically important bank (G-SIB) surcharge that are set much higher than the international standard. These higher levels need to be reconsidered to ensure that dealers have adequate balance sheet capacity to intermediate Treasury markets in times of stress. Likewise, increasing data transparency on market pricing and flow should also be considered to encourage intermediary entry and competition[6].

Central bank liquidity provision and lending facilities

Should financial stability risks materialize, central banks must be prepared to provide targeted liquidity to financial institutions during times of stress to restore market functioning and financial stability.

The use of these lending programs during the pandemic demonstrated their effectiveness in serving as backstops to support market functioning and the flow of credit in times of stress[7]. When appropriately calibrated, these programs can help promote market functioning but limit the Federal Reserve's overall footprint in financial markets in the longer term.

It is also important to clearly distinguish any temporary central bank asset purchase programs to promote core financial market functioning from monetary policy actions[8].

In the banking system, it is also important that tools to support bank liquidity and payments—including discount window operations and Fedwire® within the Federal Reserve—are available for extended operating hours and are prepared to provide support during times of stress.

We should also consider what further steps are needed to ensure that banks have access to liquidity support. In addition, we should encourage, but not mandate, the exercise of contingency funding plans and testing capabilities, requiring bank management to ensure adequate plans are in place.

In the Treasury markets, the Federal Reserve should ensure that tools like the standing repurchase agreement (repo) facility are available to serve as backstops in money markets to support the effective implementation of monetary policy and smooth market functioning.

Well-calibrated international swap lines and repo facilities can also be helpful in promoting both Treasury market and dollar market functioning. Of course, all central bank lending tools should serve as temporary backstops.

Central banks and other agencies should ensure that regulations and market oversight foster prudent financial institution behaviour and resiliency in core financial markets.

Doing so can increase the ability of private markets and institutions to function during times of stress and reduce the likelihood of future market interventions by the central bank.

Conclusion

Many central banks are facing challenging and uncertain times as they strive to restore price stability and promote financial stability. A stable and resilient financial system is essential for the effective transmission of monetary policy and for a healthy economy.

Healthy economies foster financial stability and financial stability fosters healthy economies. It is essential that central banks facing high inflation bring inflation back to target.

A failure to do so would only lead to greater financial stability risks through less certain and unstable economic conditions and through reduced central bank credibility.

It is, therefore, necessary that central banks, in collaboration with other financial regulators as appropriate, develop and use supervisory and prudential regulatory tools to promote financial stability.

Effective supervision and regulation, in turn, will support the effective conduct of monetary policy in achieving central banks' macroeconomic objectives.

As these issues transcend national borders, central banks and regulatory authorities must also aim to build an international perspective that is complementary to or informed by global collaboration. This perspective has never been more important. ■

Michelle W Bowman is a Member of the Board of Governors of the Federal Reserve System

Endnotes

1. See, for example, Board of Governors of the Federal Reserve System, Financial Stability Report (Washington: Board of Governors, May 2023).

2. See Board of Governors of the Federal Reserve System, Dodd-Frank Act Stress Tests 2023.

3. For example, dealer balance sheet capacity may become strained, especially in times of volatile financial markets, limiting market funding in Treasury markets. See, for example, Darrell Duffie, Michael J. Fleming, Frank M Keane, Claire Nelson, Or Shachar, and Peter Van Tassel, "Dealer Capacity and U.S. Treasury Market Functionality," Staff Report 1070 (New York: Federal Reserve Bank of New York, August 2023).

4. Of course, should a financial stability risk event affect the economy or the economic outlook, for example, through a slowdown in economic activity, monetary policymakers might take this into account when determining appropriate monetary policy.

5. This timeless principle was recently discussed in the current context by Tobias Adrian, Marina Moretti, Ana Carvalho, Hee Kyong Chon, Katharine Seal, Fabiana Melo, and Jay Surti, "Good Supervision: Lessons from the Field (PDF)," Working Paper 23/181 (Washington: International Monetary Fund, September 2023).

6. See, for example, Inter-Agency Working Group for Treasury Market Surveillance (IAWG), Enhancing the Resilience of the U.S. Treasury Market: 2022 Staff Progress Report (PDF) (Washington: U.S. Department of the Treasury, November 10, 2022); as well as, Darrell Duffie, "Resilience Redux in the U.S. Treasury Market (PDF)" (Federal Reserve Bank of Kansas City, Jackson Hole Symposium Paper, August 13, 2023).

7. For details on these programs, see "Funding, Credit, Liquidity, and Loan Facilities," Board of Governors of the Federal Reserve System, last modified July 7, 2023.

8. See Michelle W Bowman, "Panel on 'Design Issues for Central Bank Facilities in the Future'" (speech at the Chicago Booth Initiative on Global Markets Workshop on Market Dysfunction, Chicago, Illinois, March 3, 2023).

These remarks represent my own views, which do not necessarily represent those of the Federal Reserve Board or the Federal Open Market Committee. This article is based on a speech delivered at the Reinventing Bretton Woods Committee and Policy Center for the New South Marrakech Economic Festival, Marrakech, Morocco, 11 October 2023.

Artificial intelligence and financial stability

The use of artificial intelligence is accelerating. Jon Danielsson argues that although AI will bring considerable benefits, it also raises new challenges and can even destabilise the financial system

The financial authorities are rapidly expanding their use of artificial intelligence (AI) in financial regulation. They have no choice. Competitive pressures drive the rapid private sector expansion of AI, and the authorities must keep up if they are to remain effective. The impact will mostly be positive. AI promises considerable benefits, such as the more efficient delivery of financial services at a lower cost. The authorities will be able to do their job better with less staff (Danielsson 2023).

Yet there are risks, particularly for financial stability (Danielsson and Uthemann 2023). The reason is that AI relies far more than humans on large amounts of data to learn from. It needs immutable objectives to follow and finds understanding strategic interactions and unknown unknowns difficult.

The criteria for evaluating the use of AI in financial regulations
We propose six questions to ask when evaluating the use of AI for regulatory purposes:

1. Does the AI engine have enough data?

2. Are the rules immutable?

3. Can we give AI clear objectives?

4. Does the authority the AI works for make decisions on its own?

5. Can we attribute responsibility for misbehaviour and mistakes?

6. Are the consequences of mistakes catastrophic?

Table 1 shows how the various objectives of regulation are affected by these criteria.

Conceptual challenges

Financial crises are extremely costly. The most serious ones, classified as systemic, cost trillions of dollars. We will do everything possible to prevent them and lessen their impact if they occur, yet this is not a simple task.

The rapid growth of AI raises significant challenges for the financial authorities. Some public sector use of AI will be very beneficial. It will improve the efficiency of most routine operations, lower costs and provide a better service to society

Table 1. Particular regulatory tasks and AI consequences

Task	Data	Mutability	Objectives	Authority	Responsibility	Consequences
Fraud/Compliance Consumer protection	Ample	Very low	Clear	Single	Mostly clear	Small
Micro risk managment Routine forecasting	Ample	Very low	Mostly clear	Single	Clear	Moderate
Criminality Terrorism	Limited	Very low	Mostly clear	Multiple	Moderate	Moderate
Nation state attacks	Limited	Full	Complex	Multiple	Moderate	Very severe
Resolution of small bank failure	Limited	Partial	Clear	Mostly single	Mostly clear	Moderate
Resolution of large bank failure Severe market turmoil	Rare	Full	Complex	Multiple	Often clear	Severe
Management of global systemic crises	Very rare or not available	Full	Complex & conflicting	Multiple & international	Unclear even ex-post	Very severe

Source: Danielsson and Uthemann (2023).

Four conceptual challenges impede efforts to ensure financial stability. While frustrating human regulators, they are particularly difficult for AI to deal with.

The first conceptual challenge is data. This may seem counterintuitive because, after all, the financial system generates nearly unlimited amounts of data for AI to learn from.

However, financial data are frequently measured inconsistently, if not incorrectly. The data required for effective regulations are collected within authority silos where data sharing is limited, particularly across national boundaries.

These limitations are likely to limit and even bias the automatic learning AI requires. Some data are scarce. Laeven and Valencia's (2018) database finds that the typical OECD country only suffers a systemic financial crisis once in 43 years.

Moreover, we usually don't know what data are relevant until after the stress event occurs. All of this meanas that AI is at the risk of inferring an incorrect causal structure of the system.

The second challenge stems from the most serious crises that are brought about by unknown unknown events. Although all crises arise from a handful of well-understood fundamental drivers – leverage, self-preservation and complexity – the details of each are very different.

This means that crises, especially the most serious ones, are unknown unknown events and are therefore both rare and unique. Because the financial system is almost infinitely complex, the supervisors can only patrol a small portion of it.

They are likely to miss areas where the next vulnerability might emerge, although someone intent on criminal or terrorist gain might actively search for and find it.

Whereas humans have conceptual frameworks for working with infrequent, unique and unknown unknown events in a sparsely patrolled system, AI is less able to do so.

The third conceptual challenge relates to how the financial system reacts to control. Every time an authority makes a rule or a decision, the private sector reacts, not merely to comply but to maintain profitability while complying. That gives rise to a complex interaction between the authorities and the private sector, making the monitoring of risk and controlling financial stability challenging.

The classification in Danielsson *et al* (2009) of risk as either exogenous or endogenous is useful for understanding the practical consequences of the resulting feedback. Exogenous risk is based on the drivers of risk emerging from outside the financial system. Endogenous risk acknowledges that the interaction of economic agents not only causes outcomes but also modifies the structure of the financial system.

Almost every current framework for measuring financial stability risk assumes that the risk is exogenous, whereas it is virtually always endogenous. AI can be particularly misled by exogenous risk because it so strongly depends on data.

The last conceptual problem stems from how AI depends on fixed, immutable objectives. AI has to be told what to aim for. When resolving the most severe financial crises, we just don't know the objectives beforehand, except at the most abstract level, such as preventing severe dysfunction in key financial markets and especially the failure of systemically important institution. If we knew the objectives, we would have the right laws and regulations in place, but then the crisis probably would not have happened.

Although the lack of objectives creates difficulties for human decision makers, they have a way of dealing with that – distributed decision making – which is not available to AI. Reinforcement learning might not be of much help as the problem is so complex and events rare and unique, leaving little to learn from.

Distributed decision making

The way we resolve the most serious crises is by a distributed decision-making process where all stakeholders – authorities, judiciary, private sector and political leadership – come together to make the necessary decisions. Since the objectives are only known at a high abstract level, the stakeholders do not know beforehand what the practical objectives of the process are.

Instead, they only emerge during the resolution process, and depend critically on information and interests that only emerge during it. This vital information is often implicit, putting AI at a disadvantage because it does not have an intuitive understanding of other stakeholders' ideas and knowledge.

It is neither democratically acceptable nor prudent from a decision-making point of view to allow AI to decide on resolving crises.

Because financial crises are costly, we will go to any lengths to resolve them. The law may be changed in an emergency parliament session as Switzerland when resolving Credit Suisse. We may even suspend the law, as noted by Pistor (2013).

Rules, regulations, and the law become subordinate to the overarching purpose of crisis containment. But neither the central bank nor other financial authorities have a mandate to change or suspend the law. Only the political leadership does.

Furthermore, the resolution of a crisis will probably imply a significant redistribution of wealth. Both require democratic legitimacy, which AI does not have.

Private sector AI

Financial markets have strong complementarities that can be socially undesirable in times of stress, such as bank runs, fire sales and the hoarding of liquidity. The rapid expansion of private AI makes such outcomes more likely because, although AI is much better than humans at finding optimal solutions, it is less likely to know if they are acceptable or not.

The rapidly growing outsourcing of quantitative analysis to a small number of AI cloud vendors – Risk Management as a Service (RMaaS) as in Blackrock's Aladdin – is further destabilising because it works to harmonise belief and action, driving procyclicality and increasing systemic risk.

Because AI will be so good at finding locally optimal solutions, it facilitates the efforts of those intent on criminal gain or terrorist damage. The authorities' AI systems will be at a disadvantage because they have to find all vulnerabilities, whereas those intent on exploitation or damage only need to find one tiny area in which to operate. It is difficult in an infinitely complex financial system to prevent such undesirable behaviour.

The public response

The authorities need to respond to the growing price sector use of AI. A policy of not using AI for high-level decisions will probably be undermined by the stealthy adoption of AI, as there may be no feasible alternatives to it. We already use AI for many low-level tasks (Moufakkir 2023). And as we come to trust and depend on it, we will expand its use to more important domains.

Along the way, there may be little difference between AI making decisions and AI providing crucial advice. Perhaps, in a severe liquidity crisis, AI could bring together all the disparate data sources and identify all the various connections between the market participants necessary to provide the best advice for the leadership.

That is especially relevant if AI's internal representation of the financial system is not intelligible to the human operators. What alternatives do we have to accepting the advice given if it comes from the entity doing all the monitoring and analysis?

Even if AI is explicitly prevented from making important decisions, it is likely to become highly influential by stealth because of how it affects advice given to senior decision makers, especially in times of heightened stress.

The authorities already find it difficult to prove misbehaviour when humans make decisions. That will be amplified when private sector AI makes decisions. Who will be to blame? The human manager or the AI?

When the authorities confront a private firm and it responds, 'The AI did it, I had no idea, don't blame me', it creates yet another level of deniability. That facilitates the efforts of those intent on exploiting the system for private gain, legally or otherwise.

Who is accountable when AI makes decisions, and how can a regulated entity challenge them? The AI regulator may not be able to explain its reasoning or why it thinks it complies with laws and regulations. The supervisory AI will need to be overseen – regulated – differently than human supervisors.

Conclusion

The rapid growth of AI raises significant challenges for the financial authorities. Some public sector use of AI will be very beneficial. It will improve the efficiency of most routine operations, lower costs and provide a better service to society.

AI also threatens the financial system's stability and facilitates the efforts of those intending to exploit it for criminal or terrorist purposes.

But even then, we cannot do without AI. Given the financial system's complexity, it will probably provide essential advice to senior policymakers.

The authorities will have to respond, whether or not they want to, if they intend to remain relevant. ■

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Cyber risks and operational resilience: getting prepared

Elisabeth Stheeman discusses how the threat of cyber-attacks has become an increasingly important consideration for maintaining financial stability in the UK, describing how the FPC is working to improve the financial system's resilience to cyber risks

Introduction

The Financial Policy Committee is responsible for identifying, monitoring, and taking action to remove or reduce systemic risks with a view to protecting and enhancing the resilience of the UK financial system[1]. Often we, as a committee, think about this in terms of financial risks and tests of financial resilience. Happily, the UK financial system has passed a number of tests to its resilience in recent years.

In early 2020, the COVID-19 pandemic and the so-called 'dash for cash' liquidity shock disrupted the functioning of a range of important markets and required central banks—including the Bank of England—to step in on a large scale, returning order to financial markets.

Then just over a year ago, in response to rapid sales of UK government bonds by liability-driven investment (LDI) funds, the Bank of England undertook a temporary and targeted programme of purchases to restore market functioning.

Earlier this year, some parts of the overseas banking sector came under stress following the failure of three US banks and Credit Suisse. The UK financial system was able to absorb rather than amplify these shocks and continue to provide services to households and businesses.

We won't always be able to predict events like these that test the system. But we routinely do our own stress tests of the financial system to make sure it is prepared to withstand the macroeconomic shocks that events like these might trigger, and which might then disrupt the provision of financial services.

In July of this year, we published the results of our 2022/23 annual cyclical scenario—or, ACS—which showed that, faced with a set of severe economic conditions, the major UK banks would be financially resilient, and would be able to continue to lend to households and businesses. In addition to the ACS, we have worked with major banks and insurance companies to explore their exposures to climate-related financial risks.

Resilience to operational risk now not only includes business continuity and disaster recovery, but the ability of firms and the financial sector to be able to continue to supply vital financial services through disruption, and periods of elevated activity

Finally, we recently launched our first system-wide exploratory scenario exercise (SWES) to improve our understanding of the behaviours of banks and non-bank financial institutions in stressed financial market conditions.

The FPC's job of protecting and enhancing financial stability involves looking for and monitoring risks that could disrupt the supply of vital financial services to UK households and businesses, and aiming to ensure the UK financial system has sufficient resilience to be able to maintain the provision of vital services. This means that as well as looking at financial risks, we also focus on risks that could lead to systemic operational disruption.

The focus of this speech is operational risk; the type of risk that affects systems and processes. Operational risk can be broken down into natural and man-made hazards. Examples of natural hazards are characterised in the Government's National Risk Register as 'non-malicious risks' such as fire, floods, severe weather and pandemic[2].

Man-made threats, or 'malicious risks', could be physical and cyber-attacks, IT system outages and third-party supplier failure. This can come from human errors and management failures, and from external events and external actors.

Good operational risk management helps a company to detect and prevent risks that could lead to operational disruption, and so will reduce the number of instances in which disruption will occur. In 2021 the Prudential Regulation Authority (PRA) set out its expectations for the operational resilience of firms' important business services, noting that disruptions can affect firms' safety and soundness, undermine policyholder protection, and, in some cases, affect UK financial stability[3].

Indeed, as financial firms have become more digitised and interconnected at an operational level, the associated risks have become greater threats to the wider financial system. If business operations are disrupted at a system-wide level, there might be consequences for financial stability, and so the focus of work to improve operational resilience has broadened.

Resilience to operational risk now not only includes business continuity and disaster recovery, but the ability of firms and the financial sector to be able to continue to supply vital financial services through disruption, and periods of elevated activity.

Cyber risks

Since the inception of the FPC in 2013, the risk from cyber-attacks has been high on the committee's agenda[4]. It is the most prominent operational risk the FPC has been monitoring.

Cyber risks have also been at the forefront of UK businesses' minds. The Bank of England carries out a *Systemic Risk Survey* to get a sense of what worries UK banks and other financial institutions. Cyber risk is frequently cited as a key source of risk to UK financial stability.

The risk of a cyber-attack is the most cited risk in the latest survey for the second half of 2023, with 80% of firms mentioning it. This is the highest proportion of respondents citing cyber risk ever recorded in the survey[5]. Earlier this year, geopolitical risks were at the top of the list, but three-quarters of firms still worried about a cyber-attack[6].

These issues are not unrelated; the National Cyber Security Centre, or NCSC, has noted Russia's use of cyber capabilities to maximise its operational impact in Ukraine, calling this the most significant development in the cyber security threat internationally. The NCSC has also said that China's technical development and evolution is likely to be the single biggest factor affecting the UK's cyber security in the years to come[7].

Ransomware remains one of the most acute cyber-related threats faced by UK businesses, but less sophisticated cybercrime also remains a challenge[8].

Left unchecked, a cyber-attack could impact financial stability directly if it leads to a material disruption of the provision of vital services by financial institutions, markets and financial market infrastructure. I like to call the infrastructure that provides vital services, 'the plumbing'.

It is largely invisible to us until it no longer works, and in the 2008 financial crisis it was only when the pipes of global finance were under threat and financial stability at risk that market participants, policymakers, and the public realised how vital it was, and to never take it for granted[9].

A cyber-attack could also impact financial stability indirectly if there is financial contagion through liquidity stress, financial losses, and significant price moves that could disrupt market functioning, or through a loss of confidence in financial institutions or payment systems.

This is why the Bank—alongside HM Treasury, and the Financial Conduct Authority, or FCA—has been working to improve and test the financial system's operational resilience to cyber-attacks.

The Bank and PRA already use a range of tools to assess the cyber resilience of individual firms' important business services. The 'CBEST' tests the ability of firms and financial market infrastructures to prevent and detect cyber-attacks. Cyber stress testing looks at individual firm responses to an attack.

The Bank also works collectively with industry through the cross-market operational resilience group to build collective resilience to cyber and other risks. This includes 'SIMEX' and the wider sector exercise programme for collective response and recovery capabilities.

The FPC has set out the elements of the framework of regulation to strengthen the resilience of the UK financial system as a whole to cyber risk[10]. One is that there needs to be clear baseline expectations for firms' resilience that reflect the importance of their services to the financial system.

Another is that there should be regular testing by firms and supervisors to ensure that resilience keeps pace with the evolving nature of the risk.

For its baseline expectation, the FPC has expressed a tolerance for how quickly financial companies must be able to complete critical payments following a severe but plausible cyber incident. Cyber stress testing has been used to test firms' ability to meet this expectation.

From our perspective, this is an important component of the 'resilience' I have been talking about. Resilience in this context means both the ability to withstand cyber incidents, and the ability to restore functioning after one.

Last year, the FPC ran a cyber stress test to better understand the ability of firms to restore vital financial services after a hypothetical cyber incident. I'll now talk in more detail about this stress test and how it has helped us do our job.

2022 cyber stress test

The 2022 cyber stress test focused on disruption to retail payments—a critical function of the financial system, particularly in view of trend away from cash payments in recent years. In 2007, just over 60% of all payments were made in cash. Accelerated by payment trends during the Covid pandemic, this figure dropped to 14% in 2022, with a majority of payments being made by debit card and credit card[11].

The cyber stress test was based on a hypothetical incident whereby a threat actor, aided by a malicious insider, sought to redirect payments by amending payee data concurrently at two distinct firms. The hypothetical attack was detected and confirmed out of business hours. The test assumed that data integrity was compromised and that disruption to retail payments had occurred, affecting everyday transactions made by households and businesses.

There were two main objectives to running the test. First, to explore firms' ability to quickly identify the nature of the disruption they faced following the attack. Second, to gather evidence on the potential impacts to financial stability in cases where firms were not able to restore vital financial services quickly enough to prevent disruption that would cause material economic harm.

As I mentioned earlier, the FPC expressed baseline expectations for the ability of firms to restore services before there are material economic impacts. This is called its 'impact tolerance'. An impact tolerance is sometimes described as the maximum tolerable level of disruption to an important business service[12].

For the FPC and our objectives, this is the point at which UK financial stability is affected. The impact tolerance was established such that the financial system should be able to make critical payments on the date they are due, or the 'value date'[13].

This was a voluntary, exploratory test. A number of systemic firms and financial market infrastructures were invited to participate, reflecting that their contribution to the operation of the UK financial system's vital functions was significant. But smaller firms were also invited, to help us explore the channels through which disruption might become larger.

Firms were expected to report back on whether they could continue to make critical payments on the date they were due. This was not a formal pass-fail assessment, but participating firms were expected to share their findings and any remedial plans with supervisors.

Key lessons

There were a number of lessons from this test, including the need to consider contingencies, prepare suitable mitigating actions, co-ordinate with other firms and financial market infrastructures, and communicate throughout the incident. Let me say a bit more about each one of these[14].

It is important for firms to explore what contingencies are already available to them and consider how different contingencies could work together in an incident. In the case of our hypothetical scenario, this meant considering the options that firms have to reroute payments via alternative systems. The availability of clean data to use to reconcile and reroute payments is a pre-requisite for this.

Therefore, it is important for firms to develop and test suitable tools and/or scripts to help automate data reconciliation in advance of an incident. Planning and investment to ensure this could be done at scale and in an automated fashion to make it an effective contingency is also important.

We also urged firms to identify and prioritise critical payments that are the most important for managing the impact on financial stability. More generally, appropriate planning, preparation, and testing will further strengthen individual firm capabilities and support the industry's ability to respond and recover. All of these efforts could help to lessen the impact of an incident.

Where contingencies might fall short, we noted that preparing suitable mitigating actions could also limit the risk of an incident causing financial instability if they were to help minimise confusion for consumers and maintain public confidence in the financial system.

This could be achieved by making emergency cash available or extending overdrafts in the case of retail payments, so that despite payments not being made, customers can continue to pay for essential services.

Another lesson was that timely and co-ordinated decision-making and action across the industry is critical in limiting the impact of an incident. Firms should make decisions taking into account the potential consequences of their actions on others and understand the actions that others might take to contain the risk of contagion.

This is particularly relevant where firms provide services to one another, for example the financial market infrastructure I mentioned before. To support this, it is essential that response actions, including any potential rerouting of payments via alternative payment systems, and public communications, are co-ordinated effectively across the industry.

The existing Sector Response Framework (developed by the sector's Cross Market Operational Resilience Group, CMORG) plays an important role in this co-ordination. This framework sets out how organisations across the sector and government are connected.

It also explains how they may respond to incidents individually and together when the impacts of an incident become broader than a single firm or financial market infrastructure, and require a degree of coordination, information sharing or collective action.

There should be consistent, effective, and timely communications throughout an incident. We know that communications are an important tool for maintaining public confidence in the financial system in times of extreme stress, because they can reduce the potential for contagion.

Firms should communicate with a wide range of stakeholders, for example, customers, the public, regulators, the media, and other participants in the payments system. This should occur across a number of channels, including via the Sector Response Framework, social media channels, and traditional media.

These lessons underscore the need for firms to prepare for a potential cyber incident. Where data is corrupted, or where a third-party is operationally unavailable, the ability to make critical payments by the end of value date might not always be possible and might lead to adverse impacts on financial stability.

However, the ability of firms to take suitable mitigating actions could limit the impact of financial and operational contagion, as well as the impact of the scenario on public confidence. A fellow member of the FPC, current Deputy Governor for Financial Stability and Chair of the Bank's Financial Market Infrastructure (FMI) Board, Sir Jon Cunliffe, has noted that 'operational resilience is not a technical issue, especially for the infrastructure firms that need to act as 'systemic risk managers'. It must begin in the boardroom'.[15]

As has been recognised by the FPC previously, the 2022 cyber stress test highlighted that it might not always be possible for firms to make critical payments by the end of the value date, and that doing so might lead to adverse impacts on financial stability.

In these cases, alternative mitigating actions might be appropriate, and firms should test for such situations and invest in responses that could effectively mitigate the impact on financial stability until services are restored; the

FPC's impact tolerance accounts for both these situations. We also set our impact tolerance with regard to all operational disruptions to critical payments, whether they arise from a cyber incident or otherwise.

Operational resilience

I have talked mostly about cyber risks because they are prominent, and it is important that we continue to build resilience in this area. However, I would like to emphasise that we are also doing an increasing amount of thinking about broader operational issues.

Firms are making greater use of third parties, including cloud service providers, who offer services such as shared virtual data storage and processing capabilities. This has the potential to make firms more resilient to operational risks than using only on-site IT infrastructure.

However, because the provision of these services is often concentrated in a small number of third parties, the more important these services become, the greater the threat to UK financial stability if they were to face disruption. This makes the case for greater direct regulatory oversight of the services they provide.

Last year, the Bank, PRA and FCA published a discussion paper setting out their initial thinking on how they may exercise their new statutory powers over critical third parties, targeted to their services to the UK financial sector. The regulators will follow up this discussion paper with a consultation paper with draft rules and guidance for critical third parties in the coming months.

Alongside this work on critical third parties and our cyber stress testing, the FPC continues to identify and monitor the channels through which operational risks could affect financial stability. This includes those arising through technological developments such as Artificial Intelligence and the use of blockchain.

Conclusion

Operational resilience is a medium-term priority for the FPC. We are reflecting the key lessons I have set out today into our future cyber stress tests and continuing to improve our macroprudential oversight of operational resilience, in light of its growing importance to financial stability.

I mentioned earlier how businesses have become more digitised and interconnected at an operational level, and how this increases the potential for disruption at one firm, to lead to disruption at a system-wide level.

Because of this, we are undertaking further work to advance and develop our understanding of how financial stability can be threatened by operational risks, and how resilience can be strengthened at the system level. In short, we want to get prepared. ■

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Talking about competitiveness in Europe: productivity not protection

The European Commission put EU competitiveness at the top of the agenda. Filippo di Mauro and Marco Matani argue that productivity, financial soundness, and quality orientation are the most important factors

Ursula von der Leyen has put competitiveness in Europe at the top of the economic agenda with her latest State of the Union address. And rightly so. Gaining competitiveness means making better use of the resources and ultimately increasing the productivity of the overall economic system.

On this, the record for Europe is dismal and action is urgently needed. Latest CompNet data show that total factor productivity (TFP) in Europe has been stagnant over the last two decades with negative blips both during the 2009 global financial crisis (GFC) and most recently during COVID in 2020.

Why was it so? Out of the many reasons, in this column we focus on the external factors to conclude that China was not the problem, but more likely some other, very internal ones, including the strong negative impact during crises times of within-EU global value chain (GVC) operations, amid an overall productivity sluggishness. Among the overall competitiveness drivers, we identify productivity and innovation content as key.

The role of EU global value chains

To do so, we examine how the TFP of European firms is affected by their external environment, particularly via the conduit of the GVCs to which they are connected.

Drawing from Bertelsman *et al* (2008) as well as Chiacchio *et al* (2018), we disentangle productivity transmission inside GVCs stretching within EU borders, within two phases. In a first phase, an external productivity shock (eg. an invention on the positive side or a sudden supply disruption on the negative side) has an immediate impact on the frontier (ie. most productive) firms, which are directly connected via trade flows to the respective GVC.

In a second phase, after a learning process, productivity gains trickle down from the national frontier to other national firms through domestic production networks.

To measure such impacts, we link CompNet data on firms' productivity with their respective trade linkages as reported by the OECD Inter-Country Input-Output (ICIO) tables. The productivity of each country and macro-sector is the employment-weighted average of laggard, frontier, and average firms (firms in the bottom 20%, top 20%, and intermediate deciles, respectively, of the productivity distribution of each country and macro-sector).

There are critical factors internal to the EU which could be better activated to enhance firms' productivity and ultimately foster their global competitiveness

Hence, we aim to capture the following contributions to the TFP growth rates of each country and macro-sector each year:

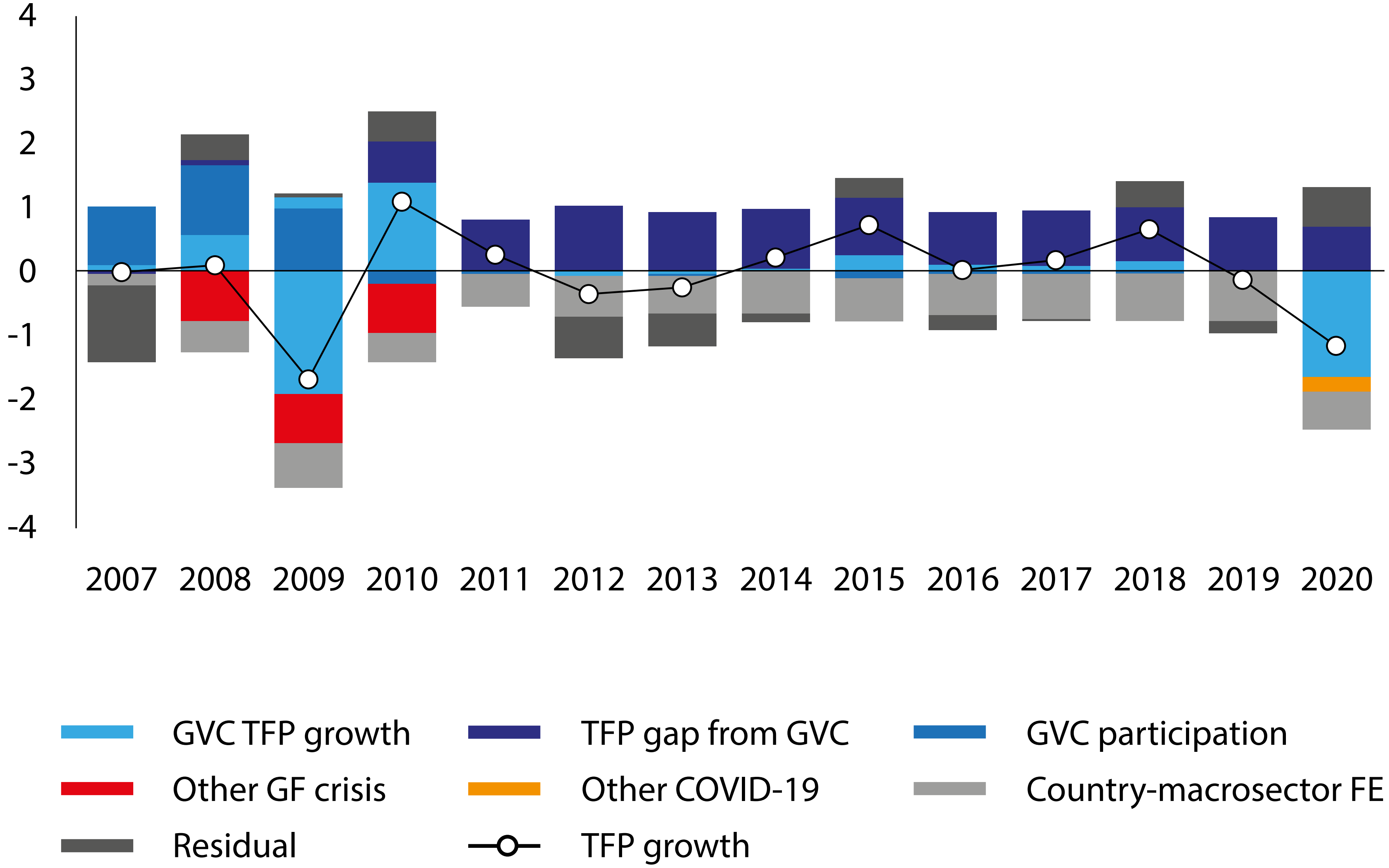
- The transmission of TFP rates of change from the respective GVC frontier (ie. from the average TFP growth rate across foreign countries and macro-sectors that import from the given country and macro-sector).
- The 'catch-up' effect – whether being more distant from the GVC frontier (in terms of a labour productivity gap) benefits TFP growth of national firms.
- Overall GVC participation (increases in percentage points of exports over output from one year to the other).
- Separately, other COVID and GFC shocks.
- Time-invariant features of each country and macro sector.
- Time-varying unexplained factors affecting TFP growth (on top of systemic COVID and GFC shocks).

The results (see Figure 1) are as follows[1].

1. As expected, the TFP growth of the EU GVC counterparts (the dashed blue histogram) has a rather strong impact on the TFP of the economy as it directly affects the frontiers firms connected to them.

2. What is notable is that such impacts become very strongly negative at the time of crisis (see the large negative histogram in 2009 and 2020)[2]. This is reminiscent of evidence of an additional burden from COVID on European

Figure 1. Contributions to EU TFP growth rates within EU global value chains



Note: Figures are yearly averages across countries and macro-sectors weighted by real value added. Results for export linkages between BE, CH, CZ, DE, DK, ES, FI, FR, HR, HU, IT, LT, LV, MT, NL, PL, PT, RO, SI, SK, and SE. Unbalanced sample over 2005-2020. The latest available year is 2018 for DE, and 2019 for LV and NL.
Source: CompNet 9th Vintage (jd_inp_prod_industry2d_20e_weighted) and OECD ICIO.

firms in GVCs (Lebastard *et al* 2023), and its sources – which may trace back to elements such as inventory management (Lafrogne-Joussier *et al* 2022), prevalence of arm's-length rather than intra-group transactions (Altomonte *et al* 2012), or risk misperception (Baldwin and Freeman 2022) – deserve further investigation.

3. The most positive contribution to aggregate TFP growth, however, comes from the productivity gap of the various countries and macro-sectors with respect to their respective within-EU GVC counterparts. The intuition is that when this gap is large, there is possibly a Balassa-Samuelson kind of 'catching-up effect,' which could be activated.

4. On the other hand, and paradoxically given the current debate, the residual, which would include the China effect together with the remaining time-varying omitted factors, has a small and often actually positive contribution to the TFP growth.

Overall, it would seem therefore that the shock that is internal to EU GVCs (ie. European firms trading with other European firms) may be more relevant in explaining TFP growth fragility amidst crises and generalised sluggishness (the always negative 'country-macro-sector FE') than any residual Chinese one.

Drivers of external competitiveness

The 2023 State of the Union speech neatly advocated for true and fair competition. It also stated that European companies recognise global competition being good for business and a pivot to create and protect good jobs in Europe.

In this context, 'predatory' practices benefitting competitors and marginalising European firms on foreign markets have been stigmatised. An anti-subsidy investigation into electric vehicles coming from China was also announced.

Nurturing a vibrant competitive environment requires policymakers to identify those aspects that are most relevant for sound firm performance (di Mauro and Forster 2008, Karadeloglou *et al* 2015). Building on previous work by Amador *et al* (2022) and Lourenço *et al* (2022), and in collaboration with a team at the Portuguese Gabinete de Estratégia e Estudos (GEE), we built a novel micro-aggregated composite indicator using CompNet data.

Our version of the Enterprise Competitiveness Indicator (ECI) considers five dimensions of performance – returns, costs, productivity, risks, and quality orientation (CompNet 2023: 29-34) – for the average firm in each country. When putting it to work, the ECI seems to offer insights into the drivers of EU firms' demeanour on global markets (Figure 2).

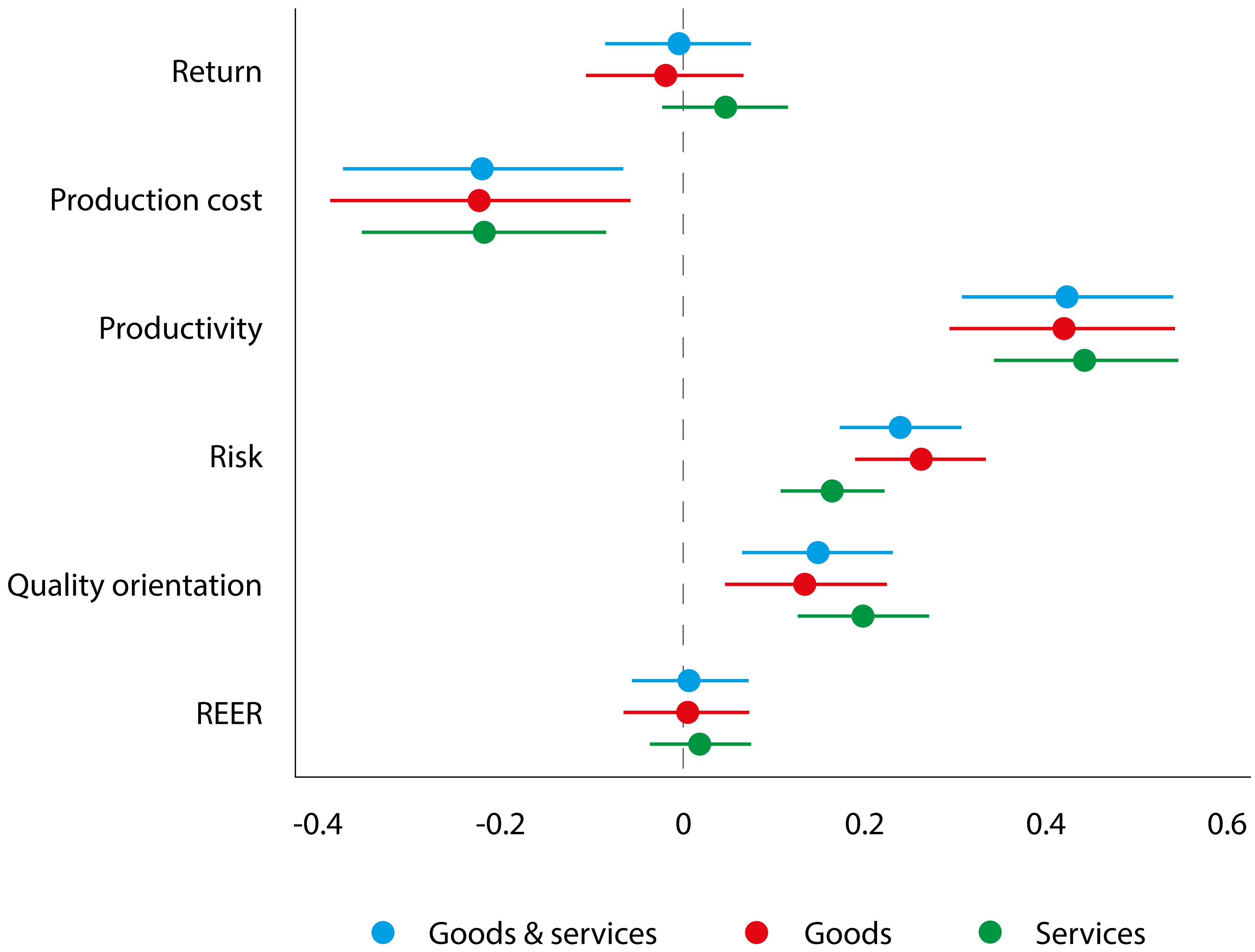
Our results suggest that productivity, financial soundness (risk), and quality orientation correlate with higher EU countries' export market shares more often than profitability (return) and, even more strongly, production costs. Also exchanges rates appear scarcely related to trade developments (see Grazioli *et al* 2016 for further on this).

Intuitively, this correlational evidence may point to European exporters being specialised in more downstream, higher value-added stages of value chains (eg. Bontadini *et al* 2021). If so, curbing artificial low prices would speak only less directly to the competitiveness of EU firms, while other factors appear more in tune with navigating international competition on those markets where the EU comparative advantages are stronger.

Conclusions

That competitiveness is now at the top of the EU economic agenda is welcome. But it is important to choose appropriately the channels one needs to tackle to improve it.

Figure 2. ECI by dimension, REER, and export market shares



Note: Coefficients from regressing market shares on ECI dimensions (pooled, each computed like in CompNet, 2023 pages 29-34) and Eurostat real effective exchange rates (REERs) with year fixed effects. REERs are the nominal effective exchange rates (NEERs) for 42 trading partners deflated by consumer price indices (CPIs). Results for BE, CZ, DE, DK, ES, FI, FR, HR, HU, IT, LT, LV, MT, NL, PL, PT, RO, SI, SK, and SE. The latest available years are 2019 for LV and NL, and 2018 for DE.
Source: CompNet 9th Vintage (unconditional_mac_sector_20e_weighted) and Eurostat

In this column, we have provided evidence that there are critical factors internal to the EU which could be better activated to enhance firms' productivity and ultimately foster their global competitiveness.

First, the GVCs operating within Europe itself have a rather strong impact on the aggregate productivity of Europe, as they directly affect the frontier firms connected to them. The robustness and resilience of these GVCs should be enhanced[3].

The still rather large gaps existing between frontier and laggard firms maintain a strong momentum for 'catching-up' forces, which is also positive for the aggregate productivity of Europe.

In comparison, the impact on the latter of GVCs outside of Europe (including therefore China) is shown to be somewhat limited and at any rate mostly positive.

When we look at the determinants of export market shares of EU firms, we show that productivity, financial soundness (risk), and quality orientation are the most important factors. Rather than, for instance, imposing across-the-board controls on imports, those are the things to concentrate on and most likely what it will take to maintain and enhance the EU's competitive edge. ■

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Endnotes

1. Results are robust to utilising import linkages and to controlling for growth rates of exports toward major non-European partners (CN, IN, JP, KR, MX, RU, TR, US). These results are available upon request to the authors.

2. Note that 2021 OECD ICIO data are available only up to 2018. We assume that the structure of EU GVCs did not change between 2018 and 2020. Since COVID reasonably twisted firms away from their ideal portfolio of trade partners, we may underestimate the magnitude of the GVC TFP shock in 2020.

3. See Miroudot (2020) for a discussion of the distinction between resilience and robustness in GVCs.

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Reboot of the UK-EU relationship in financial services regulation

Brexit poses unique challenges for policymakers in the EU. Thorsten Beck and Christy Ann Petit assess the EU's equivalence policy and present options for deepening regulatory cooperation

Brexit continues to pose unique challenges for financial sector policymakers in the EU, as the most important financial centre in Europe is now outside its regulatory framework (Macrae *et al* 2016, Jackson, 2016). The UK, on the other hand, considers its financial sector a potential growth engine at the global level and has initiated regulatory reforms to strengthen its status as a global financial centre (Edinburgh Reforms 2022, TIGRR Report 2021, Portes 2023).

Regulatory divergence between the UK and EU is all but assured, even if the UK only decides not to follow EU regulatory changes or adopt the new rules in EU financial and banking regulations (passive divergence). This is not to mention active divergence, whereby the UK would change inherited EU rules following the Financial Services and Markets Act (FSMA) 2023 and the (new) missions granted to UK regulators in lieu of legislators.

A new chapter in financial sector cooperation?

On 27 June 2023, the UK and the EU signed a Memorandum of Understanding (MoU) establishing a framework for financial services regulatory cooperation. The Windsor Framework agreement paved a new way forward for the Protocol on Ireland/Northern Ireland in February 2023, which in turn unlocked cooperation between the UK and the EU in different areas such as financial services and the UK's access to Union programmes.

Following the signing of the MoU, a joint EU-UK financial regulatory forum will be established and will take place for the first time this autumn to discuss regulatory changes and issues of common interest – including market developments, financial stability issues, and fostering enhanced EU-UK cooperation ahead of global forums such as the Federation of Small Businesses (FSB) and the Basel Committee on Banking Supervision (BCBS). The MoU implements the joint declaration attached to the Trade and Cooperation Agreement (TCA) from 2020.

In a report for the European Parliament's ECON Committee, we summarise and discuss recent trends in financial sector legislation and regulation in the UK, divergence between the EU and the UK, and the threats posed by such divergence for financial stability in the EU (Petit and Beck 2023).

Divergence between financial sector regulation in the UK and the EU will happen through reforms on both sides. Functioning and effective regulatory cooperation, however, can limit negative repercussions from such divergence

Critically, we assess the equivalence policy and strategy of the EU towards the UK. We also discuss the options to deepen regulatory cooperation while ensuring financial stability, market integrity, and competitiveness.

The developments since the completion of our report, including the signing of the MoU and the establishment of the joint EU-UK regulatory forum, have – in our opinion – not changed our general assessment, namely, that even if cooperation will be favoured and sustained at a working level among authorities, it will remain limited and dependent on the political environment, and regulatory divergence is all but guaranteed.

The new UK regulatory approach: growth and international competitiveness

The UK's renewed approach to regulation will lead to the transfer of most rules from the statutory level to the regulators' rulebook. FSMA, which received royal assent at the end of June 2023, will give greater responsibility to regulators. The bill intends to amend, repeal, or replace retained EU law in the financial services and insurance sector.

In addition, secondary objectives are added for regulators to *"facilitate, subject to aligning with relevant international standards, the international competitiveness of the UK economy (including in particular the financial services sector) and its growth in the medium to long term"* (Hunt 2022).

Following FSMA, secondary objectives include the competition objective, and the competitiveness and growth objective for the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA). This change differentiates the UK regulators' mandate from its EU counterparts, whose mandate is safeguarding financial stability, market integrity, and investor protection, while maintaining a level playing field in the EU Single Market.

Divergence, but how much?

Divergence of UK regulation from EU regulation is a given outcome of Brexit. Active divergence would occur when the UK *"deliberately legislates to move away from retained EU Law"* (Reland *et al* 2022). Passive divergence would reflect the UK not keeping up with EU legislative changes, including newly adopted legislation.

The UK has already undertaken initiatives that could result in regulatory divergence from the EU in several areas:

The implementation of the final Basel III reforms will differ between the UK and the EU both in timeline and substance. The EU reached a provisional inter-institutional agreement in June 2023, deviating from the Basel III agreements on several grounds, inter alia through adaptations based on proportionality concerns for small entities, and a specific implementation of the output floor that risks lowering regulatory capital. The current Spanish presidency of the Council intends to finalise the CRD6 and CRR3 to maintain an entry into force in January 2025. As regards the UK, the Basel III implementation is postponed until July 2025 (instead of January), with two policy statements setting potential deviations from Basel III (expected at the end of 2023 and in 2024).

- Both the UK and the EU are reviewing the Solvency II regulatory framework for insurers, with the objective of fuelling more equity investment by insurers through different regulatory adjustments. Following the FSMA, the UK's PRA unveiled its proposed matching adjustment rules in September 2023, which forms part of the implementation of the Solvency II review and would allow insurers to make broader and quicker investments in MA portfolios, ultimately giving a more significant role to the life insurance sector in the UK economy.

- The UK aims to reform different aspects of its wholesale markets regime and capital market sector, though these reforms are considered low impact.

- The UK aims to become a global centre for fintech and crypto assets through several regulatory and supervisory initiatives, including a financial market infrastructure sandbox that is already up and running, a FinTech hub at the Bank of England, and encouraging the development and use of stablecoins. The EU has a different approach, which will lead most likely to active divergence, with markets in crypto assets (MiCA) regulated as of 2024 and further regulation tightening.

- *Greening Finance: A Roadmap to Sustainable Investing*, published in 2021, stipulates that the UK Green Taxonomy will adopt the EU's six environmental objectives. In March 2023, the UK government published its Green Finance Strategy and a consultation on the regime for economic, social, and governance (ESG) ratings providers. The UK government has yet to release its consultation on the UK Green Taxonomy, expected in Autumn 2023, but some divergence is to be expected from the EU's version.

While divergence between the EU and the UK may be considered minimal before the adoption of FSMA, we can expect substantial divergence across different segments of the financial sector during the next five to ten years (for further details, check the scenarios-based analysis in Petit and Beck 2023).

From TCA to Windsor

While the TCA is extensive, it includes a very thin chapter on the financial sector, with only eight out of 783 articles directly covering this sector. Deeper cooperation in the financial sector was held back until earlier this year by the stand-off over the Northern Ireland/Ireland Protocol.

The resolution of this conflict through the Windsor Framework allows for closer cooperation and building mutual trust, with the MoU on financial services regulatory cooperation finally signed by the EU and the UK on 27 June 2023.

A thin basis for cooperation

Will this MoU and the Joint Regulatory Forum be a major change in financial sector cooperation between the EU and the UK, and limit regulatory divergence? We would strongly discourage such hope and disagree with such a promise.

Under the MoU arrangements, there is no certainty of continuity and stability of the cooperation channels. A careful look at the MoU shows an emphasis on 'exchanges of views and analysis' and 'dialogue'. Furthermore, the MoU provides that 'regulatory cooperation should not restrict the ability of either [the EU or the UK] to implement regulatory, supervisory or other legal measures that it considers appropriate', thereby making cooperation dependent on the broader (political and economic) circumstances.

There is a reason why the financial sector was excluded in the first place from the TCA (any reference to trade in services explicitly exclude the financial sector). While allowing entry of foreign financial institutions and market participants into a country's banking system, countries insist on national regulatory autonomy and the independence of supervisory power for a reason, and are loath to share it.

And while it is true that recent decades have seen an increase in global and cross-border cooperation (especially after 2008), the sovereignty principle rules strongly in the financial sector policy framework (Beck and Wagner 2013 2016). In a few instances, countries formally integrate regulatory and supervisory power in a shared system, such as in the case of the banking union (Petit 2022).

It is therefore not surprising that the EU is reluctant to move towards systematic equivalence in the financial sector and relies on only a thin cooperation framework embodied by the recently signed MoU, choosing instead a sector-specific equivalence agreement with the UK.

Equivalence granted by the EU in the financial sector exists currently with the UK in only one area, namely, central clearing counterparties (CCPs). Even here, this equivalence decision is temporary (extended until mid-2025), with a clear political will in the EU to attract more euro clearing away from London into the Single Market and preferably into the euro area.

The European Commission legislative proposal for clearing at the end of 2022 showed a further tightening of an equivalence regime in the financial sector. In the medium term, the Joint Forum may undertake dialogue on equivalence decisions, but this will remain contentious for some time.

Looking forward

Divergence between financial sector regulation in the UK and the EU will happen through reforms on both sides. Functioning and effective regulatory cooperation, however, can limit negative repercussions from such divergence. The resolution of the conflict around the Northern Ireland Protocol with the Windsor Framework has paved the way for closer cooperation between regulatory authorities in the UK and the EU, following the adoption of the MoU on financial services regulatory cooperation.

Some supporting measures for cooperation, despite their non-binding nature, may follow the meeting of the Joint EU-UK Regulatory Forum in autumn 2023. However, such cooperation will face limits, not to mention the fluctuating political environment across the channel. ■

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EU-wide investment conditional on adherence to fiscal-structural plans

Age Bakker and Roel Beetsma provide concrete suggestions for the financial design and enforcement of an EU-wide investment fund

In April 2023 the European Commission issued a concrete legislative proposal for the much-needed revision of the Stability and Growth Pact (SGP)[1, 2]. The fiscal rules have effectively been inoperative since the Commission announced in March 2020 (in the wake of the pandemic) the activation of the severe economic downturn clause – in the public debate commonly called the 'general escape clause'[3].

The key objectives of the Commission proposals are a strengthened debt sustainability framework and the promotion of sustainable and inclusive growth through reforms and investments. These objectives should be achieved by focusing on medium-term fiscal performance, gradual and credible debt reduction, more national ownership, better enforcement, and simplification of the rules.

Based on a debt sustainability analysis, the Commission will provide 'technical trajectories' for member states that violate one or both reference values of 3% and 60% for the deficit and debt ratio, respectively.

With the technical trajectory as a starting point, countries may negotiate a four-year fiscal adjustment plan with the Commission. The adjustment period may be extended to seven years based on adequate reform and investment plans, provided the public debt ratio remains on a 'plausibly downward' path, or stays at a prudent level, and the deficit remains below the 3% reference value.

A number of safeguards are added, such as an annual minimum adjustment of 0.5% of GDP when the deficit exceeds 3% and a debt ratio below the initial one at the end of the adjustment period. A major innovation is that the adjustment path stipulates a path for net primary expenditure[4]. There will be no technical trajectories for countries with debt below 60% and a deficit of less than 3%.

Finally, enforcement of the SGP, which has been weak so far, is supposed to be strengthened by reducing the financial penalty associated with violation of the rules, so the relevant actors should have less reason to shy back from imposing sanctions. A larger degree of national ownership by governments for their own plans and a strengthened supervisory role for the national independent fiscal institutions (IFIs), would raise the reputational damage of not meeting the criteria.

The described fund, which is kept outside the regular multiannual financial framework, would be a follow-up to NextGenerationEU, but with a much stronger focus on European public goods

We agree that the new proposal, in particular by requiring a gradual reduction of debt over the medium term, stands a higher chance of achieving debt sustainability than the SGP rule book. In particular, the 1/20th rule, which would demand historically unprecedented primary surpluses from a number of countries, has been unrealistic, which has undermined the credibility of the SGP[5].

Still, the question remains whether the Commission is not unduly optimistic about improved enforcement, especially as adjustment periods longer than four years exceed the customary political cycle. In 2016, it proved impossible to impose even symbolic non-pecuniary sanctions on Spain and Portugal.

Governments are loath to assign a greater role to the national independent fiscal institutions. The role of these institutions is to be critical about policies and, hence, they are often seen as a nuisance by governments. Ministries of finance, in particular, see them as questioning their assumptions or redoing their work.

In view of a long history of transgressions of the rules followed by non-enforcement, enforcement through financial punishment cannot be taken for granted under the revised rules. Therefore, some countries, such as Germany, want stronger safeguards, such as a guarantee that debt at the end of the adjustment period is below the initial debt and an annual minimum debt reduction requirement.

Indeed, only recently, supposedly well-aware of the fact that the escape clause will expire by the end of this year and Excessive Deficit Procedures may be opened again, the Italian government proposed a stimulus package of €24 billion for 2024, on top of a projected deficit of over 4%[6].

If financial sanctions are uncertain to work, what else would? We propose to introduce positive incentives for improved compliance and enforcement[7]. The experience with the Recovery and Resilience Facility of NextGenerationEU may provide guidance.

Countries have designed reform and investment plans and receive funding conditional on achieving certain milestones. Although the process does not work perfectly (plans are too piecemeal and funding is disbursed despite imperfect adherence), the overall experience is considered as reasonably satisfactory.

It may be worthwhile to expand and improve on the experiences so far of NextGenerationEU and provide for a mechanism in which countries, instead of being penalised for non-adherence, are rewarded for good behaviour.

Therefore, we propose to set up an EU fund for European public goods, ie. public investments that benefit more than one country or even the entire EU, and from which (groups of) countries can get funding if they adhere to the agreed fiscal-structural plans. The purpose of EU public goods would have to be well-defined and may encompass, for example, climate and digital transitions as well as EU-wide infrastructure.

The fund serves two purposes: providing an incentive to improve debt sustainability and stimulating investments that are much needed (eg. Beetsma *et al* 2020, Larch *et al* 2022), but that otherwise would not come about, because they are too large for individual countries and insufficiently worthwhile at the individual country level, because the benefits accrue to other countries as well.

Examples of such investments are high-speed railways, increases in the capacity of electricity grids, hydrogen infrastructure, and water management. In particular, the investments fulfil the requirements underlying the extended adjustment path from four to seven years: growth enhancing, supporting fiscal sustainability (by raising potential growth and incentivising fiscal discipline), and addressing common EU priorities, such as the Green Deal.

How could this exactly work? Having committed to their fiscal-structural trajectory (combinations of) countries submit sufficiently detailed plans for investments with a 'public good character'. The Commission itself may also propose EU-wide investment projects which would be subordinate to the same requirements for national disbursement.

The investment plans may also form part of the bid to extend the adjustment period to seven years. They contain a set of concrete milestones with associated funding needs for each next stage. At each milestone, those partners that have stuck to their fiscal-structural plan and to the investment plan itself, get the financing (or part of it) of the previous stage reimbursed from the fund. Hence, financing from the fund takes place afterwards, in order to strengthen the incentives for good behaviour.

A crucial role in the process will be for an independent assessor of the investment plans and their execution. This would need to be done by an EU-IFI, which looks in detail at the investment case itself: can a sufficiently large positive net present value be demonstrated for the project? Can sufficiently large international spill-over benefits be demonstrated? Does each country have sufficient skin in the game, ie. is there sufficient co-financing at each stage?

Finally, after each milestone the EU-IFI assesses whether the project has been executed according to plan and whether partners have adhered to their fiscal-structural plan. In line with standard governance rules, the EU-IFI draws up a publicly available report at the start and at each stage of the project with its assessment and recommendation for the European Commission. The Commission then formulates its own recommendation to the ECOFIN, which then takes a decision.

The financial design of the fund could be as follows. Countries have envelopes within the fund based on the size of their economy and draw at a maximum the size of their envelope (eg. European Fiscal Board 2022). The financial resources of the fund would need to be sizeable in order to provide sufficient incentives for good behaviour.

The design of the fund sees to it that disbursement would only come about when fiscal-structural plans are adhered to. This helps avoid that European expenditures are simply piled upon national expenditures. If they do not use the financial resources within a prespecified period of time, because they have no eligible plans or because they have not fulfilled the EU budgetary criteria, the remainder of their envelope will be re-allocated to the other envelopes.

The resources withdrawn from the fund can be financed by issuance of EU debt, similar to the financing of NextGenerationEU's Recovery and Resilience Plans. Debt only needs to be issued at the moment resources are withdrawn. Obviously, countries need to commit to their share of the debt-servicing costs[8].

That share is based on a fixed repayment key, independent of the extent to which a country has made use of its envelope. Hence, the fixed key incentivises each country to come up with suitable investment proposals. The incentive is strengthened further by the reallocation of any unused funds over the other envelopes.

In this column, we have described a fund for investments with multinational spillovers to which countries have access if they adhere to their budgetary plans. We also believe this is politically feasible.

The described fund, which is kept outside the regular multiannual financial framework, would be a follow-up to NextGenerationEU, but with a much stronger focus on European public goods.

Admittedly, NextGenerationEU was meant to be temporary, but in the meantime the urgency to formulate a European response to the changed global economic power structures has increased significantly. An EU-wide investment fund, financed by borrowing as was NextGenerationEU, would serve this purpose as national public finances, strained by rising interest rates, are not up the task.

The fund would have as additional advantage that investments would be safeguarded from the need of fiscal adjustment, because needed expenditure cuts to stay on the trajectory would not affect investments financed under the EU investment plan. In this way these investments are protected against political opportunism.

This construction simultaneously serves two possible objectives: promote debt sustainability and promote growth-enhancing and climate-benefitting investments that would not materialise, otherwise. It would have a stabilising effect due to the positive effect on potential growth and the budgetary discipline that is enforced at the same time.

Therefore, moving towards fulfilling both objectives will help to alleviate the burden on the ECB as fiscal restraint and higher growth both promote debt sustainability, thereby reducing the chance that the ECB will be confronted with a trade-off between achieving its monetary policy objectives and averting a financial crisis. ■

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Endnotes

1. The full package consists of a new regulation for the preventive arm of the Stability and Growth Pact (repealing EC No1466/97), an amended Regulation EC No 1467/97 of the corrective arm and an amended Council Directive 2011/185/EU. See European Commission (2022, 2023a, 2023b).

2. The proposal for a legislative reform was preceded by a communication by the European Commission (2022) with broad orientations for a possible reform. It was received with mixed approval. Blanchard et al (2022), Micossi (2023), and Wyplosz (2022) voiced some criticism, while Buti et al (2023) defended the proposals.

3. The clause has been extended in light of the conflict in Ukraine but will be deactivated in 2024.

4. Nationally financed primary expenditure is defined as expenditure net of discretionary revenue measures and excluding interest expenditure as well as cyclical unemployment expenditure. Deviations from this path will flow into a control account, of which the parameters have not been specified so far.

5. European Fiscal Board (2020, Chapter 5) pictures the required primary surpluses to bring debt down from 150% to 60% according to the 1/20th rule under different macroeconomic assumptions. Such high primary surpluses have historically been rarely achieved, let alone over a sufficiently long period, as shown by Eichengreen and Panizza (2014).

6. Italy's most fundamental problem is its low potential growth. The envisaged measures, such as tax reductions, reductions in pension contributions, increases in public salaries, and indexation in pensions, may help to stimulate consumption, but will do little to solve the low potential growth problem.

7. The Council of State of the Netherlands (2017) has suggested to introduce positive incentives by linking compliance with fiscal rules to financial support for structural reforms and access to structural and cohesion funds and a stability fund.

8. It is crucial that the additional debt-servicing burden associated with the fund does not endanger a country's debt sustainability. For this reason, the conditional disbursement should discourage fiscal profligacy. It is reasonable to argue, though, that much of the investment financed from the fund would have to be made in any case, for example for successful green and digital transitions.

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Outlook for the euro area economy and financial stability

Luis de Guindos provides an overview of the euro area economy, and argues that it is vital to reform the EU's economic governance framework in order to anchor expectations and support fiscal discipline

I will begin by providing an overview of the euro area economic outlook that underpinned the Governing Council's deliberations and the monetary policy decisions we took in October. I will then discuss how we see the risks to financial stability and related macroprudential policy issues.

Euro area economic outlook

Last year inflation was at historically high levels, both in the euro area and around the world, and growth was slowing following the post-pandemic rebound. Today, inflation is significantly lower, but it is still expected to stay too high for too long.

At the same time, the growth outlook for the euro area economy has deteriorated further, as global growth momentum slows and tighter financing conditions are increasingly weighing on investment and consumer spending.

In the third quarter of this year real GDP declined by 0.1% quarter on quarter. There are signs that manufacturing output remains firmly in contractionary territory, while the services sector has weakened further. Weaker industrial activity is spilling over to services, the impetus from reopening effects is fading and the impact of higher interest rates is broadening.

It is likely that the euro area economy will remain subdued in the near term. However, it looks set to strengthen again over the medium term, as inflation falls further, household real incomes recover and the demand for euro area exports picks up.

Inflation, which has been on a downward trajectory over the last 12 months, dropped markedly in both September and October. It now stands at 2.9%, according to Eurostat's flash estimate. The decline, which was in part due to strong base effects, was broad-based, reflecting a drop in energy prices and falling food, goods and services inflation.

We expect a temporary rebound in inflation in the coming months as the base effects from the sharp increase in energy and food prices in autumn 2022 drop out of the year-on-year calculation. But we see the general disinflationary process continuing over the medium term.

Further tightening is still in the pipeline from the current policy stance, and it is set to further dampen demand and help push down inflation

Energy prices remain a major source of uncertainty amid heightened geopolitical tensions and the impact of fiscal measures. The same is true for food prices, which may also come under upward pressure owing to adverse weather events and the unfolding climate crisis more broadly.

Most measures of underlying inflation continue to decline. The Eurostat's flash estimate for inflation excluding energy and food points to a further decline to 4.2 % in October, supported by improving supply conditions, the pass-through of previous declines in energy prices, as well as the impact of tighter monetary policy on demand and corporate pricing power.

At the same time, domestic price pressures are still strong and are being increasingly driven by wage pressures and the evolution of profit margins. While most measures of longer-term inflation expectations stand around 2 %, some indicators remain elevated and need to be monitored closely.

The resilience of the labour market has been a bright spot for the euro area economy, but there are signs that the labour market is beginning to weaken. Fewer new jobs are being created and, according to the latest flash estimate, employment expectations have continued to decline in October for both services and manufacturing.

Monetary policy

Based on our assessment of the inflation outlook, the dynamics of underlying inflation and the strength of monetary policy transmission, the Governing Council decided to keep the three key ECB interest rates unchanged at its October meeting.

The incoming information has broadly confirmed our previous assessment of the medium-term inflation outlook. Our past interest rate increases continue to be transmitted forcefully into financial and monetary conditions. Banks' funding costs have continued to rise and are being passed on to businesses and households.

The combination of higher borrowing rates and weakening activity led to a further sharp drop in credit demand in the third quarter of this year. And credit standards have tightened again. We are also seeing increasing signs of the impact of our policy decisions on the real economy.

Further tightening is still in the pipeline from the current policy stance, and it is set to further dampen demand and help push down inflation.

We are determined to ensure that inflation returns to our 2% medium-term target in a timely manner. Based on our current assessment, we consider that the key ECB interest rates are at levels that, maintained for a sufficiently long duration, will make a substantial contribution to this goal. We will continue to follow a data-dependent approach to determining the appropriate level and duration of restriction.

Financial stability

Let me now turn to financial stability. In our upcoming Financial Stability Review, we highlight that the financial stability outlook remains fragile as the gradual effects of tighter financial conditions on both the financial and non-financial sectors take hold.

These concerns are heightened by the recent upward shift in bond yields owing to the global 'higher-for-longer' narrative and the flare-up of tensions in the Middle East, which have added to the uncertainty surrounding the outlook.

After a period of lower market volatility until August, the rising prospect of higher-for-longer rates has started to weigh on riskier asset valuations in recent months. Risk sentiment in markets remains highly sensitive to further surprises in inflation and economic growth. Higher than expected inflation or lower growth could trigger a rise in market volatility and risk premia, increasing the likelihood of credit events materialising.

This brings me to the vulnerabilities in the non-bank financial sector. As regards credit risk, some non-banks remain heavily exposed to interest rate-sensitive sectors, such as highly indebted corporates and real estate. Deteriorating corporate fundamentals and the ongoing correction in real estate markets could expose non-banks that have invested in these sectors to revaluation losses and investor outflows.

Furthermore, low levels of liquidity could expose investment funds to the potential risk of forced asset sales if macro-financial outcomes deteriorate.

Corporate profitability in the euro area has held up well, but higher interest rates are weighing on the debt servicing capacity of more vulnerable firms. A weakening economy could prove challenging for firms with high debt levels, subdued earnings and low interest coverage ratios.

Real estate firms are particularly vulnerable to losses stemming from the ongoing downturn in euro area commercial real estate markets. In an environment of tighter financing conditions and elevated uncertainty, real estate prices have declined markedly.

The effects of higher interest rates have been compounded by structurally lower demand for some real estate assets following the pandemic. Although banks' exposure to these markets is comparatively low, losses in this segment could act as an amplifying factor in the event of a wider shock.

Euro area households, especially those with lower incomes and in countries with mainly floating-rate mortgages, are being increasingly squeezed by the higher interest rates. Tighter financing conditions have reduced the demand for housing, putting downward pressure on prices. On a more positive note, robust labour markets have so far supported household balance sheets, thereby mitigating the credit risk to banks.

Spreads in government bond markets have remained contained as many governments managed to secure cheap financing at longer maturities during the period of low interest rates. However, higher funding costs and less prudent fiscal policies could reignite concerns around sovereign debt sustainability, particularly in countries where debt levels are already high.

The euro area banking system has been a source of resilience in this turbulent year. Banks' capital and liquidity buffers remain strong, and profitability has further improved in recent quarters on the back of higher interest rates.

Despite these strong fundamentals, it is striking just how compressed bank valuations remain. This seems to reflect lingering concerns about the long-term sustainability of bank earnings, as they face increased downside risks from the prospect of deteriorating asset quality, lower lending volumes and higher funding costs.

While asset quality indicators have been robust over the last year, early signs of deterioration are becoming visible – particularly in smaller firms and some sectors like commercial real estate.

Conclusion

Since the start of our hiking cycle, we have increased our policy rates by a cumulative 450 basis points. Our restrictive policy stance continues to be transmitted forcefully into financing conditions and is increasingly affecting the real economy. Inflation has come down markedly but is still expected to stay too high for too long, and domestic price pressures remain strong. We will therefore ensure that our policy rates will be set at sufficiently restrictive levels for as long as necessary.

In view of the prevailing elevated uncertainty, our future decisions on policy rates will continue to be data dependent and taken on a meeting-by-meeting basis. At our December meeting, we will have a new set of macroeconomic projections and more data on actual and underlying inflation, economic activity and the state of transmission, so we will be in a better position to reassess the inflation outlook and required policy action.

A resilient and well-functioning financial system is essential for the smooth transmission of monetary policy that is required to achieve our goal. To this end, macroprudential authorities should preserve releasable capital buffers to ensure that they are available in the event that conditions in the banking sector deteriorate.

Furthermore, the lessons learnt from the turmoil this spring underline the need to implement outstanding Basel III reforms and complete the banking union, while previous market shocks confirm the need to boost the resilience of the non-bank financial sector by strengthening the policy framework for non-banks in an internationally coordinated manner.

Prudent and investment-oriented fiscal policies are also very supportive of our price stability goal. Fiscal policy should be geared towards making the euro area economy more productive and gradually bringing down high public debt.

Structural reforms to enhance the euro area's supply capacity can help reduce price pressures in the medium term. It is therefore vital that the reform of the EU's economic governance framework is concluded, in order to anchor expectations and support fiscal discipline. ■

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The European economic outlook and policymaking

Laura Papi argues that seeing off inflation and pivoting to longer-term reforms have important implications for the trajectory of inflation, competitiveness, and growth in the future

I will discuss the outlook for Europe and how we see the risks. Inflation, implications of the geoeconomic fragmentation, and the green transition will be particular areas of focus. I will discuss key policies for securing low inflation and forging a path of higher long-term growth.

Progress has been made in taming inflation and the likelihood of a soft landing has increased, both globally and in Europe. But downside risks are significant. Policymakers face the risk of persistent and more volatile inflation. We now live in a more shock prone world.

And the longstanding slowdown in productivity growth, the geoeconomic fragmentation and the challenges of the green transition cast doubt on whether European economies can return to the pre-pandemic growth trajectory.

These competing challenges and a highly uncertain outlook will test policymakers in Europe. Let me start with the European outlook.

Outlook and near-term challenges

At first glance, the European economy seems to be approaching a relatively benign moment. The IMF's baseline forecast anticipates a continued moderation of inflation in Europe and—contrary to initial expectations of recession—modest growth in 2023 and a slight recovery in 2024.

We expect that for Europe as a whole 2023 growth will be 1.3% (2,7 in 2022), picking up to 1.5% next year. Advanced economies are expected to go from 0.7% to 1.2%, while Emerging European Economies are expected to have a sharper recovery from about 1 to about 3%.

Aided by easing commodity prices and supply constraints, monetary tightening has cooled headline inflation, providing support to real wages. In most EU countries, the tightening cycle has peaked, with the prospect of an approaching soft landing as growth this year slows but remains in positive territory.

It is critical not to loosen policies prematurely in response to what may be temporary declines in inflation

However, there are divergencies across European countries: energy-intensive and manufacturing-oriented economies, such as Germany and Hungary, are performing less well. And downside risks continue to prevail everywhere.

Headline inflation is falling, but is not expected to return to target until 2025 in many countries, for some even 2026. Core inflation has been persistently high in many European economies, especially in services. Nominal wages are growing rapidly, outpacing inflation in some economies, especially in Eastern Europe.

As the pandemic and Russia's war in Ukraine hit European economies, in only 2 years prices increased by 25 percent, as much as over the 5 years following the global financial crisis. In Hungary, inflation reached 25 percent at end-2022, and prices have increased by 41 percent cumulatively from end-2020 to August 2023. This rapid and massive price shock eroded workers' purchasing power and left a large real wage gap.

Hence, some wage catch up is reasonable and to be expected. However, we have some concerns. We have decomposed wage growth into inflation expectations and wage catch up in green, the unemployment gap in red, productivity growth in yellow, and in grey other, that is wage growth in excess of what is to be expected from the factors I just mentioned, which as you can see is growing especially in Central, Eastern, and South-Eastern Europe, CESEE.

The risk is that wage pressures could translate into additional inflation pressures, especially where wage setting is backward-looking, as is the case in many European emerging markets, and hence harm competitiveness.

New IMF research, in our recent *World Economic Outlook*, also shows that near-term inflation may play a greater role in setting long-term inflation expectations than previously thought. Near-term expectations, in turn, are influenced to a large extent by backward-looking agents, particularly in emerging market economies where such agents are more prevalent. There is also evidence that the pass-through from inflation expectations to inflation tends to be higher when inflation is high.

The strength of the labour market is fundamentally good news. Vacancy to unemployment ratios stand at record highs and unemployment rates at record lows in most of Europe. But all of this means additional upward nominal wage pressures are likely and the possibility of a wage-price spiral exists.

Let me be clear: we don't see wage-price spirals likely in advanced European economies, but the risk in Eastern Europe is not negligible.

Another driver of high inflation has been firms' profits. In many countries, in the last couple of years, firms have passed on more than the increase in input prices to consumers. In CESEE too we saw an increase in profits, which have started to fall.

Going forward, this is positive in the sense that firms could absorb some wage increases by lower profits. But there is no guarantee that this will continue. In sum, all of these forces put together suggest that we may be experiencing a period of especially sticky price and wage pressures.

Besides the more cyclical factors that I have just discussed, there are some additional risk factors for inflation, which are more structural in nature.

Take geoeconomic fragmentation. We have already experienced big shocks from fragmentation, especially Russia's war in Ukraine. We could see additional commodity price spikes that feed through to core inflation. More generally greater fragmentation brings more trade restrictions and disruptions of supply chains, continuing to generate negative supply shocks, which will be inflationary.

The pre-pandemic view was that central banks could generally ignore supply shocks as these were believed to be mostly transient. But the pandemic and war in Ukraine have highlighted how supply shocks can have broad and persistent inflation effects.

Medium-term challenges

Let me turn to the medium- and long-term challenges. Europe's medium-term growth prospects have been declining for some time. Since the 2008 global financial crisis, per capita growth has fallen and we expect growth to remain weak over the medium term.

The pandemic and the energy crisis have resulted in significant scarring to the level of output. And this comes at a time when countries also grapple with the structural shifts from fragmentation, climate and technological change, and demographic pressures.

Fragmentation is a particularly potent economic challenge. The increasing trade restrictions and reconfiguration of supply chains, besides raising production costs, can further dampen Europe's weak productivity growth.

The economic costs of fragmentation are likely to be substantial. While estimates vary, greater international trade restrictions could reduce global economic output by up to 7 percent over the long term, or some $7 trillion in today's dollars—equivalent to the combined size of the French and German economies.

If technological decoupling is added to the mix, some countries could see losses of up to 12 percent of GDP. And looking just at commodities trade, the IMF estimates that segmentation in the trade of these critical inputs could erase 2 percent from global GDP and up to 3.5 percent from that of emerging Europe.

While reshoring or near-shoring some aspects of production may also present some opportunities to some countries, these are only available if cost competitiveness is preserved, especially on wages.

But let me be clear: economic fragmentation is a negative sum game for the world as a whole.

Climate change is another major challenge. European countries, like other parts of the globe, are experiencing rapid temperature rises and greater frequency of natural disasters, underscoring the urgency of transitioning to a greener and more climate resilient economy.

The green transition holds the promise of being an engine of growth accompanied by greater sustainability and resilience and is one of the key imperatives of our times.

In the short term, though, this may entail significant adjustment costs and benefits spread unevenly across countries, firms, and people. The effects on prices and growth could be uncertain in the short to medium term, depending on how well managed and orderly the adjustment.

Take the auto sector, so important for several countries in Europe including Hungary. IMF research shows that the transition to electric vehicles is already negatively affecting employment in sectors and regions focused on internal combustion engine vehicle production.

We are likely to see disruptions in the extensive regional value chains that have been built around supplying the auto industry, which employs 7 percent of the European workforce. This highlights the need to facilitate the relocation of factors of production across sectors. This transition will have implications for employment, investment, and public policy as countries have to reorient worker training and investment, including in new infrastructure.

Finally, Europe confronts labour supply constraints due to demographics, and capital stocks in emerging Europe are still low.

Policies

I realize that I have laid out a sobering list of near- and long-term challenges. So, what to do about all this? First, it is critical not to loosen policies prematurely in response to what may be temporary declines in inflation.

In a recent IMF paper, we have looked at 100 inflation shocks and we have seen that in many cases, policies were eased too soon, and inflation reaccelerated: here are some examples of premature celebrations, but there are many more. Fund research also shows that countries that resolved inflation episodes experienced lower growth in the short term, but not over the medium term.

Naturally, the level and duration of tightness in the monetary policy stance should be calibrated to country specific conditions. This may mean that some central banks keep rates at current levels for some time while others may have to raise them further.

While many emerging economies started raising policy rates already in 2021 and by substantial amounts, real rates have remained below the neutral level in some countries. Hungary has now one of the highest real policy rate in Europe.

Given the high cost of erring on the side of monetary policy being too loose, the empirical case for a less contractionary stance should be compelling. Monetary policy should remain restrictive until there is clear evidence of a substantial improvement in the core inflation forecast; a reduction of upward inflation risks which hinges mainly on labour market developments; and the absence of upward movements in inflation expectations. These conditions have not been met in most countries.

The key message is that fighting inflation is difficult in the short-term but pays off later, while delaying the day of reckoning ultimately requires a higher sacrifice in future growth and employment.

In emerging markets, in particular, bringing down inflation once it gets sticky can be very costly and high inflation creates competitiveness problems that EMs can ill afford. Short-term pain for long-term gain.

Second and turning to fiscal policy, our strong recommendation is that all countries step up their efforts to rebuild fiscal buffers while protecting the vulnerable. This means consolidation, starting now and especially in high-debt and high deficit countries. By reducing deficits, fiscal consolidation will complement monetary policy in the fight against inflation. Importantly, it will re-build fiscal space for future shocks and for productivity-enhancing investments, including in green infrastructure, and to face the critical transitions that we are experiencing.

In many emerging economies, there is significant room to mobilize resources and to achieve greater expenditure efficiency through better targeting and better spending prioritization. In many countries, there are opportunities to eliminate tax leakages, exemptions, and inefficiencies.

IMF research shows that the potential for revenue mobilization by increasing tax efficiency in emerging European economies is as high as 2 percent of GDP, on average. Many countries still have costly and counter-productive energy subsidies, which run counter to the green transition and reduce energy security, which need to be eliminated.

Support can be given in a targeted way at a fraction of the current cost. And with high yields globally, governments should be even more rigorous in their prioritization of public spending and not leave money on the table on the tax front.

Third, structural policies remain crucial for achieving strong, sustainable, and more evenly distributed growth. With greater prevalence of supply shocks, constrained policy space, and big transitions under way requiring large reallocation of factors of production, policies that can stimulate the supply side and facilitate the necessary adjustments have to take centre stage.

Country needs vary and reforms need to be tailored to the specific institutions and initial conditions, but there are some common priorities.

- Removing barriers that stand in the way of economic innovation and business dynamism. A strengthened business environment with policies that encourage investment and R&D spending will enhance productivity and competitiveness.

- Measures to improve worker training and skills, as well as active labor market policies, will be particularly important to facilitate the green and digital transitions without generating employment losses and to meet the needs of the new economy.

- Boosting labour participation will help counter demographic trends and can relieve the tightness in labour markets and help ease inflation pressures.

In emerging European economies, the need to get structural policies right is particularly important given the urgency of reaccelerating income convergence. To attract inward investment countries should ensure business-friendly environments by strengthening public governance, enhancing skills and infrastructure.

In addition, investing in human capital to align education, health, and social protection outcomes with those of advanced economies can help stem the excess flow of emigration.

To address geoeconomic fragmentation, some countries have introduced industrial policies to encourage the establishment of critical industries or to produce key inputs at home citing national security or just reshoring.

Industrial policies have a role to play in addressing market failures and externalities, such as in the provision of critical infrastructure or in supporting basic research, an under-provisioned public good by the private sector.

But they need to be deployed only narrowly and with care. Costly subsidy races and the use of distortionary tariffs must be avoided, and policies should be coordinated at the multilateral level to avoid beggar-thy-neighbour outcomes.

For the EU, focusing on completing the single market—completing the single services market, the banking union, and the capital markets union—is absolutely vital. Green subsidies should maintain the integrity of the EU's Single Market and follow a common EU approach. Together with the implementation of the Recovery and Resilience Plans, there reforms are critical to boost the EU's productivity and competitiveness.

Energy importers should continue to seek to diversify suppliers to avoid the consequences of overdependence on a single source.

International collaboration on climate change, including a global carbon price floor, will reduce emissions and complement domestic policies. The recently published IMF fiscal monitor proposes a practical mix of policies that are feasible and would achieve the climate goals, including also feebates, green subsidies, and regulation standards, combined with transfers to vulnerable workers.

Conclusion

I realize that these challenges, and the proposed solutions, seem daunting. But every journey starts with a single step. The policies that governments put in place today have important implications for the trajectory of inflation, competitiveness, and growth in the future.

The good news is that tackling inflation now will strengthen resilience and help to buttress competitiveness in the long term. As inflation is brought under control and fiscal space is rebuilt, European policymakers will be able to seize the opportunities posed by big transitions rather than being a casualty of these structural shifts.

Structural policies that help boost supply, including those at the EU level, ultimately will be the only way of boosting growth and will also alleviate some of the structural inflation pressures.

And all this in turn will play an important role in raising regional growth and in helping emerging economies like Hungary to converge with Europe's advanced economies.

The IMF remains deeply committed to the region and will continue to support our member countries to foster macroeconomic stability and higher living standards. ■

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Generative AI, productivity, the labour market, and choice behaviour

Lisa Cook discusses the benefits of generative AI, which can fuel economic growth, but also considers the potential disruptions

I am excited to discuss AI and its prospective effects on productivity and the labour market. Outside of those of us who have spent many years researching the economics of innovation, it seems that AI is having a moment. The surge in excitement and trepidation about AI is palpable. Google searches for 'AI' have tripled worldwide since 2022, fuelled by the buzz about ChatGPT. Of course, this group saw it coming as early as 2017, when the first NBER AI conference was held here in Toronto, and many of you saw it coming much earlier than that.

I will focus my remarks on generative AI, which creates new content largely in response to natural language prompts. As this audience knows, image and text classification—discriminative AI—has been in use for many years and is remarkably effective. I have used it to identify demographic characteristics of entrepreneurs in my own research[1].

In contrast, effective generative AI is a very recent development and seems to be a leap forward into something new. Applications of generative AI range from the prosaic, like reducing the monotony of writing routine memos, to the wonderous, like protein structure prediction and drug discovery.

Of course, experts emphasize that at their core, all forms of AI are an exercise in prediction, and technically that is true[2]. To the layperson, though, a chatbot that is nearly good enough to pass the Turing test is substantially different from the US Postal Service using AI to read your handwriting.

Some of the uses of generative AI may be unsettling. For example, concerns about the ability of generative AI to impersonate individuals to harm their reputation or violate their privacy exist and are growing.

Moreover, observers have noted that AI models sometimes harbour, if not amplify, the biases found in their training data, leading to malign effects on decisions about mortgage approvals, insurance rates, medical diagnoses, and even pretrial detention[3]. And discrimination is not just an equity issue—it also holds down economic growth, as I show in my own work[4].

The range of potential social effects of AI is wide, as will be explored in the next presentation[5]. In general, I am optimistic about broad benefits accruing to the economy and society from the use of generative AI—including

The potential for far-reaching changes to the economy from generative AI is clear, but the pace and extent of the changes will depend on the choices made by workers, managers, and policymakers more productive and less tedious work in offices, labs, factories, and warehouses—provided we address the very real concerns I just mentioned, and others like them.

As we consider how to foster the emerging benefits of AI and guard against unwelcome harms, it is important to keep in mind that the path from innovation to greater welfare passes through the choices of individuals in a social context—in the corner office, in government, and in the minds of workers and consumers—and progress could stall or accelerate in any of these places.

I will return to this point later after offering some thoughts on the potential for AI to affect productivity and the labour market.

Why do I focus on AI as a monetary policymaker? The Federal Reserve's dual mandate is to promote maximum employment and stable prices. When firms deploy technologies that make workers more productive, they create the conditions for greater wage growth consistent with stable prices. And the labour market adjustment that follows as the economy adapts to technical change can affect maximum employment.

AI and productivity

The impact of AI on the economy and monetary policy will depend on whether AI is just another app or something more profound. The most consequential innovations in the past have been general purpose technologies that have broadly transformed the economy over an extended period of time.

We are living through the ongoing transformation fuelled by electronic information technology, for example, and electrification had a similar effect in the early 20th century.

General purpose technologies have three key features: (1) they are widely used across the economy, (2) they improve steadily over a long period of time, and (3) they raise the productivity of research and development (R&D)[6]. Could generative AI have these features? I will consider each in turn.

First, is generative AI widely used? It is easy to see the potential, and we seem to be headed for widespread use. Generative AI makes communication more efficient, and nearly all human activities—and all industries—involve communication. It is true that if you let generative AI draft an email, write the minutes of a meeting, or research a topic, you will have to review, fact-check, and edit the result.

Nonetheless, thanks to AI's contribution, you may be much closer to your goal when you start than if you began with a blank page. Empirical evidence is still patchy, but there is work showing that generative AI improves productivity in a variety of settings, including computer coding, customer service, language translation, and robotics[7].

Second, will AI itself improve steadily over time? If we look backward, we can see that although the history of the computer language models at the core of generative AI goes back at least to the 1950s, there has been an explosion of technical progress in very recent years as LLMs, or large language models, using neural networks have emerged.

Whether that explosive progress can be sustained is an open question, although the concerted efforts here in Toronto and elsewhere bode well for continued innovation. To draw an analogy, the sustained progress in solid-state electronics correctly predicted by Gordon Moore in 1965 looks like a law from a distance.

But, in reality, each new generation of chip technology represents the coordinated effort of hundreds of scientists and engineers solving seemingly intractable problems[8]. Continuing advances in model architecture, data curation, and computation will be essential for the continual improvement of AI models and implementation.

Third, does generative AI make R&D more productive? Some potential for efficiency improvements in the scientific process when it comes to literature review and writing is obvious. Yet AI can go much deeper, discovering patterns in data and in previous research to generate hypotheses for testing that may not have occurred to researchers. Work by Ludwig and Mullainathan on exactly this topic will be presented shortly.

All told, generative AI seems promising as a general-purpose technology. Of course, you will get a much deeper dive into this question later this morning with the Eloundou, Manning, Mishkin, and Rock presentation.

In their work, they find that 80 percent of the US workforce will see at least some of their tasks transformed by generative AI. The authors of that paper do not take a stand on how fast this transformation will take place. Nor will I.

However, we do know that historically the journey from innovation to productivity has sometimes been a long and uneven one. An often-cited example is the electric dynamo, which was first used in the US in the 1890s but did not boost manufacturing productivity until the 1920s[9]. Things now are a bit more hopeful than that example suggests, though: The lag between invention and adoption has been substantially reduced since the 19th century[10].

Adoption of generative AI is certainly happening at a rapid clip. Even so, the full benefit of a technology only follows adoption when suitable complementary investments have been made[11]. These can include changes in corporate structure and management practices, worker training, and the adjustment of the mix of capital in use.

On the last point, we may have a head start, as AI will be deployed in a world with a massive stock of information technology already in place. New business formation will surely play a role as well, as historically much of productivity growth has followed from the entry of firms starting with a clean slate—and the exit of firms that were slow to adapt[12].

Labour market effects

As with all revolutionary technologies, when we turn our attention from productivity to the labour market, many express concern, focusing on jobs that may disappear, while others focus on which jobs will replace them. Economic history suggests cautious optimism here. When the world switched from horse-drawn transport to motor vehicles, jobs for stable hands disappeared, but jobs for auto mechanics took their place[13].

New technologies may displace some types of labour, but they can also raise the productivity and incomes of jobs they create or complement. The increase in consumption that follows may raise demand for labour overall. Nonetheless, the displacement effect might be concentrated and the productivity effect more diffuse.

Therefore, while many workers throughout the economy benefit, a smaller set bear the brunt of the negative effects. Just as the introduction of computerized machine tools replaced skilled machinists and personal computers made many routine clerical and administrative jobs obsolete, the widespread adoption of AI will be a difficult transition for some workers[14].

But the labour market effects of technological change are more subtle than just creating and eliminating positions. Labor economists encourage us to think of work in terms of tasks, not jobs[15].

As firms rethink their product lines and how they produce their goods and services in response to technical change, the composition of the tasks that need to be performed changes. Here, the portfolio of skills that workers have to offer is crucial. Can you shift to a new position that requires a different mix of your skills?

For workers with a diverse skill set, and for workers with broad skills, like critical thinking and project management, the answer may well be 'yes'. For others, like the stable hand who was highly skilled in grooming horses, the answer may be 'no'[16].

The ability of workers to move to where they are needed as the task composition of production changes will also be an important determinant of how successfully the economy adapts to the new jobs created in response to AI.

For example, how quickly will education and training react to the market signals of the skills that are needed? How will AI affect the range of skills required within firms and how will firms restructure in response? And how efficiently will the labour market match job seekers to suitable vacancies?

While the Federal Reserve does not have a role in setting policies to help workers directly, I do not want to suggest that this transition will be easy or painless. Any large change in the labour force will generate disruptions and challenges that will need to be addressed to help workers adapt and thrive.

The benefit of AI to society as a whole will depend on the adaptability of workers' skills, how well they are retrained or redeployed, and how policymakers choose to support the groups that are hardest hit by these changes.

Choice behaviour

The potential for far-reaching changes to the economy from generative AI is clear, but the pace and extent of the changes will depend on the choices made by workers, managers, and policymakers. AI makes predictions, but AI does not make choices. Ultimately, human beings are still in control.

For workers, preparing for the AI-enhanced economy is a tricky task. What should students focus on in school? What college and university courses should be developed and mandatory? What kinds of continuing education are needed?

It is safe to say that generative AI will make knowledge work more efficient—a worker can do more research, communication, design, and the like in a day. And, while some observers might warn that means fewer such workers, it is more likely we will need more of them.

After all, when knowledge workers can accomplish more in an hour, firms have an incentive to use more of them, not fewer. So the demand for STEM skills will be robust, as it has been throughout the information age, but AI technology may strengthen the rising demand for social skills as well[17].

Some of the job titles will be brand new. A search for 'generative AI' jobs on Indeed.com early this week found over 2,000 listings, including such titles as 'prompt engineer' and 'newsroom generative AI lead'.

Among firms, success deploying AI will depend on strategic decisions, such as investing in training, reorganization, and product development. Financing will need to be available to existing firms that appear to best leverage the potential of AI and to the innovative new firms that will surely appear with AI-based business models.

Policymakers, too, at all levels of government, will have to confront the changing world. Importantly, in the policy arena—as well as health care, consumer finance, insurance, and many others—decisionmakers have legal and ethical duties to be deliberate about the effects their choices have on affected groups. In this context, an AI black box with no insight into the decision-making process is of limited value.

As a policymaker, I look upon model-generated forecasts with a sceptical eye, if they are not coupled with a plausible explanation for the driving factors behind them.

More generally, when stakeholders have an opportunity to appeal a decision, they are entitled to understand how the decision was made—an issue I emphasized when I spoke at the 2018 meeting of this group[18]. So I am particularly interested in seeing progress on 'explainable AI', which may help bridge the divide between the technical sphere and the user[19].

In short, the impact of generative AI, as with all technical change, has to be understood in terms of human choice behaviour in specific social and institutional contexts. Generative AI will change the choice set available to consumers, firms, and policymakers. As it happens, because economists study choice behaviour, we are well positioned to contribute to the debate about AI and welfare and to anticipate the trajectory of this exciting trend.

Some questions you might consider include: Are there ways to limit the labour-force disruptions of AI while capturing its job-creating potential? What new training and skill development will be needed to capture AI's benefits? Can productivity measures be improved to better capture how quickly AI is affecting the economy?

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Endnotes

1. See Lisa D Cook, Matt Marx, and Emmanuel Yimfor (2022), "Funding Black High-Growth Startups," NBER Working Paper Series 30682 (Cambridge, Mass.: National Bureau of Economic Research, November).

2. On AI as prediction, see Ajay Agrawal, Joshua S Gans, and Avi Goldfarb (2019), "Artificial Intelligence: The Ambiguous Labor Market Impact of Automating Prediction," Journal of Economic Perspectives, vol. 33 (Spring), pp. 31–50.

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4. See Lisa D Cook, Janet Gerson, and Jennifer Kuan (2022), "Closing the Innovation Gap in Pink and Black," Entrepreneurship and Innovation Policy and the Economy, vol. 1, pp. 43–66.

5. See Charles I Jones (2023), "The A.I. Dilemma: Growth versus Existential Risk," working paper, September 12.

6. For the definition of general-purpose technology, see Boyan Jovanovic and Peter L. Rousseau (2005), "General Purpose Technologies," in Philippe Aghion and Steven N Durlauf, eds., Handbook of Economic Growth, vol. 1B (Amsterdam: Elsevier), pp. 1181–224.

7. Empirical papers providing evidence of the effectiveness of generative AI span a variety of tasks, including financial services, computer programming, call centres, and writing. For financial services, see Tracy Yang, Tian Lu, Beibei Li, and Lu Xianghua (2020), "Personalizing Debt Collections: Combining Reinforcement Learning and Field Experiment," ICIS 2020 Proceedings, December 14. For computer programming, see Sida Peng, Eirini Kalliamvakou, Peter Cihon, and Mert Demirer (2023), "The Impact of AI on Developer Productivity: Evidence from GitHub Copilot (PDF)," unpublished paper, Cornell University, arXiv, February. For call centres, see Erik Brynjolfsson, Danielle Li, and Lindsay R Raymond (2023), "Generative AI at Work," NBER Working Paper Series 31161 (Cambridge, Mass.: National Bureau of Economic Research, April). For writing, see Shakked Noy and Whitney Zhang (2023), "Experimental Evidence on the Productivity Effects of

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8. See Hassan N Khan, David A Hounshell, and Erica RH Fuchs (2018), "Science and Research Policy at the End of Moore's Law," Nature Electronics, vol. 1 (January), pp. 14–21. Moore's initial prediction was later revised to state that the number of components on a cost-effective integrated circuit would double every two years. See Gordon E Moore (1965), "Cramming More Components onto Integrated Circuits," Electronics, vol. 38(8), pp. 114–17; Gordon E Moore (1975), "Progress in Digital Integrated Electronics," Technical Digest 1975, International Electron Devices Meeting, IEEE, pp. 11–13.

9. See Paul A David (1990), "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox," American Economic Review, vol. 80 (May), pp. 355–61.

10. See Diego Comin, Danial Lashkari, and Martí Mestieri (2021), "Structural Change with Long-Run Income and Price Effects," Econometrica, vol. 89 (January), pp. 311–74.

11. See Erik Brynjolfsson, Daniel Rock, and Chad Syverson (2021), "The Productivity J-Curve: How Intangibles Complement General Purpose Technologies," American Economic Journal: Macroeconomics, vol. 13 (January), pp. 333–72.

12. See Ryan Decker, John Haltiwanger, Ron Jarmin, and Javier Miranda (2014), "The Role of Entrepreneurship in US Job Creation and Economic Dynamism," Journal of Economic Perspectives, vol. 28 (Summer), pp. 3–24.

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17. See David J Deming (2017), "The Growing Importance of Social Skills in the Labor Market," Quarterly Journal of Economics, vol. 132 (November), pp. 1593–640.
18. See Lisa Cook (2018), "The Consequences of AI-Based Decisions or Outsourcing Tasks When Humans Fail," presented at the NBER Economics of Artificial Intelligence Conference 2018, Toronto, September 13–14.
19. See Pantelis Linardatos, Vasilis Papastefanopoulos, and Sotiris Kotsiantis (2021), "Explainable AI: A Review of Machine Learning Interpretability Methods," Entropy, 23, 18.

The views I express here are my own and not those of the Board of Governors of the Federal Reserve System or the Federal Open Market Committee. This article is based on a speech delivered at the National Bureau of Economic Research Economics of Artificial Intelligence Conference, Fall 2023, Toronto, Canada, September 22, 2023.

Money and payments: a ‘black ships’ moment?

Jon Cunliffe recalls Facebook’s announcement in 2019 that it was launching a digital currency, and discusses the three areas where this galvanised more urgent action by authorities

It is difficult to overstate the importance of the announcement by Facebook in June 2019 that it intended to launch a multicurrency stablecoin, a new digital currency called Libra for general crossborder payment use. Indeed, one commentator has likened the impact of the Libra announcement on central banks to the sudden arrival off Tokyo harbour in 1853 of the 'black ships of evil appearance' - a modern, irresistible US fleet – that led quickly to the collapse of a centuries-old ruling system and to the opening up of Japan[1].

For the previous decade, central banks and financial regulators had been watching, with a wary eye, the development of cryptoasset markets, using new technologies, outside the conventional financial system. Many, like the Bank of England, had dipped a toe into the experimental water, running small experiments with these new technologies with the aim of understanding them and their possible use cases better. Some financial firms had gone further, exploring and investing in limited use cases within wholesale financial services.

And regulators, increasingly fretful about the cocktail of risks in unregulated cryptoasset markets – risks ranging from illicit finance to consumer harms and, potentially, to financial stability – had been debating whether and how to bring 'crypto' activities within regulation.

But the Libra announcement and the potential appearance of a new form of money, using new technology and moving between countries on new rails outside the current system, galvanised central banks and regulators into much more urgent action on a number of fronts.

I want to talk about three of those fronts: the G20 roadmap to improve crossborder payments; the Bank of England's exploration of the Digital Pound, a central bank digital currency; and the regulation in the UK of systemic payment systems using 'digital settlement assets' like stablecoins.

I will talk about the first wearing my hat as Chair of the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) and co-chair of the Financial Stability Board's Cross-Border Payments Coordination Group (CPC), and about the second and third wearing my Bank of England hat. I will of course be giving up both hats next week when my Bank of England term finishes, so this is really my parting shot.

But to be able to make sure that forms of money, and the means of transferring it, can evolve, without putting that essential confidence at risk, central banks, as the Libra moment reminded us, need to look to the future and prepare for it

Crossborder payments

The Libra project raised significant regulatory and financial stability concerns, leading to swift statements from both the G7 and G20 that *"no global stablecoin project should begin operation until the legal, regulatory and oversight challenges and risks… are adequately addressed"*[2].

But the project, and the benefits it claimed it could deliver, also shone a light on the cost, speed, reliability and availability of crossborder payment systems – a long-neglected corner of the international financial system.

Central banks, finance ministries and regulatory authorities realised quickly that they could not simply focus on the risks that new players and new technologies might bring; they needed also to understand and, if possible, address the shortcomings in the existing, less risky systems that created such opportunities for new technologies and new players.

And shortcomings there certainly were. In contrast to the improvements in domestic payment systems that were increasingly being seen in many jurisdictions, crossborder payments were slow, expensive and unreliable. Removing frictions in wholesale, retail and remittance payments across borders could both yield substantive economic benefits and improve access for millions to the international financial system[3].

So in February 2020, G20 Finance Ministers and Central Bank Governors tasked the FSB, CPMI and others to develop a roadmap to enhance global crossborder payments[4].

Work by FSB and CPMI revealed that this was not a simple problem, amenable to one or two quick solutions, but rather a complex set of interlocking frictions, both in the public and private sector, exacerbated by weak competition.

Moreover, while there were common themes, there was also substantial variation by payment types and by region and jurisdiction. The CPMI produced a comprehensive list of the necessary action areas, the so-called 'building blocks', covering infrastructure, data, regulation and competition, and these formed the basis of the FSB's roadmap of actions adopted by G20 leaders in the autumn of 2020[5].

So, three years on, as I pass the CPMI baton on to Fabio Panetta, the incoming governor of the Bank of Italy, it is fair to ask: *"How are we doing, and what are the priorities for the future?"*

We have built a strong, detailed, analytical foundation for the work. From 2021 to 2023, the CPMI and FSB produced a number of reports, analysing the key frictions and the actions for the public and private sector, in partnership, that are necessary to alleviate them. We have set out best practice where it exists and practical guidance on how to make changes in key areas.

Equally important, the G20 Leaders adopted in 2021 quantitative targets for improvement by 2027[6]. These cover speed, cost, access and transparency for wholesale, retail and remittance payments.

As we all know, 'what gets measured, gets done'. So, equally importantly, we have established the mechanisms and the data collection that will enable us to measure progress towards the targets. The first annual monitoring report against the targets was delivered to G20 Finance Ministers and Central Bank Governors in Marrakesh two weeks ago[7].

While the data are not perfect and there are important gaps we need to address, we are now able not only to measure how far we have to go but also to identify more precisely the areas for action that are likely to yield the greatest improvement.

We have started to see some concrete improvements. Since 2020, some countries have expanded access to their payments infrastructure to a wider range of financial institutions, or expanded their operating hours. Payment systems in more than 100 jurisdictions are already actively using the ISO 20022 messaging standard, which can carry far more information and so reduce payment failures.

CPMI and the private sector have now developed harmonised data requirements for these crossborder payment messages, which will prevent fragmentation[8]. Finally, a number of projects in Asia are showing the real benefits that can be achieved by interlinking fast payment systems[9].

However, as the monitoring report shows, we are significantly short of the targets for 2027. In general, on the main targets, we are between half and two thirds of the way there. That is not surprising perhaps, given we are halfway through the roadmap period. But, though achievable, given the timescales for investment and other action, it is a challenging distance to travel in four years.

So, in short, we have built a strong foundation for the work, including quantitative targets for 2027 and the machinery to monitor progress. We are starting to see some real improvements. But there is a long way to go, and it will need continued investment by the public and private sectors in infrastructure and data and regulatory changes.

As I said at the outset, both the frictions and the actions necessary to achieve them vary considerably by payment type and by region. But there are some common priority areas on which we will need to focus on the next phase of the work.

First, we need to see further upgrades to central bank and private sector payment systems. More than a dozen countries are developing and upgrading their real-time gross settlement (RTGS) systems over the next five years, for instance by expanding access or extending operating hours.

As an individual crossborder payment will often involve systems operated by both public and private sector institutions, the CPMI has launched a joint public-private sector taskforce to coordinate plans for the necessary improvements and ensure they coalesce around best practices[10].

Second, we need to implement the data standards for crossborder ISO 20022 payment messages and develop harmonised standards for application programming interfaces (APIs).

Third, we should facilitate and promote interlinking of fast payment systems. There are a range of technological solutions available or in prospect[11]. But the governance and oversight of interlinking arrangements can be a greater challenge than the technology.

CPMI is working on a report to the G20 next year on these governance and oversight issues that could serve as a useful reference for payment system owners and overseers, and it published an interim report for comment last week[12].

Fourth, we should pursue more effective, coordinated regulatory frameworks for crossborder payments, and remove unnecessary regulatory frictions. A key priority on regulation in the near-term will be for the Financial Action Task Force (FATF), in the first half of next year, to update their recommendation (which was originally developed 20 years ago) on detecting and preventing misuse of wire transfers by terrorists and other criminals.

A more granular recommendation, which takes into account new data standards and technology, will enable more consistent implementation across jurisdictions and enhance both the efficiency and the effectiveness of AML/CFT checks.

In addition to FATF's work here, there are a range of other frictions arising from the regulation of banks and non-banks, and a second public-private taskforce is focused on identifying actions to address these[13].

Fifth, we should support authorities beyond the G20 in addressing crossborder payment frictions. This month's progress report shows that the biggest frictions, not surprisingly, are in lower income regions such as Sub-Saharan Africa, and addressing these could bring transformative economic benefits. The IMF and World Bank are developing their programmes of technical assistance to support authorities in these countries.

And finally, we need to enhance competition and innovation. Currently, in most jurisdictions, only banks have access to domestic payment systems and central banks' RTGS systems – leading to weak competition, especially as the number of active correspondent banks worldwide fell by approximately 30% between 2011 and 2022.

Even where non-bank payment service providers can have direct access to payment systems, existing legal or regulatory barriers, or the high costs of direct access, prevent them from doing so. The CPMI has set out a framework of best practices to enable countries to review the access arrangements of their key payment systems[14].

It is perhaps this lack of access to payment rails operated by incumbents, and the need to use settlement assets provided by incumbents, that has helped to stimulate the exploration by potential challengers, like the Libra project, of new rails and new settlement assets using new technologies.

The Libra project, of course, after much work and much modification, fell by the wayside last year. The stumbling blocks appear to have been regulatory rather than technical.

However, though perhaps more muted, interest in using new technologies to develop new forms of settlement asset and new payment rails for use in the real economy – outside the world of cryptoasset markets – has not gone away[15]. The recent launch of the PayPal/Paxos stablecoin arrangement is one example.

These new technologies purport to offer improvements in speed, cost and reliability, all of which would make them attractive for crossborder use, and exploring their potential has therefore been included in the G20's roadmap.

However, these technologies also purport to offer new 'functionality' for money and payments that may make them competitive for domestic use – even in advanced jurisdictions that have developed sophisticated payment systems.

Technological advances have throughout history led to changes in the forms of money we use because they have made money easier and more convenient to use. The shift from physical cash to electronic payments that we have seen over the past decade has not occurred because people have lost confidence in cash[16]. Rather, it has happened because it has become more convenient and because physical cash cannot be used for internet commerce.

And small reductions in frictions and small increases in functionality matter, as the shift towards using mobile phones rather than cards at point-of-sale demonstrates[17].

The technologies that are loosely grouped under the broad heading of 'tokenisation' – cryptography, distributed ledger, atomic settlement, blockchain, fractionalisation and programmability – enable new ways of representing money that allow for greater automation of the transfer of money and the deeper integration of that transfer – the payment – into other processes.

While these technologies have been pioneered in cryptoasset markets, they could significantly transform everyday payments in the real economy, as I will discuss later.

One cannot of course say with certainty that it will be possible to deploy such technologies at scale for general use in the economy or that users will value and adopt the new functionalities. But it would be very unwise in my view to bet, as some seem to do, that we have reached the end of developments in payments and money – especially given the increasing and rapid digitalisation and automation of the processes of everyday life.

And this brings me to the other two areas of action that were accelerated by the announcement of the Libra project four years ago – the exploration of central bank digital currencies and the regulation of private sector firms that propose to use those technologies to create new forms of money like stablecoins and new payment systems for general use in the economy.

The Digital Pound

First, I will say a little about where we are in the UK on the possibility of introducing a retail CBDC, the 'Digital Pound'.

In February this year, the Bank of England and HM Treasury issued a consultation paper on the design of a Digital Pound[18]. The consultation paper did not propose the introduction of the Digital Pound. No decision has been taken to do that in the UK.

Rather, the paper concluded that current trends and technological advances in payments – the trends I have been discussing – made it likely that a Digital Pound would be needed by the end of the decade. The paper set out and invited comments on the detailed model of the Digital Pound we proposed to explore and test in the next stage of our work, prior to a decision in two to three years' time on whether or not to implement it.

We envisage the Digital Pound as a partnership with the private sector – a so-called 'platform model'. 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 and programme the Digital Pound, as the settlement asset, into the services they would offer to wallet holders.

The consultation paper offered two main motivations for the possible future introduction of the Digital Pound. The first is the most relevant to central banks. It concerns the role played by state money issued by the central bank to the general public in anchoring confidence in money and in supporting the singleness of money - the interchangeability of all monies, public and private, that circulate in the economy on demand and at par value.

The only form of state money available to the public at present – physical cash – is declining in use and usability. And as the Libra announcement highlighted, new, non-bank players could potentially exploit technological advance to offer new forms of money and new payment systems and services.

Against this backdrop, my view is that it is likely to be necessary to issue central bank money in digital form to support confidence in money, particularly in stress, and to ensure the singleness of money.

The second motivation concerns competition and innovation. While relevant to central banks, it is more a motivation for governments. Digital marketplaces, as we have learned, have a tendency to concentration as, of course, do payment systems[19].

This can be a barrier to competition and innovation, with the risk of new entrants wanting to offer new payment services being tied to particular private issuers of digital money and their payment systems. This may be a particular concern if 'big tech' firms enter more deeply into payments and money.

Competition and innovation may therefore be enhanced by providing a public alternative, a public digital money platform that allows private firms to offer services exploiting the new functionalities I have mentioned.

The Bank of England and HM Treasury consultation paper has stimulated a strong response, with over 50,000 completed responses. The responses fall into two broad categories. The majority express general, high-level concerns about three broad issues – privacy, programmability and the decline of cash.

The second, smaller category of responses comprises detailed comments on the proposed platform model and some other key design features, including the limits that have been proposed at least for the Digital Pound's introductory period.

We expect to publish a detailed response to the consultation in the coming months addressing both types of response. I do not want to anticipate that, but it is possible to make a few key observations on the consultation.

On the first category of response, the consultation document made clear that, under the proposed model, neither the government nor the Bank of England would see individuals' data. Rather, private sector payment firms would be the interface with the user, handling user information in the way banks do today.

Users would have at least the same, if not greater, protection of their privacy that they enjoy today when they make electronic payments. We also made a commitment that neither government nor the Bank would programme the

Digital Pound or constrain the uses to which it could be put. It would be for private sector firms to develop and offer, for user consent, payment services involving greater programmability.

As regards cash, the Government recently legislated to ensure the availability of physical cash to those who prefer to use it and the Bank has made clear that it will provide physical cash as long as there is any demand for it.

The responses to the consultation illustrate the importance of these key issues. It is clear that public confidence in our approach will be essential, if a future decision were taken to introduce the Digital Pound. During the design phase, we will develop the strongest possible protections in these areas, and the government has committed to introducing primary legislation before launching a Digital Pound[20].

On the second category of response, there is general support for the model of the Digital Pound we propose to explore and test further. There are, however, differing views on some key aspects, particularly the limits that we propose would apply, at least initially, to prevent rapid, destabilising changes to the banking system that could have financial stability implications.

Some question the need for limits, while banks in particular are concerned about the impact of CBDC on their deposit bases and on financial stability. And on use cases, while merchants, fintechs and payment services firms appear supportive of the possibilities, others, particularly banks, are more sceptical that attractive use cases will be developed for a retail Digital Pound.

We are still in the process of the detailed analysis of all of the responses and, as I say, we aim to respond comprehensively in the coming months. But I would observe, if only a little tongue in cheek, that criticisms of the Digital Pound have ranged from concerns that it would be adopted at a scale and pace that would disintermediate the banking system and threaten financial stability, to, at the same time, concerns that there would be no use for it and it would be a 'solution looking for a problem'.

Not surprisingly, as an institution charged with maintaining financial stability, we take the first point very seriously. Modelled estimates suggest that even with a very high level of take-up, the impact over time on the banking system should be manageable[21].

But these can only be estimates. We cannot know in advance the behavioural response of users to a Digital Pound, ie. the scale and speed of take-up by households and firms. That is why we have proposed that, initially at any rate, were we to introduce a Digital Pound, there would need to be limits on holdings.

During the next phase of development, and in advance of any decision on whether to introduce a Digital Pound, we would seek to refine, in the light of available evidence, our estimates of possible take-up and the consequent calibration of limits.

The second concern perhaps risks missing the point. I am reminded a little of Henry Ford, who is reported to have said that had he asked people what innovation they wanted, they would have asked for faster horses. Were we to decide to introduce the Digital Pound, the objective would not be to target some particular failing or identifiable use case not available in current payment systems.

Rather, it would be to create a public sector platform using public sector money that private payment services firms could use to exploit the greater functionality in money and payments that technology may now offer in an increasingly digitalised world.

Experimentation by a variety of private sector firms on a platform developed by the Bank of England and Bank for International Settlements' Innovation Hub provides some initial support for the view that with a relatively small range of technical features, a Digital Pound could support a very wide range of payments use cases[22].

While it might be possible to deliver some of the use cases through specific programming of existing payment systems using commercial bank money, there are clearly material advantages in a general-purpose platform and digital settlement asset that can be used and configured relatively simply, consistently and cheaply for a broad range of uses cases.

In the next phase of the work, we will work more intensively with the private sector to explore possible use cases for a Digital Pound and the technological design necessary to create the best platform for innovation. At the same time, we and HM Treasury will consult more widely to stimulate a national conversation on the Digital Pound.

Stablecoins

Similarly, it would be possible for the private sector to use these new technologies to create infrastructures and issue private money for general use in the economy. Indeed, that is precisely what the Libra project proposed – initially as a multi-currency basket stablecoin and subsequently as a dollar stablecoin[23].

This brings me to the third front on which the Libra project galvanised action – the development of international standards and domestic regulatory frameworks for stablecoins. To be clear, although stablecoins, whose value is linked to a fiat currency, have developed as the settlement asset and store of value in cryptoasset markets, the motivations behind these regulatory initiatives should not be seen primarily as an attempt to regulate the Wild West of highly speculative crypto markets.

I should say at this point that there is in my view a strong case for regulation of those markets, to protect investors, ensure market integrity and prevent their use for illicit finance. Indeed, in the UK, regulation has recently been extended to cover the marketing of cryptoassets, to ensure promotions are clear, fair and not misleading to retail investors[24].

And HM Treasury have consulted on the other key elements of a comprehensive cryptoasset regulatory regime, including regulation of the exchanges that provide the access to crypto markets – often, as we saw in the case of FTX, bundled with a range of other services and activities[25].

However, the regulatory initiatives that followed the Libra announcement have been directed primarily not at cryptoasset markets but rather stablecoins that could be used a means of payment in the real economy, both for crossborder and domestic use.

Thus in 2022, CPMI-IOSCO, the international standard setting body for payment systems and market infrastructure, issued guidance on the application to stablecoins of the international standards for systemic payment systems[26]. In much the same way, the FSB issued High-Level Recommendations on 'global stablecoins' in 2023[27].

Both effectively set standards for some of the unique features of payment systems using stablecoins, including not just the mechanism for the transfer of coins but also the need for the coinholder to have a clear claim on the issuer and the requirement for the issuer to be able to repay that claim, when requested, in fiat money at par value by the end of the day.

International standards of course are only effective if implemented by jurisdictions in legislation and regulation. Many jurisdictions, not least the United States, are currently wrestling with the question of how to extend their regulatory regimes to stablecoins and to cryptoassets more generally.

A number of jurisdictions, however, have legislated to bring stablecoins used for payments within the regulatory framework[28]. In the UK, the Financial Services and Markets Act passed by Parliament earlier this year gave the Bank of England power to regulate systemic payment systems using 'digital settlement assets' (including stablecoins).

The Act therefore extends the Bank of England's existing powers to regulate conventional systemic payment systems. The Financial Conduct Authority (FCA) will regulate the issuance and custody of stablecoins for conduct and market integrity purposes.

The Bank expects very soon to issue a Discussion Paper setting out its proposed regulatory regime for systemic retail payment systems using stablecoins[29]. I am not able to set out the proposed regime in detail today. But I would like to explain how we have approached the key issues and how we see this new regulatory regime fitting in alongside other regulatory regimes to avoid regulatory arbitrage.

First, and perhaps most obviously, is the question of why? Do we really need new forms of money issued by new players moving on new payment rails?

This is essentially the same question as I discussed earlier in the context of the Digital Pound. And much of the answer is the same. While it is not certain that these technologies will actually deliver the innovation and competition in payment services some have claimed, we do not want to prevent such innovation, provided – and this is a very, very important 'provided' – the risks can be managed to the same degree as equivalent risks are managed both for existing systemic payment systems and for the commercial bank money they use as a settlement asset.

There may well be some players who attempt to operate outside regulation. But setting out clearly the regulatory framework will enable those players who wish to innovate sustainably and responsibly to build the necessary management of risks into their business models and technology.

Second, I have said that our approach is to ensure that risks are managed to the same degree as equivalent risks are managed for existing payment systems and for the private, commercial bank money they transfer. This is an important elaboration of the fundamental principle of 'same risk, same regulation'.

It may not be possible, for technological or other reasons, to apply the current regulation for systemic payment systems and banks to systemic payment systems using stablecoins. It will, for example, be impossible to provide collective insurance akin to bank deposit protection, initially at any rate, as unlike for banks there is no broader industry among which to share the costs of a payout.

In order therefore to achieve the necessary level of protection of the coin holders' claim, and so protection against run risk, there will need to be more robust requirements in other areas, especially, but not only, in the requirements for the backing assets.

In that respect, the Financial Policy Committee of the Bank of England judged in 2022 that, to manage systemic risks, the backing assets should be high quality and liquid – either deposits at the Bank of England or very highly liquid securities[30]. The lack of deposit protection also has implications for the nature and enforceability of the coin holders' claim[31].

Third, we will require a legal entity that can be identified as the payment system operator and held responsible for the end-to-end management of risks. Stablecoin payment systems can be structured in many different ways, including arrangements where the issuance of the coin, the transfer of the coin and the storage of the coin (the wallets) are performed by separate entities.

It is not clear that use of public, permissionless transfer mechanisms, at least with current technology, would be consistent with this requirement. But our regime will be designed to be flexible and accommodate different structures insofar as that can achieved with the necessary management of risks.

Fourth, as with the Digital Pound, we cannot know in advance the speed and scale of adoption of such new forms of money and payments. We need therefore to be alive to possible financial stability risks from rapid transitions that could impact the stability of the banking system. For the Digital Pound, we have proposed limits, initially at any rate, to manage the risk, and it would make sense to take a similar approach to stablecoins.

Finally, we will aim to ensure clarity on regulatory boundaries and the business models that fit within them. The proposed regulatory regime is a payment system regime intended to enable innovation in payments. It is intended for business models focussed on generating revenues from payment services.

Business models that are focused on earning revenues from maturity and liquidity transformation – the return on the assets backing the liquid, money-like claims they issue – pose risks that are more appropriately regulated within the banking regime.

Likewise, business models that use stablecoins to represent claims on investment products, and which do not guarantee redemption at par, are not suitable for use in payment systems and need to be regulated under an investment regime.

Innovation using new technologies is not confined to new entrants. Banks, whose business model depends in part on issuing liquid liabilities (bank deposits) for payments use, may well want to use new technologies to tokenise and transfer bank deposits[32].

This would fall under the existing banking regime rather than the proposed regime for payment systems using stablecoins. There are a number of issues concerning the issuance and transfer of bank deposits in tokenised form that will need to be considered by bank regulators and banks themselves, including whether such tokens should be permitted to circulate freely like digital banknotes[33]. But the underlying nature of the claim, deposit protection and management of risks should be regulated in the banking regime.

Banks may also want to issue stablecoins under the proposed new regime. In that case however, our view is that they should be issued out of a separate, bankruptcy remote, legal entity with different branding, to avoid confusion among consumers and so avoid contagion in a stress between different forms of money.

Conclusion

I am often asked, *"what do central banks do?"* or, a more penetrating question – usually from schoolchildren: *"what is the Bank of England for?"* Rather than give them the long list of Bank of England functions – monetary policy, financial stability, bank regulation, payment system regulation, provision of cash etc – I give a much simpler answer.

Central banks are responsible for ensuring that that most foundational element of the economy and society, that is called money, 'works'. That people can use it every day with confidence – confidence in its value, confidence in its creditworthiness, its authenticity, its usability – and confidence that it will be accepted everywhere at the same value whatever form it takes.

And while we may not be the originators of technological innovation in money and payments, we do I think have a responsibility to ensure that beneficial innovation that will improve the usability and functionality of money can not only happen but can happen without putting confidence in money at risk.

One cannot know now whether the appearance of Libra off the shore of conventional money and payments was truly a 'black ships' moment. I certainly hope that the 'wake up' call for crossborder payments is not forgotten and that we deliver the long overdue improvements the G20 has set as the target.

Likewise, while I think that on current trends, the Digital Pound in the form we have proposed is likely to be needed by the end of the decade, the picture may look very different in two to three years' time when a decision is due to be taken.

And stablecoins and their associated technological innovations may never cross over at any scale from the highly speculative world of cryptoasset trading to the real economy.

But to be able to make sure that forms of money, and the means of transferring it, can evolve, without putting that essential confidence at risk, central banks, as the Libra moment reminded us, need to look to the future and prepare for it. Thank you for giving me the opportunity for this parting shot! ■

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Endnotes

1. I am indebted to Gillian Tett of the Financial Times for this striking historical parallel.
2. Investigating the impact of global stablecoins (bis.org), G7 Working Group on Stablecoins, October 2019: Communiqué: G20 Finance Ministers and Central Bank Governors, October 14, 2020 (utoronto.ca)
3. The global average cost for sending remittances was 6.79% in Q1 2020 – within Sub-Saharan Africa, the average cost was 8.9%. And for crossborder business-to-business payments, six out of ten of these required some kind of manual intervention, each one taking at least 15 to 20 minutes, according to a 2015 study by Traxpay. Moreover, given the scale of crossborder payment flows, improvements could provide significant benefits to the world economy - one estimate from Boston Consulting Group put the total value of crossborder payments globally at almost $150 trillion in 2017.
4. G20 Finance Ministers & Central Bank Governors Meeting (bundesfinanzministerium.de)
5. Enhancing Cross-border Payments - Stage 1 report to the G20 - Financial Stability Board (fsb.org), Enhancing cross-border payments: building blocks of a global roadmap (bis.org), Enhancing Cross-border Payments: Stage 3 roadmap - Financial Stability Board (fsb.org)
6. Targets for addressing the four challenges of crossborder payments: Final report - Financial Stability Board (fsb.org)
7. Annual Progress Report on Meeting the Targets for Cross-Border Payments: 2023 Report on Key Performance Indicators - Financial Stability Board (fsb.org)
8. Harmonised ISO 20022 data requirements for enhancing crossborder payments – final report (bis.org)
9. The link between Thailand and Singapore launched in 2021 has, according to the Bank of Thailand, reduced the costs of crossborder payments from $12-$30 to $5, and speed has increased from two days to two seconds.
10. Press release: Bank for International Settlements' Committee on Payments and Market Infrastructures invites market stakeholders to join crossborder payments interoperability and extension task force (bis.org)
11. Project Nexus between the BIS Innovation Hub Singapore Centre and ASEAN central banks is exploring interlinking fast payment systems on a multilateral basis, so that a payment system in one country could reach all the other countries in the network via a single connection.

12. Linking fast payment systems across borders: considerations for governance and oversight (bis.org)
13. FSB invites senior representatives from firms and industry associations to join crossborder payment taskforce - Financial Stability Board
14. Improving access to payment systems for crossborder payments: best practices for self-assessments (bis.org)
15. Card companies are also increasingly integrating stablecoins into their networks – eg. Visa announced in September 2023 that it will now also use the Solana blockchain, in addition to its use of Ethereum, to enable merchants to receive stablecoins such as Circle's USD Coin when they accept card payments.
16. Indeed, as part of our work on CBDC, the Bank commissioned focus group research on people's attitudes to money and payments. We found that, while understanding of the difference between publicly and privately issued forms of money was generally low, there was a strong consensus around the importance and safety of physical currency. See Annex 3, The digital pound: a new form of money for households and businesses? Consultation Paper (bankofengland.co.uk).
17. 30% of UK adults were registered for mobile payment apps like Apple Pay or Google Pay in 2022. Use of contactless card payments itself took off in 2013-14 after they started to be accepted on London buses and trains (offering a small but meaningful improvement in convenience over the existing 'Oyster' charge-cards), and they now account for 37% of all payments in the UK.
18. The digital pound: A new form of money for households and businesses? | Bank of England.
19. Unlocking digital competition: Report from the Digital Competition Expert Panel (publishing.service.gov.uk).
20. Deposited paper DEP2023-0393 - Deposited papers - UK Parliament.
21. New forms of digital money | Bank of England.
22. Project Rosalind, completed in June 2023, focused on the API which connects a central bank's CBDC ledger with the private sector providers of wallets and other services. With a set of simple and standardised API functionalities, public and private sector collaborators developed more than 30 use cases. For example: (i) enhancing online shopping by reserving a buyer's funds at time of purchase and automatically releasing this to the seller only once physical delivery of goods is

confirmed, potentially enabling greater competition in online retail as consumers might be more confident to shop online with a merchant or platform they haven't heard of; (ii) allowing commuters to purchase train tickets and be refunded immediately and automatically if the train arrives late, rather than separately completing a form and the train company separately instructing the refund; (iii) developing voice-authenticated payments using a smart speaker, and (iv) paying for car- parking by the minute through a stream of 'micro-payments' rather than paying for a block of time that the driver doesn't use all of. Project Rosalind: building API prototypes for retail CBDC ecosystem innovation (bis.org).

23. The Libra Association's first White Paper in June 2019 proposed a stablecoin backed by a multi-currency basket. In April 2020, a second White Paper made a number of changes to the initial proposal, including proposing a series of stablecoins each backed by a single fiat currency (though the concept of a multi-currency stablecoin was still present as a "digital composite of some of the single currency stablecoins available on the Libra network"). The Libra Association rebranded as the Diem Association in December 2020. In May 2021, it moved its primary operations from Switzerland to the US, focusing on the dollar stablecoin.

24. An FCA-led registration regime for anti-money laundering and counter-terrorist financing has also been in place since January 2020 for firms providing certain cryptoasset services in the UK.

25. Future financial services regulatory regime for cryptoassets - GOV.UK (www.gov.uk).

26. Application of the Principles for Financial Market Infrastructures to stablecoin arrangements (bis.org).

27. High-level Recommendations for the Regulation, Supervision and Oversight of Global Stablecoin Arrangements: Final report - Financial Stability Board (fsb.org).

28. The EU's Markets in Crypto-Asset Regulation (MiCA) came into force in June. And earlier this year, the Monetary Authority of Singapore announced the features of a new regulatory framework for stablecoins regulated in Singapore.

29. The Bank is considering the risks and benefits of innovations in wholesale settlement, including the use of stablecoins for wholesale purposes, and will set out its views in due course.

30. Financial Stability in Focus: Cryptoassets and decentralised finance | Bank of England.

31. For example, whether the coinholder has a claim on the issuer as with banks, or whether the backing assets are held in a bankruptcy-remote custody arrangement for the benefit of coinholders.
32. A form of privately issued electronic money, 'e-money', already circulates, and may continue to circulate, in the UK under regulation and larger-scale e-money issuers are occupying a growing share of the market in the UK, in direct competition with commercial banks. E-money issuers are presently regulated by the FCA for prudential and conduct purposes under a specific regulatory regime. The FPC has previously noted that this regime would not meet its expectations if e-money were to be used for payments at systemic scale. And HM Treasury has said the current e-money regime is likely to be revised to ensure requirements keep pace with the ongoing evolution of the sector.
33. For example, were banks to issue deposit tokens that could circulate freely (like digital banknotes issued by private banks), holders would have a transferable claim on the issuing bank where, in payment transactions that involve a transfer of the token between individuals, the recipient becomes a customer of the issuing bank. This would raise some difficult issues, such as around how a bank would maintain a single customer view of those who hold its liabilities in order to facilitate a rapid deposit insurance payout were the bank to fail, and around how banks would satisfy 'know your customer' requirements to prevent money laundering and terrorist financing.

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Responsible innovation in money and payments

Innovations in money and payments continue to be of primary importance. Michelle Bowman caution against solutions that could disrupt and disintermediate the banking system

Innovations in money and payments continue to be of primary importance to the Federal Reserve. As part of its key functions, the Federal Reserve carries out a number of different responsibilities that include:

- fostering a safe and efficient payment system and providing services that support US financial markets and private-sector payment, clearing, and settlement arrangements;
- promoting the safety and soundness of individual financial institutions and monitoring their impact on the financial system as a whole;
- setting US monetary policy; and
- helping to maintain the overall stability of the US financial system and the economy.

As a policymaker, I view responsible innovation through the lens of accomplishing these policy goals.

Innovation in money and payments can take many forms. We have continued to see interest in digital assets, such as cryptoassets, stablecoins, central bank digital currency (CBDC), and programmable payment platforms, including those built on distributed ledger technology (DLT).

Alongside these innovations, we have embraced opportunities to improve the existing payment infrastructure by adopting and developing instant payments, planning for future technology upgrades and improvements, and considering other more straightforward changes like expanding operating hours for the wholesale payment infrastructure.

I will share my views on several of these potential improvements, including CBDC, other digital assets, and wholesale payments innovations. I will also discuss the importance of determining whether the benefits of innovation flow from the new technology itself or, rather, result from policy choices that require new technology adoption.

While I support responsible innovation that benefits consumers, I caution against solutions that could disrupt and disintermediate the banking system, potentially harming consumers and contributing to broader financial stability risks

Throughout, I will lay out a vision for responsible innovation, which recognizes the important role of private-sector innovation and leverages the strengths of the US banking system supported by clear prudential supervision and regulation, and I will discuss how policy can support the continued development of the payment system and broader financial system.

Digital assets

Often, discussions about the evolution of the payments landscape focus on novel forms of payment, including CBDC, stablecoins, and other forms of digital assets.

Central Bank Digital Currency

First, I will touch on CBDC. For the purposes of this discussion, I will define CBDC as a new, digital form of central bank money widely available to the general public. Some refer to this as a 'general purpose' or 'retail' CBDC.

There are meaningful differences between this type of retail CBDC and what is commonly referred to as a wholesale CBDC, which is a term some use to refer to digital central bank money used to settle large-value transactions among banks. While I will return to the concept of a wholesale CBDC in a moment, I would like to share my thoughts on the debate about the introduction of a retail CBDC in the United States.

As I have noted before in other venues, there are two threshold questions that a policymaker should ask when contemplating a CBDC. First: what problem is the policymaker trying to solve, and is there a more efficient way to solve it?

Second: what features and considerations, including unintended consequences, should a policymaker think about before deciding to adopt a CBDC and in designing the operation of a CBDC?[1]

On the first question, we have seen a range of arguments in the public debate about issuing a CBDC, including addressing frictions within the payment system, promoting financial inclusion, and providing the public with access to safe central bank money. These are all important issues.

I have yet to see a compelling argument that a US CBDC could solve any of these problems more effectively or efficiently than alternatives, or with fewer downside risks for consumers and for the economy.

Yet in the United States, we have a safe and efficient payment system that continues to evolve with responsible innovations, like the FedNow Service, which is the Federal Reserve's new interbank system for instant payments that launched in July of this year.

Through FedNow, participating banks, businesses, and consumers can send and receive instant payments in real time, around the clock, every day of the year, with immediately available funds.

FedNow, and a similar private sector service, is designed to help make everyday payments faster and more convenient, allowing consumers to instantly receive funds with same-day access, and enabling small businesses to more efficiently manage cash flows without processing delays.

Future innovations may further build upon these services to more effectively address payment systems frictions and financial inclusion. It is quite possible that other proposed solutions may address many or all of the problems that a CBDC would address, but in a more effective and efficient way.

Further, the potential benefits of a US CBDC remain unclear, and the introduction of a US CBDC could pose significant risks and tradeoffs for the financial system. These risks and tradeoffs include potential unintended consequences for the US banking system and considerable consumer privacy concerns.

The US banking system is a mature, well-functioning, and effective system that delivers important benefits to our economy. Within this system, banks play a number of important roles, including providing consumers with access to credit and other banking and payments services, all within an established regulatory perimeter.

In addition, bank compliance and reporting programs support important public policies, like deterring criminal activity and protecting consumer financial data. Banks also play an essential role in the transmission of monetary policy, and they provide the foundation for a well-functioning economy and financial system.

The US intermediated banking model helps to insulate consumer financial activities from unnecessary government overreach, and I believe this is an appropriate model for future financial innovation. If not properly designed, a CBDC could disrupt the banking system and lead to disintermediation, potentially harming consumers and businesses and presenting broader financial stability risks[2].

As policymakers, we would need to carefully consider how an intermediated CBDC, with private-sector service providers, could be designed in a way that maintains financial institution involvement and minimizes, or ideally, eliminates related disruptions to the broader US financial system.

I believe it is important to continue to research the possible benefits, risks, and tradeoffs of a potential US CBDC, and to follow international CBDC developments that could have implications for the United States.

However, given that we have a safe and efficient payment system and a well-functioning banking system, the potential uses of a US CBDC remain unclear and, at the same time, could introduce significant risks and tradeoffs.

That said, recognizing the interconnected and global nature of the financial system, I see value in continuing to research and understand the underlying technology and associated policy implications as other jurisdictions continue to actively pursue CBDCs.

Doing so ensures we are aware of and can be responsive to any developments and can continue to support a safe and efficient financial system into the future.

Stablecoins

But a CBDC is just one potential piece of the evolving payments landscape. Another alternative to traditional forms of money and payment, or to a CBDC, is stablecoins. This form of payment emerged primarily to support the trading of cryptoassets but increasingly has been proposed as an alternative to traditional payments and as a store of value.

Stablecoins purport to have convertibility one-for-one with the dollar, but in practice have been less secure, less stable, and less regulated than traditional forms of money.

Digital assets used as an alternative form of money and payment, including stablecoins, could pose risks to consumers and the US banking system. Therefore, it is important to understand risks and tradeoffs associated with digital assets and new arrangements used for banking and payments.

While I support responsible innovation that benefits consumers, I caution against solutions that could disrupt and disintermediate the banking system, potentially harming consumers and contributing to broader financial stability risks.

And, where the activity happens outside the regulatory perimeter, consumers would be left without the adequate protections that our regulated and supervised banks provide today in the United States.

A comprehensive regulatory framework

For these reasons, my vision for responsible innovation includes a clear and sensible regulatory framework, where we incorporate what works well today in the US banking system, allowing for private sector innovations within established guardrails.

Within this framework, it is imperative that the same activities that present the same risks are subject to the same regulations—regardless of what a product is called and by whom it is offered. I think the desire for 'new' often leads us to overlook existing success, both in terms of regulatory approach and financial services.

Rather than speculate about the composition of alternative regimes, we should ask how these new products and providers can be held to the same standards as banks, especially with respect to consumer protection.

As an example, stablecoin issuers today typically are licensed or chartered at the state level as money service businesses or trust companies, and, in some cases, offer bank-like services, including the ability to store funds.

However, while many of these issuers are subject to state supervision, they are not subject to the full complement of prudential regulation applicable to banks like capital requirements and prudential supervision. They also do not benefit from the backstops and protections available to banks like deposit insurance coverage and access to central bank liquidity in times of stress.

In order to protect consumers, it is imperative that activities that present the same risks are subject to the same regulations and offer the same protections. This approach would also allow banks to compete on a level playing field in introducing products and services to benefit consumers. This type of regulatory clarity can provide support for responsible innovation.

Wholesale payments innovation

Next, I will speak to potential improvements, including technological innovations, in wholesale payments. Wholesale payments generally refer to large-value, interbank transactions, and not consumers sending money to other consumers. This refers to the financial plumbing that banks use behind the scenes to settle payments.

The Federal Reserve continues to speak to a broad range of stakeholders and conduct research regarding emerging technologies, including those that could enable or be supported by future Federal Reserve-operated payment infrastructures.

The goal is to better understand potential opportunities and risks of new wholesale payment platforms, including those built on DLT, as well as the associated risks and benefits of depository institutions transacting on these platforms with 'tokenized' forms of digital central bank money, sometimes called wholesale CBDC.

In my view, the term 'wholesale CBDC', despite its wide use, is generally a misnomer that leads to confusion since we already have central bank money in digital form that is available to banks for wholesale transactions[3].

Today, banks and other eligible entities hold central bank money as digital balances at the Federal Reserve—frequently referred to as reserves. These reserves are held for a number of purposes, including settling large-value interbank payments.

Interbank payment services, like the Fedwire Funds Service and other private sector services, are critical to the functioning and stability of the financial system, and the economy more broadly, as they enable important financial market functions[4].

Wholesale payment infrastructures operated by the central bank tend to underpin domestic and international financial activities by serving as a foundation for payments and the broader financial system. This infrastructure allows payments to flow safely between consumers and businesses within the United States and internationally.

Since this infrastructure is so critical to the payments system, it is necessary that we investigate and understand the potential opportunities, risks, and tradeoffs for wholesale payments innovation to support a safe and efficient US payment system.

These wholesale systems function safely and efficiently today, but we have seen new payment platforms built on innovative technologies that have generated interest in new capabilities. This includes transacting 'tokenized' forms of money and assets and enhancing the programmability of payments through the transfer of money using so-called smart contracts.

These platforms are also being explored as a way to improve the efficiency of payment, clearing, and settlement of certain financial transactions, including for crossborder purposes.

Policymakers should be mindful of the specific features innovative wholesale platforms could include, and the risks, tradeoffs, and other considerations they could entail. For example, one potential model under consideration is the concept of a common platform or shared ledger that could facilitate digital asset transactions, including commercial bank and central bank liabilities[5].

This type of ledger could be specific to one jurisdiction (such as US dollar transactions only among regulated financial institutions) or across jurisdictions and containing multiple currencies.

While there is interest in new capabilities and efficiencies that a shared ledger could offer, transacting central bank money on a shared ledger may introduce additional risks and operational complexities. This would depend on how a platform would be governed, and which entities would be allowed to participate.

In the United States for example, this technology would introduce risks and complexities that do not exist today because a shared ledger might allow central bank money to circulate on a platform that is not owned and operated by the central bank. Important legal, policy, and operational questions would need to be thoroughly considered alongside an assessment of potential benefits.

Another potential model is one where central banks maintain their own ledgers—just as they do today—and use DLT as a bridge between distinct ledgers to achieve interoperability and facilitate crossborder, cross-currency payments[6].

Still other models exist across both wholesale and retail payments that would leverage existing infrastructure. Examples include experiments that look at interlinking faster domestic payment systems to facilitate crossborder payments, or even exploring how existing domestic payment infrastructures could be incrementally improved[7].

Each model contains its own set of potential features and tradeoffs. While my vision for responsible innovation includes a broad understanding of different options, I continue to emphasize that to help focus efforts, we must begin by asking 'What specific problem are we trying to solve?'

The importance of policy choices

This brings me to the question of whether the potential benefits from innovation come from new technology or from changes to existing policy. While conversations on payments innovation often focus on the technological capabilities, policymakers must apply a critical lens to understand whether changes to regulations or policies would be necessary to address specific concerns.

Some potential technology solutions assume—or even require—policy change, such as issues related to operating hours and account access. In these cases, a new technology alone cannot solve the issue. Some point to a decentralized infrastructure to support digital assets as a solution to address current frictions in crossborder payments, like speed and cost of payments.

However, these perceived payment limitations do not always stem from problems with existing technology, but rather from existing policies, laws, and even consumer and business preferences. And within the international context, some changes may require greater alignment across jurisdictions.

Some purported payment limitations or frictions exist for specific reasons related to managing key risks that policymakers may not want to change, and it is important to understand the tradeoffs of these policy decisions.

Let's use the example of compliance requirements that deter financial crimes and counter the financing of terrorism. These policies exist to accomplish specific policy goals and are implemented by banks that balance the need for transparency to deter crime and the protection of consumer financial information from government overreach.

In these cases, the perceived barriers in existing payment systems are established for important public policy reasons and are not limitations resulting from the existing technology itself. It is important to not only thoroughly understand what technological innovations can do, but also what these innovations should be able to do within the broader context of a robust, well-functioning banking and payments system.

My vision for responsible innovation requires that we continue to distinguish which specific payment frictions can benefit from technological innovation itself and which are questions of policy and exist for good reasons, as well as the recognition that we should not compromise vital public policies in the name of innovation.

The importance of continued research

The Federal Reserve remains open to multiple options to improve the payments landscape. We continue to conduct research to fully understand technological innovations and their associated benefits, risks, and tradeoffs. We must also fully understand any related implications for Federal Reserve payment infrastructure and policy outcomes.

Researchers cover a wide range of policy areas, including payments policy, privacy considerations, financial inclusion, financial stability, and monetary policy implications. Because new digital assets are currently focused on tokenization of certain traditional or even new types of money, tokenization is a research theme for the Federal Reserve and for central banks globally.

While this topic is relevant to CBDC research work, it will also inform other issue areas—including discussions about stablecoin regulation, novel banking activities supervision, and efforts to improve the current payment system.

Technologists at the Board and the Reserve Banks have been conducting focused research and experimentation to provide insight into technical capabilities and risks associated with digital assets, including CBDC, and the programmable platforms that could support payment infrastructure improvements.

These experiments give the researchers hands-on experience with new technologies and allow the Federal Reserve to examine the application of emerging technologies in retail, wholesale, and crossborder use cases.

The Federal Reserve Board continues to collaborate closely with international counterparts on issues related to digital payments. This includes engagement with multilateral institutions, such as the Bank for International Settlements, G7, Financial Stability Board, and bilateral engagements with other central banks.

This work reflects the interconnectedness of the global financial system and allows us to follow actions taken by other jurisdictions and understand any related implications for the United States.

Conclusion

As the money and payments landscape evolves, I continue to stress the importance of looking ahead and analysing potential changes that may emerge well into the future. This can be done most effectively by understanding the broad range of options that could be leveraged to improve payments, including technology, improvements to existing payment infrastructure, and policy options and their implications.

Given the breadth of activity in this space, I believe that policymakers must specify the problems they are trying to solve, understand the range of alternatives that could address any problems, including policy and technology options, and thoroughly analyse the associated risks and tradeoffs.

For all of the Federal Reserve's involvement in this work, I support a responsible approach to innovation that recognizes the role of private sector innovations, benefits from the strengths of the US banking system, and focuses policymakers on thinking about payment and financial system infrastructure and effective policy.

To achieve this, I support a clear regulatory framework that provides for responsible innovation while building upon what works well today and preventing disruption of the US banking and payment system. ■

Michelle W Bowman is a Member of the Board of Governors of the Federal Reserve System

Endnotes

1. For additional discussion on CBDC, see Michelle Bowman, "Considerations for a Central Bank Digital Currency" (speech at Georgetown University, Washington, D.C., April 18, 2023).

2. The Federal Reserve's initial analysis suggests that a potential US CBDC, if one were created, would best serve the needs of the United States by being privacy-protected, intermediated, widely transferable, and identity-verified. See Board of Governors of the Federal Reserve System, "Money and Payments: The U.S. Dollar in the Age of Digital Transformation (PDF)" (Washington: Board of Governors of the Federal Reserve System, January 2022).

3. Fabio Panetta, member of the Executive Board of the European Central Bank, has argued that wholesale CBDC has existed for decades. See Fabio Panetta, "Demystifying wholesale central bank digital currency" (speech at the Deutsche Bundesbank Symposium on Payments and Securities Settlement in Europe, Frankfurt, Germany, September 26, 2022).

4. For additional discussion on wholesale CBDC versus reserves on a wholesale payment platform, see Jon Durfee, Jesse Leigh Maniff, and Priyanka Slattery, "Examining CBDC and Wholesale Payments" (Washington: Board of Governors of the Federal Reserve System, September 8, 2023).

5. Agustín Carstens, general manager of the Bank for International Settlements, has discussed the idea of a 'unified ledger' run by the central bank to fully realize the potential of new technologies developed by the private sector. See Agustín Carstens, "Innovation and the Future of the Monetary System" (speech at the Monetary Authority of Singapore, February 22, 2023).

6. For example, see Project Cedar, a technical experiment by the Federal Reserve Bank of New York's Innovation Center, which examined whether distributed ledger technology could be used to improve the efficiency of crossborder payments and settlements involving multiple currencies, at https://www.newyorkfed.org/aboutthefed/nyic/project-cedar.

7. For example, see the Bank for International Settlements Innovation Hub Project Nexus proof-of-concept, which explores the interlinking of domestic faster payment systems.

Thank you to Alex Sproveri and Priyanka Slattery of the Federal Reserve Board for their assistance in preparing this text. These views are my own and do not necessarily reflect those of the Federal Reserve Board. This article is based on a speech delivered at Roundtable on Central Bank Digital Currency, Harvard Law School Program on International Financial Systems, Washington, D.C., October 17, 2023.

Retail CBDC and the social costs of liquidity provision

Dirk Niepelt compares the current monetary architecture with systems that also feature a central bank digital currency

The current monetary architecture features non-banks that transact with bank deposits, and banks that settle payments with central bank reserves. This column compares the current regime with systems that also feature a central bank digital currency. It finds that a system based on a central bank digital currency can be a less costly alternative to the current two-tier regime, particularly after accounting for direct and indirect costs. Furthermore, it argues that the interest rate on the digital currency should differ from zero and from the rate of interest on reserves.

The prospect of retail central bank digital currency (CBDC) has rekindled interest in the architecture of the monetary system (Niepelt 2021). Currently, this architecture exhibits two tiers: nonbanks transact using bank deposits (or claims on deposits), while banks settle payments with central bank issued reserves.

CBDC subverts this two-tier system by offering the general public a digital, central bank-issued payment instrument that directly competes with deposits (eg. Böhme and Auer 2020, Board of Governors 2022). In other words, CBDC constitutes a step towards earlier monetary architectures, in which central banks offered accounts not just to banks but also to nonbanks (BIS 2018).

Should we take that step? In a new paper (Niepelt 2023), I address this question by analysing how monetary architecture shapes the social costs of liquidity provision. I compare three different regimes: (1) a two-tier payment system like the current one; (2) a single-tier central bank digital currency based system; and (3) a hybrid architecture in which reserves, deposits, and CBDC co-exist.

I find that a two-tier system likely generates lower direct costs of payments than a CBDC-based architecture. Another downside of CBDC results from its crowding out of deposits: while the central bank can offset deposit outflows by lending to banks, this is costly due to agency frictions.

The upside of CBDC is that it allows to bypass frictions in the banking sector such as deposit market power and externalities from reserve holdings. The social costs of addressing these frictions, which CBDC avoids, erode the advantage of the two-tier system.

A recurrent finding in our analysis is that the two central bank liabilities – reserves and CBDC – should pay different interest rates

A model of payments and bank funding in general equilibrium

I derive these results in the textbook growth and business cycle model augmented with liquidity demand, banks, and multiple costly payment instruments. Households value the liquidity of deposits and central bank digital currency. Banks exert deposit market power and invest in capital; they also hold reserves to avoid costly liquidity shortages but do not fully internalise the benefits.

The central bank issues CBDC and reserves and controls their price or quantity; it may also subsidise deposits to counteract monopsony distortions in the deposit market. Cash and government bonds are unimportant.

The optimum in this economy is intuitive. Payment instruments are provided up to the point where the marginal liquidity benefit equals the marginal social cost; that is, a generalised version of the Friedman (1969) rule holds that accounts for the resource costs of payment operations[1].

As for the source of liquidity, the optimal monetary architecture is the one that generates the lowest effective resource costs. Depending on household preferences and payment technology this may be a fully CBDC based, deposit, and reserves based, or hybrid system.

Payment operation costs: deposits dominate central bank digital currency

Deposits are optimally only partly backed by reserves because starting from full backing, liquidity transformation saves banks costs at the margin.

CBDC-based payments therefore must be more efficient than a narrow-bank arrangement (deposits fully backed by reserves) to be competitive with deposit-based payments. The calibrated model suggests that this is not a high hurdle to overcome but sufficient to make the case for CBDC a weak one if we strictly focus on payment operations.

Figure 1 illustrates this graphically. The dark grey area represents the efficiency advantage of CBDC relative to a narrow bank arrangement (full backing of deposits with reserves) that is required for CBDC to be less costly than a two-tier system with optimum reserve holdings by banks.

The second statistic (shown in the light grey area) represents the same object except that the actual reserve holdings in the US rather than the (higher) model-implied optimal ones are used. The figure displays histograms of two million realisations. The figure reports histograms because the two statistics are computed for many different calibrations, reflecting multiple data sources, and allowing for measurement error.

The dark grey distribution indicates that a small cost advantage of CBDC over narrow banks (of less than 1%) suffices to render CBDC less costly than the best possible two-tier system. The light grey distribution in Figure 1 illustrates that CBDC could exhibit large cost disadvantages relative to narrow banks (of between 9% and 49%) and still be less costly than the status quo.

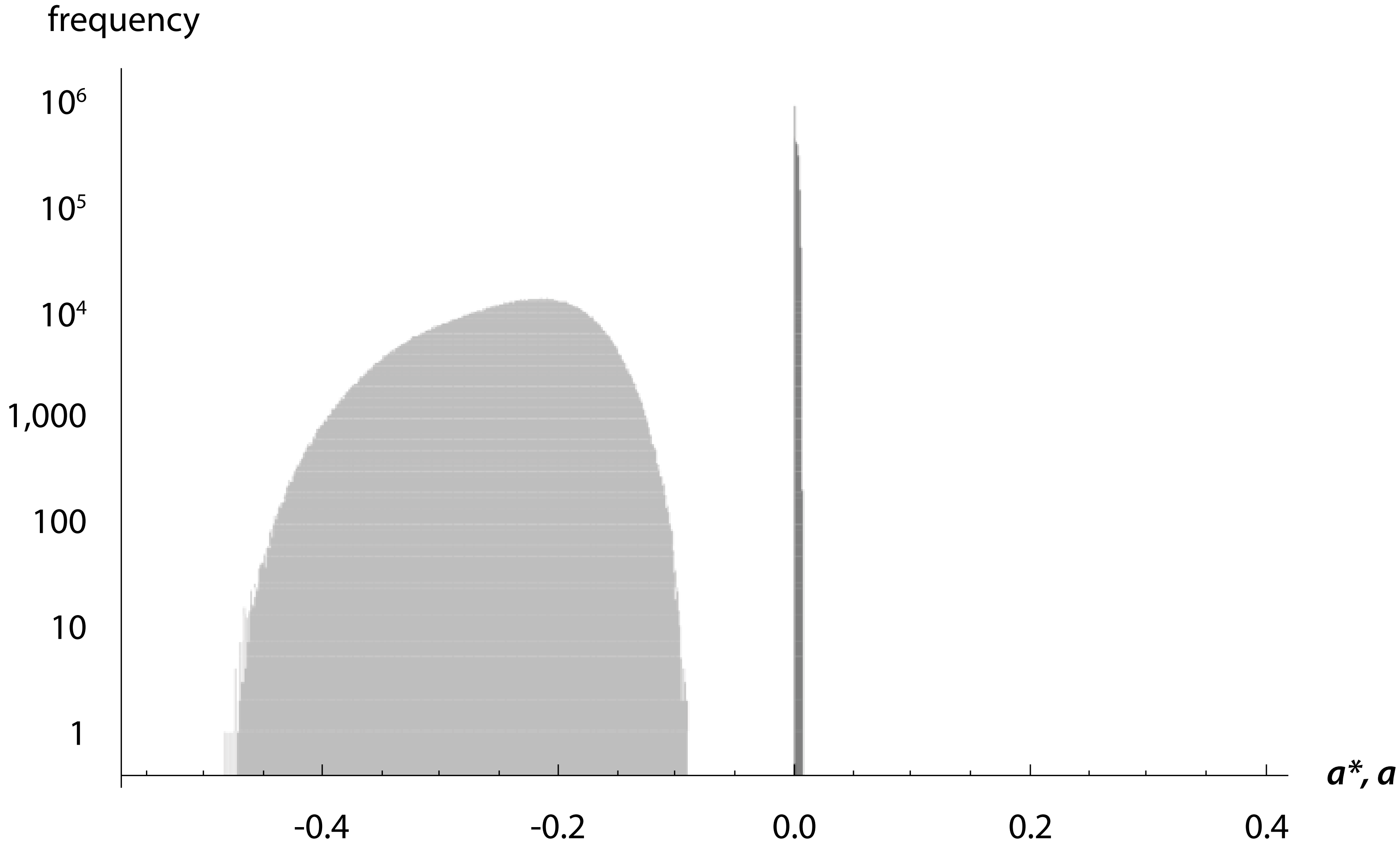
Lending frictions: deposits dominate central bank digital currency

The advantage of deposits and reserves over CBDC becomes more pronounced when I introduce an important bank lending channel, that is, when capital investment must be funded through banks rather than the central bank.

Since the central bank can pass CBDC funds on to banks by lending to them and since this decouples liquidity provision from bank lending (Brunnermeier and Niepelt 2019) a bank lending channel does not undermine our liquidity centric perspective[2]. But it weakens the case for CBDC if pass-through funding carries social costs.

Such costs likely exist. Political economy frictions could imply costly pressure from interest groups when the central bank lengthens its balance sheet. Information frictions could render it difficult to supply pass-through funding at adequate terms.

Figure 1. Distribution of necessary efficiency advantage to justify a central bank digital currency



Notes: The dark grey area represents the efficiency advantage of CBDC needed to make it less costly than a two-tier system with optimum reserve holdings. The light grey area displays the same object but based on actual US reserve holdings rather than model-implied optimal ones. The distributions are based on two million realisations.

And the central bank's insistence on scarce collateral for its loans to banks (which contrasts with the willingness of depositors to provide unsecured funding) could also give rise to social costs. Absent credible information, we assume that these costs are very high, more than an order of magnitude larger than the central bank operating costs of settling bank payments with reserves.

Figure 2 illustrates the results. As before, the dark grey and the light grey distributions represent the efficiency advantage of CBDC relative to a narrow bank arrangement that is required for CBDC to be less costly than a two-tier system. Unlike the statistics in Figure 1, the new statistics account not only for payment operations but also for pass-through costs.

Not surprisingly, costs of pass-through funding imply that a CBDC based payment architecture must exhibit substantial efficiency advantages relative to a narrow-banking payment technology in order to make liquidity provision through CBDC cheaper than through a two-tier, deposit- and reserves-based architecture.

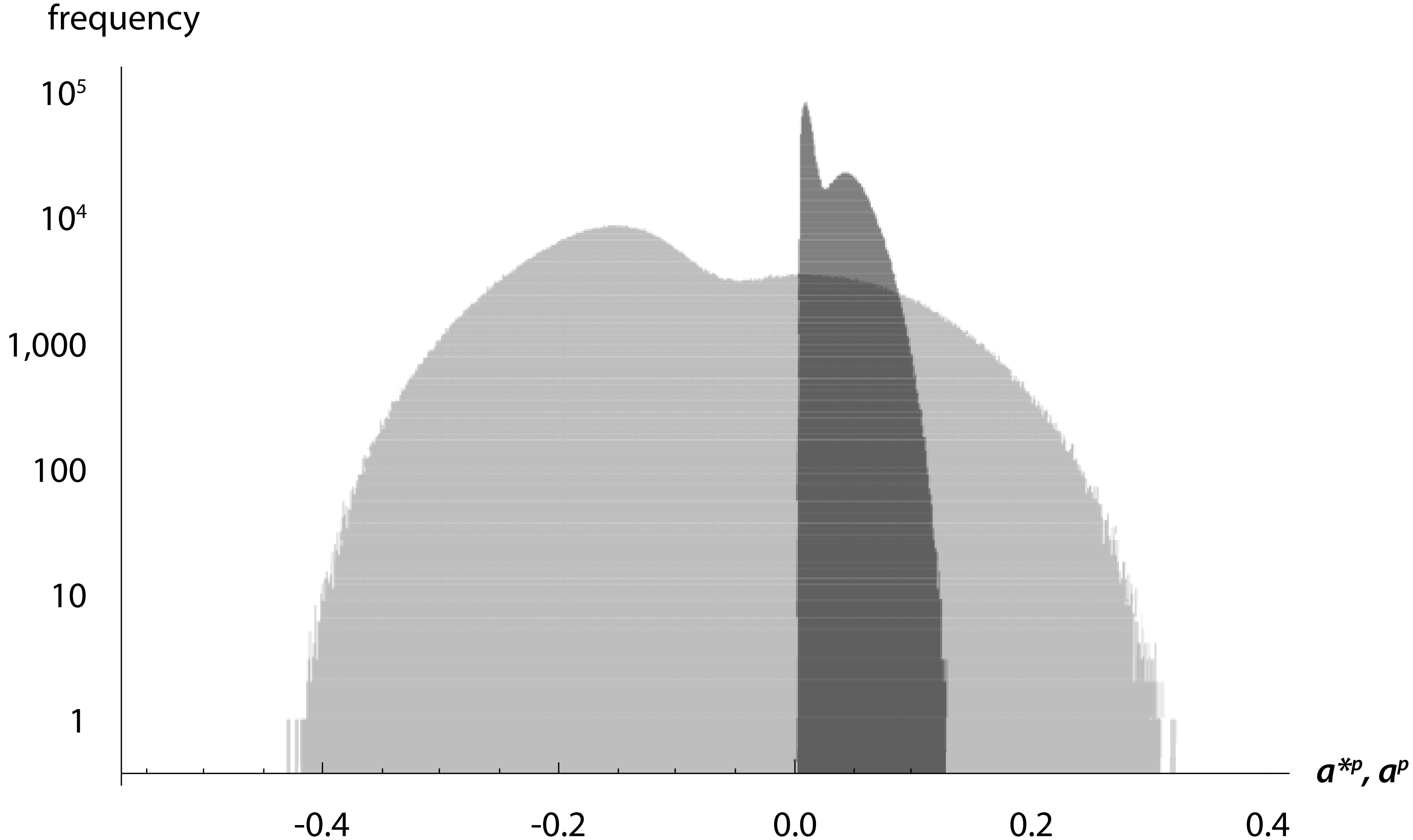
Subject to optimal reserve holdings, CBDC operations must be between 0.24% and 14% more efficient; subject to actual reserve holdings, the required efficiency advantage lies between -44% and +33%. The case for CBDC therefore is weak if reserve holdings are optimal and mixed if they correspond to actual ones.

Frictions in the banking sector: central bank digital currency dominates deposits

Central bank digital currency gains in appeal when we account more fully for the social costs of the two-tier architecture. We consider several sources of such costs and calibrate one.

In particular, we show that, unlike in the single-tier system, optimal policy in the two-tier system requires fiscal resources or regulation to address the frictions in the banking sector. Deadweight losses of taxation or regulation therefore add to the social costs of the two-tier, but not the single-tier payment system.

Figure 2. Necessary efficiency advantages for central bank digital currency: allowing for pass-through costs



Notes: The dark grey area represents the efficiency advantage of CBDC needed to make it less costly than a two-tier system with optimum reserve holdings. The light grey area displays the same object but based on actual US reserve holdings rather than model-implied optimal ones. These distributions allow not only for payment operations but also for pass-through costs. The distributions are based on two million realisations.

When we adopt this broader perspective, the ranking of single- and two-tier architectures turns around. Intuitively, the technological advantage of fractional reserve banking over narrow banking and the social costs of pass-through funding are minor compared to the excess burden of measures to address frictions in the banking sector.

Figure 3 illustrates this result. It displays realisations of the two statistics that now also account for tax distortions or more generally, for distortions that arise in the process of addressing the frictions in the banking sector (lack of competition and reserve externalities). We quantify the resulting distortions by assuming that taxing households causes deadweight burdens of 25% per tax dollar.

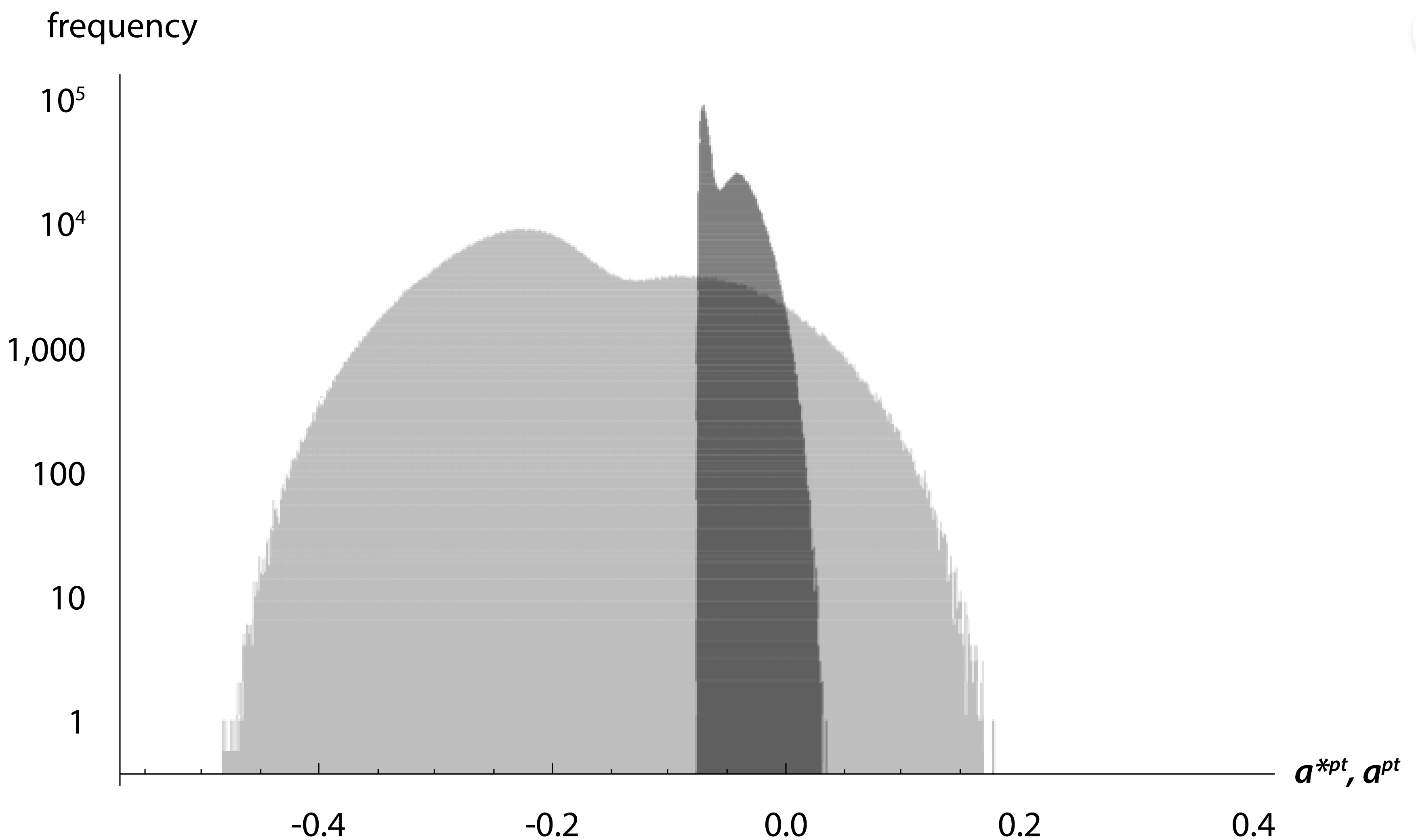
Compared with Figure 2, which illustrates the case with pass-through costs but no tax distortions, both distributions are shifted to the left. The dark grey distribution lies between -7.5% and +3.5% with mean and median below -5%; the cumulative density evaluated at zero exceeds 99%.

The light grey distribution lies between -48% and +18% with typical values around -19%; its cumulative density evaluated at zero exceeds 94%. These results suggest that central bank digital currency subject to the operating cost structure of narrow banks (or cheaper) generates social cost savings relative to deposits, independent of whether reserves are at their optimal or actual levels.

Other findings: non-circulating central bank digital currency and interest on CBDC

We also analyse the case for a non-circulating CBDC. When deposits are the efficient retail means of payment but a deposit tax/subsidy to steer banks' price setting is not admissible, a non-circulating central bank digital currency with a suitably chosen interest rate target can alternatively serve to discipline banks (Andolfatto 2021).

Figure 3. Necessary efficiency advantages for central bank digital currency: allowing for pass-through costs and tax distortions



Notes: The dark grey area represents the efficiency advantage of CBDC needed to make it less costly than a two-tier system with optimum reserve holdings. The light grey area displays the same object but based on actual US reserve holdings rather than model-implied optimal ones. These distributions allow for pass-through costs and tax distortions, quantified by assuming taxing households causes deadweight burdens of 25% per tax dollar. The distributions are based on two million realisations.

We show that this mechanism only operates under certain circumstances. We also find that a non-circulating CBDC can be helpful even if a deposit subsidy is admissible; this is the case when the subsidy is more expensive than a noncirculating CBDC and tax collections are distorting.

A recurrent finding in our analysis is that the two central bank liabilities – reserves and CBDC – should pay different interest rates (distinct from zero). Intuitively, the spread on a circulating means of payment should reflect social costs and externalities, which differ between reserves and CBDC.

And the interest rate on a noncirculating CBDC disciplining banks should reflect the central bank's target for the deposit rate, which reflects factors unrelated to the social costs of reserves. Implementing the optimal policy therefore requires the government to price discriminate between wholesale and retail holders of central bank liabilities[3].

Conclusions

We draw three main conclusions. First, it is critical to account for indirect in addition to direct social costs and benefits when ranking monetary architectures. Second, the costs and benefits we consider point to an important role of central bank digital currency in an optimal monetary architecture unless pass-through funding is necessary to stabilise capital investment and very costly[4]. Third, the interest rate on CBDC should differ from zero and from the rate on reserves. ■

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Endnotes

1. The optimal liquidity premium on central bank digital currency equals marginal CBDC operating costs. The optimal interest rate on reserves includes a Pigou (1920) subsidy such that banks internalise the reserve externality. The optimal deposit subsidy induces banks to charge the efficient liquidity premium on deposits.

2. For a critical assessment of the claim that central bank digital currency would `crowd out' deposits, see for example Chiu and Rivadeneyra (2021).

3. For a different perspective on interest on central bank digital currency see for example Kumhof et al (2023).

4. A channel the model does not capture relates to innovation. If banks that deliver central bank digital currency payment services on behalf of the central bank lack incentives to innovate, then this could weaken the case for CBDC. Another channel relates to fixed costs of CBDC deployment, in particular when CBDC only serves as a disciplining device.

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The new economics of industrial policy

Industrial policy is at the heart of modern economic policy. Réka Juhász, Nathaniel Lane and Dani Rodrik assess the latest research and consider how to do industrial policy well

Industrial policy is at the heart of the current economic discourse, propelled by major legislative acts from the Biden administration. This column presents an analysis of the 'New Economics of Industrial Policy', synthesising emerging literature to understand these complex policies. It highlights the broader objectives of modern industrial policy, extending beyond traditional sectoral support. Key findings suggest a generally positive impact of these policies, with nuances in implementation and efficacy. For a full efficiency evaluation of industrial policy, future theoretical work, informed by careful empirical work on a case-by-case basis, is called for.

The rise of 'Bidenomics' and its signature economic legislations, such as the Infrastructure Investment and Jobs Act (IIJA), Creating Helpful Incentives to Produce Semiconductors Act (CHIPS), and Inflation Reduction Act (IRA), has thrust industrial policy to the fore of economic policy discussions.

With similar packages emerging across the OECD and beyond, there is renewed interest in understanding the workings of industrial policy. What exactly is an industrial policy? How do we measure it? And how do we evaluate it? An emerging literature in economics, which we call the New Economics of Industrial Policy, is making sense of this landscape with new tools and insights.

In a recent paper (Juhász *et al* 2023), we attempt to clarify the discussion around these complex policies and synthesise the emerging literature. New work has made important methodological headway in understanding the basics of policy practice and in evaluating the efficacy of policies. The emerging picture, generally, paints a more positive view of industrial policy – but also highlights important nuances.

What is industrial policy?

We define industrial policies as those government policies that explicitly target the transformation of the structure of economic activity in pursuit of some public goal. Importantly, these policies are selective; they target some activities, but not others.

Moreover, they are intentional in the sense that changing the structure of the economy is what they want to do. As such, industrial policy can be many things – our definition includes the targeted sectoral policies with which they are typically associated (eg. support for steel, automobiles, shipbuilding, or semiconductors), but it also includes support for other targeted forms of intervention, such as R&D or exporting.

Industrial policy is not that different from many other domains of public policy choice […] where the justifications for government intervention are well-established

Likewise, the goals of industrial policy may be broad. While historically, these policies were primarily aimed at facilitating structural transformation and industrialization in particular, today, goals include climate goals, the creation of 'good jobs', supply chain resiliency, national security, and more.

What is the rationale for intervention?

The economic rationale for industrial policy falls into three main categories:

1. market failures such as positive externalities which imply that the market will not provide enough of a positive activity (for example, modern manufacturing, green energy, good jobs);

2. coordination failures whereby a desirable activity may only be individually profitable if everyone else is also producing; and

3. the provision of activity-specific public inputs which are public goods (for example, the charging infrastructure needed for the uptake of electric vehicles).

The controversy surrounding industrial policy is often less about theoretical rationales – which are broad – and more about practicalities. Sceptics worry that the cure will be worse than the disease. There are two broad concerns:

1. information problems which prevent even a well-intentioned government from picking the correct activities to target; and

2. political capture, which implies that even if the government knows which activities to target, self-interested actors will divert the government away from those that create benefits to society at large.

Both reasons create doubt about whether governments can 'pick winners'.

We acknowledge these challenges, yet argue that the ultimate test of the effectiveness is not whether governments can 'pick winners' but whether they are able to 'let losers go'. Although cutting losers ex post may be difficult, it is far less demanding than governmental omniscience in selecting winners ex ante.

In this sense, we would argue that industrial policy is not that different from many other domains of public policy choice (education policies, stabilization policies, etc.) where the justifications for government intervention are well-established (human capital externalities, Keynesian 'rigidities') but what works is not obvious. Yet, unlike industrial policy, debates in these arenas typically focus on *how* to do policy well, not *whether* policy should be attempted.

While economists turned away from the study of industrial policy, the world kept using them. In fact, industrial policies are ubiquitous – and growing. Recent work measuring industrial policy using innovative methods (De Pippo et al. 2022, Juhász *et al* 2022, Criscuolo *et al* 2022) consistently finds that industrial policies in Western economies are widespread.

For all these reasons, rather than trying to persuade policymakers to avoid them, economists should study them in order to inform the question of how to do industrial policy better. The New Economics of Industrial Policy is doing just that.

Evaluating industrial policies

Indeed, the need for careful work is pressing and evaluating industrial policy requires confronting some fundamental empirical issues. For instance, consider two types of governments: a rent-seeking one beholden to special interests and a technocratic one intervening to correct market failures. Rodrik (2012) shows that with observational data alone, one cannot distinguish the two types of governments.

These issues, and those documented by Rodrik and Rodriguez (2001) and Lane (2020), highlight the myriad of ways observational data alone can be uninformative about policy efficacy.

In addition, the canonical empirical exercise whereby the researcher is able to extract the orthogonal, 'accidental' component of an industrial policy for evaluation may not fully resolve empirical problems either.

The sceptic of industrial policy may argue that an evaluation of the random allocation of industrial policy misses all the practical (informational and political capture) challenges associated with implementing industrial policy in the real world. Optimists see ways to still recover useful quantities from the endogenously placed policy.

New, well-identified work deals with the tension between the search for exogenous variation and real-world relevance by isolating different layers of treatment. One layer, which we call the 'economic mechanism' evaluates the question of whether the justification for industrial policy is valid, ie. is the market failure for the targeted activity large?

For example, Juhász (2018) evaluates the infant industry argument in 19th-century France using the disruption to trade resulting from a blockade against Britain. Although the paper does not address contemporary policy, the paper demonstrates that the infant industry can be a powerful economic mechanism in the real world.

A second layer involves evaluating a narrow version of the efficacy question: Did the firms/industries/sectors promoted by policymakers respond in the intended direction? Recent work has been informative on this margin as well.

The credibility revolution has finally arrived in research on industrial policy

We review the findings from papers that use reduced-form research designs to evaluate three types of industrial policy: infant industry, public R&D, and place-based industrial policy. First, three recent papers (Juhász 2018, Hanlon 2020, Lane 2022) evaluate episodes that mimic cases of textbook infant industry in technological follower countries. Each paper finds some support that infant industry promotion led to increased activity in the targeted sector, though to different degrees.

Lane's (2022) study of the heavy and chemicals industry drive in 20th-century South Korea produces the clearest example of a country drastically shifting its comparative advantage using industrial policy tools.

Second, two new papers provide a fairly positive take on the scope for large-scale public R&D efforts to have large local and, more speculatively, aggregate effects (Gross and Sampat 2023, Kantor and Whaley 2023). These papers study canonical episodes of 'moonshots' in the US and show, that during times of national crisis, the US government was able to choose technologies, places and firms that delivered the desired outcomes. Moreover, while this was not the main intention of the policies, the papers also find evidence of long-lasting positive (mostly local) effects.

Third, a great deal of new work finds that place-based industrial policies (PBIPs) often lead to outcomes consistent with the intentions of policymakers in both lagging and declining regions. Historical natural experiments point to the potential for local manufacturing activity to spur local structural transformation and income gains that last generations (Mitrunen 2021, Garin and Rothbaum 2022).

Work on European PBIPs for economically distressed regions (Criscuolo *et al* 2019, Cingano *et al* 2022) suggests that PBIPs can help with manufacturing job growth (in reality, dampening the decline). Similarly, policies targeted at lagging regions also find positive, and often long-lasting effects through the creation of self-sustaining agglomerations (La Point and Sakabe 2021, Incoronato and Lattanzio 2023, Cerrato 2023).

Learning from the East Asian miracle

New work on industrial policy also moves the debate forward on the controversy over the role of industrial strategy and the East Asian economic miracle. The Asian miracle constitutes not only one of the most important episodes of modern economic development, but it remains the focal point of debates surrounding the efficacy and desirability of industrial policy.

A string of new studies, starting with Lane (2022), turns to South Korea's Heavy-Chemical Industry Drive (HCI). These studies find that policy promoted the growth and export development of targeted industries, both in the short and long run (Lane 2022), with considerable long-run welfare gains (Choi and Levchenko 2022), though possibly at the cost of increasing misallocation in the economy (Kim *et al* 2022).

Quantitative work by Ernest Liu (2019) provides a useful guide for policymakers confronting the challenge of picking which industries to target, in an economy where market imperfections occur across linked sectors. Liu provides off-the-shelf sufficient statistics for optimal targeting, and his framework shows that, in certain settings, subsidizing upstream sectors minimizes policy mistakes.

Liu shows that actual policies used in China and South Korea's HCI correspond to his statistics, suggesting that the informational problems of policymakers may not be insurmountable.

New empirical work, led by Aghion *et al* (2015), has only begun to scratch the surface of China's more recent industrial policy. Bai *et al* (2022) explores the impact of Chinese quid-pro-quo style FDI and study spillovers from foreign joint ventures to domestic firms. Relative to unrestricted FDI, they estimate that the quid-pro-quo FDI improved the quality of affiliated domestic models and raised their sales.

Deep work on Chinese shipbuilding by Kalouptsidi (2018) and Barwick *et al* (2019) point to the importance of policy design. Barwick *et al* (2019) shows how not all policy levers were efficacious: while production subsidies and investment subsidies may have been useful, entry subsidies led to inefficiencies in the shipbuilding sector.

Conclusions

After years on the periphery in economics, industrial policy is now the subject of an emerging strand of research. Although nascent, the New Economics of Industrial Policy is providing a more productive assessment of industrial policy – one potentially up to the task of informing questions about how to do industrial policy well.

This work unpacks diverse industrial policy episodes uncovering how success hinges on critical design details and economic context. While much of this new work utilises state-of-the-art reduced-form methods, we conclude by noting that these methods fall short of providing a full efficiency evaluation of industrial policy, which requires a model. Future work should move to tackling these challenges, informed by careful empirical work on a case-by-case basis. ■

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On the way to a sustainable economy

Sabine Mauderer argues that reducing uncertainty about climate change will help us to embrace the opportunities of the green transition

Introduction

Let me begin with a cliché: markets do not like uncertainty. Why? Because dealing with uncertainty tends to be stressful and complex. Unfortunately, when it comes to climate change, there is a lot of uncertainty – many unknowns. Climate change itself, however, is a certainty. Just look outside the window for proof.

Facts on the table

It is Climate Week. Flashback to early June: you would have urged me to stay indoors. Wildfires up in Canada had brought toxic smoke to New York City and turned the skies orange. There is no denying that climate change is on our doorstep.

Let me give you some figures: assuming current policies, physical risks – such as losses due to droughts or rising sea levels – could lead to an almost eight percent loss of global GDP by 2050[1]. To put this staggering figure into perspective: the global financial crisis of 2008 led to a GDP loss of around four percent.

The facts are on the table: climate change will have consequences for all of us. That much is certain. Having said that, when it comes to understanding how climate change will affect us, the picture is less clear-cut. This lack of understanding is incredibly worrying.

It may contribute to the lack of urgency that current climate policies reflect all too often. This underlines the importance of reducing uncertainty. Let's shed some light on climate risks!

The role of central banks

This is where central banks come into play. Dealing with financial risks is our bread-and-butter business. This ample expertise can help to strengthen the understanding of climate-related risks.

The Network for Greening the Financial System (NGFS) – of which I am the Vice Chair – is pooling the expertise of almost 130 central banks and supervisors from all over the world. One of our flagship products is climate scenarios.

They help assess how different pathways for emissions and climate policies might affect the economy and the financial system. To give you an example: in the US, heat stress could reduce labour productivity by almost 4 percentage points by 2050[2]. And heat stress is just one of many factors. Therefore, it is important to design holistic models for climate scenarios.

Companies should include transition plans in their broader strategy. In fact, they should be part of their risk management. Transition plans are not only about risks, but also about opportunities

Scenarios explore different plausible futures and hence contribute to reducing uncertainty. Supervisors use them for their climate stress tests. Financial institutions can use them for their in-house risk management, including for measuring Climate Value-at-Risk.

To improve the usability of the scenarios, the NGFS is continuously updating and fine-tuning them. The next update which is due later this year aims to make the scenarios more granular across sectors and regions.

Compass for the journey to net zero

Scenarios offer us a glimpse of what the future might look like. With the current climate policies, the world in 2050 does not look too great, to say the least. That will be 27 years from now. A bit less than that, 26 years ago, in 1997, the movie *Titanic* hit the theatres.

You all know the fate of the ship that was hailed as being unsinkable and that tried to steer away from the iceberg when it was too late. The window to act on climate change is closing but there is still some time to turn the ship.

Shifting the economy towards a net zero future calls for all hands-on deck. Companies must embark on a journey of adjusting their business models. Transition plans can be a powerful tool to guide the way. At the NGFS, we recognise their importance. We have started our initial work on assessing the use of transition plans and will press ahead with this.

In early summer, we published the first findings from a stock-take among members[3]: we found that, while their importance was acknowledged, a common understanding on this new topic is still lacking. I want to highlight three findings:

- What does it mean exactly for a company to be 'transitioning' – where to?
- If a transition plan is drawn up, what information can and should it provide?
- To achieve the credibility that markets need, the question of checking their accuracy needs to be answered.

At the NGFS, we will continue to work on these issues. We intend to provide more information on the data that users need and find in transition plans early next year.

Despite further work to come, let me share some of the insights we have already gained to move towards a common understanding: Transition plans are a roadmap for companies. They translate a corporate vision of a net zero future into tangible actions - by outlining concrete steps and milestones and by looking beyond the usual strategy horizon.

Companies should include transition plans in their broader strategy. In fact, they should be part of their risk management. Transition plans are not only about risks, but also about opportunities. Companies can show investors that they are ready for a net zero future. And financial institutions can benefit from transition plans, too.

They can use them to manage their own risk, but also assess whether a company is investable. That way, financial institutions can hold corporates to their commitments and enforce market discipline.

With these uses and benefits in mind, I very much welcome and highly appreciate the announcement made by US Secretary of the Treasury Janet Yellen[4]. Her presentation of the *Principles for Net Zero Financing & Investment* is an important step in the development of transition financing generally.

But even more so specifically: if you go straight to the very first principle, you will see that the US Treasury, too, recommends that:

For any voluntary net zero commitment to be credible, it should be accompanied by a net zero transition plan.

I could not agree more.

Looking ahead

Let me wrap up. Reducing uncertainty about climate change will help us to embrace the opportunities of the green transition.

In a decade or so, we will have realised: the green economy is just the economy. There can be no healthy economy without a healthy planet! ■

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Endnotes

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2. Climate Analytics: Climate impact explorer – Relative change in labour productivity due to heat stress in United States, based on NGFS scenarios.

3. Network for Greening the Financial System: Stocktake on Financial Institutions' Transition Plans and their Relevance to Micro-prudential Authorities, May 2023.

4. United States Department of the Treasury: Remarks by Secretary of the Treasury Janet L Yellen in New York on Treasury's Principles for Net-Zero Financing & Investment, 19 September 2023.

This article is based on a speech delivered at the MSCI Climate Week Conference "The climate transition: embracing opportunity & accelerating change", New York City, 20 September 2023.

What is a just transition and how does it affect the financial sector?

The move to a net zero future entails profound changes for societies and economies. Ivana Popovic, Alexandre Köberle and Michael Wilkins discuss a just transition with a particular focus on the financial sector

1. Introduction

The concept of a just transition integrates social and environmental concerns related to a net zero transition. It stems from the fact that, although climate change is an environmental issue, it will unavoidably lead to changes that have social implications as well (Robins *et al* 2019). While 'a ton is a ton [of CO_2]', and while it might be a useful measure for carbon budgets it does not reveal much about the socio-economic consequences associated with reducing its emissions (in Carton *et al* 2021).

Indeed, if net zero is 'science-based', a just transition is 'rights-based' (Curran *et al* 2022). A just transition aims to address the adverse effects a low-carbon transition might have on society, thus preventing or at least mitigating any social harm. At the same time, it aims to seize opportunities arising from addressing social injustices.

The move to a net zero future entails profound changes for societies and economies. In the UK, for instance, one fifth of jobs will be affected by a low-carbon transition (Robins *et al* 2019). Climate adaptation and mitigation policies have long-term benefits for society (eg. preservation of biodiversity, improved public health, job creation, and enhanced energy security).

In the short-term, however, and if poorly managed, climate policies can result in unequal distributions of costs and benefits among different groups and countries (Ludden *et al*; Robins *et al* 2020). Transitioning from high-emitting activities may result in stranded workers and communities (Gambhir *et al* 2018, p. 3), as well as missed opportunities for employee retention and skill improvement (ILO, 2022a).

Net zero transitions may also negatively affect low-income consumers, peripheral regions, and local economies (Robins *et al* 2020). Social inequalities can also be perpetuated or solidified, especially among vulnerable groups, who may not be able to adjust to the changes associated with the transition.

As low-carbon energy sources expand, they may also create concerns related to human rights such as abuses of indigenous peoples' rights, displacement, and loss of livelihoods (Gambhir *et al* 2018; Signorelli and Horvath, 2019). *"Systematically factoring in such risks (…) is central to a just transition"* (ILO, 2022a).

A central axiom of just transition thinking is that a green future may not be possible if not supported by measures aiming to tackle the social injustice that it might bring

Taking action to address climate change does not automatically generate socio-economic benefits (Robins *et al* 2020). Therefore, climate action should be accompanied by policies that would mitigate socio-economic risks and maximise related opportunities. The need for climate mitigation and adaptation is well established, as is the need for addressing the social consequences of those actions.

Striking a right balance between the two, however, remains a challenge (Ludden *et al* 2021). It is important to note here that concerns related to justice are not to be used as an excuse for climate-related inaction (Robins *et al* 2020). A just transition is not at odds with climate mitigation and adaptions efforts, but rather an integral part of those efforts.

It recognises that countries, communities, businesses, and social groups have different capacities when facing a low- carbon transition. These differences must be addressed to ensure that 'no one is left behind'.

The purpose of this paper is to contribute to the discussion of a just transition with a particular focus on the financial sector. The paper is structured as follows. In the first part, it discusses what a just transition means in general. The second part of the paper focuses on a just transition for financial institutions.

Starting with an overview of the various components of a just transition, and why a just transition is important to the financial sector, the paper then proceeds to present a brief overview of the existing frameworks for integrating a just transition into financial institutions' strategies.

2. Just transition to net zero

2.1. Background

The idea behind a just transition appeared in the late 1970s when labour unions in the United States sought to support workers in polluting industries (Gambhir *et al* 2018; Morena *et al* 2018). Apparently, it was born when a trade unionist, Tony Mazzocchi, started advocating for the rights of workers exposed to toxic chemicals over the course of their careers (Pinker, 2020; Morena *et al* 2018).

The term was introduced in 1995 by Les Leopold and Brian Kohler who argued that the real choice is not between 'jobs or the environment', but rather 'both or neither' (in Morena *et al* 2018). The concept gained international prominence during the 2000s, particularly in the context of UN discussions on climate change and sustainable development (Morena *et al* 2018)[1].

In 2015 the Paris Agreement called upon the Parties to consider *"the imperatives of a just transition of the workforce and the creation of decent work and quality jobs"* when taking actions to address climate change (UNFCCC, 2015).

In addition, the agreement notices the importance of climate justice, as well as the need for the Parties to *"respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity,"* when taking climate-related actions. It also recognises the specific needs and circumstances that developing countries might experience when transitioning to a green future.

The Paris agreement was followed by the International Labour Organization's (ILO) Guidelines for a Just Transition (2015) and the Solidarity and Just Transition Silesia Declaration adopted at the UN COP24 in 2018 (UNFCCC, 2018). Since then, several countries (eg. Canada, Germany, South Africa, the EU, the UK) have also started developing initiatives related to a just transition (Robins *et al* 2021a).

In 2021, the G7 affirmed the ministers' commitment to address environmental justice and just transition objectives (G7, 2021). Commitment to supporting a just transition has been further reinforced by the Glasgow Climate Pact (UNFCCC, 2021) and the Sharm el-Sheikh Implementation Plan (UNFCCC, 2022).

Although the concept of just transition has been around for some time, its incorporation into climate action by financial institutions is a relatively new, but fast-growing phenomenon. Recently, Multilateral Development Banks (MDBs) released a joint statement outlining five High-Level Principles for a just transition (MDBs, 2021). The African Development Bank (2022) and European Bank for Reconstruction and Development (EBRD, 2020) have also initiated plans related to a just transition.

CDC Group together with other stakeholders have published a white paper on just transition in the banking sector (Clifford Chance LLP *et al* 2021) and developed just transition finance roadmaps for India (Tandon *et al* 2021) and South Africa (Lowitt, 2021).

Some banks have started supporting a just transition by integrating social justice into their environmental, social and governance (ESG) reports (eg. Citigroup, 2020), corporate social responsibility (CSR) policies (eg. Crédit Agricole, 2021), plans to support emerging markets (eg. Standard Chartered, 2022; Deutsche Bank, 2022), and assessment reports based on the principles for responsible banking (PRB) (Barclays, 2021).

In 2018, more than 160 investors committed to incorporating a just transition into their climate practices (UN PRI, 2020). In the UK, a coalition of more than 40 financial institutions, along with other stakeholders, formed the UK's Financing a Just Transition Alliance (Robins, 2021b).

Financial institutions are grappling with the realisation that a net zero transition opens new opportunities and benefits, but at the same time might produce negative socio-economic implications as well.

Crucially, a central axiom of just transition thinking is that a green future may not be possible if not supported by measures aiming to tackle the social injustice that it might bring. Thus, the question is not whether 'just' will become a necessary part of any net zero transition path, but rather how it will be achieved.

2.2. What is a just transition?

Although everyone agrees that a just transition puts people at the centre of climate-related discussions, the debate over what constitutes a just transition is far from settled. A just transition has no commonly accepted definition (Spengler *et al* 2021; ILO, 2021; Wilgosh *et al* 2022).

As a result, it can range from addressing concerns related to job losses during a low-carbon transition to more radical requests for transformation of the existing economic and political systems (Morena *et al* 2018). The table below illustrates how just transition definitions can vary.

Definitions of a just transition, thus, might range from those that refer to broad objectives, ie. fairness and inclusivity (eg. Spengler *et al* 2021) to those that describe more concrete objectives, ie. decent work and the eradication of poverty (eg. PCC, 2022).

The concept of just transition has been often associated with addressing injustices after they occur, usually in the energy sector and in regard to job losses in the process of shifting away from fossil fuels (Just Transition Commission, 2021).

However, the socio-economic impacts related to a low-carbon transition usually extend beyond those felt by workers directly employed in the fossil fuel sector - they include a broader range of actors and issues such as impact on local communities, concerns related to land use for renewable energy, and consumers, households, and businesses who will be affected by rising energy prices (Pinker, 2020).

Table 1. Examples of just transition definitions

Definition	Focus
"A just transition is one that ensures that climate action and efforts to build a sustainable economy are designed and delivered so that they improve social justice, with the interests of workers, communities and consumers particularly in mind" (Robins et al 2019, p. 3)	Social justice for different groups
"A just transition aims to achieve a quality life for all (…). A just transition contributes to the goals of decent work for all, social inclusion, and the eradication of poverty. A just transition puts people at the centre of decision making, especially those most impacted, the poor, women, people with disabilities, and the youth—empowering and equipping them for new opportunities of the future. A just transition builds the resilience of the economy and people through affordable, decentralised, diversely owned renewable energy systems; conservation of natural resources; equitable access of water resources; an environment that is not harmful to one's health and well-being; and sustainable, equitable, inclusive land-use for all, especially for the most vulnerable" (PCC, 2022, p. 7).	Decent work, social inclusion, and the eradication of poverty; people at the centre (especially vulnerable groups); equality, inclusion
A just transition is "a transition to Net Zero and environmental sustainability that is fair and inclusive" (Spengler et al 2021, p. 12).	Fairness and inclusivity
"The key ingredients of what makes for a just transition are well-established: social dialogue (notably with workers and trade unions) in the workplace, along with respect for labour standards and human rights, economy-wide skills development and retraining, buttressed by social protection and safety nets. As many of the core high-carbon sectors are clustered in specific places, community renewal and regional development are crucial, along with a macroeconomic strategy to connect the just transition with key climate policy levers" (Tandon et al 2021, p. 11).	Social dialogue, labour standards and human rights; skills development, social protection; community renewal and regional development
"Nowadays, 'Just Transition' is a concept that considers the social and distributive effects of climate action across the population and the territories. The transition to a climate resilient, climate neutral economy presents a global opportunity to deliver inclusive development in the 21st century, not just avoiding the damage of climate change, but also offering the potential for tackling poverty and inequality as well as ensuring protection of and respect for human rights. (…)" (Ludden et al 2021, p. 17).	Tackling poverty and inequality; protecting human rights

Table 1. Examples of just transition definitions cont.

The term just transition "is best understood as a conceptual framework encompassing the complexities of the transition towards a sustainable, net zero emissions, and climate-resilient economy. This conceptual framework highlights public policy needs and aims to maximise the benefits of the transition, while minimising hardship for the workers, consumers and communities affected by it" (Platform on Sustainable Finance, 2022, p. 21).	Maximise benefits, minimise hardships for workers, consumers and communities
"A just transition for all towards an environmentally sustainable economy (…) needs to be well managed and contribute to the goals of decent work for all, social inclusion and the eradication of poverty" (ILO, 2015, p. 4)	Decent work, social inclusion, and the eradication of poverty
"At its core, achieving a just transition is about putting people at the centre of the climate change transition (…). Central to the just transition is the achievement of effective climate action (…), by means that fairly and inclusively share the benefits of the transition while supporting those who will be negatively impacted by it. The concept highlights the imperative to ensure that the shift to net zero is fair, and seen to be fair, across regions, sectors, the socio-economic spectrum, and generations. In the words of the UN Sustainable Development Goals ("SDGs"), it is about ensuring that no-one is left behind" (Clifford Chance LLP et al 2021, p. 11-14).	People at the centre of a transition, fairness (across regions, sectors, the socio-economic spectrum, and generations) and inclusiveness.
"At the company level, a just transition is an enterprise-wide process that plans emissions reduction efforts to maximise positive impacts and minimise negative impacts on workers and communities through retention and redeployment, skills training, new job creation, social inclusion and community renewal" (Just Transition Centre and the B Team, 2018, p. 3)	At the company level: retention and redeployment, skills training, new job creation, social inclusion, and community renewal.
"To ensure the required momentum for climate action, a "just transition" seeks to ensure that the substantial benefits of a green economy transition are shared widely while also supporting those who stand to lose economically – be they countries, industries, communities, workers or consumers" (EBRD, 2020, p. 8).	Supporting potential losers: countries, industries, communities, workers or consumers
The just transition is "a fair and equitable process of moving towards a post-carbon society. This process must seek fairness and equity with regards to the major global justice concerns such as (but not limited to) ethnicity, income, gender within both developed and developing contexts" (McCauleya and Heffron, 2018, p. 2).	Fairness and equity with regards to ethnicity, income, and gender in developed and developing countries

Beyond climate change, the term can also refer to environmental justice (see, eg. McCauleya and Heffron, 2018) and winners and losers of an energy transition (Cha, 2020). In addition to economic and social losses, a just transition can also involve cultural and emotional losses as a result of, for instance, close cultural ties with a local coal mining industry that needs to be closed (Cha, 2020).

Finally, as well as addressing injustices once they have occurred, the aim is also to prevent them from occurring in the first place. Just transition objectives differ depending on research domains, ideological viewpoints, or stakeholders' needs. As a result, definitions of a just transition vary both in depth and breadth. These different approaches are discussed below in more detail.

When looking at stakeholders' approaches to a just transition, there is a difference between those that are 'group- or constituency-focused' (ie. focused on a particular group of stakeholders) and those that are 'sector-specific' (ie. focused on a particular sector, instead of the economy as a whole) (Morena *et al* 2018).

Furthermore, there is a difference between just transition approaches based on the degree of change sought. Those are the following approaches:

(1) Status quo – which does not call for changing the rules of global capitalism, but rather for 'a greening of capitalism' based on voluntary, bottom-up and market-driven initiatives;

(2) Managerial reform – which seeks to modify certain rules and standards within the existing economic system such as those that relate to employment and occupational safety, but without challenging the existing system and balance of power;

(3) Structural reform – which aims to ensure both distributive and procedural justice, requiring institutional change and structural evolution; and

(4) Transformative approaches – which promote alternative routes to the existing economic and political systems that are seen as responsible for environmental and social problems (Morena *et al* 2018).

A further distinction can be made between these approaches in terms of the degree of inclusivity, which might range from exclusive (ie. geared toward a particular group) to inclusive (ie. geared towards the benefit of society as a whole) (Morena *et al* 2018). The above classifications of just transition are, thus, based on how much change (ranging from small and voluntary to more radical) and inclusivity each seeks.

Wilgosh *et al* (2022) provide a similar classification by making the distinction between two approaches: a limited approach to a just transition based on the existing market-based solutions and employment patterns, and an expansive approach that seeks structural transformation and more inclusivity.

Furthermore, bearing in mind that a net zero transition represents a process of exiting high-carbon activities and entering low-carbon activities at the same time, a just transition might be related to both – 'transitioning into' and 'transitioning out of' activities (SSE, 2020). Both 'in' and 'out' transitions will disrupt existing economic activities and generate new ones, with consequent socio- economic impacts (Clifford Chance *et al* 2021).

Also, different research traditions have their own version of 'justice scholarship' (Heffron, 2021):

(1) Climate justice – focuses on sharing the benefits and costs of climate change from a human rights standpoint (eg. the just transition should address the impacts of climate change on vulnerable groups);

(2) Energy justice – focuses on the application of human rights throughout the energy life cycle (eg. the just transition should address energy poverty); and

(3) Environmental justice – focuses on the social and environmental dimensions of a transition, and the involvement of all citizens in the development and implementation of environmental policies (eg. the just transition should address the communities affected disproportionately by pollution) (see Heffron, 2021; McCauleya and Heffron, 2018; Lo, 2021; Jenkins *et al* 2016).

Generally, climate and environmental justice focus on addressing injustices after they happen, whereas energy justice, at least in some cases, aims to address injustices before they happen (Heffron, 2021).

Recent definitions of a just transition, which link key dimensions of climate, energy, and environmental justice, distinguish between the following just transition approaches:

(1) Distributive justice – ensures fair distribution of costs and benefits;

(2) Procedural justice – ensures that everyone has equal access to decision-making processes;

(3) Recognition justice – ensures that all groups' interests and needs are considered equally;

(4) Cosmopolitanism justice – refers to the transition effects from a global context; and

(5) Restorative justice – refers to repairing any injustice caused by a transition (see Heffron, 2021; McCauleya and Heffron, 2018; Ludden *et al* 2021; Williams and Doyon, 2019).

Space and time are also critical dimensions of a just transition (Heffron, 2021). Timelines (eg. 2030, 2050) influence transition speed (Heffron, 2021), while space may affect the degree of injustice. A transition needs to be grounded in 'place-based realities' (Robins *et al* 2020) and 'considerations of local needs, capacity and priorities' (Spengler *et al* 2021). Net job losses, for example, vary by region and country (Gambhir *et al* 2018).

This brief overview aims to raise awareness of the challenge of defining a just transition, and subsequently implementing related policies and plans. Depending on the context, the term might include anything from subtle, voluntary changes within the existing system of global capitalism to more radical societal changes.

Just transition might imply focusing on specific social groups (eg. workers and local communities), topics (eg. climate and energy transition), aspects of a net zero transition (eg. distribution and participation), and objectives (eg. eradication of poverty and inclusivity). Intuitively, all stakeholders understand what a just transition might imply. Terms such as fairness, inclusivity, and equality are well understood at the principle level.

However, the concept remains ambiguous when it comes to operationalising and taking action to address social injustices as part of net zero plans, as well as measuring and disclosing progress on a just transition. What is meant by 'just' might be subjected to various interpretations, based on a particular actor's views and needs, and a context.

There is a need, therefore, for further clarification of what is meant by a just transition, especially in terms of the roles that various actors (including financial institutions) should play in addressing social injustices. To transition to a net zero (and nature-positive) future, all aspects of social and economic life would have to be transformed.

Every aspect of that road should be closely followed by measures that will assure that the transition is just. If there is no clear definition of a just transition and its components, social injustice may remain unaddressed.

Figure 1. The legal geography 'Just' framework for the just transition

JUST	TRANSITION	Justice	• Justice takes the form of: - Distributive justice - Procedural justice - Restorative justice
		Universal	• Universal takes the form of: - Recognition justice - Cosmopolitanism justice
		Space	Where are events taking place in terms of location? • At the local, national or international level
		Time	Time takes into account transition timelines (eg. 2030 and 2050) and energy transition speed

Source: Adapted from Heffron and McCauley (2018, p. 77).

The following sections aim to consider a just transition with a particular focus on the financial sector's needs.

3. Just transition and the financial sector: Existing definitions, practices, and guidelines

3.1. Defining a just transition for financial institutions

The current section provides a brief overview of what a just transition means based on existing guidelines for the financial sector.

Some of the most prominent just transition frameworks for financial institutions incorporate distributive, procedural, and restorative justice principles (eg. Curran *et al* 2022; Muller and Robins, 2022). They recommend addressing the distributional implications of a net zero transition, delivering positive social impacts for workers, communities and consumers, and engaging with workers and other stakeholders (Curran *et al* 2022).

To achieve a just transition, it is usually recommended that financial institutions need to engage in social dialogue, respect labour standards and human rights, facilitate skills development, support social protection, communities' renewal, regional development, consumers and suppliers (Tandon *et al* 2021).

A just transition might also be defined through three mutually dependent elements: climate and environmental action, socio- economic distribution and equity, and community voice (Spengler *et al* 2021). The objective is sometimes more broadly defined - a just transition aims to maximise the economic and social benefits of climate action while minimising risks (ILO and Grantham Research Institute, 2022), it seeks to ensure that 'no-one is left behind' by providing fairness and inclusivity (PwC, 2022).

A just transition is also seen as a way of connecting climate-related concerns to other Sustainable Development Goals (SDGs) (Tandon *et al* 2021) or as the 'social' pillar of the ESG (Environmental, Social, and Governance) framework (Curran *et al* 2022).

It seems that the least common denominator is the understanding that both climate change and action will produce certain socio-economic injustices that should be prevented, mitigated, or compensated for in a fair manner.

There is also an understanding that any action related to a just transition should simultaneously be: (a) universal and place-based, (b) applied across all sectors as well as sector-specific, (c) all-inclusive and group-specific, and (d) dynamic as well as grounded in the status quo (Spengler *et al* 2021).

Financial institutions are expected to gain an understanding of the needs of different social groups, the risks they may face, and the opportunities for business that might arise as part of a net zero transition (Robins *et al* 2019). Their financial products and services should be designed to help clients achieve a net zero transition in a socially inclusive way (Robins *et al* 2020).

Usually, just transition frameworks for financial institutions identify workers, communities, suppliers, and consumers as key actors to be affected by a net zero transition (eg. Robins *et al* 2021a; Curran *et al* 2022). Their recommendations tend to be centred around these stakeholders. Some add to that group citizens (F4T, 2021b), indigenous peoples (ILO and Grantham Research Institute, 2022) and emerging markets (Standard Chartered, 2022).

'Just nature transition' frameworks for financial institutions have also begun to emerge (see Muller and Robins, 2022). The rationale is to address the socio-economic consequences of nature loss and actions to restore and preserve nature. Several just transition frameworks for the financial sector, like the one by Spengler *et al* (2021), include nature- and climate-related elements.

Since a number of financial institutions are seeking to assess climate- and nature-related financial risks and opportunities jointly, the development of just transition guidelines will likely follow a similar trajectory in the future.

3.2. Why is a just transition important for financial institutions?

Just transition objectives can only be achieved by shifting global finance and adopting investments that accelerate and support those objectives (Spengler *et al* 2021). The concept of a just transition is relatively new in the financial sector (Spengler *et al* 2021; Muller and Robins, 2021).

When used, it has been applied either very abstractly or narrowly to address the loss of jobs associated with a shift away from fossil fuels (Spengler *et al* 2021). Typically, investors look for either climate or social investments, rarely combining the two (Ibid.). A just transition should be about both. Its purpose is to integrate socio-economic concerns into climate-related finance and investments plans.

What makes a just transition significant for the financial sector? Firstly, financial institutions should incorporate a just transition into their plans to ensure compliance with growing national and international initiatives requiring a net zero transition to be just. All financial institutions are expected to align their strategies with the Paris Agreement and the Sustainable Development Goals (SDGs).

As mentioned earlier, the Paris Agreement calls all parties to align their policies with *"the imperatives of a just transition"* and climate justice, in addition to respecting and promoting human rights, indigenous peoples' rights, local communities' rights, vulnerable and marginalised groups' rights and the right to development.

Besides calling for a just transition that promotes 'decent work and quality jobs', the Glasgow Climate Pact also calls for 'sustainable development and the eradication of poverty' as part of the just transition commitments (UNFCCC, 2021).

With the Sharm El-Sheikh Implementation Plan, just transition objectives have been further reinforced (UNFCCC, 2022). The document explicitly states that *"climate action should be implemented in a manner that is just and inclusive while minimising negative social or economic impacts."*

It also calls for a just transition to renewable energy, just energy transition partnerships, and a social dialogue. The Plan emphasises that a 'just and equitable transition' includes 'energy, socioeconomic, workforce, and other dimensions' as well as social protection and social solidarity measures.

Similarly, since they connect environmental and social dimensions (eg. climate action and decent work) many SDGs overlap with just transition aims (Muller and Robins, 2022; Tandon *et al* 2021).

Aside from aligning their strategies with the Paris Agreement and Sustainable Development Goals (SDGs), financial institutions are also expected to adhere to human, social, and labour rights, as outlined in the UN Guiding Principles on Business and Human Rights (UNGPs) (UN, 2011), ILO standards, OECD Guidelines for Multinational Enterprises (OECD Guidelines, 2011), and other relevant documents (Clifford Chance LLP *et al* 2021; Curran *et al* 2022).

Even though the UNGPs and OECD Guidelines do not provide a comprehensive framework for financial institutions to integrate just transition dimensions into their policies, they serve as a critical foundational element (Clifford Chance LLP *et al* 2021).

Secondly, financial institutions should aim to support a just transition due to 'the risks of not doing so', especially when it comes to potential litigation exposures (Clifford Chance LLP *et al* 2021).

Increasingly, countries are pledging to make their net zero transitions 'just' by including just transition objectives in their Nationally Determined Contributions (ILO, 2022a). Some countries, such as Belgium, Germany, and the Netherlands, have adopted or are considering laws related to mandatory human rights and environmental due diligence (Clifford Chance LLP *et al* 2021).

Likewise, the EU Taxonomy which defines sustainable activities requires compliance with minimum safeguards, meaning those carrying out economic activities must ensure alignment with the OECD Guidelines, UNGPs, the eight fundamental conventions identified in the ILO Declaration on Fundamental Principles and Rights at Work, and the International Bill of Human Rights (Article 18, European Parliament and the Council, 2020).

All these initiatives increase the risk of overlooking socio-economic concerns related to a net zero transition, including the possibility of litigation. Though they may not produce legal effects immediately, financial institutions should begin adjusting to just transition requirements so that they can be ready to comply when they do (Clifford Chance LLP *et al* 2021).

Thirdly, the financial sector should support just transition efforts to reduce financial risks related to climate change and action. A just transition increases the support for green growth (Curran *et al* 2022). Some studies find that perceived fairness is an important predictor of public support for climate action (in Robins *et al* 2020).

Failure to consider socio-economic challenges could lead to climate action failing or being delayed, and consequently the financial sector may be adversely affected. Overlooking the risks of potential negative impacts on workers, businesses, or communities can result in operational and supply chains disruptions, changes in market demands, and deterioration of local economies, which in turn can negatively affect the health of the financial sector (ILO, 2022a).

A just transition thus helps financial institutions to manage systemic risks arising from climate change by integrating the environmental and social aspects of economic performance (PRI, 2020).

Besides, addressing social injustices related to the workforce and communities that may be negatively impacted by a net zero transition has become an 'increasingly material driver for value creation' (Ibid.), for instance by affecting customers' ability to repay loans due to technological changes (Robins *et al* 2020).

Fourthly, a just transition is important for financial institutions because it creates space for new business opportunities. Addressing social concerns is critical to building a resilient green economy that develops the needed skills and capabilities (Curran *et al* 2022) in a timely manner.

Overlooking human capacities and skills to deal with a net zero transition can 'bring less than optimal co-benefits' (ILO, 2022a). Through collaboration with vulnerable sectors, groups, and regions, the financial sector can identify new net zero opportunities (Robins et al., 2020).

For instance, banks can adapt existing and develop new products, such as just transition linked corporate loans, in order to address socio-economic challenges and opportunities (Clifford Chance LLP *et al* 2021)[2].

3.3. Just transition in the financial sector: what is new and what is old?

Although relatively new in the financial sector, the concept of just transition overlaps or is closely related to some of the existing practices and rules that financial institutions already align with.

As mentioned earlier, financial institutions are expected to adhere to human, social, and labour rights, as outlined in the UN Guiding Principles on Business and Human Rights (UNGPs), ILO standards, OECD Guidelines, and other relevant documents, such as the International Bill of Human Rights.

Although these documents do not explicitly refer to a just transition, they cover some of the just transition objectives, such as the protection of human rights, employment, the environment, public health, and consumer interests.

Just transition objectives are also closely related to SDGs especially those that concern decent work and economic growth (SDG 8), reduced inequalities (SDG 10), poverty elimination (SDG 1), climate action (SDG 13) and protection and restoration of biodiversity and ecosystems (SDGs 14 & 15).

A number of financial institutions have already put in place activities aimed at supporting the SDGs. To achieve the SDGs, it is essential to ensure 'no one is left behind' and to build an 'inclusive and just society' (UN, 2015). These are also the goals that a just transition seeks to achieve.

A just transition is also closely associated with Environmental, Social and Governance (ESG) frameworks. According to some interpretations it is supposed to cover the social pillar of the ESG framework (see, eg. Curran *et al* 2022).

However, the environmental pillar of ESG often receives more attention than the social pillar (ILO, 2022a). For example, while Green Bonds represent the largest segment of the sustainable debt market, Sustainability-Linked Bonds (SLB) have only recently emerged (Ibid.).

Furthermore, financial institutions often consider environmental and social indicators separately, as part of their ESG disclosure frameworks, rather than addressing how social and climate issues intersect (UN PRI, 2022). To ensure a just transition they should connect the 'E' and 'S' pillars of their strategies (F4T, 2021b).

Financial institutions that focus on ESG considerations should consider whether and how they already incorporate aspects of just transition issues, and if so, where they may fall short (Clifford Chance LLP *et al* 2021).

Each of the above covers some aspects of a just transition, but not all. Besides, the goal of a just transition is to integrate socio-economic considerations into net zero transition plans and strategies.

It is not about considering environmental and socio-economic concerns separately, but rather simultaneously as part of transition plans and strategies aiming to avoid any social harm and maximise opportunities related to a net zero future.

Similarly, a just transition is about processes as well as outcomes (ILO, 2022a). It includes the participation, involvement, and support of all stakeholders through social dialogue.

Therefore, even though financial institutions may already apply certain principles and practices relevant to a just transition, they must do so in a more comprehensive and integrated manner so that potential socio-economic risks that could undermine a net zero transition are properly addressed while opportunities are seized.

3.4. Existing frameworks for incorporating a just transition into financial institutions' strategies

Generally, frameworks for implementing a just transition can be classified as those that focus specifically on a just transition (see Appendix 2, 3 and 4) and other related initiatives that do not explicitly refer to just transition objectives but intersect with them (see Appendix 1).

They can also be divided into those designed for governments and social actors (see Appendix 3) and those designed for financial institutions (see Appendix 4). This section focuses mainly on frameworks that are intended to provide recommendations for a just transition in the financial sector (listed in Appendix 4).

Some of the frameworks designed for the financial sector align their recommendations for a just transition with frameworks for financial institutions' net zero transition plans (eg. Curran *et al* 2022). Others focus on investment vehicles (eg. Spengler *et al* 2021), commercial banks (eg. Clifford Chance LLP *et al* 2021), development banks (EBRD, 2020), financial institutions' practical decision-making (eg. PwC, 2021), or the integration of human rights into renewable energy investments (Signorelli and Horvath, 2019).

While some offer more principle-based guidance, others provide more detailed guidance. Finally, some of the frameworks focus on particular countries (eg. Tandon *et al* 2021), while others provide more general recommendations.

Based on the review of those frameworks, Table 2 outlines key steps and principles the finance sector should consider to address just transition concerns.

In general, all reviewed frameworks recommend financial institutions to integrate just transition objectives into their policies, plans, governance structures and procedures, products and services, engagements with clients and other stakeholders, and disclosure frameworks.

Banks are expected to assist their clients and customers in aligning with just transition objectives. This includes providing loans to customers to finance projects with positive social impact, conducting just transition due diligence, encouraging product development aiming to address social injustices etc.

Supporting SMEs to develop sustainable products and services is seen as particularly significant in that respect. Transition finance, green, social, sustainability, and sustainability-linked bonds are also considered particularly significant areas of bank financing that should be improved to address social injustices.

Similarly, investors are also expected to support just transition objectives, by incorporating a just transition into their strategies, setting clear targets related to a just transition, and applying extra-financial indicators related to social impacts, among other things.

As divestment and decarbonisation engagement might have far reaching negative social impacts, it is recommended that financial institutions approach this issue with suitable care.

The analysed frameworks suggest that in addition to general principles, strategies to deal with the socio-economic effects of a net zero transition should also be sector- and location-specific. A one- size-fits-all approach is not recommended.

Some sectors, such as energy, food, and transport, are seen as particularly vulnerable to social injustices. However, the social implications extend beyond these sectors and should therefore be addressed appropriately.

A just transition does not apply only to 'sectors undergoing decarbonisation', but also to 'net zero aligned and enabling activities that benefit from green financial flows' (ILO, 2022a).

There is also agreement that while some financial actors and companies have started developing plans for a just transition, this has been far from common practice. Most companies do not consider a just transition (WBA, 2021b) and financial flows are not systematically aligned with just transition goals (ILO, 2022a).

One of the reasons for this relates to the difficulties in identifying and tackling *"the components of the just transition agenda from a finance perspective because of a lack of consensus around definitions, limited standardisation of social metrics, difficulties in obtaining decision-useful data, emerging but still limited market recognition of the need to address*

Table 2. An overview of selected frameworks addressing a just transition designed for the financial sector

A just transition as part of financial institutions' net-zero transition plans (Curran et al 2022)	Just Transition Blueprint for investment vehicles (Spengler et al 2021)	Measures that commercial banks can implement a just transition in their financing (Clifford Chance LLP et al 2021)	Approaches to navigating a just transition to net zero – focus mainly on the energy and extractives sectors (PwC, 2021)	Integrating workers, local communities and consumers into investing and financing frameworks (F4T, 2021a, 2021b, 2021c)
Foundations: Financial institutions should integrate a just transition into their net zero transition plans. Implementation strategy: **(1)** Financial institutions should provide assessments of the socio-economic implications of their net zero plans. **(2)** Banks should review their customers' portfolio of financing products and services with the aim of either embedding a just transition within existing products or developing new products that will support just transition objectives. **(3)** Investors should incorporate a just transition into their investment process and support assets that are geared towards it. **Engagement:** Financial institutions should engage with their customers, policymakers, and other stakeholders (eg. trade unions) with the aim of supporting a just transition. **Metrics and targets:** Financial institutions should develop and	**Ambition – Principle:** Investment vehicles should support the integrated just transition elements: climate and environmental action, socio-economic distribution and equity, and community voice. This should be grounded in local context. **Investment strategy – Principle:** Investment strategies should be explicitly aligned with the just transition elements. They should also be investable by institutional investors. **Outcomes framework – Principle:** Investment vehicles need to have clearly defined and transparent targets related to each element of the just transition. **Structure Principle:** Investment vehicles' structure and terms should enable the capital invested to advance a just transition. They should also allow institutional investor to participate.	**A. Operationalising the just transition in banks' internal governance and systems:** • To ensure a just transition, banks should have an appropriate governance structure. • Banks' climate strategies should account for social implications. • Banks should adopt just transition policies. • Banks should integrate just transition considerations across risk categories and portfolio risk management. • Banks should have the right and transparent tools for measuring progress on a just transition. **B. Operationalising the just transition through financial products and services:** Two areas of bank financing are particularly relevant to a just transition: (1) Transition finance. (2) Green, Social, Sustainability, Sustainability-linked Bonds and	**(1) Green finance** Assessment of environmental and social impact, impact on local communities and jobs. **(2) Decarbonisation engagement** Financial institutions should work more closely with related companies to understand how they minimise the potential environmental and social harm they might cause. **(3) Conditional transition finance** Financial institutions could impose conditions on lending and investment activities to prevent environmental and social harm. **(4) Managed phaseout** Financial institutions, along with other stakeholders, need to understand and minimise the potential social harm caused by closing high-emitting assets. **(5) Responsible divestment and exclusions** Since divestment may have negative social and environmental	**(1) Integrating workers in financing and investment frameworks** Use cross-sectoral extra-financial indicators to integrate workers into investment strategies. Engage with companies to encourage them to implement just transition objectives. Develop financial instruments to reallocate capital to investments focused on a just transition. **(2) Integrating consumers in financing and investment frameworks** Three key sectors that will particularly need to integrate consumer needs are energy, food mobility: **a.** Financing frameworks • Provide loans to customers to finance long-term projects with positive social impact. • Support SMEs to develop sustainable products and services. • Support a just transition through insurance products. **b.** Investment frameworks • Investing strategies should incorporate extra-financial

Table 2. An overview of selected frameworks addressing a just transition designed for the financial sector cont.

disclose metrics for measuring just transition progress. **Governance:** Financial institutions should incorporate a just transition into their governance procedures and develop the in-house skills and capacities needed to support a just transition.	**Governance – Principle:** Investment vehicles' governance structure holds the vehicles accountable for just transition comments and allows for other stakeholders' participation. **Operations – Principle:** Investment vehicles staff have the necessary skills and capacities to implement a just transition.	Equivalent Loan Products. **C. Operationalising at the transactional level – engaging with clients on the just transition:** 1. Preparatory activities. • Understanding the context. • Identifying additional funding sources. • Preparing clients to address just transition considerations. 2. Client and transaction screening. 3. Just transition due diligence. 4. Incorporating just transition issues in loan documentation.	impacts, financial institutions may decide to reinvest. This is where investment previously in fossil fuel assets/companies is reinvested in projects that have positive social and environmental impacts.	indicators related to environmental and social metrics. • Utility companies provide affordable and low-carbon energy sources, so investors should consider investing in them. **(3) Integrating local communities in financing and investment frameworks** • Investors should consider local needs. • Businesses should contribute to the growth of a region through the jobs they create and the services they provide. • Investors should also consider the impact of their investments on nature.

socio-economic impacts of the decarbonisation process, immaturity of available processes and mechanisms focused on social parameters and the fact that social spending is often seen as a cost rather than an investment" (ILO, 2022a).

Existing frameworks provide clear guidance on how financial institutions can incorporate a just transition into their strategies, governance, and products. However, further work is required to identify and standardise all components of a just transition - that is, socio-economic risks resulting from a net zero transition, pathways to address those risks, metrics for evaluating progress on a just transition, and business opportunities associated with it.

Future work is also necessary to develop sector- specific guidelines and to consider both the short-term and long-term socio-economic consequences of a green future. Meanwhile, firms and financial institutions that do engage with the just transition agenda should do so in a comprehensive and integrated manner that aligns environmental and social objectives.

4. Conclusion

The purpose of this paper is to contribute to ongoing discussions regarding a just transition and the financial sector. It is intended to facilitate future considerations of a just transition by providing an overview of available definitions and frameworks related to its aims and components.

The paper suggests that a just transition represents a multidimensional concept, and it should be regarded as such by the financial sector. Focusing solely on employment in high-emitting sectors, as has been the case in the financial sector up until now, is not sufficient.

A just transition encompasses a much broader set of issues, such as the impact of a low-carbon transition on local communities, concerns related to land use for renewable energy, social inequalities, and eradication of poverty.

These should be addressed in locally relevant and appropriate manner that respects the needs and concerns of specific stakeholders, especially the most vulnerable who are often voiceless in most settings.

Financial institutions should therefore start considering all these various components to ensure that a net zero transition is indeed just. Hence, to accelerate adoption and implementation by financial institutions, a broader consensus is needed on the definition of just transition.

An in-depth analysis and classification of socio-economic risks associated with net zero transitions that should be included in financial institutions' standard risk assessments will be presented in a follow-up paper published by the Centre for Climate Finance & Investment (CCFI).

The analysed literature also suggests that environmental and socio-economic concerns should not be treated separately but rather simultaneously to avoid social harm and maximise opportunities associated with a green future. The financial sector is also expected to engage with other stakeholders (eg. workers, local communities, and indigenous peoples) and understand socio-economic challenges they might face.

Furthermore, financial institutions should assess the social impacts of their decisions and activities, assist clients in aligning with just transition objectives, encourage product development aiming to address social injustices, and develop in-house expertise and governance structures related to a just transition. To do so they should firstly commit to making their net zero strategies 'just' by defining clear targets and metrics for measuring success.

While some financial actors, such as multilateral development banks and private sector players, are taking a more active role in just transition initiatives, a significant gap remains in the alignment of financial flows with just transition goals (ILO, 2022a). Consequently, more work is needed to ensure that financial institutions are well-prepared for the challenges related to a just transition.

Besides identifying all relevant components of a just transition that should be considered by the financial sector, as discussed earlier, this also involves having a thorough understanding of the costs of a just transition as well as the business opportunities that are associated with it. ■

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Appendix

Appendix 1. A not-exhaustive list of initiatives that intersect with the just transition objectives

Initiative	Relevance for a just transition
OECD Guidelines for Multinational Enterprises (2011)	Non-binding recommendations and standards for responsible business conduct.
UN Guiding Principles on Business and Human Rights (2011)	Guiding principles on the issue of human rights and transnational corporations and other business enterprises.
International labour standards	A comprehensive system of instruments on work and social policy.
Principles for Responsible Banking (2019)	Framework for the sustainable banking system.
Sustainable development goals (SDGs)	The 2030 Agenda for Sustainable Development.
The EU Taxonomy for sustainable activities (2020).	The EU framework to facilitate sustainable investment.
Platform on Sustainable Finance – Final Report on Social Taxonomy (2022).	A proposal for a social taxonomy within the present EU legislative environment on sustainable finance.
Aizawa et al – Principles-Based Social Taxonomy for Sustainable Investing: Building blocks and lessons for the future (2022).	A social taxonomy proposal.

Appendix 2. A not-exhaustive list of international agreements and initiatives that refer to a just transition

Document	Relevance for a just transition
The Paris Agreement (2015)	• Calls on the Parties to consider "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities"; and • Notes "the importance for some of the concept of 'climate justice', when taking climate action in addition to respecting and promoting human rights, indigenous peoples' rights, local communities' rights, vulnerable and marginalised groups' rights, and the right to development.
Glasgow Climate Pact (2021)	Besides calling for a just transition that promotes "decent work and quality jobs" (as emphasised by the Paris Agreement) it also calls for "sustainable development and the eradication of poverty" as part of the just transition commitments.
Sharm El-Sheikh Implementation Plan (2022)	• It states that "climate action should be implemented in a manner that is just and inclusive while minimising negative social or economic impacts". • It calls for a just transition to renewable energy, just energy transition partnerships, and a social dialogue. • It emphasises that a just and equitable transition includes "energy, socioeconomic, workforce, and other dimensions" as well as social protection and social solidarity measures.

Appendix 2. A not-exhaustive list of international agreements and initiatives that refer to a just transition cont.

Sharm El-Sheikh Implementation Plan (2022)	• It states that "climate action should be implemented in a manner that is just and inclusive while minimising negative social or economic impacts". • It calls for a just transition to renewable energy, just energy transition partnerships, and a social dialogue. • It emphasises that a just and equitable transition includes "energy, socioeconomic, workforce, and other dimensions" as well as social protection and social solidarity measures.
Solidarity and Just Transition Silesia Declaration (2018)	• It commits to supporting a just transition, including the just transition of the workforce, as well as decent work and quality jobs in a net zero transition. • It recognises the challenges facing sectors, cities and regions in transitioning away from fossil fuels and high emitting industries, as well as the importance of ensuring a decent future for workers who are affected by it. • It emphasises the importance of a social dialogue aimed at increasing employment rates, ensuring social protection, and improving labour standards and welfare for workers.

Appendix 2. A not-exhaustive list of international agreements and initiatives that refer to a just transition cont.

ILO – Guidelines for a just transition (2015) + User's manual to the ILO's Guidelines for a just transition (2021)	• ILO's guidelines for a just transition. • The guidelines cover the following areas: macroeconomic and growth policies, industrial and sectoral policies, enterprise policies, skills development, occupational safety and health, social protection, active labour market policies, rights and social dialogue and tripartism.
PRI – Statement of Investor Commitment to Support a Just Transition on Climate Change (2020)	• Affirms investors' commitment to support just transition objectives through investments, corporate engagement, capital allocation decisions, advocacy and partnerships, and transparency.
UNFCCC – Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs (2016)	• It focused on the effect of climate change mitigation policies and actions on the workforce. • It also provides guidance on how to approach just transition at the national level.

Appendix 3. A not-exhaustive list of frameworks addressing a just transition designed for governments and other societal actors

Document	Relevance for a just transition
IEA – Recommendations of the global commission on people-centred clean energy transitions (2021)	The recommendations (designed for governments, funders, investors and international organisations) focus primarily on clean energy transitions.
PCC – A Framework for a Just Transition in South Africa (2022)	The document provides a just transition framework for South Africa.
Just Transition Commission – A national mission for a fairer, greener Scotland (2021)	The report provides recommendations for a just transition in Scotland.
ILO – A just energy transition in Southeast Asia (2022)	By examining the cases of Indonesia, the Philippines and Viet Nam, the report discusses the need to ensure a just transition while phasing out coal.
PRI - Proposals for a Just Transition Disclosure Framework in China (2022)	The report introduces a framework for companies to disclose their just transition commitments.
Council for Inclusive Capitalism - Just Energy Transition: A Framework for Company Action (2021)	The document provides a just energy transition framework for companies to ensure that their energy transitions are just for workers, consumers, and communities.
Just Transition Centre and the B Team – Just transition: A business guide (2018)	The guidance provides companies with practical considerations and processes to ensure a just transition for their workers and communities.

Appendix 3. A not-exhaustive list of frameworks addressing a just transition designed for governments and other societal actors cont.

SSE - Supporting a just transition (2020)	The document outlines SSE's just transition strategy and principles.
WBA - Just Transition Methodology (2021a)	The document presents just transition indicators used to evaluate companies' performance.
Climate Action 100+ -Net Zero Company Benchmark (2022)	The document contains indicators used to assess companies' disclosures, including those related to a just transition.
Atteridge and Strambo - Seven principles to realize a just transition to a low-carbon economy (2020)	The report presents seven principles of a just transition, including how to implement those principles in practice.
Ceres - Practices for Just, Equitable and Sustainable Development of Clean Energy Resources (2020)	Recommendations for the clean energy industry to adopt five best practices to help ensure that the transition to clean energy in the US is just, equitable and sustainable.
B4IG - Business for Inclusive Growth (B4IG) calls to put people at the heart of climate action (2021)	This paper proposes indicators for analysing and measuring business contributions to social challenges relating to a net zero transition.

Appendix 4. A not-exhaustive list of frameworks addressing a just transition designed for the financial sector

Document	Relevance for a just transition
Robins et al – From the grand to the granular: translating just transition ambitions into investor action (2021)	Framework that investors can use to assess a just transition.
Curran et al – Making transition plans just: How to embed the just transition into financial sector net zero plans (2022)	Guidance to financial institutions on how to incorporate considerations related to a just transition into their net zero transition strategies.
Tandon et al – Towards a Just Transition Finance Roadmap for India (2021)	The report suggests actions financial institutions in India should take to support climate policies that also deliver a just transition.
Spengler et al – Mobilising institutional capital towards the SDGs and a Just Transition (2021)	Action-oriented recommendations for a just transition (designed for different public and private financial sector actors).
ILO – Finance for a just transition and the role of transition finance (2022)	The paper discusses ways to align financial decision-making with just transition objectives.
ILO and Grantham Research Institute – Just transition finance tool for banking and investing activities (2022)	The document provides financial institutions with practical advice on how to integrate a just transition into their activities.
Clifford Chance LLP et al. – White paper on just transition and the banking sector (2021)	The paper offers suggestions for how banks can incorporate just transition considerations into their internal structures, relationships with clients, and transactions.

Appendix 4. A not-exhaustive list of frameworks addressing a just transition designed for the financial sector cont.

PwC – Navigating a just transition to net zero: A framework for financial institutions (2022)	The report offers the five practical approaches and accompanying strategic questions as a framework for financial institutions to fulfil their role in financing a just transition.
Muller and Robins – Just Nature: How finance can support a just transition at the interface of action on climate and biodiversity (2022)	The paper focuses on 'just nature transition' and how finance can support a just transition at the interface of action on climate and biodiversity.
F4T – Stakeholders in the just transition: Integrating workers into investment and financing frameworks. N°1. (2021) + F4T – Stakeholders in the just transition: Consumers. N°2 (2021) + F4T – Stakeholders in the just transition: Territories and local communities. N°3. (2021)	In a series of papers, F4T examines how financial actors can better integrate workers, consumers, and local communities into their strategies.
Signorelli and Horvath – Fast & fair renewable energy investments: A practical guide for investors (2019)	This briefing explains how investors can tackle climate change while respecting human rights and a just transition.
EBRD – The EBRD just transition initiative (2020)	The initiative aims to ensure that the EBRD's regions share the benefits of a green economic transition, while protecting vulnerable countries, regions, and people from falling behind.
Multilateral Development Banks – MDB Just Transition High-Level Principles (2021)	The document provides high-level principles for a just transition.

Endnotes

1. For more about a brief history of just transition see Morena et al (2018).

2. For more examples of financial products that can support a just transition, see, for instance, Clifford Chance LLP et al. (2021, pp. 66–68).

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