CENTRE FOR ECONOMIC POLICY RESEARCH

Edited by Thorsten Beck and Yung Chul Park

Prospects of the Global Economy after Covid-19

CEPR PRESS

Prospects of the Global Economy after Covid-19

CEPR PRESS

Centre for Economic Policy Research
33 Great Sutton Street
London, EC1V 0DX
UK
Tel: +44 (0)20 7183 8801
Email: cepr@cepr.org
Web: www.cepr.org

ISBN: 978-1-912179-58-9

CEPR PRESS

Prospects of the Global Economy after Covid-19

Edited by Thorsten Beck
and Yung Chul Park

CENTRE FOR
ECONOMIC
POLICY
RESEARCH

KOREA
INSTITUTE
OF FINANCE
KIF
한국금융연구원

CENTRE FOR ECONOMIC POLICY RESEARCH (CEPR)

The Centre for Economic Policy Research (CEPR) is a network of over 1,600 research economists based mostly in European universities. The Centre's goal is twofold: to promote world-class research, and to get the policy-relevant results into the hands of key decision-makers.

CEPR's guiding principle is 'Research excellence with policy relevance'.

A registered charity since it was founded in 1983, CEPR is independent of all public and private interest groups. It takes no institutional stand on economic policy matters and its core funding comes from its Institutional Members and sales of publications. Because it draws on such a large network of researchers, its output reflects a broad spectrum of individual viewpoints as well as perspectives drawn from civil society.

CEPR research may include views on policy, but the Trustees of the Centre do not give prior review to its publications. The opinions expressed in this report are those of the authors and not those of CEPR.

KOREA INSTITUTE OF FINANCE (KIF)

The Korea Institute of Finance (KIF) was founded in 1991 as the first institute of its kind in Korea. In the years that have followed, the efforts of our team of leading scholars have propelled our institute to become Korea's preeminent comprehensive financial research center, conducting policy research to further the development of Korea's financial industry and working closely with financial institutions to boost their competitiveness.

Through in-depth research on both short- and long-term issues, the KIF seeks out future-oriented financial policy schemes and devises concrete, feasible strategies for the development of Korea's financial industry.

In addition to these tasks, and in keeping pace with the changes in the international financial order, we shall greatly bolster our efforts to raise the general public's understanding of, and address its curiosity regarding, today's principal financial issues and to demystify the complex terminology of finance.

Our entire team is now doing its utmost to construct efficient and appropriate financial policy proposals that will help Korea overcome the present economic difficulties. We shall do our best to ensure that the KIF firmly holds onto its place in the eyes of the public as the most trusted and highly regarded institute for the advancement of Korea's financial industry.

Contents

Acknowledgements

This book comprises the papers, comments and panel discussions delivered at the international conference on “Prospects of the Global Economy” in celebration of the 30th anniversary of the Korea Institute of Finance (KIF). Dr. Sangho Sohn, former president of the KIF, and his staff decided on the main theme and selected the paper authors for the conference. Due to Covid-19, the event had to be delayed until November 2021. Many staff members spent days planning and staging the event. We would not have been able to organise a successful conference without their sacrifices and hard work. In particular, we would like to thank Dr. Sukho Lee, who served as the overall manager of the event, for his valuable contributions to the flawless execution of the conference. Anil Shamdasani has provided meticulous editorial services, making the book much more readable than otherwise. We are grateful for his suggestions for improving earlier drafts of the book.

Foreword

The Covid-19 pandemic has brought about unprecedented impacts on, and changes in, the global landscape of the real economy and financial sectors. Due to liquidity injections by central banks and fiscal authorities around the world to deal with the crisis, we are faced with concerns over asset price bubbles and price inflation. We are also seeing the fragility of global supply chains as well as the escalation of trade protectionism and regionalism. Moreover, with the acceleration of digitalisation, competition between financial firms and BigTech companies is becoming increasingly fiercer.

With this trend likely to continue into the post-Covid era, issues related to digitalisation and the international monetary system will be of greater importance. Digitalisation in the financial sector will progress at an ever-faster speed, and the spotlight on and demand for digital currency will grow stronger and stronger. There is also the possibility that economic uncertainty and financial market volatility in emerging countries will rise during the process of monetary policy normalisation in advanced economies such as the United States. Other challenges that many countries will encounter include climate change, ageing populations and economic inequality.

Against this background, the Korea Institute of Finance (KIF) invited renowned scholars and experts from home and abroad to the 2021 KIF International Conference, a two-day online seminar held on 30 November and 1 December 2021. Distinguished speakers and discussants tackled issues regarding the digital transformation in finance and the international monetary system, identified the global challenges in the post-Covid era, and sought better ways to improve our economy as a whole. This new book from CEPR and the KIF consists of three chapters based on the three sessions at the 2021 KIF International Conference.

CEPR and the KIF are grateful to the authors as well as the six discussants of the chapters – Young Do Kim, Ugo Panizza, Kyungsoo Kim, Suresh Naidu, Kwanho Shin and Sebnem Kalemi-Ozcan. We especially thank Yung Chul Park for his strong dedication and editorship of this book. Our thanks also go to Sophie Roughton and Anil Shamdasani for their expert handling of its production.

Tessa Ogden
Chief Executive Officer, CEPR

Jongkyu Park
President, Korea Institute of Finance

February 2022

Introduction

Thorsten Beck and Yung Chul Park
European University Institute and CEPR; Korea University

The Korea Institute of Finance (KIF) was planning an international conference on the growth and stability of the global economy as the main event for the commemoration of its 30th anniversary in 2018. It was when Korea was gripped with growing discontent with an unsettling economic outlook. The country displayed all the traits of economic decline: an ageing population, a low birth rate (the lowest among the OECD members), and the fear of falling behind advanced economies in the race for the 'Fourth Industrial Revolution'.

Korea was equally divided in politics between conservatives for the status quo and progressives bent on populist indoctrination, making it almost impossible to construct a consensus-built policy agenda. Amid the intensifying factional struggle and the attendant political impasse, Korea was also caught in the conflict between the United States and China when it had no international institutions to turn to articulate its voice on global economic and security affairs.

Realising the public's concern about disconcerting economic prospects, the conference organisers at KIF sought to broaden the scope of the conference as a forum for analysing and seeking answers to Korea's economic predicaments. For this purpose, the KIF decided to solicit the views and advice of experts on economic and institutional development, the international monetary and financial system, and financial growth and development. Because of Covid-19, the conference had to be postponed until November 2021 and held remotely. Over the past two years, the economic outlook has deteriorated further and the political malaise has remained unabated.

This book contains three papers focusing on economic and institutional development, the international monetary and financial system, and financial growth and development by, respectively, Daron Acemoglu, Maurice Obstfeld, and Thorsten Beck and Yung Chul Park. The papers are based on the presentations at the conference as well as the contributions of the papers' disccussants and a summary of the panel discussion.

As pointed out by Daron Acemoglu at the start of his paper, today's world faces four fundamental and existential challenges: the rise in inequality, climate change, demographic change and the weakening of democracy. These challenges not only require urgent actions, but have also been exacerbated by the pandemic. At the same time, these challenges also provide opportunities to make institutions more inclusive, but they also require global cooperation, which has been waning in recent years due to the rising confrontation between the United States and China.

The rise in inequality can be explained by the most recent wave of automation related to the rise of artificial intelligence (AI), which has replaced numerous low- and middle-skill workers with machines and algorithms, without creating new tasks and opportunities elsewhere. These trends have been exacerbated by an increasing focus on corporate profits and weakening of unions, the rise of global BigTech firms without the necessary oversight, and capital being taxed less than labour.

Climate change calls for global cooperation, and more specifically, for a global carbon tax – probably of no less than $150 per metric tonne of carbon, which is in the neighbourhood of the level of carbon tax in Sweden today – complemented by aggressive and immediate subsidies for research in renewables and other green technologies, including storage and transport technologies and a smart grid for the allocation of renewable energy

However, there is also a good kind of automation. Acemoglu argues that ageing countries have not grown any slower and, if anything, have achieved higher growth rates than countries with lower ageing over the last two decades. The reason for this is that ageing countries have invested in technologies to overcome their labour shortages, especially in good automation technologies that have eliminated jobs that were not attractive to the workforce, while at the same time creating other good jobs.

In the political arena, digital technologies have played an important part in the retreat of democracy and steep falls in trust in public institutions. AI-powered social media platforms such as Facebook and Twitter have facilitated the spread of disinformation, contributing to polarisation and lack of confidence in institutions and political hatred. Other emerging applications of digital technologies may have posed a more serious threat to democracy and liberty around the world because they are employed in intensifying authoritarian surveillance and control of populations.

Many of the challenges Acemoglu is concerned about are rooted in the inefficient utilisation of technology. What, then, would be a meaningful solution for them? Acemoglu argues that the solution is to rebuild institutions domestically and globally that are entrusted with and capable of harnessing the power of large corporations and significantly redirecting technological change. The new institutions to be rebuilt are new welfare state organisations, which he refers to as 'welfare state 3.0'. They share similarities with those systems built by the Nordic and other European welfare states. Since they were established in the 1950s and earlier, they need to be reformed to make them more efficient, effective and attuned to globalisation.

At the same time, better regulation of technology is required so that the composition of innovations is tilted away from technologies that pollute the environment and cause climate change, and equally tilted away from Silicon Valley's excessive focus on automation and more towards human-friendly technologies that are capable of creating employment opportunities. This is based on the recognition that regulation is needed to internalise externalities.

Ultimately, this requires more rather than less state. Many emerging market and developing economies (EMDEs) and Korea, having developed such strong faith in a small government and deregulation since the financial crises in East Asia and Latin America in the late 1990s, will not be favourably disposed to introducing new welfare institutions in addition to what they have already established. They may not worry about states and politicians crushing democratic traditions and liberty as much as they do about the loss of the overall efficiency and competition in global markets that will entail when a substantial amount of resources is allocated to welfare spending.

Acemoglu argues that the political fallout from the welfare state does not necessarily threaten liberty and democracy if countries manage to engineer a balance between state and society, which allows society to become more involved in politics while the state shoulders greater responsibilities. Balancing state and society may require a welfare system supported by a high degree of trust in the government and a history of working together to reach compromises and address societal challenges. Many EMDEs may not have nurtured such trust or history. They also have yet to develop the institutional capacity to establish and manage the balance of Acemoglu's welfare state.

In the second paper, Maurice Obstfeld chronicles the evolution of the global financial markets since the Global Financial Crisis, focusing on changes in the markets' domestic impacts, the strains that have emerged due to the Covid-19 crisis and the risks that may lie ahead. A key theme of his analysis is reforms that strengthen market resilience for enhancing financial stability. He also offers valuable policy recommendations on how EMDEs should go about planning to unwind the current expansionary macroeconomic policies to facilitate an orderly transition to a post-Covid economy.

One of the trends that has shaped the contour of the evolution has been the slowing but upward trend of international financial integration among advanced economies and EMDEs. The volume of global financial transactions seems disproportional to any fundamental economic need or activity, yet it produces a system prone to fragility. Like the Global Financial Crisis, the Covid-19 shock in the spring of 2020 illustrated the need for massive central bank intervention as a backstop to market stability.

Another is emerging evidence of a global financial cycle in which global asset and commodity prices, capital flows and bank borrowing move in a synchronised pattern. Given the central role US financial markets and the dollar play in the global economy, it is not surprising that the cycle is linked to US monetary policy. Recent data also depict the close relationship between the global financial cycle index and real output growth in EMDEs. This close tracking raises the concern that EMDEs may become more vulnerable to the vicissitudes of international capital flows. One factor for synchronisation is the prevalence of foreign-currency borrowing, with the consequence that a depreciation of the local currency vis-à-vis the dollar will weaken domestic balance sheets, causing contractionary macroeconomic effects.

The global financial cycle impacts all countries in some way, whether advanced, emerging or developing. Higher-income economies seem to absorb the resulting shocks more easily due to deeper and more fluid financial markets, their wealth, their productive diversity in many cases, the generally greater credibility of their policy frameworks and elements of the global financial safety net, from which they benefit disproportionately. For emerging markets, the close linkage between the global financial cycle and growth raises an important policy issue as to the extent to which a flexible exchange rate system can ensure monetary independence. Recent research has cast doubt that flexible exchange rates can provide perfect insulation against all shocks, though without some degree of flexibility, macroeconomic outcomes would be even worse. As a result of the synchronisation, policy trade-offs between stabilisation and inflation may have worsened for EMDEs. Still, Obstfeld argues that exchange-rate flexibility mitigates the negative impacts of various shocks.

Turning to policy responses to the initial phase of Covid-19 shock in EMDEs, Obstfeld observes that policymakers in EMDEs have been uncharacteristically aggressive in implementing counter-cyclical monetary and fiscal policy in a crisis that would normally dictate a pro-cyclical stance. However, they have also benefited from the massive monetary and financial stimulus provided by advanced economies early in the crisis, and especially from the easing actions of the US Federal Reserve, resulting in a more favourable international environment for EMDEs than during the Global Financial Crisis.

Nonetheless, EMDEs could be vulnerable to sudden stops in the near-term future in the next contractionary phase of the global financial cycle, for two main reasons. First, there has been an uneven rollout of effective vaccines across the globe, which might threaten recovery in many EMDEs. Second, EMDE fiscal responses to the crisis have made them more vulnerable to hikes in advanced-economy interest rates – which could set off a contractionary phase of the global financial cycle. The concentration of new sovereign debt issuance on domestic bank balance sheets in a number of EMDEs raises the risk of a sovereign-bank doom loop. US monetary tightening tends to raise interest rates (a fall in bond prices) in EMDEs, which will weaken their balance sheets. This, in turn, sets up destabilising expectations of government fiscal intervention to support the banking sector, higher deficits, more accommodative monetary policy and yet lower bond prices.

In strengthening market resilience for the financial stability of the global financial system, Obstfeld recommends four reforms. One reason why the banking systems have avoided the distress of the Global Financial System can be explained by post-2008 regulatory reforms. However, there has also been the migration of financial activity from the more constrained banking sector to unregulated or loosely regulated non-bank financial actors, and thus a shift of financial stability risk outside the regulatory perimeter. This requires more stringent regulation of these segments of the financial system.

Another reform put forward is expanding the scope of bilateral central bank swap lines as part of the global financial safety net. The US Federal Reserve swap lines were essential in stabilising global markets during the Global Financial Crisis and in the spring of 2020. In light of the dollar's continuing dominance as a funding and investment currency, Obstfeld proposes extending central bank swap lines multilaterally, especially the Fed's, by building a higher degree of coordination in financial regulatory policies than now exists.

A third reform is to revisit the use of capital flow measures – long maligned by the IMF – and incorporate them in an integrated policy framework that conceptualises the use of capital flow measures, foreign exchange intervention, monetary policy, fiscal policy and macroprudential policy as distinct instruments that may all be needed to reach multiple policy goals in a small open economy. Finally, the current international architecture for external debt restructuring is inadequate to handle sovereign debt defaults. Obstfeld argues that it is necessary to make private-sector participation mandatory to facilitate the debt workout.

In the third chapter, Thorsten Beck and Yung Chul Park discuss the shorter- and longer-term challenges for the financial sector, both related to the exit from the pandemic and consequent economic crisis and to the challenges posed by economic transformation, digitalisation and climate change.

The economic fallout from the pandemic and the consequent lockdown measures have provided unique challenges for policymakers across the globe, as households and enterprises had to be supported by governments during periods of limited or no economic activity. As societies emerge from the pandemic, the sequencing of exit strategies from government support is important to avoid cliff effects and scarring, but also in terms of how quickly the economy can recover and manage the necessary resource reallocation process. Beyond the exit from direct support measures for corporate and financial sectors are the challenges of monetary policy normalisation and fiscal consolidation, with different countries and regions of the world facing different challenges and needs for policy normalisation.

Beyond the immediate challenges, the banking system has undergone structural changes over the past decades that have changed its role in middle- and high-income countries. Specifically, the share of credit to households rather than enterprises has increased. At the same time, the corporate sector has seen an increasing role of intangible assets, which are harder for traditional banks to finance than tangible assets – a trend that can also explain increased cash holdings by corporates. In addition to a shift in banks' lending portfolio, their activity mix has expanded towards non-intermediation businesses, while tighter bank regulation has raised the importance of non-bank financial intermediaries. These trends have changed the way we think about the relationship between the financial

system and economic growth, but also stress that we have to look beyond the traditional banking system towards other segments of the financial system, including private equity and debt providers.

Digitalisation has been an important disruptive force in banking. Traditional banks face increasing competition from new players, including FinTech start-ups and technology platform (BigTech) companies, with the regulatory response critical for the future structure of the financial system. These potentially decisive changes raise the questions of whether the benefits from digitalisation and structural changes outweigh the new risks, and what the financial sector of the future will look like. Decentralised finance has had the ambition to replace the current financial system, but seems to be directing its focus back to connecting with traditional finance rather than replacing it. Cryptocurrencies, such as Bitcoin or Ether, are losing attractiveness compared to stablecoins that are, in some form or other, pegged to traditional currencies. This has increased pressure on central banks to consider introducing retail central bank digital currencies; this in turn, however, might have implications for banks' role in private money creation.

A final challenge that Beck and Park discuss is that of climate change, which poses problems for the financial system (climate, regulatory and transitional risks resulting in stranded and non-performing assets) and at the same time requires the critical function of the financial system for resource reallocation. However, tentative evidence has shown that banks might have limited incentives to support such a transition (especially when compared to public capital markets), which puts the focus on the regulatory response to the climate change challenges, but also raises the question of the relative roles of different segments of the financial system.

The three papers led to interesting debates among the different speakers and discussants at the conference. These debates reinforce the critical contribution that economists can and should make to the current challenges that humanity itself and advanced, emerging and developing economies face as they exit from the pandemic. This exit poses many challenges for policymakers across the globe, but also the opportunity to address fundamental risks for humanity and to move towards a safer and more sustainable world.

CHAPTER 1

Confronting the challenges of the post-Covid world

Daron Acemoglu
MIT and CEPR

1 INTRODUCTION

Today, the world is in the grips of a number of major, almost existential, challenges:

- The rise in inequality in both the West and the developing world, in most cases fueled by automation technologies and globalisation. Inequality has reached alarming levels in some economies, and in the United States it has also taken the form of significant real income losses at the bottom of the distribution, while the top has continued to flourish.
- Climate change, which is continuing unabated, making it all but impossible for global temperatures to be kept within 2°C of pre-industrial times (the not-so-ambitious objective of the Paris Accord).
- Demographic change, which is leading to rapid ageing in most countries around the world.
- Weakening, and in some cases collapse, of democracies and precipitous falls in trust in public institutions, especially in democratic countries.

To add to these challenges, at a time when many problems, including climate change and tackling inequality, require international coordination, we are also witnessing the unwinding of global cooperation and the waning of the influence of international organisations, such as the United Nations and the World Health Organization (WHO).

Many recognise that some of these challenges, such as climate change, are truly existential, because they will likely completely transform the world as we know it and may lead to large numbers of casualties and hundreds of millions being dislocated from their countries.

Other challenges, such as the surge in inequality and the meltdown of support for democratic institutions, are equally threatening to the way of life that has emerged in much of the world, especially in the West, over the last seven decades. Further increases in inequality would take us towards a truly two-tiered society – much more hierarchical

in terms of economics and social status than anything Western nations, Japan and South Korea have experienced in recent decades (much more similar to the situation in South Africa, for example, before the fall of apartheid).

The collapse of democracy in these countries would also be a complete game-changer. It is therefore my contention that we have to recognise these challenges as existential as well.

Finally, ageing, which has taken place very rapidly in Germany, Japan and South Korea, will also change economies and societies, even if it is not as threatening as these other trends.

These challenges have many commonalities.

First, they all require urgent action. This is our last chance to take meaningful action on climate change before it becomes all but inevitable to significantly exceed the 2°C target. Inequality has reached alarming proportions, and as I will argue, the rapid rollout of artificial intelligence (AI) technologies will further exacerbate these inequities. We have only a small window of opportunity to start reversing inequality trends. Politically, the health of democratic institutions in many countries, including the United States, has approached the point of no return, raising doubts about the ongoing role of democratic governance in many parts of the world.

Second, Covid-19 has exacerbated many of these problems. This is most visible in the case of the collapse of democratic institutions and global cooperation, but is no less true for inequality, because automation has received a further powerful boost during the pandemic.

Third, many of these challenges simultaneously provide opportunities for restructuring our institutions in a more inclusive way, as I will explain.

Fourth, meaningful action on most of these challenges requires global cooperation. This is clear in the case of climate change, but it is no less true for combating inequality, since technology choices that impact inequality are global, as are the rules of globalisation (by definition), and other economic decisions, including capital taxation, are linked across countries.

Revitalising democratic institutions also has an important international element. However, in this hour of need for strong, autonomous global institutions supporting international cooperation, the world has been moving in the opposite direction. The downward slide of global cooperation is of course a potential danger not just because it complicates solutions to the four challenges I have outlined, but also because it raises the spectre of much more hostile international relations and even war.

Finally, and this is the most important thesis of this chapter, these challenges are intimately linked to our current institutional failures and to the current distorted direction of technological change. Any meaningful solution will have to rebuild

institutions domestically and around the world and significantly redirect technological change. In particular, I will argue that two specific fault lines are complicit in our current predicament and will have to be tackled for us to come out of it:

1. **Responsibilities and priorities of businesses**. The power of corporations has increased tremendously over the last several decades, with the rise of mega international businesses. The huge reach of BigTech, controlling and exploiting data on billions of people, is just one dimension of the overwhelming power of corporations. With great power should come *some* responsibility. However, most businesses are still implicitly or explicitly motivated by the maximisation of profits, especially shareholder returns, and the prestige and power of their chief executives. The singular focus on profits is intellectually rooted in Milton Friedman's famous "shareholders' values" dictum, which claims that "the social responsibility of business is to increase its profits" – that is, corporations should look after their shareholders, without regards to the effects that this has on their other stakeholders, including their employees (Friedman 1970). Moreover, the reality is that, regardless of Friedman's emphasis on shareholders, large corporations are run by powerful chief executive officers (CEOs) who will always be motivated to look after their own interests as well. Gargantuan pay packages and stock market options have aligned some of the interests of these corporations and their top management, but so far this has only been on issues that have fanned the flames of inequality, such as automation and worker layoffs. More generally, the narrow framing of what corporations should be about was always problematic, but has become more so when we are confronted with existential challenges, from climate change to automation-fueled inequality.

2. **The direction of technology.** Many of the challenges are technological in nature (inequality fueled by automation, the technologies that have enabled the rapid rise in globalisation, and of course industrial technologies spewing out massive amounts of carbon emissions). But more importantly, many of these challenges require different types of technologies – fundamentally, a new direction of technological change. This is clear in the case of climate change, where just cutting coal, oil and gas consumption without significant improvements in renewables and other green technologies would not be sufficient or feasible. It should also be evident in the case of inequality, since meaningful corrections to inequality trends in much of the West would not be feasible if businesses continue to automate rapidly. I will also explain why the direction of technological change is critical for our response to ageing and the future of democratic institutions.

Of course, neither changing corporations' priorities nor redirecting technological change could even be contemplated without the appropriate institutional framework to guide incentives and decisions and without pressure from broader segments of society,

especially civil society organisations and non-business interest groups. Indeed, a vital part of the new institutional compact that we need at the moment is more robust participation of diverse voices and interests.

Relatedly, I will emphasise that both corporations' ability to completely ignore stakeholders other than the upper management and shareholders and technology's inequality-boosting trajectory are both rooted in the way that institutions have malfunctioned, insulating these powerful actors from the wishes and voices of the rest of society. Hence, more participatory, inclusive institutional arrangements have to be at the heart of our efforts to combat these challenges.

Putting all of these ideas and priorities together, I will outline what I view as the critical elements of a new institutional compact. Critically, because it is so much harder to build global institutions, it will have to start domestically. These domestic institutions have clear commonalities with the welfare states that Nordic countries, Britain and many in continental Europe built in the 1930s, 1940s and 1950s. I will refer to the template of these new institutions as the welfare state 3.0, to highlight that they need to be much more efficient and effective, and also extend their reach into new areas (Acemoglu 2020). Most importantly, I will argue that regulation of technology has to be a central element of these new welfare state institutions. This will no doubt be a controversial claim, especially to many economists. Nevertheless, the vital role of the direction of technology and our current predicaments caused by distorted new technologies and their effects make this unavoidable. I will explain why we should not expect the market process by itself to settle on the socially most beneficial direction of technological change, and how technology can be regulated without leading to disastrous outcomes. This last discussion will also take me into issues of political economy.

The rest of this chapter is organised as follows. In the next four sections, I outline the basic contours of the four challenges I have identified above. Section 6 briefly discusses the unwinding of global cooperation. Section 7 explains why redirection of technological change is critical for confronting the major challenges we are facing, and why this needs to be accompanied by changes in leading businesses' priorities. Section 8 outlines the types of institutions that can support such redirection and refocus, emphasising in particular the role of technology regulation. Section 9 discusses the political economy challenges in building and maintaining such institutions, emphasising the need for both stronger democratic institutions and more robust participation from civil society organisations in politics. Section 10 concludes.

2 THE INEQUALITY CHALLENGE

Inequality has increased in most industrialised nations and in much of the emerging world. But the surge in inequality has been most jarring in the United States, which is where I will start.

Before discussing recent trends, it is useful to put them into perspective, especially in the context of the more shared, inclusive growth experience of the US and European economies in the aftermath of World War II. During this period, the United States and Western Europe experienced three decades of rapid and broadly shared growth. In Europe, many started referring to these times as 'glorious decades', reflecting the rapid and inclusive nature of economic growth. In the US, this came with lower inequality. The gap between college-educated and other workers closed, Black Americans started narrowing the huge earning gaps that existed between them and the white population, women began integrating into the labour force and earning more, and those with little education saw their earnings increase more or less at the same rate as those with college degrees (Acemoglu and Autor 2011). Not everything was perfect, of course. Gender discrimination continued and African Americans were economically and politically repressed, even though there was important progress both before and after the iconic civil rights reforms of the 1960s.

American labour market trends look very different since 1980, however. Inequality surged, with the gap between low-education and high-education Americans and between business-owners and labour widening dramatically (Acemoglu and Autor 2011). Worse, the rise in inequality was accompanied by a significant decline in the real earnings of low-education men. While the real wages of workers with post-graduate degrees continued to increase, the majority of US workers experienced stagnant or falling real wages, and these trends have continued to the current day.

Many think of our current epoch as the age of technological breakthroughs. Indeed, new software products are introduced daily, and there are about four times as many patents today than four decades ago, mostly because of the surge in patenting in computers, electronics, and other digital technologies (Acemoglu et al. 2021a). Yet, the rapid productivity advances of the US economy in the 1950s and 1960s have now given way to lacklustre productivity growth (Gordon 2017). This disappointing productivity performance, the worst for the United States since the beginning of the twentieth century, raises the possibility that we are not using our current knowledge and technologies in the most fruitful way.

These developments are not unique to the United States. Inequality has increased in most of the Western world, including in continental Europe, even if it has not reached the same levels as in the United States (Bhatt et al. 2020). Another difference is that the significant declines in the real earnings of low-education workers in the United States and other Anglo-Saxon economies have not been paralleled in much of the rest of the developed world, and this most likely reflects the lack of institutional protection for low-pay workers in these economies. The slowdown in productivity growth is also a widely shared trend in the West. Inequality and low productivity growth since 1980 have been characteristics of many emerging economies as well, including Latin America (Ferreira and Schoch 2020).

What underpins these changes? Like most complex social and economic phenomena, this transformation has many causes, ranging from globalisation to the declining power of labour against capital. My research with Pascual Restrepo, however, indicates that automation has been just as important as these other factors in explaining these changes in the industrialised world (Acemoglu and Restrepo 2019).

By automation, I refer to the substitution of machines and algorithms for tasks previously performed by labour. Of course, automation is not new. Since the weaving and spinning machines that fueled the British Industrial Revolution, automation has often been an engine of economic growth. However, my research shows that in the past, it was part of a broad technology portfolio, and its potentially negative effects on labour were counterbalanced by other technologies boosting human productivity and employment opportunities. During the rapid mechanisation of agriculture in the United States, for example, millions of workers were displaced from the farming sector, but the economy simultaneously created myriad new jobs and many of these were associated with new industries and new tasks, such as clerical, design and technical work. This more balanced technology portfolio did not mean that agricultural mechanisation was without hardship (indeed, there was a lot of misery among dislocated workers). But it ensured that growth was rapid and new opportunities were created for many, especially those with a basic level of education, to work in the new manufacturing and non-manufacturing jobs.

We see something very different in the recent past. Automation appears to have accelerated in the United States (and in much of the industrialised world) while there has simultaneously been a significant slowdown in other technologies, including new tasks that used to counterbalance automation and create new opportunities for workers (Acemoglu and Restrepo 2019).

All of these trends pre-date AI. Nevertheless, recent advances in AI are exacerbating the trends. In principle, AI is a broad technological platform with diverse applications, and can thus be used for helping human productivity and creating new human tasks and competencies in education, healthcare, engineering, manufacturing and elsewhere. But recent evidence suggests that AI technologies are being deployed for automation and the replacement of workers (Acemoglu et al. 2021b). If so, AI is likely to contribute to inequality. As I will explain below, AI may also have far-ranging implications for economic development and inequality in emerging economies.

The Covid-19 pandemic is also accelerating automation. This is for the natural reason that, in the midst of all the demand for social distancing, employers are looking for ways to substitute machines for human workers (EY 2020).

Industrial robots illustrate both the benefits and costs of automation. Robots have raised productivity in many parts of modern manufacturing. But their impact on labour has been more negative. While business owners and investors have benefited, workers, and especially low- and middle-education workers, have been displaced by industrial robots and have suffered economically. Local communities where businesses have adopted more

robots have experienced employment and wage declines (Acemoglu and Restrepo 2020a). The same evidence also shows that local labour markets impacted by the introduction of robots have experienced significantly greater inequality, which is of course expected, since many of the jobs that were automated used to be performed by workers with less than a college degree. My recent research with Pascual Restrepo evaluates the effects of automation and inequality more comprehensively, by considering not just robots but also office software-based automation and focusing on national, rather than local, inequality trends. The evidence indicates that between 50% and 70% of the changes in the US wage structure are linked to the effects of automation technologies. This does not deny the role of institutional factors, including the decline in the real value of the minimum wage. It certainly does not imply that globalisation and the world of cheap imports from China have not been important (though globalisation itself, and especially offshoring, are enabled by advances in digital technologies). But it highlights that we cannot combat inequality effectively without focusing on what technologies are doing to the labour market.

Despite the rapid advances in digital technologies, robotics, electronics and now AI, the disappointing performance of productivity growth in the West and around the world is a big puzzle. Even though information and communication technology (ICT) has advanced rapidly and is used in every sector of the economy, industries that use ICT more intensively have not performed better in terms of productivity, output or employment growth (Acemoglu et al. 2014). The reasons for slow productivity growth over the last two decades are not well understood, but one contributing factor appears to be that many automation technologies, such as self-checkout kiosks or automated customer service, are not generating much productivity growth. Consistent with this presumption, my recent research with David Autor and Christina Patterson shows that much of the slowdown in productivity growth in both the United States and Western Europe is associated with 'unbalanced innovation': while productivity and innovative efforts have increased in computers and electronics, they have lagged behind in other sectors, and this has created bottlenecks holding down aggregate productivity performance (Acemoglu et al. 2021a).

These arguments raise the possibility that there is excessive automation, meaning that redirecting technological change away from automation towards more worker-friendly avenues could increase both productivity and welfare. There are several reasons for excessive automation, and it is important to understand them in order to formulate solutions for the surging inequality.

I would in particular like to emphasise four broad factors that have biased the US technology portfolio, and by implication the world's technology portfolio, towards too much automation. The first is the objectives and priorities of businesses. Management–labour relations were far from perfect, especially in the United States, before the 1970s. But labour market institutions, collective bargaining and prevailing norms meant that managers had to share some of the business rents with workers, leading to a more equal division of economic gains. The same considerations also encouraged businesses to make

technology and strategic choices that took account of their employees. This meant, in particular, efforts to use a company's labour force as a resource – all else equal, employers have an interest in increasing the productivity of their workers. Companies often achieved this by training, by investing in technologies that augment worker capabilities, and by introducing new production tasks that make better use of worker skills (Acemoglu 2003). The German apprenticeship system is the emblematic example of this type of arrangement, where employers invested in workers' training, preparing them for more complex production tasks (Acemoglu and Pischke 1988).

The overall outlook of many managers started changing with two developments: increasing emphasis from the media and consultants that they should just focus on profits and stock market performance, and the increasing competition from first Japan and then China.

These two developments made many CEOs decide to prioritise cost-cutting to remain competitive and attempted to do so by using automation and other digital technologies to 'reengineer the corporation' in order to reduce labor costs. In the process, increasing profits started becoming more attractive (Hammer and Champy 2009). But this also meant less interest in investing in workers and greater acceptance of automating jobs and laying off workers.

The second factor may have been even more important. Global technology trajectories came to be shaped by a handful of large tech firms, such as IBM at first and then Microsoft, Google, Facebook, Amazon and others. For example, BigTech companies are responsible for more than two out of every three dollars spent globally on AI (Bughin et al. 2017). They have also had a huge impact on the direction of the use of technologies more broadly. Their approach to data, algorithms and new software products also motivates the focus and priorities of hundreds of thousands of young students and researchers specialising in computer science, AI and data science, who aspire to work for these and related companies. In the context of the role of other large companies over the last century and a half, these firms' business models are quite peculiar: they are centered on substitution of computers, machines and algorithms for human work. This can be seen, for example, by the fact that they have tiny workforces, despite their over-sized contribution to GDP and stock market valuations (Acemoglu and Restrepo 2020b). As their influence on technology and other industries expanded, it created a bias towards automation throughout the rest of the economy, both in the United States and globally.

Third, the influence of Silicon Valley and BigTech on the direction of technology became exacerbated because the leadership and funding that the US government used to provide for scientific and applied research started ebbing (Gruber and Johnson 2019). During much of the 20th century, entrepreneurs and innovators were at the forefront of new technologies, but in most cases, they were supported and in fact sometimes had their research objectives set by the government. US government leadership was critical for antibiotics, sensors, modern engines, aerospace, communication technologies,

the computer and the Internet, among many others. The fundamental scientific breakthroughs necessary for these technologies would not have taken place so quickly without the government's willingness to fund science and support leading researchers. Nor would these technologies have flourished commercially without large government purchases.

Finally, government policy shifted towards directly encouraging automation, especially through its tax code. The tax system of many Western countries treats capital more favourably than labour, encouraging firms to substitute machines for workers, even when workers may be more productive. My research with Andrea Manera and Pascual Restrepo shows that this asymmetric treatment of capital and labour has become exacerbated in the United States over the last 40 years: via payroll and federal income taxes, labour pays an effective tax rate of over 25% (Acemoglu et al. 2020). Even 20 years ago, capital was more lightly taxed than labour, with equipment and software facing tax rates of around 15%. This differential has widened even more with tax cuts on high incomes, the shift of many businesses to S-corporation status making them exempt from corporate income taxes, and very generous depreciation allowances. As a result of these changes, software and equipment today face tax rates close to zero, and in some cases corporations can get a net subsidy when they invest in capital. US companies, on average, can save about 20% of costs when they lay off workers and install new machinery to produce the same output. Via this channel, the US tax system generates a powerful motive for excessive automation.

Automation, like AI developments, has been much more rapid in the West. But it would be incorrect to think that it will not have immediate effects on the rest of the world. In fact, it can have some of its most damaging impacts on the emerging world.

The global comparative advantage of developing nations, even in this age of technology, is abundant and comparatively cheap labour. This is all the more so since much of the richer world has started ageing rapidly and will continue to do so.

Viewed from this perspective, automation and especially AI are examples of what economists used to call 'inappropriate technology'. Technologies are inappropriate (and in particular, inappropriate to lower-income countries) when they are developed for the conditions in the West and do not achieve their full fruition in productivity when implemented and adopted in the emerging world.

Why is automation inappropriate for of the emerging world? This is simple to see.

Countries in Latin America or other emerging countries, such as India or Pakistan, have much less need for saving labour and face higher relative costs of capital. The appropriate technology for such countries should prioritise more labour-intensive production methods.

The inappropriateness of technology is problematic largely because of its inequality implications: it will boost inequality in the developing world and further open the gaps between rich and poor countries (Acemoglu and Zilibotti 2001).

How this reasoning makes AI inappropriate to the developing world is also clear.

Although industrialised nations and the tech giants are pouring billions into AI technologies for automation, from the viewpoint of the emerging world, we need more technologies that complement their workforces, rather than trying to replace such workers. The effects of automation and AI will become more troublesome for the emerging world as they continue to remake the international division of labour, which is already underway.

In summary, inequality in many parts of the world, not least in the United States, has reached alarming proportions. The rise in inequality is intimately linked to automation technologies that have replaced many low- and middle-skill workers with machines and algorithms. There is also evidence that the extent of automation has been excessive, in part because it has not been accompanied and counterbalanced by other technological advances necessary for creating new tasks and opportunities for workers.

3 CLIMATE CHANGE

Earth's temperature has already increased by 1.2°C above pre-industrial levels (WMO 2020). The rise is set to continue, perhaps as much as another 5°C in the next 80 years (Herring 2012). There is no meaningful scientific disagreement to the idea that this is caused by greenhouse gases (GHGs) emitted by industrial processes, transport systems and agriculture. We are already seeing extinction of many species, including coral reefs, directly linked to warming, and many parts of the world are on their way to becoming much less hospitable for human existence. Some scientists estimate that more than one billion people might be forced to emigrate by 2050 (Fitch 2020).

There is also broad agreement that the current global policy proposals are inadequate for dealing with the climate change crisis. The pledges at the Glasgow COP26 Conference, even if they are realised, will fall woefully short of the Paris Agreement's (already modest) objective of keeping global temperature rise below 2°C.

It is clear how we got here. The scientific evidence on climate change and the urgency of action has been clear for at least four decades. But the same institutional failings and lack of responsibility, especially among big energy companies, precluded any meaningful policy action. On the contrary, despite the scientific evidence on the dangers of climate change, governments both in the West and the developing world have continued to pour trillions of dollars into fossil fuel subsidies. Just in the last five years, some estimates put the amount of global subsidies to fossil fuels at around $5 trillion (Garrington 2021). China, in the meantime, has been building more than one power plant every week (CREA 2021), while India has doubled its coal consumption over the last decade (BBC 2021).

Moreover, there is broad scientific consensus on at least some elements of what needs to be done. The most important step is the establishment of a global carbon tax (probably of no less than $150 per metric tonne of carbon, which is in the neighbourhood of the level of carbon tax in Sweden today). The carbon tax would probably need to be backed up by carbon tariffs, so that countries that do not accept this carbon tax or fail to implement it cannot export products produced with high emissions to other countries.

Although the global carbon tax has to be the bedrock of the policies combating climate change, it is not sufficient. My research emphasises that the carbon tax needs to be complemented by aggressive and immediate subsidies for research in renewables and other green technologies, including storage and transport technologies and a smart grid for the allocation of renewable energy (Acemoglu et al. 2012). These types of green subsidies are critical for a smooth transition to cleaner energy supply, especially if we do not want to sacrifice economic growth, which would be very costly both for hundreds of millions of poor citizens in the West and billions of people living in poverty in the developing world.

The role of redirection of technology is critical in all of this. We are in this climate change crisis because big energy companies have continued to invest in coal, oil and gas. We need to redirect technological change away from fossil fuels towards renewables and other green technologies.

A key point that is sometimes lost in the discussion is that this can be done very effectively. Four decades ago, renewable energy was prohibitively expensive and the basic knowhow for green technologies was lacking. Today, renewables already make up 19% of energy consumption in Europe and 11% in the United States, and are cost-competitive with fossil fuel-based energy – and in fact, cheaper in most cases if government subsidies to fossil fuels are removed (IRENA 2018, 2019, LAZARD 2019). This striking achievement is thanks to a redirection of technological change away from fossil fuels, and it has taken place with minimal government support. In the United States this took the form of some state-level regulations (such as in California), a small amount of federal support to green technologies, and consumer awareness and demand for clean products. The last point here is particularly important because, as I will emphasise later, pressure from civil society, including workers and consumers, is critical for aligning the technology choices of businesses with broader social objectives.

Much more needs to be done, and again the bulk of this ought to take place along the same three axes: redirection of technological change, more responsible behavior from leading firms, and institutional reforms to make firms and politicians more accountable.

4 AGEING

Most countries today are in the midst of a very rapid demographic change (United Nations 2017). Soon, people aged over 55 will make up the majority of the workforce in many countries. To many economists and policymakers, ageing is a huge challenge. It increases the dependent population and healthcare costs, it reduces tax revenues, and many believe it will depress productivity because of shortages of the more productive younger and middle-aged workers (Gordon 2017). It also creates myriad macroeconomic challenges, with potential for excessive savings (Summers 2013). Some are even worried that the political economy of ageing countries can change significantly, as older voters push for policies that are in their narrow interests.

With so many worries, it is reasonable to expect that the countries that have experienced most of the demographic change over the last three decades should already be feeling these adverse consequences. Reality is very different, however. My research shows that ageing countries have not grown any slower, and if anything, have somewhat higher growth rates over the last two decades than their slowly ageing peers (Acemoglu and Restrepo 2017). What is going on?

The simple answer is that ageing countries have invested in technologies to overcome their labour shortages, especially in automation technologies. Germany, Japan and South Korea, for example, are among the chief adopters of robots and other industrial automation technologies.

This pattern is not just effective in these three most rapidly ageing countries; it holds when one compares other countries that are ageing rapidly to those that have not started their major demographic change towards an older population yet (Acemoglu and Restrepo 2021).

The greater investments in automation by ageing countries makes economic sense. These are the economies that experienced shortages of middle-aged and younger workers, which are typically the ones that specialised in manual blue-collar jobs that require dexterity and physical strength. Some of these jobs can now be automated by dedicated machinery and even more by industrial robots.

It may at first seem surprising that investment in automation technologies can fully offset the potential negative effects of ageing. But, in fact, this is exactly what the theory of directed technological change predicts: technology is often very responsive to changes in factor shortages, as well as to other incentives, and its response can transform economic dynamics (Acemoglu 2002).

This account clearly shows another example of the effect of new technologies and their adoption on adjustments to other major challenges. In contrast to my earlier discussion – focused on inequality and climate change – this is a more hopeful story. Why?

In the successful response of (some) economies to ageing, we are seeing a very different face of automation: one dealing with labour shortages and enabling successful adaptation to the different composition of the workforce. This highlights two important points. First, as I have already hinted at, automation is not inherently bad or inefficient. In fact, it has an important role in economic growth, provided that it is part of a balanced portfolio. It is more likely to play this role when it is responding to labour shortages or eliminating jobs that were not attractive to the workforce in the first place and are being replaced by other good jobs. More importantly, as I have already emphasised, automation is much more likely to be part of a healthy portfolio of new technologies when it is accompanied by other innovations that increase worker productivity and introduce new tasks that can reinstate them into the production process.

In this light, the automation response of rapidly ageing countries is very different from the type of excessive automation I discussed earlier. Rather, it illustrates a different 'good' face of automation, helping against labour shortages, as opposed to the unbalanced automation observed in the United States and many other Western nations over the last several decades.

Second, the response of rapidly ageing economies to demographic change also gives us clues about when we may expect the market to do a good job in terms of technology adoption and development: when incentives of different segments of society are broadly aligned (adoption of automation technologies does not harm workers when there is labour shortage and when this is accompanied by other adjustments to help labour) and the technologies that need to be developed are already mature and thus there is no issue of different companies pushing towards their own paradigm at the expense of others.

The example of 'good' automation in this context therefore has much to teach us about the proper balance of technologies and other instances, as I will discuss.

5 DEMOCRACY'S TRIAL BY FIRE

The 1990s and 2000s were decades of optimism about democracy and institutional trajectories of the emerging world. In a process that political scientist Samuel Huntington called the 'Third Wave', we witnessed a rapid wave of democratisation around the world starting with the collapse of southern European dictatorships (Spain, Portugal and Greece) in the 1970s. The fall of the Berlin Wall was thought to accelerate this trend, so much so that many thought this was the 'end of history' – heralding the triumph of 'liberal democracy' around the world. Indeed, there was a rapid wave of democratisation in the 1990s, continuing into the early 2000s.

Democracy has not fared very well over the last 15 years, however. According to the NGO Freedom House, which tracks democracy and vertical rights around the world, many more countries have moved away from democracy in every one of the last 16 years than have become more democratic (Repucci and Slipowitz 2021). Many of its ills are common across both the developed and the developing world

Why is this? Once again, this is a complex phenomenon and is not mono-causal. Here, I will focus on four factors. First, polarisation has increased considerably in many countries. The United States once again illustrates this trend and some of its origins. In the decades that followed World War II, US lawmakers frequently worked with their counterparts from the other party and produced bipartisan bills. A telling measure of the increase in political polarisation is that this type of bipartisan behavior has all but ceased (McCarty et al. 2017). Polarisation is not confined to politicians. There is increasing evidence that the electorate is highly polarised today. Polarisation raises a number of difficult problems for democracy. It makes compromise and even debate difficult. When urgent policies are implemented without broad support in society, their legitimacy is limited, and this lack of legitimacy can then spread to democratic institutions. In the United States, this dynamic can be seen in the efforts to enact a comprehensive healthcare reform under President Obama. Although there was broad support from the public for legislation that would make healthcare more widely available and would attempt to control rising costs and provide coverage to millions of Americans who did not have access to health insurance, these reforms did not receive support from the Republican side, and as a result, are still seen as illegitimate by some part of the electorate.

Polarisation is not confined to the United States. From Latin America to India and Turkey, much of the developing world has experienced political polarisation as well. Similar trends are visible in Europe, too. Although the effects of polarisation have been highly detrimental in the United States, they are even more dangerous in countries where democratic institutions are weak or are currently being built. It is reasonable to expect that if the increase in polarisation continues, this will make democracy paralysed in many countries.

Second, many authoritarian governments control the media and use it for indoctrination and for whipping up nationalist fervour. China is an example, but this trend is not confined to China, and covers diverse countries such as the Philippines, Brazil, Turkey and Hungary. We can see traces of it in the United States as well, where cable news networks and online news sources have made the electorate more polarised and less willing to listen to counterarguments, making democratic discourse and bipartisan policymaking even more difficult (DellaVigna and Kaplan 2007). The clampdown on media by authoritarian (and sometimes less than fully authoritarian) governments is accompanied by intensifying misinformation in social media, also contributing to polarisation and distrust, as I will discuss below in the context of the effects of new technologies on democratic discourse.

Third, attacks against democracy have often been coupled with increased nationalism. This is at first surprising, since many commentators thought nationalism was on the wane. We do not know exactly why, but reality has been very different over the last two decades. Many of the populist-authoritarian leaders that have left their imprint on countries such as the Philippines, Brazil, India and Turkey are fiercely nationalist and have used nationalism as a way of weakening democratic institutions and judicial independence, as well as a convenient way of clamping down on media freedom.

Finally, the role of big money has stacked the cards against the success of democratic institutions. Oligarchs have come to play a central role in politics not just in countries like the Ukraine, Turkey, Russia and Greece, but in many parts of Latin America and Asia as well. In the United States, we are seeing the richest families and the largest corporations become disproportionately influential in shaping policy via lobbying efforts, campaign contributions, their outsized social status and their close connections with politicians (Bartels 2012).

New technologies are also contributing greatly to the weakening of democracy and the waning of public trust in institutions more generally. Digital technologies and more recently AI-powered social media such as Facebook and Twitter have started transforming political communication and debate. AI has enabled these platforms to target their users with individualised messages and advertising, and even more ominously social media has facilitated the spread of disinformation, contributing to polarisation, lack of trust in institutions and political rancor. The Cambridge Analytica scandal illustrates the dangers. Cambridge Analytica acquired the private information of about 50 million individuals from data shared by around 270,000 Facebook users about themselves and others. It then used these data to design personalised political advertising in the Brexit referendum and the 2016 US presidential election. Many more companies are now engaged in similar activities, with more sophisticated AI tools (Coppins 2020).

Recent research suggests that standard algorithms used by social media sites such as Facebook reduce the exposure of individuals to posts from different points of view, further contributing to the polarisation of the American public (Levy 2019).

Other emerging applications of digital technologies may be even more threatening to democracy and liberty around the world, because they are intensifying authoritarian surveillance and control of populations. Basic pattern recognition techniques are already powerful enough to enable governments and companies to monitor individual behavior, political views and communication. They have been used extensively by several companies and countries. For example, the Chinese Communist Party has long relied on similar techniques for identifying and stamping out online dissent and opposition, for mass surveillance, and for controlling political activity in parts of the country where there is widespread opposition to its rule, such as Xinjiang and Tibet (King et al. 2013).

Another area of considerable concern is facial recognition, currently one of the most active fields of research within AI (Zuboff 2019). With AI-powered technologies for collecting information about individual behaviour, experts believe that both authoritarian and semi-authoritarian governments (including the United States and many in Latin America) can start controlling protest movements and oppositions, ultimately cutting off the lifeblood of democracy.

These worrying trends against democratic institutions have also been exacerbated by COVID. Many authoritarian governments have increased their surveillance of protest movements and opposition, and they have accelerated the development of digital tools of surveillance and control.

6 WHITHER GLOBAL COOPERATION?

Many of the post-Covid challenges, including tackling the misuse of digital technologies and surveillance, require international cooperation. Of course, meaningful action against climate change is impossible without global coordination. It is also impossible to redirect technological change away from excessive automation or from surveillance technologies such as facial recognition, when some countries, including China, are pouring billions into such uses.

Similarly, a more shared model of prosperity requires capital to be taxed (as I indicated above), but this would be impossible without international cooperation on taxation as well.

Global cooperation was always fragile, but has been significantly damaged by the new 'great power' rivalry between the United States and China. Both countries' attempts to influence and dominate international institutions weakens these institutions, and makes meaningful cooperation harder.

The pandemic has contributed to this trend, reducing the credibility of organisations such as the UN and WHO, both because of their ineffectiveness and their inability to withstand pressure from China. This adds another layer of complication to efforts to remake the post-Covid world.

7 THE IMPERATIVE TO REDIRECT TECHNOLOGICAL CHANGE

I have so far argued that we need to tackle rising inequality, preferably by creating a model of shared economic growth, take urgent action on climate change, and strengthen democratic institutions. This all needs to be bolstered by better global coordination and better-functioning global institutions.

In all of these cases, how we use technology is going to be critical. I have also indicated that the current trend is for using technology for automation, generating inequality and weakening democracy, while paying insufficient attention to renewable technologies, despite the urgency of climate change.

Hence, my conclusion is that we need a push towards redirected technological change, with an eye to creating more opportunities for workers, reducing the excessive bias towards automation, investing more in renewables and other green technologies, preventing excessive data collection and surveillance of citizens and workers, and empowering citizens rather than just corporations and governments.

Excessive automation, excessive reliance on fossil fuels and excessive investments in surveillance technologies and data collection by private companies are not the result of some preordained technological path; they are the results of choices of researchers who have focused on automation applications at the expense of other uses of technologies, and companies that have built their business models on automation and reducing labour costs rather than broad-based productivity increases. We can make different technological choices, but this necessitates a concerted effort for redirecting technological change. This can only be done with the state playing a central role in the regulation of technology, and societal pressure on companies to align their interests and priorities with those of broader social objectives.

By 'regulation of technology' I am referring to a positive role of governments in incentives so that the composition of innovations is tilted away from technologies that pollute the environment and cause climate change, and equally tilted away from Silicon Valley's excessive focus on automation and more towards human-friendly technologies that are capable of creating employment opportunities. Such regulation also has a role in ensuring that communication technologies do not propagate misinformation and put some weight on empowering individuals, citizens and communities, not just corporations and governments.

Many economists and tech entrepreneurs and researchers are staunchly opposed to government regulation of technologies. For economists, this has a good, principled reason: in history, powerful actors have often blocked new technologies, with disastrous effects on long-run economic growth. Although this is true, and something I have emphasised in my own work (Acemoglu and Robinson 2012), we cannot deny that there have also been instances, such as the US government's scientific leadership I discussed above, where such intervention led to more positive outcomes.

Why this stark difference between different approaches to technology amongst powerful political actors? The most important difference is rooted in whether rulers and politically powerful constituencies are blocking technologies in order to preserve their political position, or alternatively whether regulation of technology is motivated by various market failures. This difference, in turn, is intimately linked to the form of government.

Under authoritarian political institutions, it is easy for rulers to manipulate technologies for their own selfish benefits. Under democracies, there is at least the possibility that regulation of technology can be motivated by the 'social good'.

But to understand what this social good may be, we first need to step back and consider whether and when we expect the market to perform well in selecting the direction of technology, without any government intervention. My main argument here is that we should not expect the market to always make the right technology choices, and if we have strong democratic institutions, this at least raises the possibility that society may benefit from the right type of regulation of technology. There are at least four reasons for 'market failures' in technology.

First, the evidence that the market is doing well in choosing the right technologies is not overwhelming. Although we are in the midst of a period of prodigious technological creativity, with new breakthroughs and applications invented every day, as I have already pointed out, productivity growth has been unusually slow. The slow pace of improvements is clear from the standard statistic that economists use for measuring how much the technological capability of the economy is expanding – the growth of total factor productivity (TFP). TFP growth answers a simple question: if we kept the amount of labour and capital resources we are using constant from one year to the next, and only our technological capabilities changed, how much would aggregate income grow? TFP growth in much of the industrialised world was upwards of 2% a year and sometimes more than 3% a year in the three decades that followed World War II. It now hovers below 0.5% (Gordon 2017). So the case that the market is doing a fantastic job of expanding our productive capacity isn't ironclad.

The theoretical argument that we should rely on the market for setting the direction of technological change is weak as well. In the terminology of economics, innovation creates significant 'externalities'. This is of course obvious in the case of energy. Fossil fuel technologies pollute the environment and contribute powerfully to climate change, while renewables and other green technologies do not. But when corporations are just focused on profits, they do not take these externalities into account and tend to over-pollute, and worse, they tend to invest in and use fossil fuel technologies, despite their disastrous effects.

But the role of externalities is not confined to fossil fuels and the energy sector. More broadly, when a company or a researcher innovates, many of the benefits accrue to others. This is doubly so for technologies that create new tasks and organisational forms. The beneficiaries are often workers whose wages increase (and new firms that later find the right organisational structures and come up with creative products to make use of these new tasks). More broadly, new organisational forms and tasks can only be developed gradually, and there will be many other researchers and companies building on early advances. This again intensifies the externalities from innovation in these areas. These external benefits are not part of the calculus of innovating firms and researchers,

and this may be a powerful deterrent for the types of technologies that have the greatest social value. This argument is even stronger when new products themselves produce non-economic costs and benefits.

Take surveillance technologies. The demand for surveillance from repressive (and some democratic-looking) governments may be great, generating plenty of financial incentives for firms and researchers to invest in facial recognition and snooping technologies. But the erosion of liberties is a notable non-economic cost, and it is often not accounted for. A similar point holds for automation technologies: it is easy to ignore the vital role that good, secure and high-paying jobs play in making people feel fulfilled. With all of these externalities, how can we assume that the market will get things right?

Unfettered markets have had an especially hard time making the right choices when there are alternative, competing technological paradigms, as in the field of AI. When one paradigm is ahead of the others, both researchers and companies are tempted to pursue that leading paradigm, even if another one is more productive. Consequently, when the wrong paradigm surges ahead, it becomes very difficult to switch to more promising alternatives (Dosi 1982).

Moreover, innovation responds not just to economic incentives but also to norms, which determine what researchers find acceptable, exciting and promising, and shape their moral compasses. If the norms within the research area do not reflect our social objectives, the resulting technological change will not serve society's best interests. This last point again reiterates the importance of broader societal pressure, as misaligned norms in various disciplines often arise because researchers may be insulated from the voices and interests of the rest of society.

In any case, even if not explicitly endorsing a systematic framework for regulation of technology, most economists would agree that governments should support renewables and other green technologies, not fossil fuels. But the evidence and reasoning I have presented so far clearly indicates that the same should be true for the balance between automation and human-friendly technologies. Once we take this step, then we are already contemplating a framework for regulation of technology.

Even if the arguments I have presented so far are valid, some may see any regulation of technology as a slippery slope, ultimately leading to more inefficient forms of government interventions. However, we have to bear in mind that governments all around the world – via their tax policies and their support for corporate research in universities, for example – impact the direction of technology. As I have already argued, the US government has encouraged automation by way of its asymmetric taxation policies for capital and labour. Similarly, the United States, like many other countries, has also massively subsidised fossil fuels. Hence it would be incorrect to think that government policy so far has been neutral towards different types of technologies.

Put differently, regulation of technology is not really new, but recognising that the government is effectively regulating technology already and developing a framework for doing so would be a new and in my opinion an important step.

8 WELFARE STATE 3.0

What I have suggested so far is a new framework for regulation of technology and also other institutional arrangements so that technological choices are not completely insulated from societal priorities. After all, these technology choices have a first-order impact on the rest of society, so it would be strange and non-democratic to expect that they should be imposed on the rest of society without any consultation.

These suggestions thus amount to a new institutional framework. I will refer to these as welfare state 3.0. This terminology is motivated by three considerations. First, in addition to the regulation of technology and increasing the capability of diverse voices to be heard in the context of important business and technology decisions, new institutions have to bolster some of the early welfare state institutions' objectives, such as a stronger social safety net, greater opportunities for children from disadvantaged backgrounds, better health care, better infrastructure and better protection for disadvantaged groups.

Second, however, these institutions would have to rectify some of the shortcomings of early welfare state institutions, for example, the inefficiencies and bloated bureaucracies, which were part of the motivation for the deregulation reforms of the 1980s and 90s.

Third, these institutions would involve significant extension of the responsibility of the state. Early welfare state institutions did not have to deal with global issues such as climate change, pandemic and anti-terrorism measures. More importantly for my focus here, they did not have a clear mandate for the regulation of technology. Welfare state 3.0 must make these central priorities.

None of this is possible if the new welfare state institutions will not engender a different type of behaviour from corporations. The private sector has to be at the forefront of technological change, and of course they will also be the ones adopting newly developed technologies. So corporate priorities matter.

Neither the rollout of new green technologies nor worker-friendly innovations can be counted on if firms insist on paying attention only to shareholders' and top management's interests. Similarly, the use of communication technologies to manipulate consumers and foment polarisation becomes much more likely when firms act in selfish ways. New regulations must therefore push firms to be held accountable for their broader responsibilities – to the environment, to their workers and to democracy.

This is of course easier said than done for many reasons, and in the next section, I will discuss some of the most important challenges to the building of these types of new institutions.

9 CHALLENGES OF BUILDING NEW INSTITUTIONS

The most challenging objections to the ideas proposed here have been articulated by the great Austrian economist Frederich Von Hayek. Hayek, a recent émigré to Britain teaching at my alma mater, the London School of Economics, became alarmed by the Beveridge Report, which advocated an ambitious set of new welfare programmes for the United Kingdom both during and after the war. Hayek first wrote a memo to Lord Beveridge, which he later turned into his celebrated book, *The Road to Serfdom*. In it, Hayek warned against the rise of the administrative state that would crush society and its freedoms (Hayek 2014). As he later summarised it, his concern was that:

> "extensive government control produces…a psychological change, an alteration in the character of the people.... even a strong tradition of political liberty is no safeguard if the danger is precisely that new institutions and policies will gradually undermine and destroy that spirit."

If Hayek's objections had any validity for early welfare state institutions (and they did have some), they would have much greater weight for welfare state 3.0 because of the increase in the burden on the shoulders of these state institutions. Should we then be so worried about states and politicians crushing democratic traditions and liberty that we should shy away from the institutional reforms I am proposing? I do not think so. Even though Hayek's concerns were well-placed, he turned out to be wrong, and the reason why is instructive.

Liberty and democracy did not get quashed in the United Kingdom or in Scandinavian countries that had started adopting similar welfare state programmes even before the war. The United States and the rest of Continental Europe also adopted their own versions of these programmes. On the contrary, these programmes enabled greater opportunities for individual freedom to flourish. In hindsight, there is an obvious reason for this: most of the people in Europe at the time were not truly free. When the majority of the population lived under economic fear, as they did during the Great Depression, and lacked the resources, including education and skills, to earn a decent living, it is difficult to claim that they were enjoying some absolute liberty (Acemoglu and Robinson 2019).

Indeed, this is what William Beveridge keenly understood when he articulated why the sort of policies called for in his report were vital for liberty:

> "Liberty means more than freedom from the arbitrary power of Governments. It means freedom from economic servitude to Want and Squalor… A starving man is not free" (Beveridge 1947).

However, there is an even more fundamental reason why the political fallout from the welfare state did not threaten liberty and democracy, which can be understood with the help of the conceptual framework James Robinson and I offer in our new book, *The Narrow Corridor* (Acemoglu and Robinson 2019). In the book, we explain why the best

guarantors of democracy and liberty are not constitutions or clever designs of separation of powers, but society's mobilisation. But that requires a balance between state and society. When that balance is secured, which puts the polity in the 'corridor', both the state and society can get stronger and gain greater capacity together. So when we need the state to shoulder greater responsibilities, society itself can become more involved in politics. This is a process that we tried to capture with the imagery of the Red Queen from *Through the Looking Glass and What Alice Found There*: both state and society together need to do all the running they can so that they keep up with each other. This is indeed what happened in much of the industrialised world. As the state took on more, democracy deepened and society's involvement and ability to keep politicians and bureaucrats in check intensified.

This account clarifies another important point: having broad societal participation in politics and also having the voices and priorities of the general population being heard in the context of technology and corporate decisions is not a luxury. It is essential for the functioning of democratic institutions and the protection of liberty in general. Such participation is also vital for protecting these new institutions once they are launched. This is the basis of my argument that what we need to create is an institutional framework that both involves the major elements of welfare state 3.0 and enables a stronger, more robust form of democracy, with fluid participation of various diverse segments of society and public decision-making.

10 CONCLUSION

In this chapter, I have argued that the world is facing several existential challenges, most importantly alarming levels of inequality, climate change and the weakening of democratic institutions. It also has to adjust to the new reality of a much older population and workforce.

We have so far not done very well in terms of rising up to these challenges. This is mostly because our institutions have not served us well – either because they have not adapted to the changing circumstances or worse, they have become truly captured by oligarchic interests and anti-democratic strongmen around the world. It is also because corporations have become trapped in a mindset that fixates on short-term profits and their top management's income and power. This refocusing of corporate objectives has been at the expense of their consumers and workers, and of course at the expense of the climate and the broader institutional environment.

In all of these cases, technologies are at the forefront of the fault lines. Inequality has been fueled by automation technologies and communication technologies that have enabled the rapid growth of globalisation. Fossil fuel-based technologies are responsible for the rapid growth of carbon emissions, and new technologies have been a contributing factor to political polarisation and the weakening of civil society organisations.

But technology will also have to be a large part of the solution. We need to redirect innovation towards worker-friendly technologies, towards renewables, and towards those that empower citizens and workers, not just corporations and governments. This redirection has to be bolstered by new institutions and commitment from the corporate sector to move away from the narrow interests of their CEOs and major shareholders.

I have outlined a set of new welfare state institutions that have to be part of this transformation, and I have argued that we need stronger democratic institutions and new pathways for societal participation in public decision-making (including in the corporate priorities) in order for this to be a reality. The current environment – with huge polarisation, international conflict and collapse of trust in public institutions – is a challenging one for building new, inclusive institutions. Yet, we have no alternative but to try.

REFERENCES

Acemoglu, D (2002), "Directed Technical Change", *Review of Economic Studies* 69: 781-809.

Acemoglu, D (2003), "Cross-Country Inequality Trends", *Economic Journal* 113: F121-149.

Acemoglu, D (2020), "The Post-Covid State", Project Syndicate, 5 June.

Acemoglu, D and D Autor (2011), "Skills, Tasks and Technologies: Implications for Employment and Earnings", *Handbook of Labor Economics* 4: 1043-1171.

Acemoglu, D and J-S Pischke (1988), "Why Do Firms Train? Theory and Evidence", *Quarterly Journal of Economic*s 113: 79-119.

Acemoglu, D and P Restrepo (2017), "Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation", *American Economic Review* 107(5): 174-79.

Acemoglu, D and P Restrepo (2019), "Automation and New Tasks: How Technology Changes Labor Demand", *Journal of Economic Perspectives* 33(2): 3-30.

Acemoglu, D and P Restrepo (2020a), "Robots and jobs: Evidence from US labor markets", *Journal of Political Economy* 128(6): 2188-2244.

Acemoglu, D and P Restrepo (2020b), "The Wrong Kind Of AI? Artificial Intelligence and The Future Of Labor Demand", *Cambridge Journal of Regions, Economy and Society* 13(1): 25-35.

Acemoglu, D and P Restrepo (2021), "Demographics and Automation", *Review of Economic Studies* 89(1): 1-44.

Acemoglu, D and J A Robinson (2012), *Why Nations: the Origins of Power, Prosperity, and Poverty*, Crown Business.

Acemoglu, D and J A Robinson (2019), *The Narrow Corridor: States, Societies, and the Fate of Liberty*, Penguin.

Acemoglu, D and F Zilibotti (2001), "Productivity Differences" *Quarterly Journal of Economics* 116: 563-606

Acemoglu, D, P Aghion, L Bursztyn, and D Hemous (2012), "The Environment and Directed Technical Change", *American Economic Review* 102: 131-66

Acemoglu, D, D Autor, D Dorn, G H Hanson and B Price (2014), "Return of the Solow Paradox? IT, Productivity, and Employment in US Manufacturing", *American Economic Review* 104(5): 394-99.

Acemoglu, D, A Manera and P Restrepo (2020), "Does the US Tax Code Favor Automation?", *Brookings Papers on Economic Activity*, Spring.

Acemoglu, D, D Autor and C Patterson (2021a), "Bottlenecks: Sectoral Imbalances and the US Productivity Slowdown", mimeo, MIT.

Acemoglu, D, D Autor, J Hazell and P Restrepo (2021b), "AI and Jobs: Evidence from Online Vacancies", NBER Working Paper 28257.

Bartels, L M (2018), *Unequal Democracy: The Political Economy of the New Gilded Age,* Princeton University Press.

BBC (2021), "Climate change: Why India can't live without coal", BBC News, 28 September.

Beveridge, W (1947), *Why I Am a Liberal*, Jenkins.

Bhatt, A, M Kolb, and O Ward (2020), "How to Fix Economic Inequality? An Overview of Policies for the United States and Other High-Income Economies", PIIE Educational Resources.

Bughin, J, E Hazan, S Ramaswamy, M Chui, T Allas, P Dahlstrom, N Henke and M Trench (2017), *Artificial Intelligence: The Next Digital Frontier?*, McKinsey & Company.

Coppins, M (2020), "The Billion Dollar Disinformation Campaign to Reelect the President", *The Atlantic*, March.

CREA – Centre for Research on Energy and Clean Air (2021), "China Dominates 2020 Coal Plant Development", Global Energy Monitor Briefing, February.

DellaVigna, S and E Kaplan (2007), "The Fox News Effect: Media Bias and Voting", *Quarterly Journal of Economics* 122(3): 1187-1234.

Dosi, G (1982), "Technology Paradigms and Technological Trajectories", *Research Policy* 11(3): 147-162.

EY (2020), "How do you find clarity in the midst of a crisis? Addressing the "now" is critical, but anticipating the "next" and "beyond" is the optimal response to COVID-19", Global Capital Confidence Barometer 22.

Ferreira, F and M Schoch (2020), "Inequality and social unrest in Latin America: The Tocqueville Paradox revisited", Let's Talk Development blog, 24 February.

Fitch, C (2020), "Predictions of mass-migration due to climate change are rife, but not necessarily accurate", *Geographical*, 27 December.

Friedman, M (1970), "A Friedman doctrine- The Social Responsibility Of Business Is to Increase Its Profits", *The New York Times*, 13 September.

Garrington, D (2021), "'Reckless': G20 states subsidised fossil fuels by $3tn since 2015, says report", *The Guardian*, 20 July.

Gordon, R J (2017), *The Rise and Fall of American Growth: The US Standard of Living Since the Civil War*, Princeton University Press.

Gruber, J and S Johnson (2019), *Jump-Starting America: How Breakthrough Science Can Revive Economic Growth and the American Dream*, Public Affairs.

Hammer, M and J Champy (2009), *Reengineering the Corporation: Manifesto for Business Revolution*, A. Zondervan.

Herring, D (2012), "Climate Change: Global Temperature Projections", NOAA Climate.gov, 6 March.

IRENA – International Renewable Energy Agency (2019), *Renewable Power Generation Costs in 2018*.

IRENA (2020), *Renewable Power Generation Costs in 2019*.

King, G, J Pan, and M E Roberts (2013), "How Censorship in China Allows Government Criticism but Silences Collective Expression", *American Political Science Review* 107(2): 326-343.

LAZARD (2019), "Levelized Cost of Energy and Levelized Cost of Storage 2019", 7 November.

Levy, R (2020), "Social Media, News Consumption, and Polarization: Evidence from a Field Experiment", *American Economic Review* 111(3): 831-870.

McCarty, M, K T Poole and H Rosenthal (2017), *Polarized America: The Dance of Ideology and Unequal Riches*, MIT Press.

Repucci, S and A Slipowitz (2021), *Democracy under Siege*, Freedom House.

Summers, L H (2013), "Why Stagnation Might Prove to Be the New Normal", *The Financial Times*, 15 December.

United Nations (2017), "World Population Ageing 2017 Highlights", UN Department of Economic and Social Affairs.

von Hayek, F (2014) *The Road to Serfdom: Text and Documents: The Definitive Edition (The Collected Works of F.A. Hayek)*, Routledge.

Walton, G (2001), *China's Golden Shield: Corporations and the Development of Surveillance Technology in the People's Republic of China*, International Center for Human Rights and Democratic Development.

WMO – World Meteorological Organization (2020), *The State of the Global Climate 2020.*

Zuboff, S (2019), *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, Profile Books.

ABOUT THE AUTHOR

Daron Acemoglu is MIT Institute Professor at the Massachusetts Institute of Technology. He received a BA in Economics at the University of York, and M.Sc. in Mathematical Economics and Econometrics at the London School of Economics and a Ph.D. in Economics at the London School of Economics in 1992. He is an elected fellow of the American Academy of Arts and Sciences, the Econometric Society, the European Economic Association, and the Society of Labor Economists.

He has received numerous awards and fellowships, including the inaugural T. W. Shultz Prize from the University of Chicago in 2004, the inaugural Sherwin Rosen Award for outstanding contribution to labor economics in 2004, the Distinguished Science Award from the Turkish Sciences Association in 2006, and the John von Neumann Award from Rajk College, Budapest in 2007. He was also awarded the John Bates Clark Medal in 2005, given every two years to the best economist in the United States under the age of 40 by the American Economic Association, and holds an Honorary Doctorate from the University of Utrecht. His research interests include political economy, economic development and growth, human capital theory, growth theory, innovation, search theory, network economics and learning.

DISCUSSIONS

Suresh Naidu, *Columbia University*

Thank you for the opportunity to discuss all of these interesting ideas. I won't recap, but Daron Acemoglu highlighted four major challenges and then ends with the point that the solution is kind of a set of policies to regulate technology. I agree that what we really need to do is take charge of the trajectory of technological progress. I think Daron's work over the years has shown how technology is not necessarily something that will just be selected autonomously, but we can respond well to incentives and policies. So, my problem with the solution, which I will talk about a little bit, is that it is very hard to imagine a political vehicle with the scale capacity and legitimacy to implement the sort of solutions that Daron is suggesting.

I am going to take the narrow corridor more seriously than Daron did in his presentation and suggest that the precursor to any of the policy solutions is, in fact, a non-policy solution. In some sense, we need something autonomous in civil society, and this something has to transcend the political and geopolitical boundaries that we have. If you just start with the institutions we actually have to regulate technology in the United States, you have done a great job.

There have been plenty of blunders – for example, the roll out of Covid-19 testing. In the United States, we still can't get reliable, fast Covid tests. Arguably, the biggest input into getting vaccines as fast as we did was just weakening the regulation around pharmaceutical development. And even before Covid, there were some examples of disasters in the regulation of technology. We let highly addictive opioid painkillers loose in the American market, with some disastrous consequences. Even before opioids, we had other sorts of narcotic drugs let loose on the American population. I think that as a result of both these mistakes, but also a propaganda war that has a basis in truth, there is a lot of mistrust in the Food and Drug Administration (FDA). And it's one of the many sources of US vaccines hasn't been getting. Oh, it only has emergency authorisation to vaccinate, so people didn't get it. It doesn't look like a great scenario for our existing institutions.

The failure by the FDA wasn't for the libertarian reason that people complain about, which is that it is too bureaucratic. I think, in fact, that when it is checked by the public and when there are civil society groups that are paying attention to what the FDA is doing, it actually delivers pretty good results. I'll give an example that might be helpful for Daron's book, which is AIDS and ACT-UP. This was really like a social movement around getting antiretrovirals and defining the standard of critical care for AIDS. It was a case where the FDA responded to civil society organisations in a way that transformed the direction of AIDS treatment and the direction of pharmaceutical developments for AIDS. I think the idea here is that drug regulation fails when there are no independent civil society organisations looking out for potential harm. This civil society is the

precursor for the kinds of regulations Daron is talking about, particularly at a scale that has to be at least international, if not completely global. We are going to need some sort of global civil society.

And this is the problem: the audience for the policies that Daron is proposing doesn't exist. There is a presupposition that there is some legitimate political authority in some entity that can turn on technological regulation that will do the thing that we need it to do. And I just don't think there is that audience. Even if it does exist, it doesn't have the political legitimacy to implement the changes that we need. We can have all the great policy ideas that we want, but there is not actually an entity with the tools and incentives to implement them. So, it is a much more fundamental problem than policy design.

It feels to me that regulation is at the end of a very long sequence of steps that we need to go through, where we first need to establish collective ability to do something before we ask it to manage technology. I think these are the questions that are behind the questions Daron is asking. What are the political institutions that we can make work at the transnational scale? Central banking might be one, for example. What are models of democracy that can be marshalled to work at such a scale? What are the coalitions that could hold such things together? What are the technologies that could facilitate the rise of a global political community? All this seems very, very far away. The experience of the European Union is not promising for exactly how this could unfold, but it seems like we need something like this before we can think about policies.

Ernest Gellner told the story about how the nation-state arose out of a bunch of villages. He basically tells the story about how, as an economy industrialises, it creates a demand for social insurance and general education at a higher level of aggregation than local villages could provide. Gellner argues that elites are often already cosmopolitan. Let's run with the idea that we have a whole bunch of parochial, less-educated groups and then cosmopolitan, educated elites like Piketty's Brahmin Left, pulling together across countries but in deep tension with the less-educated groups inside their countries. The policy advice being dispensed by academics like Daron and me is seen as a tool of these cosmopolitan educated elites to dominate the latter, not actually constructive solutions. We can't be giving policy advice without having something else to change the political dynamic, so that expert advice is not seen as self-interested. For example, in the Government Statistical Service, the non-college-educated are deeply sceptical of economics.

Covid is the worst kind of shock for this. It is a shock that separates people by country rather than pulling them together. It is the worst thing for creating the kind of political community that we need.

I want to conclude with my little iota of promise and hope. I am a big believer in international migration as a pre-requisite for global peace. I also think international migration has actually helped address a lot of the short-term problems in Daron's presentation. It can mitigate international inequality across countries. When correctly

managed with labour market institutions, it can also dampen capital-labour inequality and push technology towards labour-augmenting rather than labour-replacing uses. It can help address the demographic problems in advanced countries. It is an important adaptation mechanism for climate change. In the long run, it also creates a constituency with a vested interest in global social insurance. If you have to think about something on the margin that might push in the direction of where we need to go, you might think of expanding permanent international migration. I'll leave it at that. Thanks.

Kyung Soo Kim, *Sungkyunkwan University*
First of all, congratulations on your 30th anniversary. And thank you very much for having me here. I think this is really great storytelling. The details are based on the author's own research for many years, and the proposals he made is being approached very cautiously.

Professor Acemoglu's paper can be summarised into three topics. Inequality, climate change, demographic change and democracy are challenges that threaten our prosperity and peace in the 21st century, and even more so in the post-Covid-19 era. Behind these challenges lie digital technologies such as automation and artificial intelligence (AI). To overcome these challenges, an institutional build-up is needed at the international level as well as the national level. The 'welfare state 3.0', which he coined, should guide digital technology along the 'right' path of evolution.

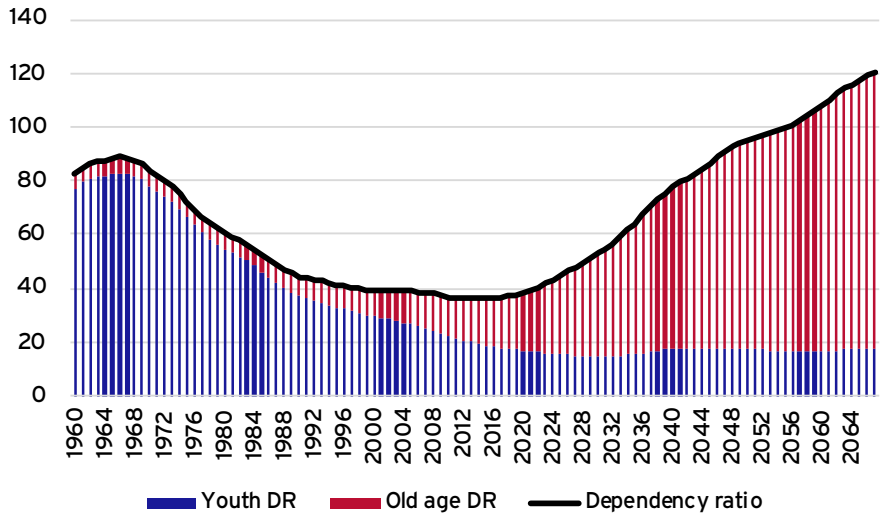
1 Technology and demography

We all know that technology is the key to growth and wellbeing because it drives productivity. The literature on technological advances, including this one, leads us to speculate that there may indeed be a long-term interaction between technology and demography. Considering what has happened over the past 70 years and what will happen in the future, it can be conjectured that the green revolution will lead to an ageing population, ageing will cause a digital revolution, and the digital revolution will lead to a decrease employment and eventually a decrease in the population.

In particular, I would like to emphasise that Korea, which has made significant progress in automation as Acemoglu noted, is now at the forefront of demographic transformation. Korea has just crossed a demographic inflection point. As you can see in Figure 1, 10 million will disappear from the labour force after 20 years, and another 10 million will disappear after another 20 years.

Putting all of this together, the question arises: if we control for demographic variables, is it likely that the Solow paradox won't hold? In other words, common sense suggests that technological progress is limited to the digital economy and does not appear as an improvement in productivity as a whole. But wouldn't it be possible to get different results if we controlled for demographic variables?

FIGURE 1 KOREA'S DEMOGRAPHIC OUTLOOK



Source: Statistics Korea

2 Inequality and jobs

On inequality, I would like to address two points. First, David Autor (2015) argued that human capital has been scarce and always will be no matter what (see the quote below). Therefore, investing in human capital should be top priority. Professor Acemoglu's presentation does not seem to solve the problem by cultivating human capital alone. I would love to hear his thoughts on what makes it so.

"The primary system of income distribution in market economies is rooted in labour scarcity. If machines were in fact to make human labour superfluous, we would have vast aggregate wealth but a serious challenge in determining who owns it and how to share it. One might presume that with so much wealth at hand, distribution would be relatively straightforward to resolve. But history suggests that this prediction never holds true. There is always perceived scarcity and ongoing conflict over distribution, and I do not expect that this problem will become any less severe as automation advances.

> ... employment polarisation will not continue indefinitely. ... the issue is not that middle-class workers are doomed by automation and technology, but instead that human capital investment must be at the heart of any long-term strategy for producing skills that are complemented by rather than substituted for by technological change..." Autor (2015)

Next, I would like to point out that income inequality exacerbates wealth inequality. If the equity premium is too high, people will borrow money to invest in equities. Then interest rates will go up and equity returns will fall, so the premium will go down. But the equity premium puzzle suggest that theory doesn't explain reality, and that in reality

it is difficult for everyone to borrow money to invest in stocks. Indeed, according to Table 1, from 2019 Survey of Consumer Finance, more than 80% of stocks are owned by the top 10%.

TABLE 1 FAMILIES GROUPED BY NET WORTH

Bottom 50%	1%
50-80%	6%
80-90%	9%
90-95%	13%
95-99%	33%
Top 1%	38%

Source: Gebeloff (2021), as cited in 2019 Survey of Consumer Finance, Federal Reserve Board.

So, what keeps people from borrowing money to invest in stocks? I think the answer can be found in Mian et al. (2020). Through extensive data analysis, they estimated that the bottom 90% owe most of the debt and that the top 1% hold it. The financial constraints on debt repayment would force the bottom 90% to increase their demand for safe assets, making it difficult to invest in risky stocks for the long term. Moreover, similar to the global saving glut, the saving glut of the rich will contribute to a lower risk-free rate.

3 The regulation of tech

The 'right' regulation of technology may not be as easy as it sounds. For example, labour-saving technology will reduce the need for company A in country B to outsource to country C. As a result, the shareholders of company A will benefit at the expense of (workers in) country C. Clearly, the government of country B has no reason to discourage labour-saving technological development.

Nevertheless, in the post-Covid era, technology regulation is an even more important issue. Currently, there is a lively discussion in developed countries and the international community about the regulation of giant technology companies. Here, the regulatory direction varies from country to country. While the United States prioritises data protection, the European Union prioritises privacy. Meanwhile, China sees data as a state asset and not a business, in the belief that the state can provide better service. Therefore, it is necessary to discuss how these differences in perception can converge.

I think Professor Acemoglu is pessimistic in his paper. He is emphasising international corporations. The reality, however, is that geopolitical risks are rising, and international cooperation seems far-fetched. Of course, this is no coincidence, as discussed thoroughly in this paper. Listed below are some quotes from influential political scientists and

historians that appeared in *Foreign Policy* shortly after the pandemic and *The Economist* after the United States left Afghanistan. The last item in the list is the title of an article written by a *Financial Times* columnist, who warned of geopolitical risks in East Asia even before the pandemic began.

- "Previous plagues did not end great-power rivalry nor usher in a new era of global cooperation" (S. Walt, *Foreign Policy*, 2020)
- "Democracies will come out of their shell" (J. Ikenberry, *Foreign Policy*, 2020)
- "The United States has failed the leadership test" (K. Schake, *Foreign Policy*, 2020)
- "The demand for recognition on the part of groups that feel they have been marginalised by elites is something as an Achilles heel of modern democracy" (F. Fukuyama, *The Economist*, August 2021)
- "The end of America's empire won't be peaceful" (N. Ferguson, *The Economist*, 2021)
- "Forty years of prosperity in the (East Asian) region is now under threat" (G. Rachman, *Financial Times*, 2019)

Last but not least, it would be great if Professor Acemoglu could share his wisdom on what the challenges and proposals discussed in this paper might imply for Korea.

Thank you very much.

References

Autor, D (2015), "Why Are There Still So Many Jobs? The History and Future of Workplace Automation", *Journal of Economic Perspectives* 29(3).

Gebeloff, R (2021), "Who owns stocks? Explaining the rise on inequality during the pandemic", *The New York Times*, 26 January.

Mian, A, L Straub and A Sufi (2020), "The Saving Glut of the Rich and the Rise in Household Debt", CESifo Working Paper Series 8201.

CHAPTER 2

The international financial system after Covid-19

Maurice Obstfeld[1]

University of California, Berkeley Peterson Institute for International Economics and CEPR

INTRODUCTION

In March of 2020, international markets seized up with a violence unequalled since the Global Financial Crisis nearly a dozen years before. As economies around the world locked down in the face of the potentially deadly but completely novel SARS-CoV-2 virus, stock markets fell, firms and governments scrambled for cash, liquidity strains emerged even in the market for US Treasuries, and capital flows to emerging and developing economies (EMDEs) reversed violently. Once again, the world economy appeared on the brink of collapse – until it was pulled back by monetary and fiscal interventions that outstripped even those of the 2008–2009 Global Financial Crisis.

The Global Financial Crisis erupted after five years of global financial market expansion following the Asian crisis of the late-1990s, the dot.com collapse and Enron corporate fraud scandal, and the 9/11 attacks on the United States. Following the crisis, macroeconomists questioned their earlier theoretical paradigms, financial firms altered their business models and regulators rethought their oversight frameworks. Those paradigms, models and frameworks needed to change – they had complemented each other in allowing the most severe financial crisis since the 1930s.

The Covid-19 crisis originated in a totally different type of shock – one coming exogenously from outside the financial system rather than from within – and it provided a kind of stress test for the amended international financial system. So far, the system has survived tolerably well, even in the face of a global public health response that has underperformed on many levels. But a collapse in 2020 was avoided only thanks to unprecedented policy support, previously unthinkable in magnitude and scope, which it would be rash to rely on for the future. And now, support is being withdrawn.

1 For helpful comments I thank my discussants at the conference, Kwanho Shin and Sebnem Kalemli-Özcan, as well as Yung Chul Park. Egor Gornostay, Madi Sarsenbayev, Jianlin Wang and Victoria de Quadros provided excellent research assistance. Chris Gohrband, Robin Koepke, Gian Maria Milesi-Ferretti, and Fabio Natalucci were generous in discussing and sharing data. I acknowledge with thanks financial support from the Clausen Center for International Business and Policy and the Class of 1958 Chair at UC-Berkeley. All errors and opinions are mine alone.

This chapter reviews the evolution of global financial markets since the Global Financial Crisis, changes in academic thinking about these markets' domestic impacts, the strains seen during the COVID-19 crisis and perils that may lie ahead. A key theme is that stability will be enhanced if the global community embraces reforms that elevate market resilience, rather than depending on skillful policymakers wielding aggressive but ad hoc policy interventions to ride to the rescue again. Next time could be different – and not in a good way.

The plan of this chapter is as follows. Section 1 surveys trends in financial market activity since the GFC, focusing especially on the huge demands that the Covid-19 shock placed on markets. Section 2 reviews the emerging evidence that global asset and commodity prices, capital flows and intermediary leverage are driven by a global financial cycle linked to US monetary policy.

Section 3 summarises measures central banks took to counteract the effects of the Covid-19 shock, focusing on the case of the Republic of Korea. For EMDE central banks, the episode stood in sharp contrast to earlier crises, in which their authorities sometimes felt forced to react procyclically. But it is too early to argue that EMDEs have entered a new world of copious policy space. Section 4 argues that with advanced economies defeating the pandemic more quickly than EMDEs, the world is experiencing an uneven rebound in which lagging and more indebted EMDEs are likely to be hit by a contracting global financial cycle, driving them into liquidity or solvency crises.

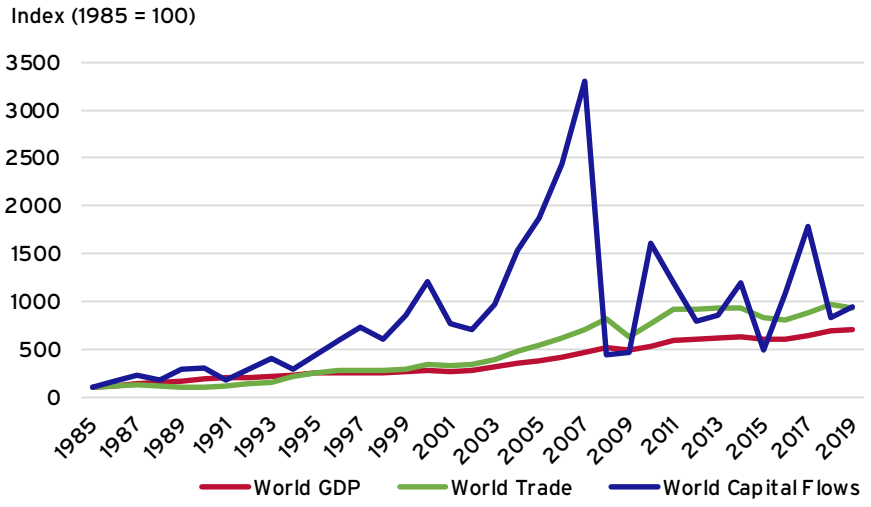
That potential scenario is just one of several threats to financial stability that the Covid-19 crisis has highlighted. Accordingly, Section 5 outlines several areas where reforms at both the global and national levels could improve the resilience of international financial markets.

1 TRENDS IN INTERNATIONAL FINANCIAL MARKETS

Starting in the 1990s, the scale and scope of global financial markets exploded. Eventually, additional financial vulnerabilities owing to massive and largely unregulated cross-border financial flows came to outweigh incremental gains from asset exchange, resulting in the global financial distress of 2008-09. Figure 1 shows an index of global capital flows since the mid-1980s. By the mid-1990s, growth in international financial transactions outstripped that in output or trade, even as the latter's growth was amplified in the new millennium's first decade by the proliferation of global value chains. The extreme bulge in capital flows in that same decade cannot be explained by a sudden rise in opportunities for mutually advantageous, socially beneficial asset trade. Instead, it reflected market distortions that came to tears before the decade's end. Since the Global Financial Crisis, international capital flows have fluctuated wildly in response to various shocks, though never again reaching their earlier 2007 peak. Korea has not been immune to these capital-account surges and stops.

Key to these developments has been the regulatory regime around international financial flows – the set of guardrails governments maintain to manage the volume and character of cross-border finance, as well as its uses within the domestic financial system. Figure 2 reports the Chinn-Ito (2006) measure of financial account openness, updated to 2019. This index is a de jure measure that codes the level of official restrictions as reported by the IMF, as opposed to a de facto index of actual international capital movements. After the early 1990s, high-income countries quickly removed remaining restrictions, approaching maximum levels of financial openness by the early 2000s.[2] Like other high-income countries, Korea has for several years been characterised by nearly complete de jure financial openness. Lower-income countries also began a liberalisation process around the early 1990s, but it has been slower and has remained incomplete, even backtracking slightly after the Global Financial Crisis. Accordingly, flows between advanced economies account for the bulk of the early-millennium surge seen in Figure 1. In general, middle- and low-income countries with current account surpluses invest them in advanced markets, which then recycle them to developing markets with current account financing needs. However, in the past two decades, the volume of direct flows between developing markets has risen (Broner et al. 2020, CGFS 2021), also supporting rising gross levels of external assets and liabilities on the part of the less prosperous economies.

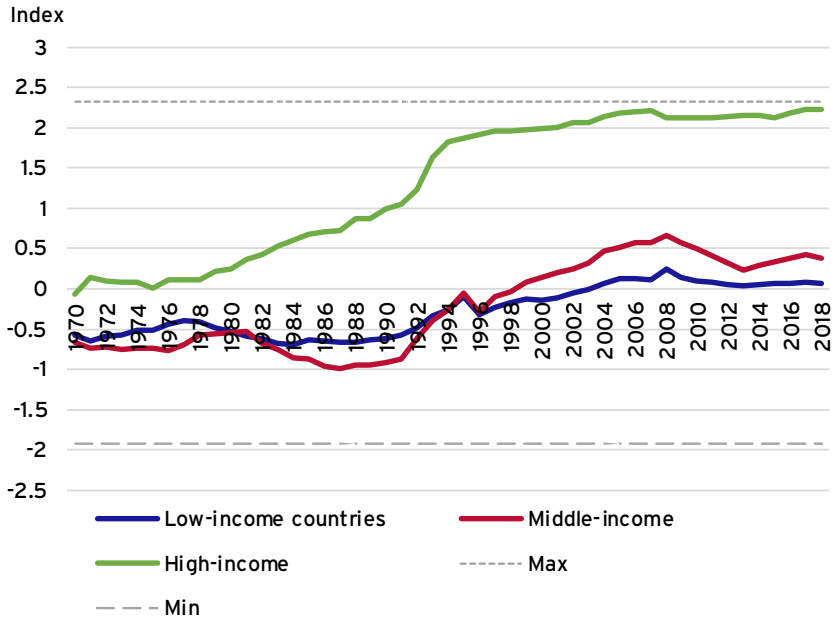
FIGURE 1 COMPARING THE GROWTH OF WORLD GDP, WORLD TRADE, AND WORLD CAPITAL FLOWS (NOMINAL US DOLLARS, ALL SERIES REBASED TO 1985 = 100)



Sources: IMF, Balance of Payments and International Financial Statistics, and UN, Comtrade database.

2 For a discussion of this process, see Obstfeld (2021a).

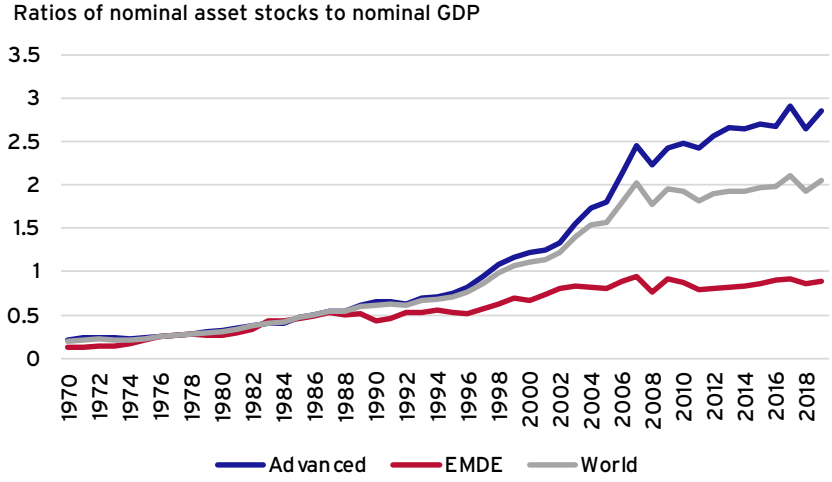
FIGURE 2 CHINN-ITO INDEX OF FINANCIAL ACCOUNT RESTRICTIONS, 1970–2018 (SIMPLE COUNTRY-GROUP AVERAGES)



Source: Chinn and Ito (2006) data, updated by authors through 2018.

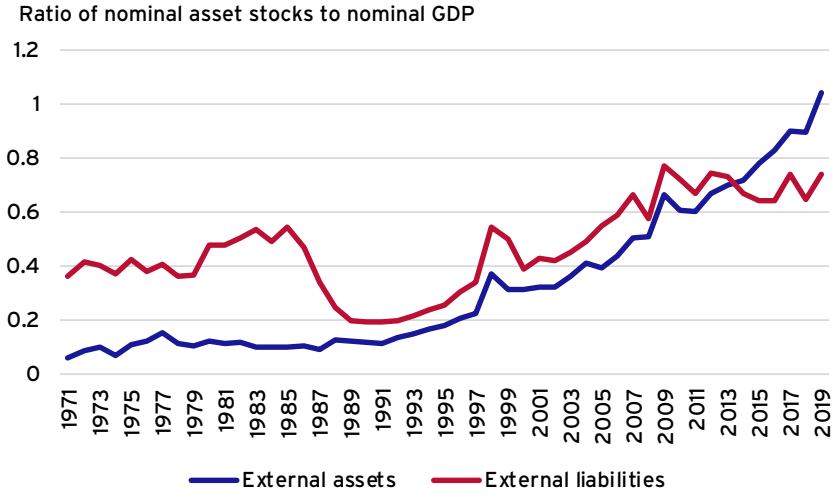
A country's level of gross external assets and liabilities relative to GDP furnishes one possible de facto measure of international financial integration. For the advanced and EMDE country groups, Figure 3 shows the average of external assets and liabilities as a ratio to GDP (based on the data of Lane and Milesi-Ferretti 2018). The rapid run-up in advanced economies, starting in the early 1990s but slowing sharply after the Global Financial Crisis, is evident and quite consistent with Figure 2. The very high numbers (recently around three times GDP) reflect in part the extreme sizes of the balance sheets of financial centres, including offshore havens. Also consistent with Figure 2, EMDEs show a less extreme (though still pronounced) increase after the early 1990s. However, that trend has pretty much stalled relative to the de facto openness levels reached just before 2008, in contrast to the continuing slow rise seen for advanced economies. Figure 4 shows the external assets and liabilities of Korea, also as a share of GDP. The magnitudes are similar to those for the EMDE grouping in Figure 3. In Korea's case, however, while the growth of gross external liabilities (relative to output) has stalled since the Global Financial Crisis, external assets have continued to grow, consistent with Korea's ongoing current account surpluses (which in 2015 reached 7.2% of GDP, falling to a still substantial 4.6% in 2020).

FIGURE 3 RATIOS OF EXTERNAL FINANCIAL EXPOSURE TO GDP FOR ADVANCED ECONOMIES AND EMDES, 1970–2019 (AVERAGE OF GROSS EXTERNAL ASSETS AND LIABILITIES)



Source: Lane and Milesi-Ferretti (2018) data, updated by authors through 2019.

FIGURE 4 KOREA: RATIOS OF EXTERNAL ASSETS AND LIABILITIES TO GDP, 1971–2019



Source: See note for figure 3.

Extreme as they may seem compared with world trade, the capital flow numbers graphed in Figure 1 far understate true gross levels of international transactions in financial instruments. To see why, note that Figure 1 shows the sum of all countries' capital (or financial) inflows (which equals the sum of global capital outflows apart from errors and omissions in the official data). By definition, a country's capital (or financial) inflow equals

foreign purchases of assets issued by domestic residents less foreign sales of assets issued by domestic residents, that is, net foreign purchases of domestic assets. Capital outflows are defined analogously as domestic residents' purchases of foreign assets less their sales of the same. However, reported capital inflows and outflows – often referred to as 'gross' capital flows because their difference is the *net capital inflow* or current account deficit (again, apart from errors and omissions) – actually are themselves the result of netting the purchases and sales carried out on the same period by a particular set of actors. In principle, such 'gross' capital flows thus understate the absolute levels of two-way flows (Koepke and Paetzold 2020). To get an accurate assessment, we need the gross 'gross' numbers, that is, purchases and sales of domestic and foreign residents before netting.

Such data are hard to come by, but at least for the United States, we can calculate a workable lower bound from the US Treasury's Treasury International Capital (TIC) System data and compare those numbers both with the *net* capital flow required to offset the current account and the conventionally defined gross capital inflow and outflow. The TIC data are monthly and report:

1. Gross US resident sales to foreign residents of US stocks and US long-term bonds (for example, excluding Treasury bills, but including long-term corporate bonds). These necessarily equal foreign purchases of the US assets.
2. Gross US resident purchases of US stocks and US long-term bonds from foreign residents. These necessarily equal foreign sales of the US assets.
3. Gross US resident purchases of foreign stocks and bonds from foreign residents.
4. Gross US resident sales of foreign stocks and bonds to foreign residents.

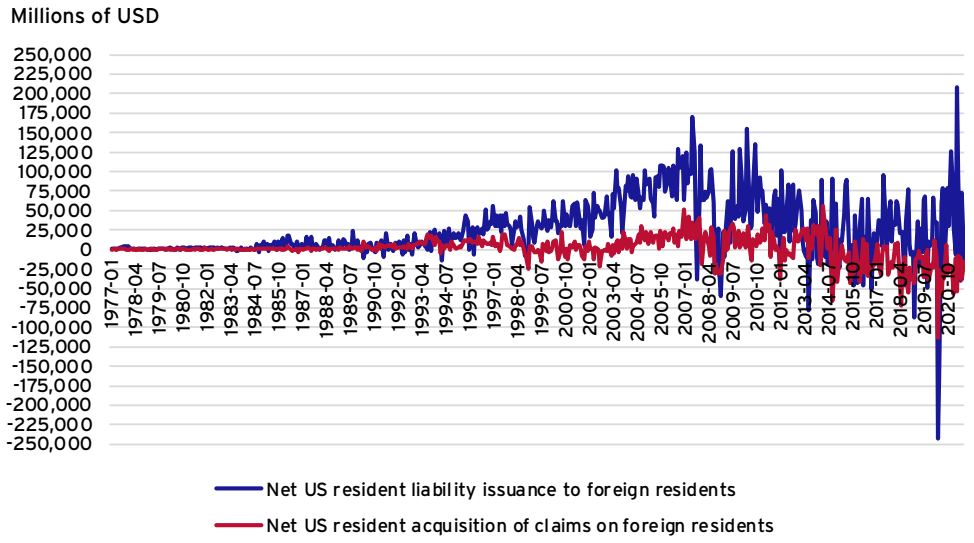
These data therefore capture much of portfolio capital flows; they exclude, in addition to transactions in short-maturity US Treasury bills, foreign direct investment flows and flows of bank loans. In conventional balance-of-payments accounting, US capital inflows relate closely to (a) less (b), whereas US capital outflows relate closely to (c) less (d).

Figure 5 graphs these two proxies for the US 'gross' capital inflow and outflow. In terms of overall magnitude, the absolute values of the series stay below $250 billion, which is short of 1% of current annual US GDP. Because these are monthly flows and not expressed at an annual rate, however, the correct comparison is with one-twelfth of annual GDP. So, we are looking at monthly inflows and outflows that can be in the order of 10% of GDP. If the TIC data offered a comprehensive picture of all financial flows, the US current account deficit would equal the difference between capital inflows (a) – (b) and capital outflows (c) – (d).[3] The deficit was about 3% of GDP over 2020 – roughly one-third the magnitude of 'gross' capital inflows and outflows. Also notable in Figure 5 are the abrupt

3 Thus, if the data were comprehensive, the current account deficit would also equal (a) + (d) – [(b) + (c)]: gross US resident sales of all assets to foreigners (whether claims on the United States or a foreign country) less gross US resident purchases of all assets from foreigners.

contractions in international positions – with foreign residents selling US assets and US residents selling foreign assets – around the Lehman shock in 2008 (see Figure 3) and the Covid-19 shock in the early spring of 2020. US recovery and fiscal stimulus early in 2021 bring a surge of capital inflows.

FIGURE 5 US CONVENTIONAL 'GROSS' MONTHLY LONG-TERM PORTFOLIO INFLOWS AND OUTFLOWS

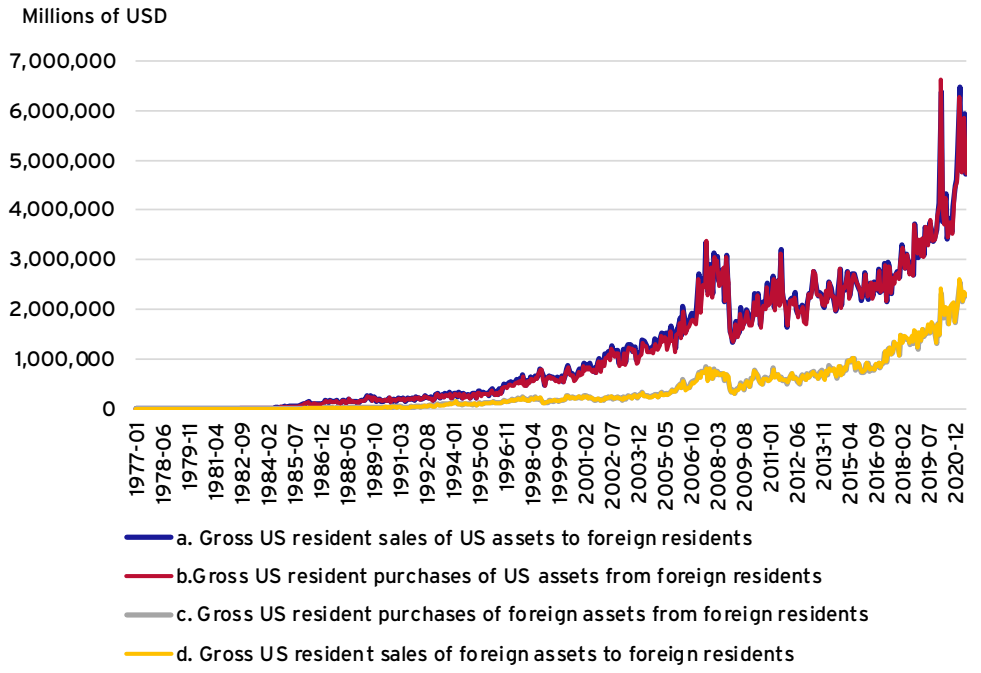


Source: U.S. Treasury, Treasury International Capital System, Monthly Transactions in Long-term Securities.

Figure 6 graphs the true gross capital account transactions (gross 'gross' flows) – the sales and purchases considered separately. Often these may be legs of a single transaction, corresponding to offsetting bookkeeping entries in the balance of payments, but nonetheless the magnitudes of transaction volumes are breath-taking.[4] The numbers have tended to grow over time, falling after Lehman but then rising back up and reaching very high levels in the volatile market conditions of the Covid-19 crisis. Transaction volumes for US long-term assets have recently approached $7 trillion per month, which would exceed monthly US GDP by a factor of between three and four (and these numbers exclude trade in short-term assets). One interesting (if unsurprising) feature of the data is that in trades involving US residents, transaction volumes for US assets are consistently much higher than those for foreign assets. This is a reflection of continuing 'home bias' by US residents, of the outsized role of the dollar in global financial markets and of the United States' big net debtor position. Moreover, the gap between transaction volume in US assets and in foreign assets appears to be secularly widening over the 2000s.

4 That is why the series are so highly correlated. Suppose a foreign resident holder of a US brokerage account shifts from US bonds to US stocks. The United States is selling them a stock but buying back a bond in payment. The trade gives rise to offsetting items in category (a) and (b) above, with no net impact on US capital inflows (a) – (b).

FIGURE 6 GROSS US RESIDENT MONTHLY LONG-TERM PORTFOLIO ASSET SALES TO AND PURCHASES FROM FOREIGN RESIDENTS



Source: See note for Figure 5.

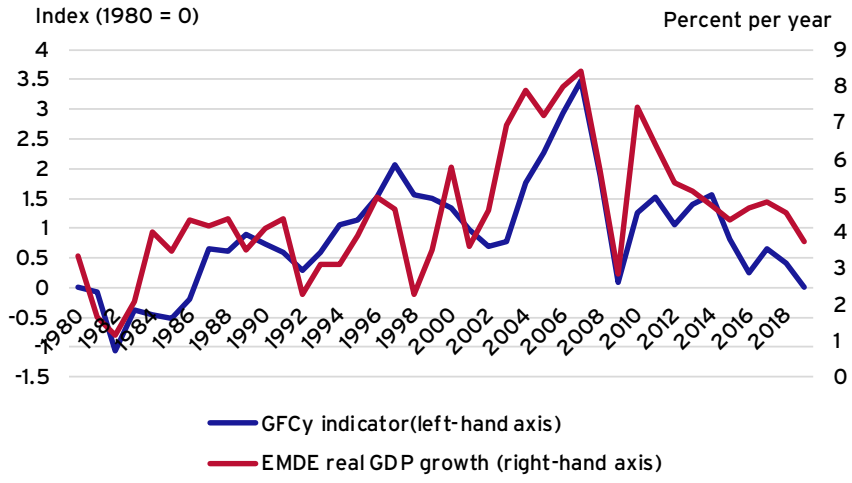
Net capital flows (the current account) matter as a component of aggregate demand. Conventionally defined gross capital flows matter as a measure of the net global demand for country assets. A general collapse in gross flows may signal a global risk-off episode, while a collapse in gross inflows (a sudden stop) can leave an economy with depressed asset prices as well as an inability to pay maturing debts (Forbes and Warnock 2012). The enormous volume of *truly* gross two-way asset trade indicates how small are the asymmetric proportional changes that can potentially spark crises. The same is true of foreign portfolio shifts between a given country's asset classes. Such shocks could be amplified if the financial system's plumbing leads to liquidity shortages, fire sales, failed settlement or other dysfunction. The volume of global financial transactions seems disproportional to any fundamental economic need or activity, yet produces a system prone to fragility.[5] Like the Global Financial Crisis, the Covid-19 shock in the spring of 2020 illustrated the need for massive central bank intervention as a backstop to market stability.

5 Trading levels may be socially inefficient for several reasons, among them: tax arbitrage schemes or money-laundering motives, investor overconfidence (Odean 1999), externalities from liquidity management (He and Kondor 2016), or the design of fund managers' incentive contracts (Kashyap et al. 2020).

2 GLOBAL CYCLES IN ASSET PRICES, COMMODITY PRICES AND ASSET FLOWS

The last section described the distinct upward trends in international financial integration and transaction volumes. But what forces underlie the fluctuations around trend that the data also show? Recent research points to a pattern of synchronized international movements in financial conditions, such that asset prices, commodity prices, capital flows, and intermediary leverage tend to surge and ebb together across a range of national markets (Miranda-Agrippino and Rey 2021). Given the central role of US financial markets and the dollar in global markets, US financial conditions and Federal Reserve monetary policy are key drivers of the global cycle. Financial conditions and monetary policies in other developed markets also play roles, and global fluctuations in risk aversion certainly correlate with the cycle, partly as cause and partly as effect. Figure 7 suggests a cyclical behaviour in global capital flows, most notably in the run-up to the Global Financial Crisis.[6]

FIGURE 7 GROWTH IN EMERGING AND DEVELOPING ECONOMIES AND THE GLOBAL FINANCIAL CYCLE



Source: GFCy variable with data updated through 2019 is available at http://silviamirandaagrippino.com/code-data. The raw monthly data are averaged to derive annual observations. Real GDP growth is from IMF, World Economic Outlook database, April 2020.

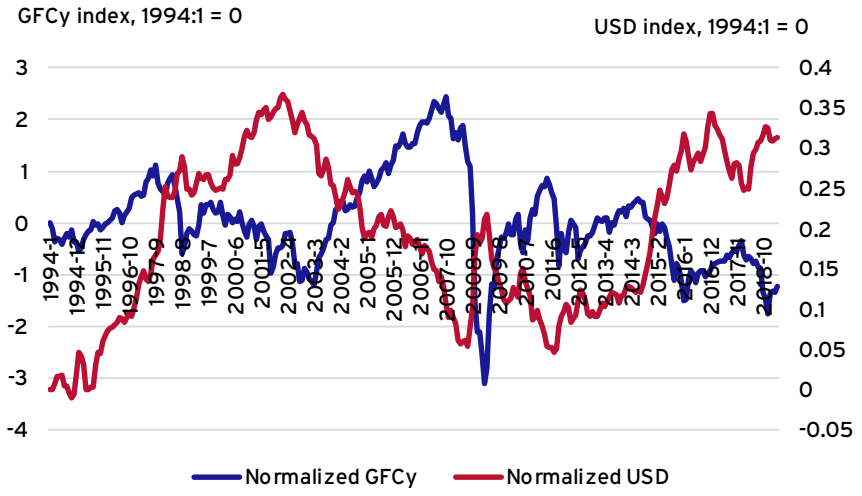
For countries with some degree of integration into world markets, these cycles reflect global financial-market impulses with potentially powerful effects on exchange rates, growth, prices and financial stability. Researchers have therefore sought to measure the global financial cycle and to ascertain its effects and the variables that drive it.

6 There is disagreement over the scope of the global financial cycle. For example, Cerutti et al. (2019) argue that the cycle encompasses asset prices but not capital flows.

Miranda-Agrippino and Rey (2020) use a monthly dynamic factor model of equity, bond and commodity prices spanning five continents to estimate a single-global factor accounting for 20% of the common variance of the asset prices. Scheubel et al. (2019) develop alternative measures based on a latent factor model that includes not only asset prices but also non-price indicators including portfolio inflows to EMDEs, global credit volume and the leverage of broker-dealers. Davis et al. (2021) apply a related approach to explain net and gross capital flows (gross being defined in the conventional sense). They find that two factors – a global financial cycle factor and an energy price factor – have high explanatory power for gross and net flows across advanced economies and EMDEs. Both the Scheubel-Stracca-Tille factor and the Davis-Valente-van Wincoop financial factor correlate well with the factor of Miranda-Agrippino and Rey, which I denote by *GFCy*.

Figure 8 illustrates the close relationship between the global financial cycle index *GFCy* and real output growth in EMDEs, which are especially vulnerable to the vicissitudes of international capital flows. For the annual data in the figure, changes in EMDE growth rates track broadly the swings in *GFCy*.

FIGURE 8 *GFCY* INDEX VERSUS BIS BROAD NOMINAL DOLLAR INDEX



Source: *GFCy* variable with data updated through 2019 is available at http://silviamirandaagrippino.com/code-data. Exchange rate data from Bank for International Settlements, available at https://www.bis.org/statistics/eer.htm.

Several studies identify the US dollar's nominal effective exchange rate as a bellwether for global financial conditions, operating through international banking activity (as in Bruno and Shin 2015 and Shin 2019) and possibly other channels. This association likely reflects, in part, the impact of US monetary policy shocks on the dollar's exchange rate, restrictive policy implying dollar appreciation and tighter lending conditions. In this case, cross-border US *dollar flows* will react most strongly, yielding an especially powerful negative impulse given the dollar's centrality in cross-border transactions.

Using a vector-autoregression framework, Miranda-Agrippino and Rey (2020) show how alternative measures of US contractionary monetary policy shocks induce dollar appreciation, falls in financial intermediary leverage, credit and banking flows, and a decline in the global cycle index *GFCy*. As to the mechanisms at work, Cesa-Bianchi et al. (2018) present evidence to support a model in which currency and house-price appreciation inflates collateral values, amplifying the expansionary effect of capital inflows. The association could also reflect dynamics in which causality flows from exogenous shifts in global risk appetite into simultaneous movements of the dollar (through safe-haven effects) and the global asset prices that underpin *GFCy*.

Looking at the data from 30,000 feet, the unconditional negative correlation between the dollar's strength and the Miranda-Agrippino and Rey global cycle factor is striking. Figure 8 shows the relationship since 1994: the correlation coefficient between the two monthly series is −0.35. More impressive than the negative month-to-month correlation, however, is the strong negative relationship between low- frequency swings in the series. The figure thus suggests that the dollar's foreign exchange value is indeed a powerful inverse indicator of the global financial cycle.[7]

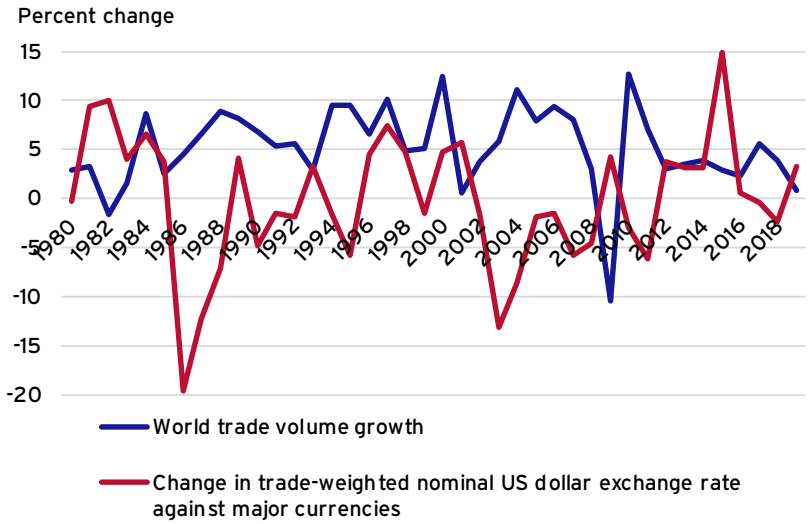
The mechanisms linking the dollar and the cycle affect EMDEs with special force, helping to explain Figure 7. One factor is the prevalence of foreign currency borrowing in some countries, implying that a depreciation of local currency against the dollar will batter domestic balance sheets, with contractionary macro effects. Even where sovereigns have largely graduated to domestic currency borrowing and banks avoid currency mismatch, duration mismatches in foreign currency matter, and emerging market corporates borrow extensively in foreign currency. Moreover, foreign holders of domestic currency debts may be especially sensitive to prospective exchange rate movements, creating outsized capital-flow responses that can destabilise domestic financial markets unless the domestic investor base is deep (Carstens and Shin 2019). Two additional mechanisms follow from the dollar's impact on global trade and commodity prices.

A striking relationship in the data is the strong negative association between nominal dollar appreciation and world trade volume. Figure 9 shows this relationship in annual data from 1980. This relationship is not fully understood, but likely owes to at least five primary (and complementary) mechanisms. First is a direct effect of dollar-induced financial tightening, operating through the need for trade finance credit. This effect has likely become stronger with the proliferation of global value chains since the 1990s (Bruno and Shin 2021). A second potential mechanism works through the dollar's safe-haven tendency to strengthen in global crises, when risk appetite falls sharply as trade contracts. A third mechanism would be a contractionary effect of a stronger dollar on

7 Figure 8 should be interpreted with caution, as the *GFCy* index is based on asset prices measured in dollars. However, Miranda-Agrippino and Rey (2020, online appendix) state that its general behaviour is robust to estimation based on assets' local currency prices.

export demand when export prices are invoiced in US dollars and sticky.[8] Gopinath et al. (2020) show how dollar appreciation reduces ex-US world merchandise export growth, even controlling for global GDP growth and risk aversion (as proxied by the VIX). A fourth possible mechanism is a global decline in investment when the dollar strengthens and funding conditions tighten, insofar as international trade is particularly sensitive to investment (IMF 2016). Finally, a fifth mechanism is driven by the fall in real commodity prices that tends (as I document next) to accompany a stronger dollar (see also Druck et al. 2018).

FIGURE 9 US DOLLAR APPRECIATION CORRELATES WITH LOWER GROWTH IN THE VOLUME OF WORLD TRADE



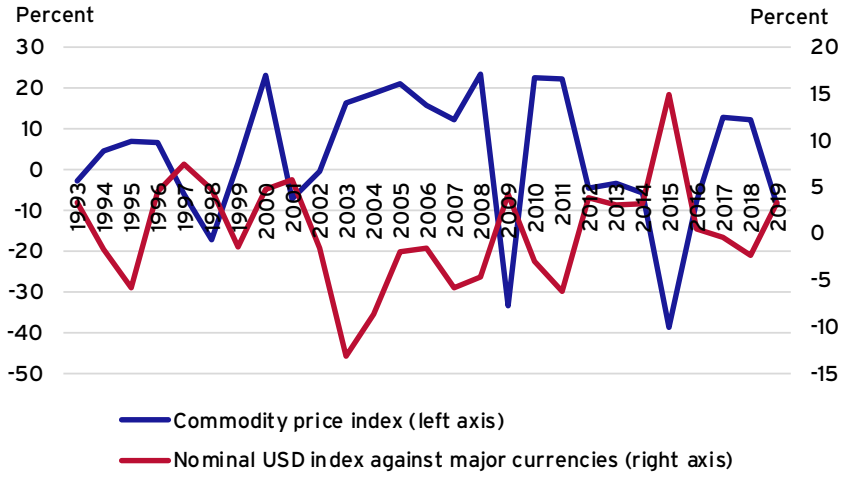
Source: International Monetary Fund, World Economic Outlook database, April 2021, trade volume of goods and services; FRED, dollar exchange rate series TWEXMANL, trade-weighted based on goods trade with major-currency trading partners (Euro area, Canada, Japan, United Kingdom, Switzerland, Australia, and Sweden).

Trade fluctuations have disproportionate effects on smaller and more open economies, especially EMDEs. Another channel through which dollar exchange rate movements affect many of them is the dollar's association with commodity prices. (In 2019, about 20% of world trade consisted of primary commodities, but the exports of poorer countries were disproportionately concentrated on commodities.) Figure 10 shows the strong negative correlation between nominal dollar appreciation and changes in dollar commodity prices. The simple correlation coefficient is –0.72 over 1993–2019. Part of the strong negative correlation between the GFCy index and the dollar comes through the dollar's negative association with commodity prices. It may not be immediately obvious that commodity-

8 As Bruno and Shin (2021) point out, dollar invoicing of exports likely increases the demand for dollar-denominated trade credits (since the short dollar position is naturally hedged), accentuating the impact of dollar appreciation through the previous mechanism.

price declines due to a stronger dollar harm the real incomes of the exporting countries. Let $E_{lc/\$}$ be the local-currency price of the US dollar, let $P_{\$}^{comm}$ be the world dollar price of commodities, and let P_{lc}^{GDP} be the local GDP deflator in terms of domestic currency. Then the price of commodities in terms of exporter GDP equals $E_{lc/\$} P_{\$}^{comm}/P_{lc}^{GDP}$. If a stronger dollar means that all nominal dollar prices fall in proportion – as in the case of a purely monetary shock in a flexible-price world – then $E_{lc/\$}$ rises (local currency depreciates) in the same proportion as $P_{\$}^{comm}$ falls. With the local price level unchanged, the real price of the commodity export in terms of local output would remain unchanged, as would local real incomes.

FIGURE 10 DOLLAR COMMODITY PRICES TEND TO FALL WHEN THE US DOLLAR APPRECIATES IN NOMINAL TERMS



Source: See note for Figure 9.

But this is far from what happens in practice when the dollar becomes stronger. When the dollar appreciates by x% in nominal effective terms against other advanced-country currencies, $E_{lc/\$}$ may well rise by less than x%: some commodity exporters intervene in foreign exchange to limit exchange rate movements ('fear of floating'), while others may peg their currencies to the dollar outright. More importantly, $P_{\$}^{comm}$ will tend to fall by *more* than x%, as is evident from the much larger scale of the left axis in Figure 10. Both factors result in a fall in the relative price $E_{lc/\$} P_{\$}^{comm}/P_{lc}^{GDP}$ when the dollar appreciates, and a consequent fall in exporter real income. A stronger dollar, if not accompanied by a rise in global commodity demand, will hammer primary exporters' terms of trade and real incomes. Table 1 shows, for six emerging markets, the negative correlations between monthly movements in the real local value of the IMF commodity price index (with CPIs standing in for GDP deflators) and the dollar's nominal exchange rate against advanced country currencies.

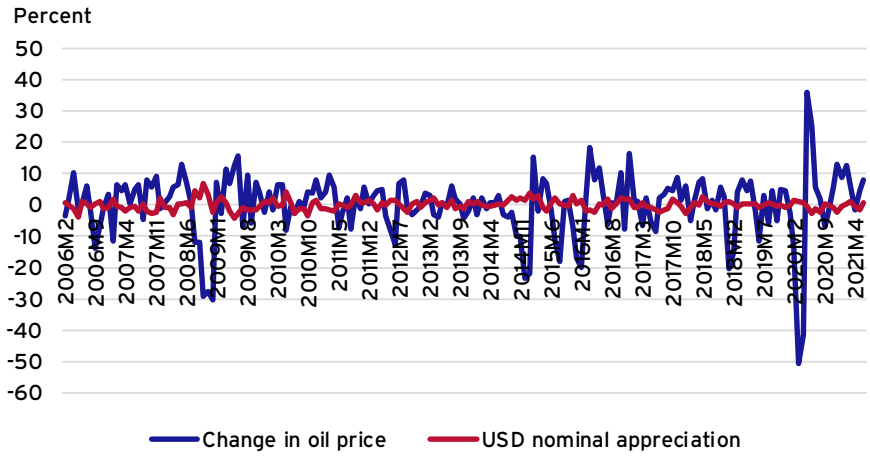
TABLE 1 MONTHLY CORRELATION BETWEEN CHANGE IN NOMINAL DOLLAR INDEX AGAINST MAJOR CURRENCIES AND CHANGE IN REAL LOCAL COMMODITY PRICE, FEBRUARY 2006 TO JUNE 2021

Brazil	Chile	India	Saudi Arabia	South Africa	Thailand
−0.20	−0.35	−0.44	−0.58	−0.21	−0.45

Source: US dollar nominal effective exchange rate against advanced country currencies from Federal Reserve Board of Governors. Monthly dollar commodity price index from IMF Primary Commodities Prices website. Monthly local CPI data and country exchange rates against US dollar from FRED. For Thailand, monthly CPI from national sources via Haver.

Figure 11 focuses on the case of oil prices, showing their outsized fluctuations compared with those in the dollar's nominal effective rate. The correlation coefficient between the price changes for the dollar and oil is –0.39 over the period shown.[9]

FIGURE 11 US DOLLAR APPRECIATION AND CHANGE IN DOLLAR OIL PRICE, MONTHLY DATA



Source: Nominal effective U.S. dollar exchange rate against advanced economies, as reported by the Federal Reserve Board of Governors. IMF dollar oil price index from IMF Primary Commodity Prices website.

Rey's important paper on the global financial cycle focused attention on the degree to which more flexible exchange rates can help countries, and especially EMDEs, steer an independent policy course amid the monetary and financial shocks arriving through global capital markets (Rey 2013). An earlier 'fear of floating' literature (Calvo and Reinhart 2002) pointed out that with faster pass-through of exchange rates to domestic prices and more dollarised domestic debts, EMDEs faced a harsher policy trade-off between stabilisation and inflation in responding to adverse foreign shocks with currency

9 Simple OLS regression of the oil-price change on dollar appreciation (both in natural logarithms) yields a coefficient of -2.45 (standard error of 0.42, R^2 = 0.15).

depreciation, and would therefore opt for more limited exchange-rate flexibility.[10] Even earlier, Cooper (1999) argued that exchange-rate movements driven by capital flows could be a source of discomfort for policymakers.

The 'trilemma versus dilemma' description of this problem is simplistic. Even among the most ardent proponents of flexible exchange rates, few have contended that they would provide perfect insulation against all shocks. Countries may well face more difficult trade-offs owing to fluctuations in global financial conditions. This happens when some instruments become less effective at promoting desired macroeconomic responses while simultaneously inflicting more unintended consequences. Yet, exchange rate flexibility still affords a precious degree of freedom for policy, without which macro outcomes would be worse overall (Obstfeld 2015). The need for flexibility may be greatest during crises, when exceptional policies can be brought to bear to mitigate the adverse side effects of large exchange rate movements, for example, allocating foreign exchange reserves to the economy's systemically important foreign currency debtors. In both the Global Financial Crisis and the crisis associated with the outbreak of Covid-19, many EMDEs allowed the currencies to depreciate sharply (Figure 12).

FIGURE 12 EMERGING MARKET NOMINAL EFFECTIVE EXCHANGE RATE INDEX, 2005-2021

Source: Monthly data from J. P. Morgan/Haver.

Recent studies affirm that policy trade-offs are indeed worse for EMDEs, but that exchange-rate flexibility mitigates the negative impacts of various shocks. Klein and Shambaugh (2015) conclude that for EMDEs, capital controls afford relatively little

10 Gourinchas (2017) presents a notably clear account of this trade-off.

policy autonomy unless they are extensive, whereas policy autonomy (in the sense of independence of short-term interest rates) rises with more exchange rate flexibility. Looking in detail at the case of Chile, Gourinchas (2017) estimates a dynamic model in which a conventionally responsive domestic monetary policy will help mitigate spillovers from foreign shocks, so that "flexible exchange rates remain the primary line of defence against foreign monetary policy and global financial cycles alike" (p. 282). Based on quarterly 1996–2018 data for 55 emerging markets and 14 advanced economies, Kalemli-Özcan (2019) finds that tighter US monetary policy propagates powerfully to EMDEs (though not to advanced economies) through capital flows and increases in interest-rate risk premia. However, she also finds that exchange rate flexibility can moderate the impact on economic activity. In data for a quarterly panel of 40 emerging market economies over 1973-2016, Ben Zeev (2019) finds that countries with pegs fare significantly worse (in terms of output, exports, asset prices and other key variables) in the face of contractionary Gilchrist-Zakrajsek credit shocks than countries with more flexible regimes. Using a large global set of monthly data spanning 30 advanced and emerging economies over 1990-2018, Degasperi et al. (2021) reaffirm the Kalemli-Özcan result that US monetary policy affects emerging markets through higher term premia regardless of exchange rate regime, but conclude that "both real and nominal spillover effects are larger in countries with more rigid exchange rate regimes" (pp. 3-4). This relatively short list of studies is selective rather than complete, but it stands in for a much larger body of evidence pointing in the same direction.

The global financial cycle impacts all countries in some way, whether advanced, emerging, developing or a high-income emerging market like Korea that is nonetheless subject to volatile capital flows. Higher-income economies seem to absorb the resulting shocks more easily due to deeper and more fluid financial markets, their wealth, their productive diversity in many cases, the generally greater credibility of their policy frameworks and elements of the global financial safety net from which they benefit disproportionately. Nonetheless, the initial phase of Covid-19 indicated that emerging market economies also had policy space to address the crisis – in part by exploiting exchange rate flexibility, and with an assist from macroeconomic support policies in advanced economies.

3 EMERGING MARKET POLICY RESPONSES TO THE INITIAL COVID-19 SHOCK

The appearance of the global pandemic inflicted massive external real and financial shocks on EMDEs. Global trade collapsed in the first quarter of 2020, to a degree comparable with 2008's trade collapse. Korea of course did not escape this shock, but suffered to a degree less than the global average. The financial shock manifested in a sharp reversal of capital inflows in March 2020. Figure 13 shows the pattern of portfolio capital inflows for a group of 26 mostly middle-income countries, including Korea. Figure 14 shows the Korean data, which suggest a March 2020 capital flow reversal comparable with that around the Lehman event.

Korea is a high-income economy with a very flexible exchange rate, credible policies, and an evolved macroprudential framework including measures targeting foreign-currency liabilities (IMF 2017a, Lee 2017). Its monetary and financial policy reactions to the Covid-19 crisis parallel those successfully used elsewhere in many economies, and notably in emerging market economies.

English et al. (2021) offer an excellent compendium on central banks' responses to the initial phase of the Covid-19 crisis, with the chapter by Céspedes and De Gregorio (2021) focusing on emerging economies. While the details differ among emerging markets – indeed, Indonesia went so far as to allow temporarily direct financing of the fiscal deficit by Bank Indonesia – a partial list of measures undertaken by emerging market central banks often included the following:

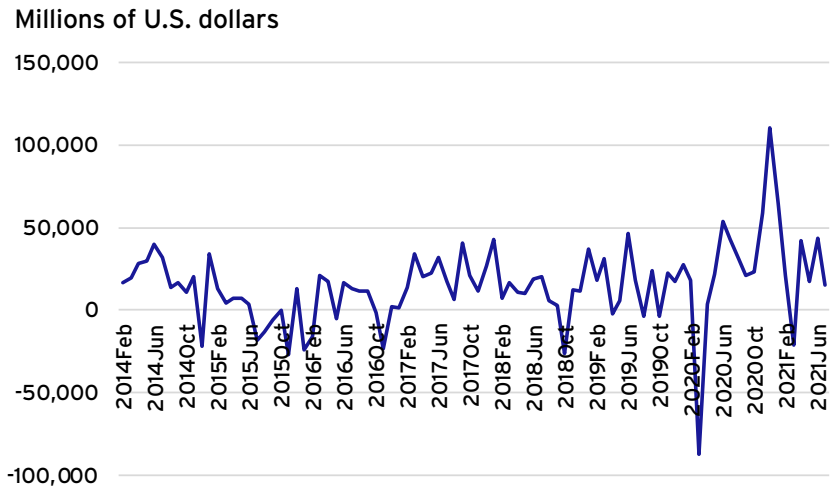
- interest rate cuts
- large-scale central bank purchases of domestic assets, mostly sovereign debt
- foreign exchange intervention
- looser reserve requirements (including loosening those discouraging capital inflows)
- liquidity enhancing operations
- measures to promote bank loans to businesses
- macro-prudential easing (e.g. relaxed capital requirements)
- market functioning enhancements.

EMDEs benefited, however, from the massive monetary and financial stimulus provided by advanced economies early in the crisis, and especially from the easing actions of the US Federal Reserve. These actions underpinned the sudden reversal of negative capital inflows after March 2020, evident in Figures 13 and 14. Although capital flows have continued to be volatile since then, even turning negative again in a few months, the financial environment has generally remained benign for EMDEs so far, as a new expansive phase of the global financial cycle has set in. In particular, the generalised wave of EMDE sovereign defaults that some predicted at the outbreak of the crisis did not materialise in 2020–2021, despite those countries' aggressive use of their monetary and fiscal policy space.

Providing important support to the global economy, the Fed extended dollar swap lines to 14 central banks, reducing the cost and lengthening the tenor of its offerings. Although only two emerging economies – Brazil and Mexico – were offered swap lines (as in 2008), the facilities offered to advanced economy authorities can help stabilise conditions in a broader region that includes emerging markets (for example, the impact on emerging Europe of swap lines to Nordic central banks). In the current crisis, the locus of swap line

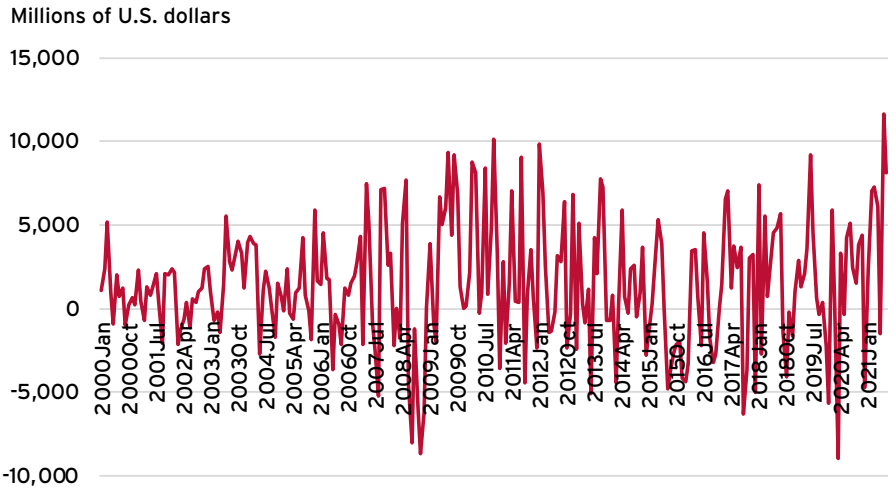
usage shifted geographically compared with the Global Financial Crisis, from Europe to Asia. This time, drawings by the Bank of Japan exceeded those by the ECB, and the Bank of Korea and Monetary Authority of Singapore also participated (Gislén et al. 2021).

FIGURE 13 CAPITAL INFLOWS TO 26 EMERGING MARKET ECONOMIES, 2014-2021



Source: Data for a group of mostly middle-income countries assembled by Koepke and Paetzold (2020).

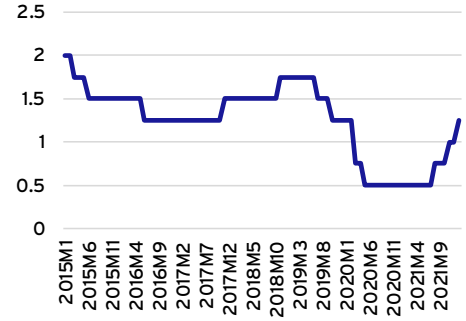
FIGURE 14 CAPITAL INFLOWS TO THE REPUBLIC OF KOREA, 2000-2021



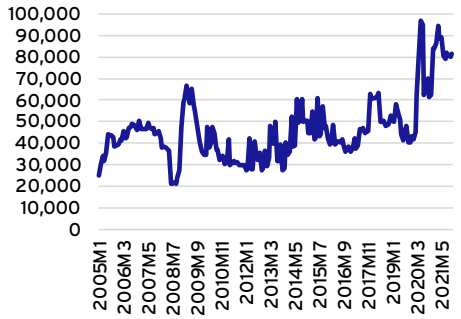
Source: See note for Figure 13.

FIGURE 15 KOREA RESPONSES TO THE COVID-19 CRISIS

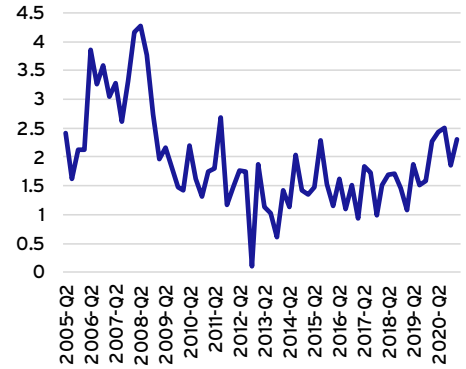
(a) BoK policy interest rate (percent)



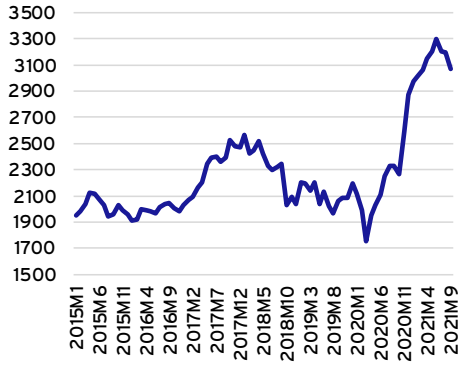
(b) Central bank domestic assets (billions of won)



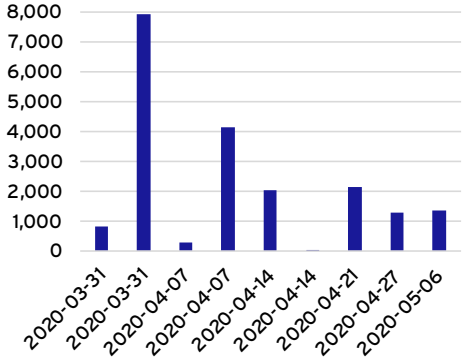
(c) Credit to the private nonfinancial sector from all sources (percent change in won value)



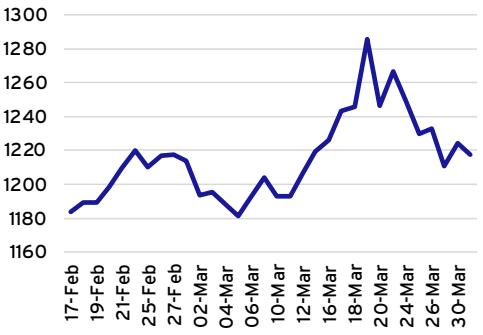
(d) KOSPI stock market index



(e) Korea swap line drawings (millions of USD)



(f) Won/USD closing exchange rate, February 17 to March 31, 2020



Sources: Bank of Korea, Korea Stock Exchange, BIS, Federal Reserve Bank of New York.

Figure 15 summarises aspects of Korea's response. The Bank of Korea promptly cut its policy interest rate, though not all the way to zero (panel (a)). It also expanded its balance sheet (panel (b)). (The Bank of Korea has already raised the rate three times more recently in the face of inflation and financial stability concerns.)

Céspedes and De Gregorio (2021) emphasise how emerging market central banks were able to maintain domestic credit growth in 2020, unlike the experience in the Global Financial Crisis. For Korea, this pattern is evident in panel (c). Credit growth rose once the Covid-19 crisis hit, unlike its decline in 2008-2009 (albeit then, from very high levels that were symptomatic of the forces generating the previous crisis). In line with lower interest rates and the growth in domestic credit, panel (d) indicates that Korea has participated in the current expansive phase of the global financial cycle, with a sharp increase in its equity prices, as in the United States and other countries following the initial crash in March 2020.

Korea drew several times on its $60 billion swap line with the Fed (panel (e)), auctioning these dollars to domestic banks with dollar funding needs. Even the announcement of the swap agreement had a dramatic impact on the foreign exchange market. Korean authorities allowed the won to depreciate sharply during the generalised panic after the WHO's 11 March 2020 declaration of a global pandemic (panel (f)). The won/dollar exchange rate reached a high point on 19 March; later that day, the Fed announced the Korean dollar swap line, prompting an immediate reversal in the won's depreciation.

4 CONTINUING VULNERABILITIES FOR EMDES

The ability of EMDEs to use monetary (as well as fiscal) policies to mount strong counter-cyclical responses was a positive surprise at the start of the Covid-19 crisis. In general, they built on the accumulated capital of monetary policy credibility (which had reduced EMDE inflation rates to low levels compared with past decades); on the increasing intellectual sophistication and operational expertise of their policymakers; on a comparatively strong cyclical position at the start of 2020; and on a strong lift from expansionary policies in advanced economies in the face of a shock with initially deflationary consequences. They departed from past practice also in more fully exploiting exchange rate flexibility, cutting interest rates even as their currencies depreciated in the face of a capital flow sudden stop.[11] This response suggests that the trilemma has not collapsed to a simple dilemma: open capital account without monetary autonomy, or closed capital account with monetary autonomy – regardless of the exchange rate regime.

Nonetheless, EMDEs could be vulnerable to sudden stops in the near-term future as the next contractionary phase of the global financial cycle is getting underway.[12] Two current factors make this more likely.

11 See also Aguilar and Cantú (2020).
12 Kalemli-Özcan (2021), IMF (2021) and Obstfeld (2021b) voice similar concerns.

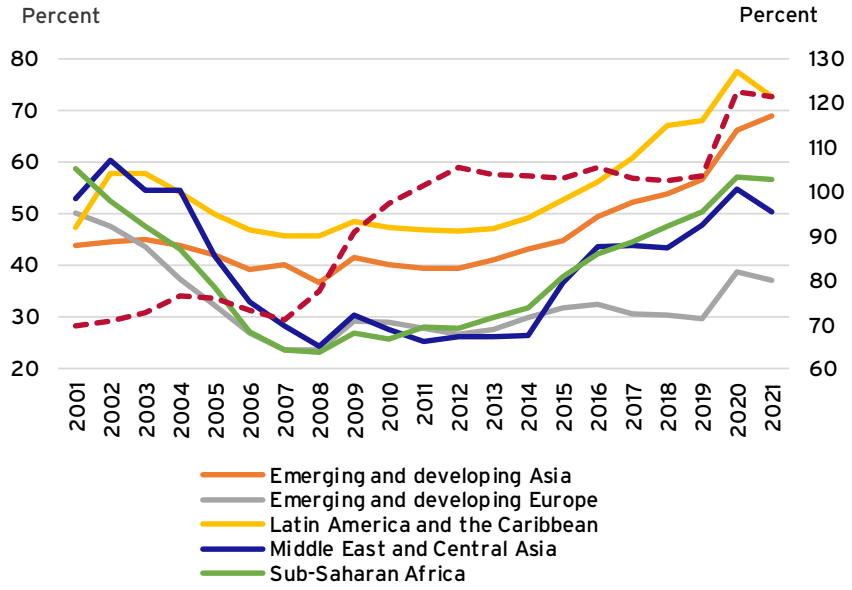
First, the rollout of vaccines has been slower in most EMDEs than in advanced economies, and in many cases much slower. Moreover, some EMDEs are using less-effective vaccines (notably less effective against the Delta variant of SARS-CoV-2), while often what vaccines are available can go to waste due to underdeveloped infrastructures for getting shots into arms. The Covax mechanism has failed to meet even its modest targets as rich countries have effectively hoarded vaccine doses. In the longer run, this imbalance will threaten even highly vaccinated countries because unvaccinated regions will remain breeding grounds for new resistant variants. But in the near term, it implies a more rapid recovery in the advanced world than in EMDEs, with a consequent rise in global interest rates while EMDEs are still struggling.

Second, EMDE fiscal responses to the crisis have made them more vulnerable to hikes in advanced economy interest rates – which could set off a contractionary phase of the global financial cycle. In advanced and less prosperous countries alike, fiscal deficits grew in 2020 as governments intervened to support firms and households during lockdowns, raised public health spending and lost revenues due to compressed economic activity levels. In many EMDEs, public revenue fell even as a percent of their lower levels of GDP. While the fiscal responses in EMDEs were not as extensive as those of advanced economies, the EMDEs have historically been constrained to lower debt levels due to their less-developed revenue capacities and capital markets. Being able to fund sovereign debt in domestic currency is no panacea, because higher debt levels undermine inflation credibility more quickly for EMDEs and raise their vulnerability to capital-flow reversals (Carstens and Shin 2019).

Figure 16 shows the development of general public debt-to-GDP ratios in advanced economies and emerging and developing regions (figures for 2021 are IMF projections as of October 2021). While the 2020 runup in advanced economies (tracked on the right-hand axis) is bigger in absolute terms, all EMDE regions also show significant jumps for that year. Moreover, in all regions, debt-to-GDP ratios had already been rising since the early 2010s. (See also Kose et al. 2021 on the current debt boom.) Figure 17 offers a more relevant comparison of the percent increases in debt-to-GDP ratios in the country groupings. Here, advanced economies are in the middle of the pack for 2020. Broadly speaking, EMDEs' changes in debt-to-GDP ratios were comparable to those of advanced economies, conditional on the lower debt capacity of the former group. The improvement in EMDE debt ratios the IMF assumes for 2021 relies on relatively optimistic growth forecasts, and also reflect less ambition in fiscal support policies – although greater fiscal support might be needed to generate the assumed growth.[13]

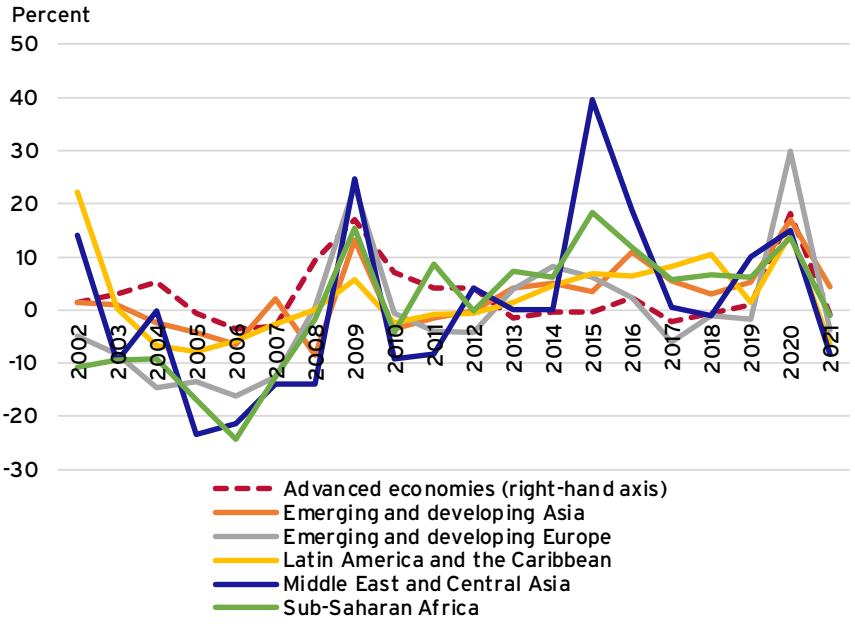
13 The sharp 2021 reduction in debt ratios for the Middle East and Central Asia is the result of elevated energy prices in that year, driven by global recovery and a fairly restrictive policy by OPEC+.

FIGURE 16 GENERAL GOVERNMENT DEBT-TO-GDP RATIOS IN ADVANCED AND EMDE ECONOMIES



Source: IMF, World Economic Outlook database, October 2021.

FIGURE 17 PERCENT CHANGES IN GENERAL PUBLIC DEBT-GDP RATIOS IN ADVANCED AND EMDE ECONOMIES



Source: See note for Figure 16.

In short, higher interest rates in advanced economies will put greater stress on public finances in EMDEs. They will also harm the fortunes of EMDE corporates that borrowed more since the crisis began, a downside legacy of the continuing domestic credit growth that supported EMDE economies in 2020. The same observations apply to the macroprudential easing policies that were positive for growth in 2020 (see Bergant and Forbes 2021).

Figure 18 focuses on one particular source of potential fragility, namely, the concentration of new sovereign debt issuance on domestic bank balance sheets in a number of EMDEs (Sachdeva and Harvey 2020, IMF 2021). This pattern sets up the possibility of a sovereign-bank doom loop. As Kalemli-Özcan (2019) shows, US monetary tightening transmits to EMDEs via a rise in longer-term bond premia, and therefore a fall in bond prices. By weakening EMDE bank balance sheets, that development could set up destabilising expectations of government fiscal intervention to support the banking sector, higher deficits, more accommodative monetary policy and yet lower bond prices. Figure 18 also indicates that in the first year of the Covid-19 crisis, foreign investors on the whole *reduced* their sovereign exposures. Higher domestic saving due to the lockdowns facilitates the domestic placement of sovereign debt, but with recovery, higher saving rates will not persist. A further challenge, facing advanced and less prosperous economies alike, comes from the inflationary pressures that supply chain disruptions are exacerbating.

We should therefore expect heightened financial fragility as an uneven rebound unfolds in the world economy. Apart from the home-grown problems that advanced economies may face emerging from a period of prolonged policy accommodation, they could face significant spillovers from EMDE woes. How resilient will global financial markets prove in the face of these pressures?

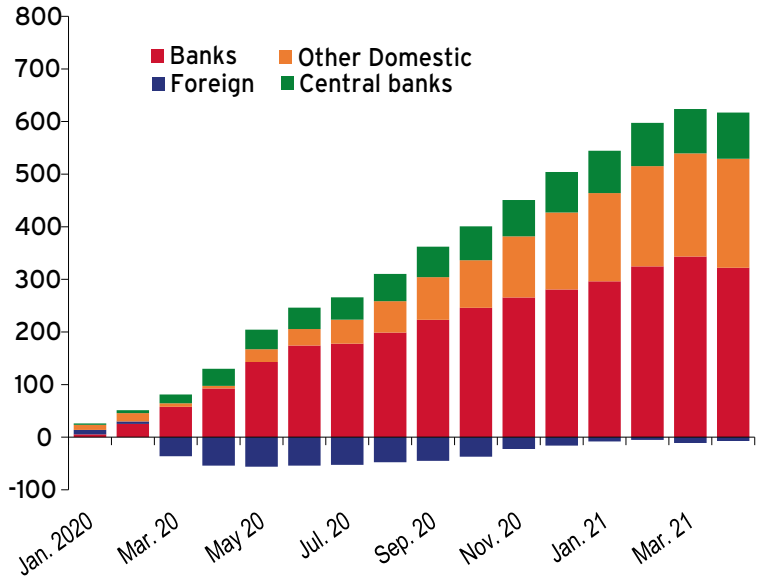
5 ENHANCING THE RESILIENCE OF GLOBAL FINANCIAL MARKETS

Reforms in several directions could strengthen the global financial system to face the turbulence that may lie ahead. Most of these proposals reflect long-standing needs, although the experience in the recent Covid-19 crisis underscores the urgency of action.[14]

In the spring of 2020, banks avoided the widespread distress of the Global Financial Crisis. In large part this success owed to the origin of the Covid-19 shock being *outside* of the banking sector. But some credit is also due to the national and international banking sector reforms that followed the 2008–09 crisis and the euro area crisis, which augmented bank capital, enhanced the liquidity of balance sheets and upgraded prudential regulatory frameworks in many countries.

14 See also Eguren Martin et al. (2020).

FIGURE 18 DOMESTIC SOVEREIGN BOND HOLDINGS IN 12 EMERGING MARKET ECONOMIES (CUMULATIVE CHANGE, BILLIONS OF US DOLLARS)



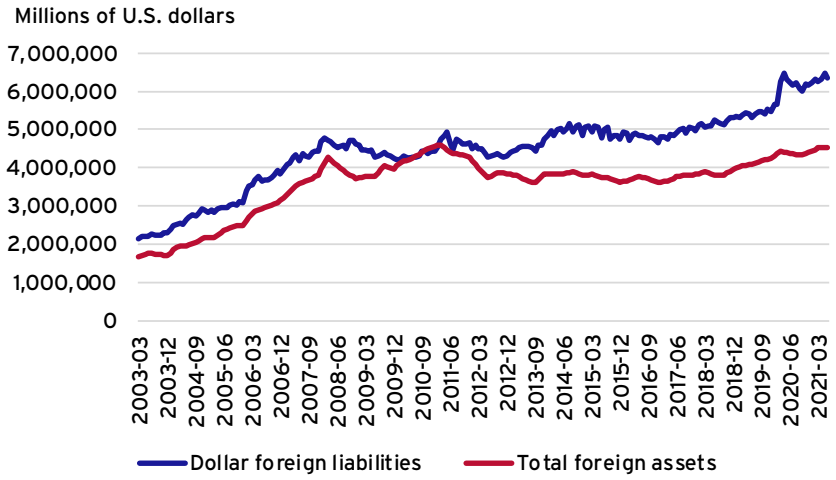
Source: Update to figure 1.6.6 in International Monetary Fund (2021), data courtesy IMF Money and Capital Markets Department.

A predictable side effect, however, has been the migration of financial activity from the more constrained banking sector to unregulated or loosely regulated nonbank financial actors. In its recent report, the Committee on the Global Financial System (CGFS) of the BIS notes several changes in the structure of international capital flows, but first among them is the growing share of market-based capital flows (CGFS 2021).[15] Since 2007, the share of bank loans in the external debt of advanced economies has shrunk from about 35% to about 22%, whereas the share of portfolio debt has risen from about 43% to 50%. At the same time, the share of bank loans in the external debt of emerging market borrowers has fallen from around 52% to 45%, and the share of portfolio debt has risen from around 24% to nearly 40%. Advanced economy cross-border bank claims (which include debt securities, not just loans) declined from about 70% of home-country GDP at the time of the Global Financial Crisis to around 50% in 2019 (CGFS 2021, Graph 1.2). Eguren Martin et al. (2020) document the dominant role of nonbank actors in the reversal of EMDE capital flows in March 2020.

Returning to the TIC data, Figure 19 shows how the foreign position of US banks and other financial institutions has essentially been stagnant in nominal terms since just before the Global Financial Crisis.

15 See also Lane and Milesi-Ferretti (2018).

FIGURE 19 US BANKS' AND OTHER FINANCIAL INSTITUTIONS' FOREIGN ASSETS AND LIABILITIES, 2003-2020



Source: US Treasury, Treasury International Capital System, US Banking Data.

Notes: Monthly asset data are interpolated quarterly data. The dollar liability data cover about 95 percent of total liabilities (that is, liabilities in all currencies). The liability series also encompasses all non-US holdings of short-term Treasury securities.

At the same time, and as noted earlier, the cross-border activity of emerging market banks has risen – according to CGFS (2021), from about 7% to 9% of home GDP between 2008 and 2019. However, it remains small in scale compared with advanced economies' international bank activity.

From a policy perspective, this evolution points to the need for more thinking about financial stability risks coming from the nonbank sector, for example through increasingly complex intermediation chains that may ultimately also impinge on the banks. The spread of innovative FinTech platforms only increases the risks, including from cybersecurity breaches, and may render prudential oversight more difficult. All along, climate-related risks are only rising. The challenges that the international dimension raises are particularly big, owing to the seams between national regulatory systems. The Financial Stability Board (FSB) has outlined an extensive programme to assess the risks from nonbank financial institutions in light of the Covid-19 market turmoil of spring 2020 (FSB 2020). However, it seems fair to say that even bank regulation now needs to encompass an even broader set of potential systemic risks than were envisioned in the immediate post-Global Financial Crisis reforms. The trend of emerging market banks increasingly venturing abroad into other emerging markets only raises the stakes for those countries.

Another part of the financial market infrastructure in need of strengthening is the global financial safety net (GFSN), in which bilateral swap lines have become increasingly important (Perks et al. 2021). Federal Reserve swap lines were essential in stabilising

global markets in the spring of 2020 in light of the dollar's continuing dominance as a funding and investment currency. But the geographic coverage and market reach of those swap lines was limited, especially because dollar funding activity has tended to migrate from the European theatre that was dominant in the Global Financial Crisis to Asia and emerging markets (CGFS 2020).

The need to extend central bank swap lines multilaterally, especially the Fed's, has long been apparent (e.g. Obstfeld 2009), though it remains unclear what institutional structure would be most politically acceptable to the issuers of funding currencies, and what lending safeguards would be necessary. At the least, building trust would demand a higher degree of coordination in financial regulatory policies than now exists. In 2017, IMF staff developed a proposal for a Short-term Liquidity Swap facility to "provide liquidity support for potential balance of payments needs of a short-term, frequent, and moderate nature, resulting from volatility in international capital markets" (IMF 2017b). The facility was meant to be available to countries with "strong fundamentals" and without ex-post conditionality. The IMF Executive Board was divided on the proposal, which some major shareholders opposed, and turned it down. Amid the market disruption in April 2020, however, the IMF Board approved a similar Short-term Liquidity Line (SLL) facility intended to address some of the gaps in the network of bilateral swaps. Unfortunately, potential beneficiaries seem not to view the SLL (or the Fund's two other precautionary credit lines originating in the Global Financial Crisis period) as equivalent to central bank swaps, and indeed, not a single country has drawn on the SLL so far. Plant and Rojas-Suarez (2021) provide an excellent discussion of the likely reasons, as well as the ways the IMF could encourage take-up of the facility. The IMF declined to adopt the pandemic support facility that Fisher and Mazerai (2020) proposed, but such a policy instrument would also strengthen the GFSN during the current pandemic, and could be mobilised during future contagious outbreaks. Also relevant is the proposed Resilience and Sustainability Trust, which would provide an IMF umbrella for richer countries to lend Special Drawing Rights (SDRs) for investments in climate adaptation, health and other areas of vulnerability.[16] The IMF's upcoming Sixteenth General Review of Quotas will provide another opportunity to strengthen the GFSN through enhanced non-borrowed lending resources.

The US market for Treasury securities showed unexpected dysfunctionality in March 2020, notably during a 'dash for cash' later in the month when Treasuries became temporarily illiquid as domestic and foreign holders rushed to sell them for money (Duffie 2020, FSB 2020). The dollar remains by far the central currency in the international financial system (CGFS 2020) and, for better or worse, no serious competitor is yet in view. At the same time, central bank dollar reserves play a key role in the overall resilience of the GFSN. If central banks or sovereign wealth funds cannot rely on converting their

16 See also G30 Working Group on Sovereign Debt and COVID-19 (2021).

Treasury holdings at par, those reserves become less effective in providing insurance to their holders. Thus, the health of the Treasury market is vital to that of the GFSN, and measures that strengthen its functioning also strengthen the GFSN.[17]

To enhance the liquidity of Treasuries amid the turmoil, on 31 March 2020 the Fed established the Foreign and International Monetary Authorities (FIMA) repo facility for converting official foreign Treasury into cash. It became a standing facility on 28 July 2021. (Reflecting ongoing tensions in domestic markets, the Bank of Korea in June 2020 floated an analogous facility to allow domestic banks, insurance companies and brokerages to swap US Treasuries into dollar cash; see Roh and Park 2020.) Several changes would enhance the plumbing of the US Treasury market, the most far-reaching of which would be central clearing of transactions in the market, including repo (for reform proposals, see Duffie 2020, G30 Working Group on Treasury Market Liquidity 2021, Hubbard et. al 2021).

For EMDEs, improved defensive policies can bolster resilience – and thereby global resilience. Their vulnerability to the global financial cycle makes it understandable why so many less-affluent economies, even emerging market economies, have stopped short of full financial opening (recall Figure 2). In 2012, the IMF officially recognised this reality by developing an "institutional view" (IV) on capital controls that allows for their use in some circumstances, notably when financial flows threaten economic or financial stability and the capital flow measures (CFMs) do not substitute for necessary adjustments in macroprudential, monetary or fiscal policies (IMF 2012).[18] The Fund's acceptance of CFMs as a legitimate policy tool was a huge shift in approach: an aversion to exchange control resides deep within the institution's DNA, and even an attempt to focus surgically on cross-border financial transactions could spill over to the current account.

Nonetheless, the IV is in several ways too restrictive. Research shows that CFMs are rarely imposed in the temporary manner the IV envisions, in response to cyclical tides in the global capital market. Instead, they are generally structural and thus long-lived in nature. Notwithstanding the IV, many Fund members feel that global markets might stigmatise them if they vary CFMs reactively. Thus, the Article IV surveillance process has regularly featured disagreements between Fund staff and country authorities as to whether particular policy measures should be labelled as CFMs or macroprudential measures (MPMs), with the authorities often advocating for the latter designation (Everaert and

17 Euro reserves are also an important component of global international reserves, and in the spring of 2020 euro bond markets also experienced liquidity problems.

18 Even before the IV, however, IMF staff accepted and even recommended capital controls in some individual country cases. For the case of Iceland in 2008, see Honohan (2020).

Genberg 2020).[19] A particular cause of disagreement has been policy in some countries – including some richer countries, such as Canada – to limit foreign speculative purchases of property in soaring real estate markets. Finally, the IV is asymmetric with respect to inflow and outflow controls, restricting use of the latter to situations of imminent or ongoing crisis. The Fund's internal Independent Evaluation Office recognised these criticisms in a comprehensive review and recommended rethinking the IV (IEO 2020).

Recently, the Fund has proposed an Integrated Policy Framework that conceptualises the use of CFMs, foreign exchange intervention, monetary policy, fiscal policy and macroprudential policy as distinct instruments that may all be needed to reach multiple policy goals in a small open economy (IMF 2020).[20] Importantly, the approach has the potential to place capital control and foreign exchange intervention policies on an equivalent plane with monetary, fiscal and macroprudential policies, and thereby remove some of the stigma that currently attaches to CFMs. In light of this work and the limitations of the IV, the Fund is currently reconsidering its advice on CFMs, and could go further in the direction of regularising their use in a wider set of circumstances.[21] This approach would also be in line with the recent recommendations of a group of ASEAN central banks (ASEAN WC-CAL 2019). Following a 2016-2019 review, the revised OECD Code of Liberalisation of Capital Movements addresses some of the same criticisms IMF member countries have raised concerning the IV (OECD 2020).

If a future sudden stop in capital flows to EMDEs is protracted, and especially if the pandemic lingers on, liquidity support may not be enough to stave off solvency problems. Despite some recent improvements, however, the current international architecture for external debt restructuring is inadequate to handle a rash of sovereign defaults, some potentially affecting systemic countries (G30 Working Group on Sovereign Debt and Covid-19 2021). Earlier hints by the Group of Twenty pointing towards mandatory private-sector participation in debt restructurings have fallen by the wayside as global financial conditions have remained easy. It should not take a renewed financial crisis to revive those ideas.

19 CFMs can play a macroprudential role (for example, when they limit foreign funding of imprudent domestic investments) but they can also play other policy roles that IMF rules proscribe (for example, preventing adjustment of an undervalued exchange rate). In contrast, a hypothetical 'pure' MPM would not discriminate in its implementation between domestic and foreign residents. The overlap in the roles of MPMs and CFMs has sometimes blurred the distinction between them, as has the difficulty smaller countries face in counteracting the global financial cycle through MPMs without the support of measures that could be characterised (at least partially) as CFMs.

20 See Jeanne (2021) for a related framework.

21 As Honohan (2020: 25) aptly puts it, the 2012 IV approach "is quite different from seeing [capital flow] measures as a tool to be actively integrated with monetary, exchange rate, and macroprudential measures".

REFERENCES

Aguilar, A and C Cantú (2020), "Monetary Policy Response in Emerging Market Economies: Why Was It Different This Time?", BIS Bulletin 32.

ASEAN WC-CAL – ASEAN Working Committee on Capital Account Liberalization (2019), Capital Account Safeguard Measures in the ASEAN Context.

Ben Zeev, N (2019), "Global Credit Supply Shocks and Exchange Rate Regimes", *Journal of International Economics* 116: 1-32.

Bergant, K and K Forbes (2021), "Macroprudential Policy during COVID-19: The Role of Policy Space", CEPR Discussion Paper 16607 .

Broner, F, T Didier, S L Schmukler and G von Peter (2020), "Bilateral International Investments: The Big Sur?", World Bank Policy Research Working Paper 9501.

Bruno, V and H S Shin (2015), "Capital Flows and the Risk-Taking Channel of Monetary Policy", *Journal of Monetary Economics* 71: 119-132.

Bruno, V and H S Shin (2021), "Dollar and Exports", BIS Working Paper 819, June (revised).

Calvo, G A and C M Reinhart (2002), "Fear of Floating", *Quarterly Journal of Economics* 117: 379-408.

Carstens, A and H S Shin (2019), "Emerging Markets Aren't Out of the Woods Yet", *Foreign Affairs*, 15 March.

Cerutti, E, S Claessens, and A K. Rose (2019), "How Important Is the Global Financial Cycle? Evidence from Capital Flows", *IMF Economic Review* 67: 24-60.

Cesa-Bianchi, A, A Ferrero, and A Rebucci (2018), "International Credit Supply Shocks", *Journal of International Economics* 112: 219-237.

Céspedes, L F and J De Gregorio (2021), "Central Banking and Credit Provision in Emerging Market Economies during the Covid-19 Crisis", in B English, K Forbes, and A Ubide (eds), *Monetary Policy and Central Banking in the Covid Era*, CEPR Press.

CGFS – Committee of the Global Financial System (2020), "US Dollar Funding: An International Perspective", CGFS Papers No. 65, Bank for International Settlements.

CGFS (2021), "Changing Patterns of Capital Flows", CGFS Papers No. 66, Bank for International Settlements, May.

Chinn, M D and H Ito (2006), "What Matters for Financial Development? Capital Controls, Institutions, and Interactions", *Journal of Development Economics* 81: 163-192.

Cooper, R N (1999), "Exchange Rate Choices", in *Rethinking the International Monetary System*, Federal Reserve Bank of Boston Conference Series.

Davis, J S, G Valente, and E van Wincoop (2021), "Global Drivers of Gross and Net Capital Flows", *Journal of International Economics* 128.

Degasperi, R, S S Hong, and G Ricco (2021), "The Global Transmission of U.S. Monetary Policy", manuscript, University of Warwick.

Druck, P, N E, Magud, and R Mariscal (2018), "Collateral Damage: Dollar Strength and Emerging Markets' Growth", *North American Journal of Economics and Finance* 43: 97-117.

Duffie, D (2020), "Still the World's Safe Haven? Redesigning the U.S. Treasury Market after the COVID-19 Crisis", Hutchins Center Working Paper 62, Brookings Institution.

Eguren Martin, F, M Joy, C Maurini, A Moro, V Nispi Landi, A Schiavone, and C van Hombeeck (2020), "Capital Flows during the Pandemic: Lessons for a More Resilient International Financial Architecture", Financial Stability Paper No. 45, Bank of England.

English, B, K Forbes, and A Ubide (eds) (2021), *Monetary Policy and Central Banking in the Covid Era*, CEPR Press.

Everaert, L and H Genberg (2020), "IMF Advice on Capital Flows to the Republic of Korea and Selected ASEAN Economies", IEO Background Paper BP/20-02/07, Independent Evaluation Office of the International Monetary Fund.

Fisher, M and A Mazerai (2021), "A Possible IMF Pandemic Support Facility for Emerging-Market Countries", Peterson Institute for International Economics Policy Brief 20-11.

Forbes, K J and F E Warnock (2012), "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment", *Journal of International Economics* 88: 235-251.

FSB – Financial Stability Board (2020), *Holistic Review of the March Market Turmoil*, November.

G30 Working Group on Sovereign Debt and COVID-19 (2021), *Sovereign Debt and Financing for Recovery after the COVID-19 Shock: Next Steps to Build a Better Architecture*, Group of Thirty, May.

G30 Working Group on Treasury Market Liquidity (2021), *U.S. Treasury Markets: Steps toward Increased Resilience*, Group of Thirty, July.

Gislén, M, I Hansson, and O Melander (2021), "Dollar Liquidity from the Federal Reserve to Other Central Banks", *Sveriges Riksbank Economic Review* 31(1): 27-51.

Gopinath, G, E Boz, C Casas, F Díez, P-O Gourinchas, and M Plagborg-Møller (2020), "Dominant Currency Paradigm", *American Economic Review* 110: 677-719.

Gourinchas, P-O (2017), "Monetary Policy Transmission in Emerging Markets: An Application to Chile", in E G Mendoza, E Pastén, and D Saravia (eds), *Monetary Policy and Global Spillovers: Mechanisms, Effects, and Policy Measures*, Central Bank of Chile.

He, Z and P Kondor (2016), "Inefficient Investment Waves", *Econometrica* 84: 735-780.

Honohan, P (2020), "IMF Advice on Crisis-Driven Capital Controls in Europe", IEO Background Paper BP/20-02/10, Independent Evaluation Office of the International Monetary Fund.

Hubbard, G, D Kohn, L Goodman, K Judge, A Kashyap, R Koijen, B Masters, S O'Connor, and K Stein (2021), *Task Force on Financial Stability*, Hutchins Center at Brookings and Chicago Booth Initiative on Global Markets, June.

IEO – Independent Evaluation Office (2020), *IMF Advice on Capital Flows*, Independent Evaluation Office of the International Monetary Fund, September.

IMF – International Monetary Fund (2012), *The Liberalization and Management of Capital Flows: An Institutional View*, November.

IMF (2016), "Global Trade: What's behind the Slowdown?", Chapter 2 in *World Economic Outlook*, October.

IMF (2017a), "Increasing Resilience to Large and Volatile Capital Flows: The Role of Macroprudential Policies – Case Studies", IMF Policy Paper, September.

IMF (2017b), "Adequacy of the Global Financial Safety Net – Considerations for Fund Toolkit Reform", IMF Policy Paper, December.

IMF (2020), *Toward an Integrated Policy Framework*, September.

IMF (2021), *Global Financial Stability Report: Preempting a Legacy of Vulnerabilities*, April.

Jeanne, O (2021), "Rounding the Corners of the Trilemma: A Simple Framework", CEPR Discussion Paper 16717.

Kalemli-Özcan, S (2019), "U.S. Monetary Policy and International Risk Spillovers", in Challenges for Monetary Policy, A Symposium Sponsored by the Federal Reserve Bank of Kansas City, Federal Reserve Bank of Kansas City.

Kalemli-Özcan, S (2021), "A COVID-19 Tantrum?", *Finance and Development* 58: 24-27.

Kashyap, A K, N Kovrijnykh, J Li, and A Pavlova (2020), "Is There Too Much Benchmarking in Asset Management?", NBER Working Paper 28020.

Klein, M W and J C Shambaugh (2015), "Rounding the Corners of the Policy Trilemma: Sources of Monetary Policy Autonomy", *American Economic Journal: Macroeconomics* 7: 33-66.

Koepke, R and S Paetzold (2020), "Capital Flow Data – A Guide for Empirical Analysis and Real-time Tracking", IMF Working Paper 2020/171.

Kose, M A, F Ohnsorge, and N Sugawara (2021), "A Mountain of Debt: Navigating the Legacy of the Pandemic", World Bank Policy Research Working Paper 9800.

Lane, P R and G M Milesi-Ferretti (2018), "The External Wealth of Nations Revisited: International Financial Integration in the Aftermath of the Global Financial Crisis", *IMF Economic Review* 66: 189-222.

Lee, J-W (2017), "Twenty Years after the Financial Crisis in the Republic of Korea", ADB Institute Working Paper 790, Asian Development Bank.

Miranda-Agrippino, S and H Rey (2020), "U.S. Monetary Policy and the Global Financial Cycle", *Review of Economic Studies* 87: 2754-2776.

Miranda-Agrippino, S and H Rey (2021), "The Global Financial Cycle", prepared for the *Handbook of International Economics*, Vol. 6.

Obstfeld, M (2009), "Lenders of Last Resort in a Globalized World", IMES Discussion Paper Series 09-E-18, Institute for Monetary and Economic Studies, Bank of Japan.

Obstfeld, M (2015), "Trilemmas and Trade-offs: Living with Financial Globalisation", BIS Working Papers 480, January 2015 (reprinted in S J Davis, E S Robinson, and B Yeung (eds), *The Asian Monetary Policy Forum: Insights for Central Banking*, World Scientific, 2021).

Obstfeld, M (2021a), "The Global Capital Market Reconsidered", *Oxford Review of Economic Policy* 37: 690-706.

Obstfeld, M (2021b), "An Uneven Global Rebound Will Challenge Emerging-Market and Developing Economies", Policy Brief 21-21, Peterson Institute for International Economics.

Odean, T (1999), "Do Investors Trade Too Much?", *American Economic Review* 89: 1279-1298.

OECD – Organisation for Economic Co-operation and Development (2020), *OECD Code of Liberalisation of Capital Movements*.

Perks, M, Y Rao, J Shin, and K Tokuoka (2021), "Evolution of Bilateral Swap Lines", IMF Working Paper 2021/210.

Plant, M and L Rojas-Suarez (2021), "What Do Middle-Income Countries Want from the IMF as They Look to Recover from the Pandemic?", Center for Global Development Note, November.

Rey, H (2013), "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence", in *Global Dimensions of Unconventional Monetary Policy. A Symposium Sponsored by the Federal Reserve Bank of Kansas City*, Federal Reserve Bank of Kansas City.

Roh, J and Y Park (2020), "BOK to Throw New Dollar Lifeline to Financial Firms via Repo Operations", Reuters, 30 June.

Sachdeva, M and O Harvey (2020), "Shadow QE in EM: Who Has Been Buying EM Bonds?", Deutsche Bank Research, Fixed Income EM Special Publication, October.

Scheubel, B, L Stracca, and C Tille (2019), "The Global Financial Cycle and Capital Flow Episodes: A Wobbly Link?", ECB Working Paper 2337.

Shin, H S (2019), "Global Liquidity and Procyclicality", in K Basu, D Rosenblatt, and C Sepúlveda (eds) (2019), *The State of Economics, the State of the World*, MIT Press.

ABOUT THE AUTHOR

Maurice Obstfeld is the Class of 1958 Professor of Economics and former Chair of the Department of Economics (1998-2001) at the University of California, Berkeley. He arrived at Berkeley in 1991 as a Professor, following permanent appointments at Columbia (1979-1986) and the University of Pennsylvania (1986-1989), and a visiting appointment at Harvard (1989-90). He received his Ph.D. in economics from MIT in 1979 after attending the University of Pennsylvania (B.A., 1973) and King's College, Cambridge University (M.A., 1975). From September 2015 to December 2018, Dr. Obstfeld was the Economic Counsellor and Director of Research at the International Monetary Fund. From July 2014 to August 2015, he served as a Member of President Barack Obama's Council of Economic Advisers. Dr. Obstfeld was previously (2002-2014) an Honorary Adviser to the Bank of Japan's Institute of Monetary and Economic Studies. He is a Fellow of the Econometric Society and the American Academy of Arts and Sciences. Since February 2019, he has been a nonresident senior fellow of the Peterson Institute for International Economics.

DISCUSSIONS

Sebnem Kalemli-Özcan, *University of Maryland and CEPR*

It's a pleasure to be here at the 30th anniversary. Let me start with a summary of this very nice paper by Maurice Obstfeld. It is a very good description of international financial markets and emerging economies' place in those markets, in terms of how emerging markets contribute or how they got hurt – all that is covered very well both before and after the onset of the Covid-19 pandemic. So, it is a very good go-to piece if you want to understand these issues. There's so much in the paper. The key theme that comes out is that emerging markets are going to be in a vulnerable spot during the recovery from Covid-19. There are several reasons for that. At the same time, as policymakers, we know what to do. We employed the right policies as a response to Covid. These were short-term emergency responses, as Maurice reported. So now we have a chance to do much better. And we cannot wait for next crisis to undertake medium- to long-term reforms to improve the resilience of the international financial system.

First of all, I couldn't agree more with Maurice. I agree with everything in this paper. There's really nothing to disagree with here. So, what I would like to do is to go over the key mechanisms that Maurice underlines. I'm going to also have another look at the issue of capital flows. I have the same data Maurice is looking at, but I'm going to have a different take here. Instead of looking at the total capital flows at the country level to emerging markets or advanced economies, I'm going to look at these flows at the sector level based on the borrowing sector. And I'm going to compare what happened during previous crises and during Covid to understand the sectoral vulnerabilities. Finally, I'm going to highlight the important points and policy implications that Maurice has already mentioned.

The link from global shocks, global financial conditions and US monetary policy to emerging markets is what I called 'international risk spillovers' in my 2019 Jackson Hole paper. Te United States is the centre here, because it is about global financial conditions and the dollar. How these conditions transmit to emerging markets is really about changing risk sentiments of international investors. Because if you look at this transmission, it is not the same for Mexico, Brazil, Korea, and Switzerland. There's going to be a big difference between advanced economies and emerging markets, and further within emerging markets as these are going to be more risk-sensitive. There is going to be this emerging market-specific risk sentiment of global investors. So, what are the channels here? Maurice mentioned all of the channels of international risk spillovers, I just want to mention them here again so that we are very clear on what is coming from the lender side and what is coming from the borrower side. The lender side is global banks' funding costs and balance sheets. The easier funding is for global banks – the stronger their balance sheet, the more they are going to invest in emerging markets and the more risk they will take. Of course, the second layer of that is, whoever the domestic intermediary in the emerging market is – and most of the time, it's the domestic banks –

obviously their funding costs and balance sheets are going to be important, and they are going to be very tightly linked to the global banks. These are lender-side mechanisms, as lenders are going to be pricing the assets here, not the borrower. And on the borrower side, their corporate balance sheets are going to be very important, as Maurice said, and that's going to be about how much dollar debt you have in your country, and how much of that is hedged. In general, if you look at big corporations in countries like Korea, Brazil and Turkey, you see that they are mostly hedged either because they are big multinational corporates or they are exporters. Unfortunately, this is not the case for the small and medium-sized enterprises, which most of the emerging market economies are composed of. Why do these smaller firms borrow in dollars and not hedge? They borrow in dollars because it is cheaper. There is uncovered interest parity (UIP) violation at the firm level, and they borrow in dollars even from their own domestic banks because that's just cheaper and they do not hedge as hedging is expensive.

Hence, the UIP condition is violated both at the macro level and at the firm level in emerging markets. Not only that, UIP risk premium actually fluctuates with all these important indicators Maurice mentioned – US monetary policy, global financial conditions, global risk aversion. In that sense, this is a very good barometer of international risk spillovers. In fact, I'm going to argue that emerging market policies should aim at smoothing this UIP risk premium. And this makes the case for flexible exchange rates even stronger. So, I fully agree with Maurice that we do need flexible exchange rates; that case remains strong. But here there's a separate role for flexible exchange rates from the standard expenditure-switching role, since flexible exchange rates absorb risk premium shocks. And they really help the monetary policy trade-off by getting rid of this UIP risk premium. So you don't really have to do anything. Basically, the flexible exchange rate frees the hand of the monetary authority to target inflation. This UIP risk premium concept and how it moves in emerging markets with global shocks makes the case for flexible exchange rate stronger.

The final point is on capital flows. The traditional way of looking at capital flows is by asset class. So we look at portfolio bond flows, equity flows, FDI, other investment flows and all that – which is, of course, very useful. But an alternative and also very useful way is to separate capital flows by sector. In emerging markets, banks, corporates and sovereigns each receive around 35% of all capital flows. So that looks good. However, when you go to loans and bonds, the picture changes. If you look at loans, banks and corporates have the lion's share here. And sovereigns have almost everything in bond flows – because sovereigns don't borrow in loans, they borrow in bonds. And that's exactly what you see when you look at bonds. This is very important when we are trying to understand the vulnerabilities related to the borrowing sector and related to the dollar factor that Maurice mentioned. Because we all know very well that there is a tendency in emerging markets sovereigns borrowing local currency in the last twenty years . If you

just look at bonds in the portfolio debt category of capital flows, you are going to miss a big chunk of the dollar exposure because that comes mostly through loans. The growth of loans of corporate and banks, it is more in dollars.

To make this point clear, let's look at capital outflows from each sector during certain events. The first is the Global Financial Crisis, around the 2008 Lehman collapse; the second is the May 2013 'taper tantrum'; and the last is Covid-19. As Maurice clearly explained at the beginning of his presentation, during the Global Financial Crisis, capital flow was out of the banking sector. It was also coming out of the corporate sector in the emerging markets. That's something that is very much expected in a financial crisis. It was the same during the taper tantrum. When you come to Covid, you see something very different. In the acute 2020 phase of Covid, at the beginning of March-April, there was a huge dumping of sovereign bonds of emerging markets, so capital flow was coming out of emerging markets' sovereigns; and then later in 2020 and towards 2021, out of the banking sector. The banking sector comes later. Why? Because at the start of Covid, uncertainty was very high and of course these are local currency sovereign bonds, the riskiest asset class from the perspective of foreign investors, so this is the thing that is going to depreciate most quickly. So in that sense, if you want to understand the vulnerabilities in terms of currency exposures and sectors, you really need to be looking at these things by sector.

Well, let me go back and tie this to the US and emerging market monetary policy response. We saw an extreme countercyclical response during Covid. This does not mean risk premia and external finance premia in emerging markets will not increase with a contractionary US monetary policy shock that is likely to happen in the coming months. I studied the effect of surprise US monetary policy shocks on emerging markets' risk premia in my 2019 and 2021 Jackson Hole papers, where surprises are measured by looking at the changes in Fed funds futures in a 30-minute window around the Fed announcements. There is a huge increase in risk premia in emerging market government bond spreads when such contractionary US surprises occur. You see a huge increase in these short-term spreads. This is very important. This is not term premia; this is not the long end of the yield curve. This is government borrowing less than 12 months. What is more interesting is that this increase in risk premia happens despite the fact that emerging markets do countercyclical monetary policy and cut rates as a response to contractionary US policy.

Why is this happening? Let me go through that, and then I'll conclude. This is going to be very clear when you look at what the UIP risk premium is. The UIP premium has two parts: (1) the interest rate differential in a country, say Korea, minus the US; and (2) the exchange rate adjustment term, with the expected depreciation of the exchange rate where the exchange rate is defined in local currency per dollar, the higher means depreciation . So that's the UIP premium. If these two terms cancel each other out, then the UIP premium is zero. The first interesting fact is that UIP never holds in emerging markets. So emerging markets always provide excess returns to foreign investors in the

form of the UIP risk premium. It is also very volatile and persistent at the same time. However, for advanced economies, it actually holds on to the average. What is even more interesting is when we look at the two components of the UIP premium – the interest rate term and the exchange rate adjustment term – for emerging markets, the UIP premium moves with the interest rate differential term. That's why, when there is a contractionary US monetary policy shock, risk premia and external financing costs in emerging market increase. Hence the UIP premium is a good metric that picks up spillovers to emerging markets related to global financial conditions. There is a very close correlation between the UIP premium and the economic policy uncertainty index for emerging markets. On top of global financial conditions-related risk sentiments for investors, policy uncertainty in emerging markets will be important. Here is an example: say you are an inflation-targetter and operate under a floating exchange rate regime, and you use your monetary policy rate to manage the exchange rate. This means your policy is uncertain and you are going rise up the policy uncertainty index and increase your UIP premium. If your policies are uncertain, you pay a higher premium to foreigners for your external financing needs.

It is clear from Maurice's presentation that Korea has credible policies. In fact, Korea is now classified as an advanced country because of its high income. Korea's metrics are going to respond like those of advanced economies, including the UIP premium, because of the credible monetary policy framework and floating exchange rates. This is exactly why the UIP premium is not going to increase in Korea as it has in countries like Turkey, Argentina, Brazil, and Colombia in the face of risk-off shocks, such as Covid-19.

Of course, it doesn't mean that Korea, with flexible exchange rates and credible policies, is out of the woods, so I go back to the vaccine supply chain issues Maurice mentioned, which is absolutely the most important and essential thing right now. There is vaccine inequality. Vaccinated advanced economies are doing very well in terms of output loss in sectors such as accommodation and food, art and entertainment; they have very little output loss. Emerging markets are doing much worse because they are not fully vaccinated.

The final issue is dollar debt accumulation. It is much better to keep the flexible rates and to deal with dollar debt via pre-emptive countercyclical policies. Credible monetary policy also limits the extent of pass-through from exchange volatility to inflation. As a result, you are solving both problems by letting your exchange rate be flexible.

Kwanho Shin, *Korea University*

As the Covid-19 virus spread rapidly around the world, the global economy was once again plunged into a vortex. The global economy initially responded by locking down. Stock prices plummeted, financial companies suffered from liquidity shortages, and firms fell into unprecedented predicament. In response, countries have implemented unprecedented fiscal and monetary policies. How will the international financial system evolve once the virus has subsided? This paper attempts to answer this question.

Obstfeld first "reviews the evolution of global financial markets since the Global Financial Crisis, changes in academic thinking about these markets' domestic impacts, the strains seen during the Covid-19 crisis, and perils that may lie ahead". Then the paper concludes, rather optimistically, that "stability will be enhanced if the global community embraces reforms that elevate market resilience, rather than depending on skillful policymakers wielding aggressive but ad hoc policy interventions to ride to the rescue again".

I have three comments based on the paper that I recently wrote with Hyun Song Shin at the Bank for International Settlements (Shin and Shin 2022). In the paper, we reviewed the experience of Korea in the implementation of macroprudential policies after the Global Financial Crisis and drew lessons from it. First, it is foremost important to have a coherent overall macro-financial policy framework that incorporates monetary policy as part of it. Since the Global Financial Crisis, while the mandate of the Bank of Korea was broadened to have an explicit financial stability goal, its role is not properly clarified. The Bank of Korea is still lacking in appropriate tools to respond to financial instability, and the supervisory authorities monopolise them. The Bank of Korea raised the policy rate twice in August and November 2021, mainly due to the widening of the financial imbalance caused by the increase in household debt and the rise in housing prices. The lack of direct tools to deal with financial instability and the unsatisfactory coordination with the financial supervisory authority, which monopolises macroprudential policies, forced the Bank of Korea to respond to financial instability through the increase in the policy rate.

Second, we need to pay more attention to capital flows in the bond market, as the bond market expanded significantly after the Global Financial Crisis while the relative volume of bank borrowing in capital inflows to emerging countries decreased. Since the Asian currency crisis in 1997, a number of emerging countries have been working forcibly to develop bond markets denominated in local currencies. As the deleveraging of financial institutions proceeded after the Global Financial Crisis, the bond market had opportunity to further develop. However, as highlighted by Hoffman et al. (2020), during the Covid-19 pandemic borrowing through local currency bonds has not insulated emerging market economies from sudden reversals of capital flows. This is especially true for the economies that experienced sharp currency depreciations, as portfolio investors face amplified losses as exchange rates move against them. This phenomenon was coined

'original sin redux' by Carstens and Shin (2019). While Obstfeld emphasises the role of exchange rate flexibility in mitigating negative impacts of external shocks, this episode shows the possibility that a floating exchange rate can aggravate the situation.

Finally, the experience in March 2020 showed the limitations of an approach that focuses on the regulations on the banking sector alone. The worsening of the situation as banks' short-term borrowing was interrupted during the Global Financial Crisis prompted financial authorities to focus on regulating short-term borrowing. One prominent example was a bank levy on short-term non-deposit liabilities with a maturity of less than one year that was imposed in 2011. As shown by Bruno and Shin (2014), the regulations on banks contributed to reducing their short-term borrowing in Korea. However, in March 2020, the sharp widening of the FX basis in the US dollar-Korean won swap market was mainly driven by the dollar funding pressures of securities firms that were under pressure to meet increased margins for structured products such as equity-linked securities (ELSs). In addition, the FX hedging activities through the FX swap market by pension funds and life insurance companies in response to external fixed income investments also contributed to the financial stress. Hence the overall design and management of macroprudential frameworks should incorporate more effectively the regulations on non-bank financial intermediaries (NBFIs) that played the pivotal role in aggravating financial vulnerability during the Covid-19 crisis.

References

Bruno, V and H S Shin (2014), "Assessing Macroprudential Policies: Case of South Korea", *The Scandinavian Journal of Economics* 116(1): 128–157.

Carstens, A and H S Shin (2019), "Emerging Markets Aren't Out of the Woods Yet", *Foreign Affairs*, 15 March.

Hofmann, B, I Shim and H S Shin (2020), "Emerging Market Economy Exchange Rates and Local Currency Bond Markets amid the Covid-19 Pandemic", *BIS Bulletin* No. 5.

Shin, H S and K Shin (2022), "Lessons from Macro-Financial Policy in Korea", in E Robinson, C Borio and H S Shin (eds), *Macro-financial stability policy in a globalised world*, World Scientific Publishing Co Pte Ltd.

CHAPTER 3

Finance for the post-Covid world: Risks and opportunities

Thorsten Beck and Yung Chul Park[1]
European University Institute and CEPR; Korea University

1 INTRODUCTION

The current socioeconomic crisis (the 'Great Lockdown') did not start in the financial sector; rather, the financial sector was affected by the crisis as much as other sectors. However, the financial sector has been critical as a transmission channel for government support programmes for households and enterprises, and it will be as important during the economic recovery phase, as well in economies' transition to net zero. At the same time, the financial sector is undergoing structural changes that influence how it interacts with the real economy and with government. This chapter assesses the challenges financial sectors across the globe will face in the coming decades as well as the role they should take in addressing future challenges. It points to different scenarios for what the financial sector of the future will look like.

The economic fallout from the Covid-19 pandemic and the consequent lockdown measures have provided unique challenges for policymakers across the globe. Rather than stimulating economic activity, as is done during 'standard' recessions, households and enterprises had to be supported by governments during periods of limited, if any, economic activity. Banks have often served as transmission channels for such support. However, this also implied a reduction in banks' allocation function, which is a critical role for banks in modern market economies and for economic growth, given the focus on incumbent firms and generous guarantees provided by governments. In addition, the provision of such support measures raises the challenges of exit from the measures. How quickly can regulatory authorities go back to 'business as usual'? How does the interaction of monetary, fiscal and regulatory policy actions influence the recovery process? We will discuss these issues in Section 2.

Beyond the immediate challenges, the banking system has undergone structural changes over the past decades that have changed its role in middle- and high-income countries. Specifically, the share of credit to households rather than enterprises has increased. At the same time, the corporate sector has seen an increasing role of intangible assets, which

1 We are grateful to our discussant at the 30th Anniversary Conference in Seoul. The authors gratefully acknowledge financial support by the KIF.

are harder for traditional banks to finance than tangible assets – a trend that can also explain increased cash holdings by corporates. In addition to a shift in banks' lending portfolios, their activity mix has expanded towards non-intermediation businesses, while tighter bank regulation has raised the importance of non-bank financial intermediaries. These different trends are also important for understanding the non-linearity in the relationship between financial development and economic growth, a relationship often found to be insignificant in high-income countries. We will discuss these structural changes and the consequent challenges in Section 3.

Traditional banks also face increasing competition from new players that digitalisation has allowed to enter financial service provision. Specifically, FinTech start-ups, technological platform companies and cryptocurrencies pose challenges for incumbent banks, with the regulatory response critical for the future structure of the financial system, including banks' role in private money creation. These potentially decisive changes raise the question of whether the benefits from digitalisation and structural changes outweigh the new risks, and what the financial sector of the future will look like. Decentralised finance has had the ambition of replacing the current financial system, but it seems to be directing its focus back to connecting with traditional finance rather than replacing it. We will discuss these trends in Section 4.

Humanity faces vital challenges related to climate change, both adapting to any temperature changes that are no longer avoidable and achieving the transition to a sustainable net zero economy. Given the reallocation of resources this requires, the financial system will have to play a critical role. However, tentative evidence has shown that banks might have limited incentives to support such a transition (especially when compared to public capital markets) while at the same time facing the risk of stranded assets. This puts the focus on the regulatory response to the climate change challenges, but also raises the question of the relative roles of different segments of the financial system. We will discuss these challenges in Section 5.

This chapter should be seen as raising issues and questions rather than providing conclusive answers. While it is informed by recent research, it does not provide an exhaustive literature survey across these different areas. Given the tentative nature of recent research findings and the uncertainty of future developments, we cannot offer conclusive policy recommendations. Rather, we focus on important trends in the financial sector that pose challenges for regulators and policymakers who are interested in both maximising the benefits the real economy can draw from an effective financial system and minimising the stability risks.

This chapter relates to an extensive literature on the relationship between financial sector development and the real economy (for extensive discussions on the different dimensions of this relationship, see Beck and Levine 2018). It starts from the assertion, as shown by an extensive empirical literature, that – for better or for worse – the efficiency and stability of the financial sector is critical for the real economy (Patrick and Park 1994,

2013, Eichengreen et al. 2015, Popov 2018). While deeper and more efficient financial systems are associated with higher levels of economic growth, this relationship often breaks down at high levels of economic or financial development. At the same time, a rapid expansion of credit, often related to asset price booms, can result in systemic distress (Loayza and Ranciere 2006). Similarly, there is an extensive literature on the relative merits of different segments of the financial system, specifically financial intermediaries and public capital markets (Beck and Levine 2002). This debate has taken on renewed importance with the need for resource reallocation as societies transition to a net zero economy.

The chapter also relates to an extensive literature on financial sector regulation. The right balance of reducing fragility and maximising efficiency of financial intermediation has been at the core of regulatory debates over the past decades, with observers pointing to regulatory super-cycles – regulatory regimes are often tightened after major crises, with heavy emphasis on restrictions and regulatory oversight, and then relaxed over time, with more emphasis on market forces and self-regulation (Dagher 2018). While the Global Financial Crisis led to an array of regulatory reform efforts, there looms a larger challenge: how to construct a regulatory system that is robust to regulatory arbitrage (Beck et al. 2017). Ample experience has shown that new regulation leads to evasion efforts by financial market participants and the shifting of risky activities outside the regulatory perimeter. This feedback loop and catch-up process for regulators raises the more fundamental question of how regulation can adapt to the dynamic nature of the financial system.

The increasing importance of new providers of financial services – including FinTech and BigTech companies, but also decentralised finance in the form of cryptocurrencies – has put these challenges once more at the forefront of regulatory conversations. Similarly, the question of forcing financial institutions to internalise the effects of climate change is an important challenge for regulators. To what extent should regulators limit their focus to prudential risks that arise from the transition to a net zero economy, and to what extent should they take into account broader environmental objectives?

2 THE FINANCIAL SECTOR: ACCELERATOR OR BRAKE FOR THE POST-COVID RECOVERY?

While this chapter is primarily focused on long-term trends, the pandemic and the policy response to it have important implications for the financial sector. We will therefore discuss in this section both the role of the financial system as a transmission channel for government support during the pandemic and also the important choices policymakers have to make when exiting from the support programmes, as they will affect both the health of financial sector as its ability to support the recovery.

The financial sector has been critical for the transmission of government support programmes for households and enterprises during the pandemic. Monetary, fiscal and regulatory authorities adopted a wide range of support policies and programmes in spring 2020. In the euro area, the ECB introduced a pandemic emergency purchase programme (PEPP) for public and private sector assets, enhanced its long-term refinancing operations and kept key interest rates at a historically low level. In the United States, the Federal Reserve cut the federal funds rate by 1.5 percentage points, resumed quantitative easing and backstopped money market funds, among other actions. Across the globe, authorities have adopted a variety of monetary and regulatory measures to ensure the proper functioning of financial intermediaries and markets and thus, ultimately, their support for households and enterprises (Feyen et al. 2020).

In fiscal policy, the range of aid schemes has been wide across countries, including government-sponsored job retention programmes, grants to firms to compensate them for specific fixed costs such as rents or interest on loans, and income support for the self-employed. The overall government support packages related to the pandemic have amounted to about 14% of GDP in Europe based on information available up to September 2020 (ESRB 2021), while the reported uptake of these programmes was over €700 billion (roughly 4% of GDP). In the United States, 4.5 million businesses had received a total of over $500 billion by June 2020 under the Paycheck Protection Program, which provided low-interest private loans to pay for firms' payroll and certain other costs and included loan forgiveness if the firm kept its employee count and wages stable. Beck and Keil (2022) show for the United States that banks that were geographically more exposed to lockdown measures replaced regular lending with government-supported lending.

In Europe, a number of regulatory and prudential policies aimed at releasing capital and liquidity buffers, while at the same time loan provisioning rules were relaxed. In return, banks were asked not to distribute profits in the form of dividends or share buy-backs and to be conservative in variable remuneration. In the United States, federal banking supervisors encouraged depository institutions to use their capital and liquidity buffers to lend and indicated that Covid-19-related loan modifications would not be classified as troubled debt restructurings. Holdings of US Treasury Securities and deposits at the Federal Reserve Banks were temporarily excluded from the calculation of the supplementary leverage ratio for holding companies. Regulators across the globe took similar actions (Feyen et al. 2020).

The combined effect of these measures was to create a virtuous circle between corporates, banks and sovereigns, avoiding a funding crunch for either and keeping risk premiums at deflated levels. However, due to the higher debt level of governments and corporates, the measures also created the basis for possible future increased systemic risk. The exit strategy from the various support measures will ultimately determine whether the financial sector can help accelerate the recovery process or will hold it back, with an even worse scenario of systemic financial distress resulting from pandemic-induced

distortions.[2] An appropriate exit strategy would ensure a healthy banking sector that can fully take on its allocation function, an easy restructuring of viable but over-indebted firms and the exit of unviable firms.

One can frame the discussion on how quickly to exit from these support measures as Keynes versus Schumpeter/Hayek. On the one hand, continuous support can be justified with the attempt to avoid hysteresis, in other words, the risk that the current severe economic downturn and consequent high unemployment (in the absence of support measures) cause unemployed individuals to lose their job skills or become demotivated, in turn leading to high rates of long-term or structural unemployment. Such scarring effects would not only hamper economic recovery but ultimately result in lower longer-term growth rates. Supporting firms and people is thus the first priority – through such support, pressure on banks and other financial institutions is also relieved.

On the other hand, the pandemic will have (possibly permanently) changed the returns on activity in different sectors and industries. There is thus a need for reallocation of resources within the economy post-pandemic. This requires a process of 'creative destruction', where some firms may have to undertake a profound transformation towards new products, services and/or markets, and new firms are created in sectors and industries with growth opportunities. Such a process would be impossible if support measures kept all firms in their current structure alive, independent of whether or not they are viable in their current structure in the long run. Similarly, incentives to search for and relocate to new jobs might be reduced during times of generous income support. Ultimately, the choice is not between one approach or the other, but more that of transition – i.e. when to exit from crisis support measures and ensure the proper functioning of market forces.

The strategy to exit from support measures is especially important for the banking system. In March 2020, supervisors provided guidance to mitigate volatility in banks' regulatory capital and financial statements stemming from IFRS9 accounting rules, which would result in excessive procyclicality of regulatory capital. However, granting banks flexibility concerning loan classifications may induce them to continue unviable relationships. Specifically, facing the risk of large losses if borrowers and loans have to be downgraded, banks have incentives to evergreen loans (i.e. rolling over non-performing loans rather than recognising losses). The key question is how to achieve the right balance between supporting borrowers and setting appropriate incentives for banks.

By the same token, the exit from guarantee schemes should be carefully designed. In fact, as argued by Gobbi et al. (2020), the collateral values are likely to fall when guarantees are lifted, potentially encouraging loan foreclosures. These considerations would call for a smooth phasing out of government credit guarantees to avoid cliff effects on bank

2 For a more extensive discussion on exit strategies, specifically in Europe, see Beck et al. (2021a).

lending. At the same time, incentives for zombie lending and the associated risks of cliff effects would be much reduced if firms were financed with equity instead of debt, also counteracting a potential debt overhang. Therefore, the phasing out of credit guarantees could be usefully complemented with measures that promote the use of equity (or equity-like) instruments to reduce the excessive reliance on debt-based instruments (Boot et al. 2020, Laeven et al. 2020).

The broad support measures by both fiscal and regulatory authorities have put the usual loss-recognition process on hold. However, as these support measures are being phased out and as complementary supervisory actions (asset quality reviews and stress testing) are being undertaken, losses will emerge on banks' balance sheets. While this might not imply widespread bank failures, one can foresee a scenario where several banks are not only undercapitalised (relative to standard capital requirements or at least under a stress scenario) but will not be able to raise additional capital on the market. The question is whether bank resolution frameworks are robust enough to handle such failures.

The sequencing of exit strategies from government support will not only be important in terms of fragility and how to address it, but also in terms of how quickly the economy can recover and manage the necessary resource reallocation process. One of the critical functions of the financial system is the allocation of resources according to demand and growth opportunities. Wurgler (2000) shows that countries with developed financial systems increase investment more in their growing industries, and decrease investment more in their declining industries, than those with undeveloped financial systems. Fisman and Love (2007) show that industries with higher global growth opportunities grow faster in economies with more developed financial systems. A healthy, efficient and stable banking system is critical in this recovery and reallocation process.[3] An exit strategy that helps maintain such a banking system is thus important not only to avoid systemic distress coming out of the pandemic but also to accelerate the recovery process.

What does this imply in concrete terms? While circumstances vary from country to country, several general principles can be derived. First, returning to standard loan classification rules requires remodulation of moratoria. Second, exit from guarantees should only be done if the legal and regulatory framework is ready to deal with a possible rise in corporate insolvency, while possible new equity- or grant-type support measures for viable but overindebted firms are made available. Third, and similarly, the return to 'standard' regulatory requirements for banks requires being prepared for resolving fragile banks. Finally, close coordination across different policy areas is necessary.

3 It is important to note, however, that the financial sector can be impeded in this role by other constraints in the economy. For example, Aghion et al. (2021) show that pro-competitive reforms after the 1997/98 crisis reduced the dominance of chaebols and helped increase productivity of non-chaebol firms, with one channel being the reduction in preferential access to finance for chaebols; see also Chapter 4 in Eichengreen et al. (2015) and Park et al. (2013) for the ASEAN experience.

Beyond the exit from direct support measures for corporate and financial sectors are the challenges of monetary policy normalisation and fiscal consolidation. While the early stages of the pandemic saw below-target inflation rates across the advanced world, inflation rates picked up considerably in 2021. Initial beliefs that these increases would be temporary and inflation rates would return to target rates within a few months have given way to concerns of longer-term inflationary trends. At the core of this debate is the question of whether the increase in inflation is due exclusively to supply chain problems and that fixing these problems is therefore necessary and sufficient, but cannot be achieved with monetary policy, or whether aggregate demand risks outstripping aggregate supply for longer periods. At the time of writing this chapter, both the US Federal Reserve and the Bank of England have signalled (and in the latter case, already started) the tightening of monetary policy in the near future, while the ECB has indicated that it will hold off on monetary tightening.

Similarly, the question of fiscal sustainability has arisen, but with a stark difference between advanced and emerging economies. On the one hand, there are limited concerns on the debt sustainability of leading economies, including the United States, Japan and the United Kingdom. On the other hand, many emerging markets, which rely on international capital flows to finance government and private sector funding gaps, face increasing concerns of debt sustainability, exacerbated by increasing interest rates in the United States and thus higher funding costs. The euro area faces additional challenges, as the currency union imposes economic (as well as legal) limits on fiscal deficits and debt. It is clear, however, that a return to these fiscal rules would imply a deflationary fiscal stance and might undermine the economic recovery process.

As in the case of financial sector support measures, the challenge is one of timing. It is widely acknowledged by now that fiscal tightening happened too early after the Global Financial Crisis, which contributed to the euro debt crisis and to a slower recovery in the United States. While this crisis is a different one, as it did not start in the financial sector, balance sheets of households, corporates and financial institutions might also need repair, as argued above, so that too early tightening might be damaging. However, it is also important to understand the interaction between monetary and fiscal policy stances in this context, as tightening along both dimensions can slow the recovery even further.

Finally, the euro area presents specific challenges. First, the diversity in both inflation rates and government overindebtedness makes it more difficult to design a monetary policy that is optimal for all countries within the currency union. Second, there are fears that high sovereign debt burdens can result in fiscal dominance, in the sense that the ECB will be reluctant to raise interest rates to exacerbate the debt burdens further. First steps to alleviate these concerns have been taken by embarking on joint fiscal policy action in the form of NextGenerationEU. In addition, slowly increasing interest rates while maintaining the option for asset purchase programmes to support governments

in temporary funding problems can mitigate the fears of fiscal dominance. However, the next decade will be as politically and economically challenging for the euro area as the previous one.

3 STRUCTURAL CHANGES IN THE FINANCIAL SECTOR

The structure of the financial sector has undergone significant changes over the past decades, which has implications for the sector's impact on the real economy and financial stability. An extensive empirical relationship has shown a positive and significant relationship between financial development and economic growth, but subject to important non-linearities.[4] Cecchetti and Kharroubi (2012), Arcand et al. (2015) and Sahay et al. (2015) present evidence that additional financial deepening slows growth once financial depth exceeds an optimal level.

For example, the beneficial effect of financial deepening on economic growth begins to vanish when the ratio of private credit to GDP rises above 100% (Cecchetti and Kharroubi 2012) or 120% (Arcand et al. 2015). Cecchetti and Kharroubi also find that when the financial sector accounts for more than 3.5% of total employment or 8.4% of total value-added, further increases in the sector's size tend to be detrimental to growth. In addition, there is evidence that bank-based (or bank-biased) financial systems such as in Europe, where banks' balance sheets are relatively large compared to the role of public equity and bond markets, drag down economic growth (Langfield and Pagano 2016). In the following, we will point to a few of these trends that can explain these non-linearities, but are far from being exhaustive. Then, in the next section, we focus on one specific trend that has the potential to cause even stronger disruption in the financial sector, namely, digitalisation.

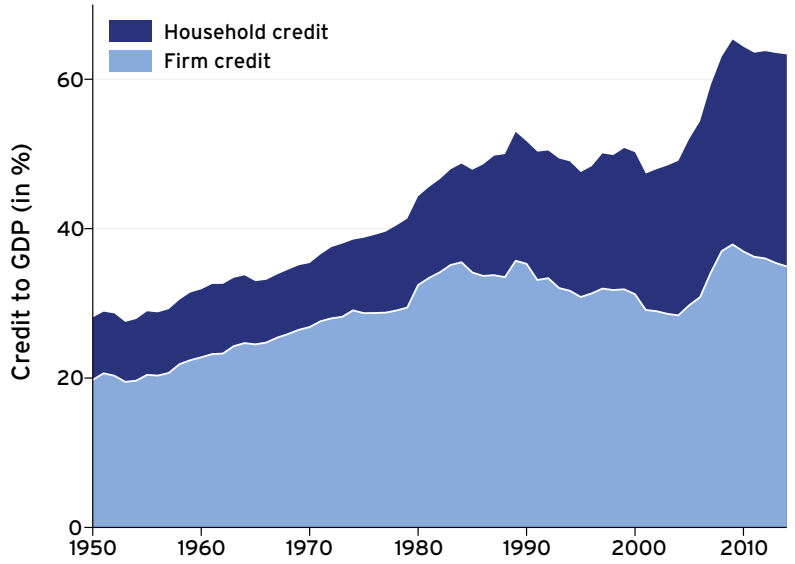
First, there has been a trend away from enterprise lending to household lending by banks, primarily in the form of mortgages in many advanced and emerging markets, primarily in the form of consumer credit in less developed countries (Figure 1). This trend has implications for both the relationship between finance and economic development and for financial stability. Beck et al. (2012) show that the relationship between financial development and economic growth documented in an extensive empirical literature goes through enterprise rather than household credit. Higher household credit-to-GDP is not significantly associated with higher GDP growth.[5] Further, in the short term, growth in household debt predicts lower GDP growth and higher unemployment (Mian et al. 2017).

4 We use a rather broad idea of financial development in this context, i.e. financial systems that provide a wide range of financial services in a cost-effective manner to a large share of the population, including small enterprises and poorer households. Recent data efforts have distinguished between financial depth (volume of financial services, such as credit), financial efficiency (as measured, for example, by interest rate spreads) and financial inclusion (the financial system reaching as large a share of the population as possible), in addition to financial stability.

5 A different explanation for non-linearity is that financial deepening helps economies catch up to the productivity frontier in the early stages of economic development, but in countries close to or at the frontier, it generates a limited or no growth effect (Aghion et al. 2005); see also Rioja and Valev (2004a, 2004b). However, these studies have used overall credit to the private sector rather than differentiating between beneficiaries, and can thus be seen as being predecessors for the trends described here.

There are also important stability implications from this change in credit composition. Theory suggests that credit to households and non-tradable firms can fuel unsustainable demand booms (e.g. Schmitt-Grohé and Uribe 2016), credit to these sectors may disproportionately contribute to a build-up of financial fragility (e.g. Schneider and Tornell 2004) and, given the lower average productivity growth in the non-tradable sector, expansions in credit to non-tradable firms and households may lead to a misallocation of resources across sectors (e.g. Reis 2013, Benigno and Fornaro 2014).

FIGURE 1 CREDIT COMPOSITION OVER THE PAST HALF-CENTURY



Source: Mueller and Verner (2021).

In line with these theoretical predictions and using granular data on credit composition across 117 countries with data over several decades, Mueller and Verner (2021) show that credit to households and non-tradable sectors predicts lower medium-term growth and that credit expansion to households and the non-tradable sector is associated with a higher likelihood of a future systemic banking crisis.

Second, there has been a trend away from tangible towards intangible assets on corporates' balance sheets. Studies of firms with different shares of tangible and intangible assets have shown that firms with intangible assets use less debt but have higher cash holdings (Begenau and Palazzo 2021). The corporate finance literature highlights that intangibles may reduce a firm's debt capacity due to their low collateral value and because intangible assets are more easily diverted, which can explain the higher cash holdings of firms that focus more on intangible than tangible investment (e.g. Rampini and Viswanathan 2010, Falato et al. 2020).

This trends in the corporate sector is also reflected on banks' balance sheets. Dell'Ariccia et al. (2021) show that banks shift their lending away from corporate lending towards real estate when firms invest more in intangible assets, thus connecting corporate and bank balance sheet changes, while Doettling and Ratnovski (2021) find that intangible investment responds less to the credit channel of monetary policy. Beck et al. (2020) show that the increasing trend towards intangible assets and away from tangible assets might be a possible explanatory factor for a non-linear finance–growth relationship. Specifically, they find that the relationship between banks' liquidity creation and economic growth turns insignificant in countries with a higher share of industries relying on intangible assets.

The questions these two trends (banks lending more to households, and corporates relying less on bank credit due to a shift towards intangible assets) raise are whether they will continue and what their implications will be for the role of the financial sector in economic growth and for financial stability. Are banks left with a shrinking share of the corporations as borrowers, as they no longer fund innovative firms that rely on intangible assets? Will they shift even more towards real estate lending? What are the implications of this change in banks' loan portfolios for inequality? Will funding by banks focus on incumbent firms and wealthy clients, rather than funding innovative and small enterprises? While these trends do not necessarily imply a reduced impact of financial intermediation per se on economic growth, they clearly point to a reduced role of the traditional banking system for innovation and economic growth. They also point to the need for new segments of the financial sector, including private equity and debt providers, to take on a bigger role. In sum, more analysis is needed to understand the relationship between these changes in banks' and non-financial corporations' balance sheets and economic growth.

A third trend is a gradual expansion of the financial sector beyond the traditional activity of intermediation towards so-called 'non-intermediation' financial activities (Demirgüc-Kunt and Huizinga 2010). This also implies that the financial system might actually grow too large relative to the real economy, by extracting excessively high informational rents from its customers and attracting too much young talent in quantitative professions to finance and away from more productive industries (Philippon 2010, Bolton et al. 2016). During periods of rapid financial growth, in part propelled by market liberalisation, financial institutions (where labour productivity is relatively low) are likely to attract skilled workers away from more productive sectors, thereby lowering the overall productivity of the economy (Kneer 2013). This result is in line with Cecchetti and Kharroubi (2012) who show lower productivity growth with higher credit growth in advanced countries.

Based on a sample of 77 countries for the period 1980–2007, Beck et al. (2014) find that intermediation activities increase growth and reduce volatility in the long run, while an expansion of the financial sector along other dimensions, including non-intermediation activities, has no long-run effect on real sector outcomes. Over shorter time horizons, a

large financial sector, as measured by a high contribution to GDP or a high employment share, stimulates growth at the cost of higher volatility in high-income countries. While these results were obtained for the period before 2007, subsequent experiences – including the 2008 collapse of the Icelandic banking system and the collapse of the Cypriot banking system in 2012 – have confirmed the high risk of pursuing the growth of the financial sector with the objective of creating national financial centres.

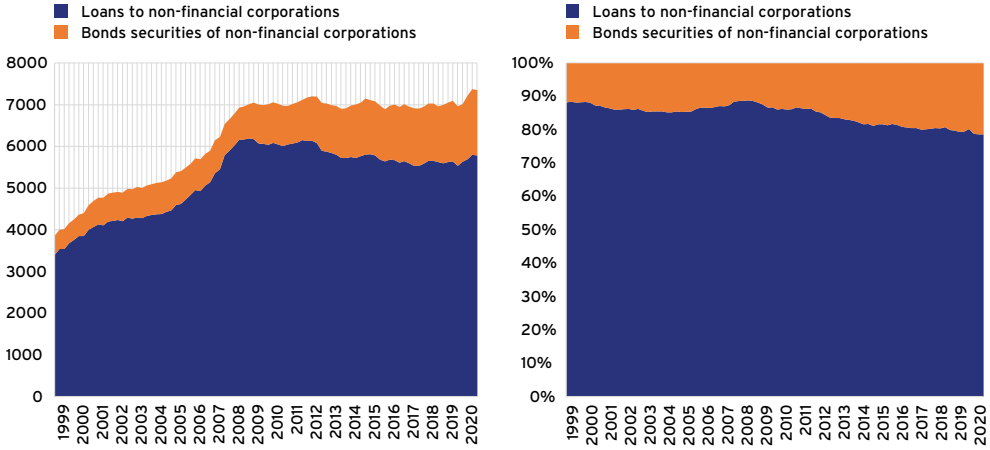
A final trend we would like to mention is that there has been an increase in the role of non-bank financial intermediaries, some of which take on very bank-like functions. Mostly in reaction to increasingly tight bank regulations, other institutions have emerged that have many features similar to banks but have not been regulated like banks. One specific example are money market funds. These are funds that invest in bonds, treasuries and other such assets (thus providing short-term funding to corporates and banks) and have a liability structure that is very similar to banks.

Money market funds are used by investors effectively as short-term cash management vehicles. They emerged to a large extent as a response to regulation in the banking system: the limitations on the returns that banks can offer led investors to demand a vehicle that would offer a bank-like claim with a higher return. During the years leading up to the Global Financial Crisis, money market funds started investing in riskier securities, exposing themselves to the mismatch between very liquid liabilities and less liquid assets, just like banks. This structure resulted in fragility in the autumn of 2008 when, following the collapse of Lehmann Brothers, some money market funds could not honour their liabilities to investors (known as 'breaking the buck'). This almost unprecedented event led to massive runs in the industry across other money market funds. Similarly, in the spring of 2020 at the onset of the pandemic, money market funds saw large outflows, forcing funds to sell assets and come close to breaching liquidity requirements imposed after the 2008 crisis. As in 2008, central banks intervened as market makers of last resort, providing money market funds with the necessary liquidity.

While these events have led to calls for more rigorous regulation of non-bank financial intermediaries, the risk is that financial market actors will react to such tighter regulation by shifting activities outside the regulatory perimeter. One such example are bond funds, which invest in corporate, government and other types of bonds. This is again likely to be a response to the tightened regulation of banks, but also of money market funds. As banks find it more difficult to lend, firms are issuing more bonds to address their financing needs, and mutual funds are holding these bonds. The problem with bonds, and especially corporate bonds, is that they are much more illiquid than equity, and so the liquidity mismatch for funds that hold corporate bonds is more severe. Goldstein et al. (2017) show that corporate bond funds indeed exhibit different flow-performance sensitivity that leads to more outflows upon bad performance and is consistent with the fact that they lead to greater first-mover advantage and fragility. They also show that this is amplified in times of aggregate illiquidity.

The rise of non-bank financial intermediaries goes hand-in-hand with a longer-term trend towards capital market funding, including debt securities (see Figure 2 for the euro area). At the same time, there is a cyclical element to firms' choice between bank loans and bond issue, as shown by Becker and Ivashina (2014). In periods characterised by tight lending standards, depressed aggregate lending, poor bank performance and tight monetary policy, firms are more likely to switch from bank to bond funding.

FIGURE 2 DEBT FINANCING BY CORPORATES IN THE EURO AREA OVER TIME



Source: ECB (who-to-whom accounts), OECD, Haver Analytics and ESRB calculations.

Notes: loans to non-financial corporations as reported to who-to-whom accounts, excluding intragroup lending. Debt securities as reported in the Quarterly Sectoral Accounts, according to ESA 2010. Last observation is Q1-2021.

In summary, the financial system, and especially the banking system, has undergone several structural changes over the past decades. Banks have shifted from enterprise towards household lending, while the corporate sector has shifted towards more intangible assets, which require different funding forms and can to a large extent explain the rise in internal savings. Further, the financial system has expanded beyond intermediation activities, resulting in socially suboptimal growth of financial sectors, including growth in non-bank financial intermediation, which in turn raises the challenge of the regulatory perimeter.

Overall, these trends have changed the way we think about the relationship between the financial system and economic growth. While banks and bank-like financial intermediaries are still at the core of payment system and other critical infrastructures for modern market economies, the focus on household lending and the switch of innovative corporates relying on intangible assets away from the banking sector puts a question mark on whether the traditional banking system can still be thought of as critical for economic growth in high-income countries. Other segments of the financial system, including private equity and debt providers, might become more important for the growth and allocation process.

4 DIGITALISATION AND THE FINANCIAL SECTOR

In addition to the trends discussed so far, there is one additional major development that has been starting to play out in the financial sector but has the potential to disrupt even more forcefully during the next decade or so: the digital revolution has enabled an ongoing transformation of financial service provision. Mobile technology, the internet and internet application programming interfaces (APIs) have enabled quicker information exchange, new delivery channels and better exploitation of economies of scale; the information technology revolution has facilitated the creation and processing use of 'big data' and applied statistics for financial risk measurement and management; and distributed ledger technology (DLT), which describes decentralised data architecture and cryptography, allows the keeping and sharing of records in a synchronised way while ensuring their integrity through the use of consensus-based validation protocols.

The proliferation of cryptocurrency and the growth of decentralised finance has also broadened the scope of peer-to-peer financial transactions, raising the possibility of reducing the role of traditional financial intermediaries in the future. At the same time, advances in digital technologies have blurred boundaries between firm and industry in the financial sector and have made the separation of banking and commerce no longer an accepted norm for regulation, as non-financial firms, particularly BigTech companies, offer financial services (Feyen et al. 2021).

What effect does financial innovation, such as recent digital innovations, have on economic growth and stability? Financial innovation has been a defining feature of the financial sector over the centuries, in the shape of new products (e.g., new types of securities), new technologies (e.g., credit scoring and automated teller machines, or ATMs) and new institutions (e.g., venture capitalists, mutual funds) (Tufano 2013). The literature has provided alternative hypotheses on the repercussions of financial innovation for financial stability and real economy.

The traditional *innovation-growth view* posits that financial innovations help reduce agency costs, facilitate risk sharing, complete the market and ultimately improve allocative efficiency and economic growth, and thus focuses on the bright side of financial innovation (Allen and Gale 1994). It allows the financial system to better fulfil its functions of easing exchange, pooling savings, screening and monitoring entrepreneurs and managing risks (Levine 2005).

The *innovation-fragility view*, on the other hand, focuses on the 'dark' side and has identified financial innovations as the root cause of the recent Global Financial Crisis, by leading to an unprecedented credit expansion that helped feed the boom and subsequent bust in housing prices (Brunnermeier 2009), by engineering securities perceived to be safe but exposed to neglected risks (Gennaioli et al. 2012), and by helping banks and investment banks design structured products to exploit investors' misunderstandings of financial markets (Henderson and Pearson 2011).

Reconciling both views and using cross-country comparisons, Beck et al. (2016) find that in countries with higher levels of financial innovation, banks grow faster but are also more fragile. They also find that these positive and negative effects are stronger in countries with larger securities markets and more restrictive regulatory frameworks. In a second test, the authors show that banks in countries with higher levels of financial innovation suffered higher profit reductions during recent crisis.

One important question is whether the most recent wave of financial innovation has improved the efficiency of financial service provision. According to Philippon (2015), the unit cost of financial intermediation measured by the ratio of the value-added of the finance and insurance sector to intermediated assets had remained close to 200 basis points for more than a century, despite advances and large investments in computers and communication technologies. However, the post-Global Financial Crisis data, which are likely to reflect the rapid pace of financial innovation since the crisis, show that the unit cost of financial intermediation has declined (or efficiency has improved) over the past ten years, which Philippon (2019) ascribes to scale economies and big data as a consequence of digitalisation in the financial sector.

Extending Philippon's construct and also including capital income of banks, Bazot (2018) shows, for a cross-section of advanced countries, that the high unit cost values of the 1970s and 1980s coincided with the increase in nominal interest rates. On the other hand, despite the fall in nominal rates, high unit cost values during the 1990s and the 2000s seem to have coincided with the joint development of financial wealth management, credit intermediation and the securities industry. Because financial intermediation income has increasingly depended less on nominal rates due to the development of the securities industry, the unit cost did not follow the decline in nominal rates during the 1990s.

The recent wave of financial innovation based on the opportunities digitalisation offers has come mostly from outside the incumbent banking system in the form of new financial service providers, either in competition or cooperation with incumbent banks, but with the potential for substantial disruption (Cornelli et al. 2020). Across the globe, FinTech companies have shown impressive growth and are typically small and specialised in specific services (although, in aggregate, they cover a large diversity of financial services). BigTech companies, usually operating through platforms, derive advantages from data analytics, network externalities and interwoven activities, and follow an envelopment strategy moving from non-financial into financial services.[6]

The coronavirus pandemic has set off a boom in e-commerce (Alfonso et al. 2021), which in turn has intensified the shift to digital payments (Auer et al. 2020). This increase in the demand for digital payments has created opportunities for FinTech and BigTech companies to carve out a further growing share of financial services for

6 While there is no one widely accepted definition of either, we define FinTech firms as new technology-driven players aiming to compete with traditional financial institutions in the delivery of financial services, and BigTech firms as platform firms, such as Google, Facebook, Apple, Amazon, Alibaba and Tencent.

consumers, particularly in providing payments services as they have played a dominant role in developing digitalised financial services. The increase in digital payments has also created opportunities for FinTech platforms and BigTech companies to offer other online financial services such as consumer credit, investment counselling and account management, among others, to their new customers.[7]

As a result of these innovations and new providers, incumbent banks face competition across different business lines, and disintermediation may result in losses of scale and/or scope economies. Banks typically expect FinTech companies not to threaten their incumbency, albeit with some need to buy out innovators to sustain this position. With BigTech companies, however, incumbent banks could react in different ways depending on how BigTechs go about expanding into financial service provision – by establishing subsidiaries or cooperating with incumbent banks. The former approach would constitute a direct challenge to incumbent banks, which might react by increasing their risk profile to defend their position. Cooperation seems less disruptive, although it would also likely erode the rents that incumbent banks have enjoyed until recently, potentially rendering many of them unviable under their current business model.

New providers entering with bank-like intermediation models would be exposed to the known risks in banking (liquidity risk, credit risk, market risk, etc.), in turn affecting system-wide risk. While more competition could enhance stability over the long term, concentration (particularly with BigTechs) could result in new too-big-to-fail institutions, and a stronger focus on transaction-based intermediation could make the system more procyclical. Furthermore, incumbent banks may take greater risks to compete with new providers. Cooperation between BigTechs and incumbent banks might lengthen intermediation chains, moving them towards the originate-and-distribute model, which raises concerns about incentives and risk distribution.

In addition to financial risk, digitalisation also poses significant non-financial risks, both for banks and for FinTech and BigTech companies. These risks stem from (i) greater concentration on providing basic services, such as cloud computing; (ii) broader use of artificial intelligence (AI) in finance; (iii) overly automated or IT-oriented services that may be more prone to cyberattacks; (iv) trust in a leading technology that might suddenly turn obsolete; and (v) a false sense of security from overleveraging insights from AI.

One specific innovation that has so far been largely outside the regulatory framework are cryptocurrencies based on DLT. The most prominent DLT has been blockchain, based on Nakamoto (2008), who introduced it as a method of validating ownership of the cryptoasset bitcoin. Blockchain is a decentralised distributed database that maintains a continuously growing list of records locked into a chain of hacking-proof 'blocks'.

7 See Beck et al. (2021b) for Korea's experience with BigTech companies' activities in finance.

The emergence of a new system of alternative finance (also referred to as decentralised finance) that provides a multitude of financial services without relying on central financial intermediaries and operates outside of the central bank and the regulatory structure of traditional finance has elicited much discussion and controversy in recent years. Although the growth of this new segment of the financial system has accelerated in recent years, it still constitutes a small niche market. The total value locked (TVL) in decentralised finance has reached an all-time high, topping $261 billion in December 2021, which represents a few basis points of global banks' total lending (bitcoinke.io) but constitutes a steep increase from $676 million just a year before (Bitcoin.com).

Anonymity and independence from central authorities embedded in decentralised finance impose heavy costs on managing lending and borrowing. As decentralised finance falls outside of the regulatory structure overseeing traditional financial institutions, it has no mechanism for consumer and data protection. As a result, it is vulnerable to security and fraud risks and suffers from uncertainty of compliance and legal obligations. The absence of a central bank also raises the question of stability of the instruments in use because the system is prone to instability, as shown by the extreme volatility of the bitcoin price.

Since 2013, the crypto industry has provided financial services by creating mostly financing platforms, such as initial coin offerings (ICOs), security token offerings (STOs), initial exchange offerings (IEOs) and decentralised finance (Defi), mentioned above. However, these protocols have not been readily available sources of financing for both large corporations and small and medium-sized enterprises (SMEs). Instead, they have been exclusively utilised to create new coins or build decentralised applications, and for speculative investment in online derivative markets for arbitrage and margin trading. As of November 2021, there were more than 10,000 cryptocurrencies issued by various crypto platforms.[8] The cryptocurrency market capitalisation was estimated to be more than $3 trillion in November 2021 (*Miner Daily*, 22 November 2021). Bitcoin is the largest among these currencies, accounting for more than 45% of the market, followed by Ether.

Overall, these figures suggest that a growing share of private savings has been channelled to investment in creating the infrastructure of the crypto industry, namely, coins and applications. The industry has not produced new financial services and has contributed little to improving the efficiency of the traditional financial system. At this stage of development, the expansion of the crypto industry has exerted little effect on the growth of the real sector; instead, it has resulted in a significant misallocation of resources. The cost of producing or mining a Bitcoin is estimated to be between $7,000 and $11,000, whereas its market price is currently more than $42,000. This huge gap raises interesting questions about the factors accounting for the difference. In the case of most cryptocurrencies, including Bitcoin, their value-added can be considered very small, if not zero, because they are neither an efficient means of transactions nor a stable store of

8 Data on the activities of the crypto industry vary a great deal from source to source. The figures used in this study should be taken as unauthorised estimates.

value. They are utilised for speculation and illicit transactions such as money laundering and tax evasion and produce a large amount of e-waste. [9] When these external costs are taken into account, the contribution of the cryptocurrency market to economic growth is likely to be negative (Williamson 2018).[10]

In recent years, there have been clear signs that participants in the crypto industry have begun to realise that maintaining the integrity and stability of the cryptosystem may have to be bolstered by a regime of regulatory rules and procedures. They also recognise the value of financial intermediation, for, in its absence, they fear crowdfunding platforms (ICOs and IEOs) and decentralised finance may not survive as viable financing mechanisms. These apprehensions may persuade crypto players of the need to assimilate with the traditional financial system, even if such a move means the loss of what is regarded as the sacred feature of a system where intermediaries and regulatory institutions do not exist. Will the industry elect for self-regulation or submit to the oversight of the traditional financial system? In view of the US government's intention of introducing regulatory rules and procedures for governing the cryptoasset industry, crypto enthusiasts may have no choice but to accept the eventual integration with the legacy financial system.[11]

In conclusion, the expansion of the crypto market has led to a misallocation of resources and reduced the scope of intermediation in the traditional financial system. The gap between the cost and price of Bitcoin reflects a growing extrinsic value stemming from irrational speculation that its price will continue to rise. This exuberance alone may call for more rigorous regulation of the cryptocurrency market.

Although cryptoassets have caught the attention of many investors, more recently there has been a trend towards stablecoins – cryptoassets that are pegged to another asset (such as the US dollar, other national currencies and commodities) and whose value is guaranteed by holdings of sufficient reserves in these assets, similar in construction to a currency board. However, the proliferation of stablecoins has raised the concerns of monetary authorities as it could erode central banks' monetary control and undermine the role of fiat currency as legal tender. Therefore, it was only a matter of time before government authorities in charge of financial oversight would come out to impose regulations on the issuance of stable coins (President's Working Group on Financial Markets et al. 2021) and central banks around the world have started exploring the value of central bank digital currencies for retail customers (e.g. Bindseil et al. 2021).

9 Bitcoin could produce up to 64.4 metric kilotonnes of e-waste at peak Bitcoin price levels seen in early 2021 (De Vries and Stoll 2021).

10 However, it should be noted that many different coins, including Bitcoin and ERC-20 tokens, are used as a means of payment and a store of value to provide decentralised lending and borrowing services for mostly those operating within the crypto space. Even if this might point to positive effects, the total contribution of the crypto industry to economic growth has probably been negligible.

11 It is reported that the Biden administration is planning to issue an executive order that will mandate federal agencies to regulate digital assets "as a matter of national security".

Introducing retail central bank digital currencies, however, can, under certain intermediation models, lead to a very different structure of the financial system.[12] With households and enterprises having access to alternative payment instruments, incumbent banks face the loss of their privilege of creating private money and thus face higher funding costs and a more volatile funding base, as the traditionally stable retail deposit clientele switches, at least partially, to the digital currency. Financial intermediation might move away from incumbent banks, while at the same time the central bank plays an increasing role as an intermediary.

Other financial service providers (including FinTech and BigTech companies) might increasingly offer tailor-made and specialised services in lending, asset management and risk management, while the traditional banking system no longer plays the role of a stable anchor. While this might seem like an extreme scenario, it certainly cannot be excluded. Political decisions on the issuance of central bank digital currencies to retail customers should therefore carefully balance efficiency gains with any stability risks this poses to the incumbent financial system. Issuing digital currencies can give customers more options and result in more competition. However, it is important to consider the medium- to long-term implications for the structure of the financial system, in terms of both efficiency and stability, as well as transition risks arising from such disruption.

5 THE TRANSITION TO NET ZERO AND THE FINANCIAL SECTOR

Climate change is an existential threat to humanity. Protecting the environment and reducing greenhouse gas emissions is a public good with positive externalities. The public sector should play a pivotal role in driving the transition to a net zero economy as it has tools available, such as fiscal expenditures, taxation, setting investment and product standards for green energy, and adjusting environmental policies. However, decades of insufficient efforts in environmental protection by national governments in the domestic and international spheres leave little doubt that the public sector cannot solve the climate crisis by itself.

Various studies estimate the total global investment needed to reach carbon neutrality by 2050 at between $3 trillion and $6 trillion annually. Although the United States, the European Union and other countries have promised to increase their spending on the fight against climate change vastly, their collective contributions are nowhere close to attaining this target (Sutton 2021). This financing gap has underscored the private sector's critical role in saving our planet.

Despite the continuing warning of the temperature rise, financial institutions and markets have never restrained their financing of greenhouse gas (GHG) emitters. To many detractors, the financial sector has thus been part of the climate change problem

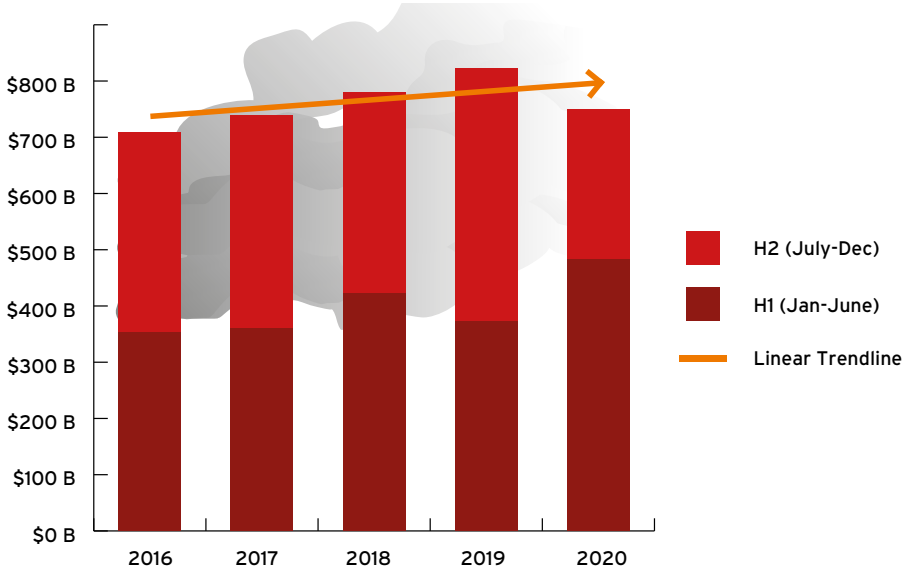
12 See Beck et al. (2022) and the concluding section for a more detailed discussion on different scenarios for the future structure of the banking system.

and it is not surprising that is a growing consensus that financiers must share the burden of leading international efforts to set the global economy on a pathway to net zero emissions. There are calls for them to participate actively or even provide leadership in shifting capital away from fossil fuels and carbon-intensive activities to investments in renewable energy.

Banks have traditionally accounted for a large share of financing for investment in the capital-intensive energy sector and high GHG-emitting industries. This lending profile suggests that banks have the capacity and the will to channel financial resources into climate-friendly activities such as constructing green transportation and other real estate infrastructure, if they are also capital-intensive and deemed profitable.

What has been most disconcerting amid global warming has been that the world's 60 largest private sector banks have provided finance totalling $3.8 trillion for fossil fuels since the Paris Agreement (Figure 3). The investment banking sector has also earned more than $17 billion in fees from arranging fossil-fuel financing.[13] This financing has no doubt contributed to feeding carbon emissions that, at the current pace, will increase temperatures well above the 1.5°C target. Despite a massive global drop in fossil fuel demand and production in 2020, banks' fossil fuel financing remained above 2016 and 2017 levels (Rainforest Action Network et al. 2021).

FIGURE 3 GLOBAL FOSSIL FUEL FINANCING, 2016-2020 (BILLION USD)



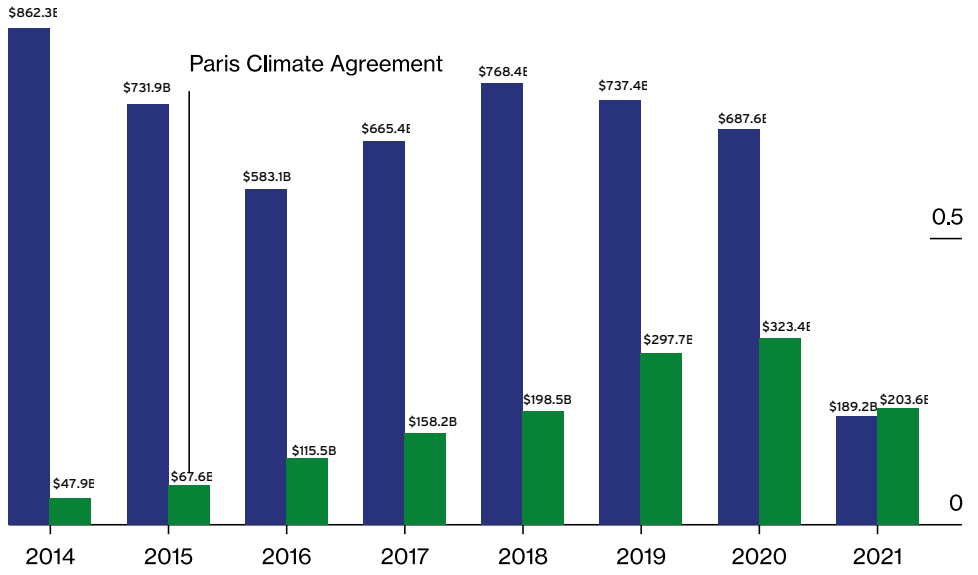
Source: Rainforest Action Network et al. (2021).

13 https://www.bloomberg.com/news/articles/2021-10-25/big-banks-haven-t-quit-fossil-fuel-with-4-trillion-since-paris

Although overall fossil fuel financing fell in 2020, bank financing from January to June of 2021 was the highest of any half-year since the adoption of the Paris Agreement, as large energy companies went out to borrow as much as they could to prepare for expected difficult times (Figure 4).

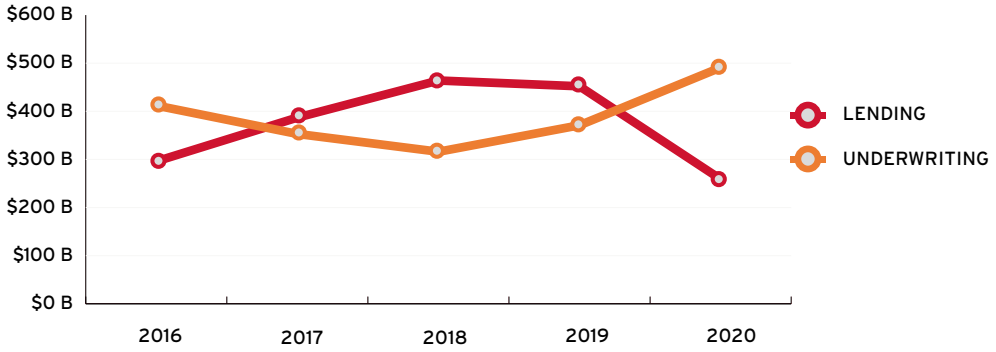
In 2020, 65% of financing for fossil fuels was provided through the underwriting of bond and equity issuances. Since 2018, the underwriting has more than compensated for the decline in bank lending (Figure 5).

FIGURE 4 FINANCING FOR FOSSIL FUEL INDUSTRY AND GREEN PROJECTS (TRILLION USD)



Source: Bloomberg League Tables.

FIGURE 5 UNDERWRITING AND BANK LENDING FOR FOSSIL FUELS FINANCING (BILLION USD)



Source: Rainforest Action Network et al. (2021).

As shown in Figure 4, global financing for decarbonisation has been much less than that for the fossil fuel industry and certainly far below what is required to meet the targets of the Paris Agreement. The returns may not be low, however. In terms of hypothetical investment portfolios in three countries/regions - the United States, the United Kingdom, and Germany and France – the Centre for Climate Finance at Imperial College Business School and the International Energy Agency calculated the total return and annualised volatility of these portfolios over five- and ten-year periods. The results show that "renewable power generated significantly higher total returns over the last ten years, at 422.7% against 59% for fossil fuels or over 7 times the return. Over five years, the performance is lower but still more than 3 times higher than fossil fuels across the board"(CCFI and IEA 2020).

The structure of a country's financial system is an important driver of the extent to which financial systems can support the transition to a net zero economy. Using a large panel of countries and industries over the period 1990–2013, De Haas and Popov (2019) find that for given levels of economic and financial development and environmental regulation, CO_2 emissions per capita are lower in economies that are relatively more market-based than bank-based. Industry-level analysis reveals two distinct channels: first, stock markets reallocate investment towards less polluting sectors; second, they also push carbon-intensive sectors to develop and implement greener technologies, as evidenced by more green patents in carbon-intensive sectors as stock markets deepen (De Haas and Popov 2019).

This aggregate evidence is complemented by firm-level evidence. Beyene et al. (2021) present evidence that bond markets price the risk that assets held by fossil fuel firms become stranded, while banks in the syndicated loan market seemingly do not price this risk as much. Consequently, to fulfil their financing needs, fossil fuel firms increasingly rely less on bonds and more on loans. Within the banking sector, banks with diversified portfolios and 'too-big-to-strand' incentives in particular are more willing to finance fossil fuel firms with stranded asset risk because it leads to greater lending ex ante and prevents further losses from divestment. These changes in financing supply for fossil fuel firms are reinforced by the pricing of climate policy exposure in bonds. The differential in the pricing of climate policy exposure and the consequential larger allocation of bank credit towards fossil fuel implies that banks have been less amenable to accounting for the likelihood that environmental policies will lead to assets being stranded.

And even where banks price the risk of stranded assets, as shown by Delis et al. (2018) for the period since the 2015 Paris Agreement, it seems unlikely that the corresponding increase covers the potential losses from stranded assets. The finding that investors demand compensation for exposure to carbon emission risk is confirmed by Bolton and Kacperczyk (2022), who find that stocks of firms with higher total carbon dioxide emissions earn higher returns, controlling for size, book-to-market and other return predictors.

Banks' existing funding of fossil fuel technology along with their exposure to carbon assets are important variables that could explain the relative inefficiency of bank-based versus bond-market based financing in the climate transition (Degryse et al. 2020). The entry of innovative and green firms in polluting industries risks devaluing legacy positions held with incumbent clients. As a result, banks exposed to such losses may be reluctant to finance innovation aimed at reducing polluting activities such as GHG emissions. Using data on credit allocations in Belgium between 2008 and 2018, Degryse et al. (2020) find that the more homogeneous and concentrated the banking system is in a given industry, the lower the number of new innovative firms that will be granted loanable funds. The market structure of the banking system may thus be key to facilitating a green economic transition, highlighting the need for policies to address the role of brown legacy positions and heterogeneous bank business models (Degryse et al. 2020).

Political pressure has pushed financial institutions, including banks, to commit to do more for the transition to net zero. The Glasgow Financial Alliance for Net Zero (GFANZ) is an international coalition of seven sub-alliances, including asset owners, insurers, asset managers, banks, investment consultants, exchanges, rating agencies, audit firms and other key financial service providers (GFANZ 2021).

The Alliance, launched in April 2021, represents over 450 major financial institutions across 45 countries, controlling over $130 trillion.[14] Its goal is to transform the global financial system to finance investment in a net zero economy over the next 30 years. The investment requirements for net zero are enormous – between $100 trillion and $150 trillion over the next three decades. The combined commitments of the GFANZ members show that the Alliance is prepared to fund the enormous investments the world needs to reach net zero.

Of the seven sub-alliances of GFANZ, the Net Zero Banking Alliance (NZBA) is the largest constituent, followed by the Net Zero Asset Managers Initiative. The industry-led, UN-convened NZBA was created in April 2021 and unifies 98 banks from 39 countries, representing $66 trillion, or over 43% of global banking assets. The members of the alliance are committed to aligning their lending and investment portfolios with net zero emissions by 2050 and an intermediate target for 2030, and claim that they will promote investment in climate-friendly activities and guide firms in cutting their GHG emissions. By joining the NZBA, members commit to reducing emissions attributable to their operations and – much more significantly – their lending and investment portfolios to net zero.

14 GFANZ has seven sub-alliances whose members include asset owners, insurers, asset managers, banks, investment consultants, exchanges, rating agencies, audit firms and other key financial service providers

GFANZ has introduced self-regulation of setting and enforcing rules and standards specified in the guidelines for the conduct of its members in charting a pathway to net zero. The effectiveness of this self-regulation will depend on the designation of rules, the share of the members adopting them, and enforcement and compliance monitoring.

The Alliance represents a group of heterogeneous financial institutions providing different financial services and products. For this reason, at this stage of development, it appears uncertain whether the Alliance will be able to fulfil the three conditions for successful self-regulation acceptable to all members, casting doubt over whether the rules will help what the Alliance set out to achieve. First, at present, NZBA consists of 98 large banks. Although it represents a large share of global banking assets, the low participation rate among the large number of smaller banks could render it ineffective. Second, it is unclear how member banks will be assessed for compliance with their commitments under the Alliance and what sanctions will be applied if they are deemed non-compliant. Third, beyond enforcement, there is a valid case for scepticism over the quality of the decarbonisation models banks are required to pursue under the NZBA.

This new cooperative arrangement thus raises a few questions. Some fear that the cooperation may result in an undue concentration of political power in bankers' hands, as GFANZ members may demand that regulatory authorities protect them from competition to prevent loss of depositors to non-member institutions. The public sector, in turn, may seek more and diverse financial assistance from the sector they are entrusted with regulating to resolve many other issues for which it could not mobilise sufficient resources. Although in the wake of the Global Financial Crisis there has been increasing pressure to limit the close interlinkages between politics and finance, such initiatives might actually strengthen them again.

If self-regulation is not sufficient to push the financial system towards supporting the necessary transition to a net zero economy, the question arises of the extent to which regulatory interventions can help. Oehmke and Opp (2021) analyse the effects of introducing green supporting and brown penalising factors into banks' capital requirements and show an important distinction between structuring these according to the classical prudential mandate and a broader 'green' mandate. While climate-related risks that affect bank stability can be optimally addressed by a combination of green supporting and brown penalising factors, capital regulation is a less-effective tool to address carbon externalities that manifest themselves outside of the banking sector. Ultimately, the socioeconomic externalities of carbon emissions can only be addressed at the macroeconomic level, through taxation. A similar argument can be made for central banks shifting their portfolio of securities in the context of quantitative easing towards supporting a transition towards a net zero economy. There are strong arguments in favour of such a policy shift, but one has to realise that it is certainly not sufficient. Finally, there is the risk that as central banks and regulatory authorities take on an additional

mandate, this might create conflicts with their existing mandate for price and financial stability, ultimately violating the Tinbergen principle that each policy objective should have a separate policy tool.

Finally, one might wonder whether stakeholder pressure can also contribute to the financial system supporting the transition to net zero. Homanen (2022) shows a potentially important role for depositor discipline in pushing financial institutions towards divesting from environmentally damaging projects. Specifically, he shows that banks that financed the highly controversial Dakota Access Pipeline experienced significant decreases in deposit growth, with locally oriented banks being among the main beneficiaries of this depositor movement. He estimates that affected banks lost at least $8.25 to $11 billion in deposit funding.

6 CONCLUSIONS AND LOOKING FORWARD

In this chapter we have discussed several seminal trends in the financial system and the challenges and responsibilities that the system faces as the world emerges from the Covid-19 pandemic. Managing the exit from pandemic support measures and taking into account the interconnections between the different support measures will be critical to the ability of the financial system to support the recovery and the needed reallocation of resources in the economy.

Among the longer-term trends, we have pointed to the shift of banks from enterprise towards household and especially mortgage lending, while the corporate sector has shifted towards more intangible assets that require different funding forms and can, to a large extent, explain the rise in cash holdings. Further, the financial system has expanded beyond intermediation activities, resulting in socially suboptimal growth of financial sectors, including growth in non-bank financial intermediation, which in turn raises the challenge of the regulatory perimeter.

In addition, the traditional banking system faces challenges related to digitalisation and new providers of financial services. We have discussed the value-added of these different new providers and segments of the financial system. While there is a strong case to be made that some innovations will increase efficiency as well as access to financial services, we make the case that decentralised finance relying on distributed ledger technology and cryptoassets are unlikely to contribute to economic growth. Finally, we have discussed the extent to which the financial system can contribute to the transition to net zero. Tentative conclusions from recent research point to limited incentives for banks to fund innovative green technologies, which casts doubts on banks' commitments to support financially the transition to net zero.

The financial system thus faces important challenges as the world emerges from the pandemic; but to tackle the challenges of the future, the global economy must rely on a functioning financial system. This chapter takes stock of current trends and challenges,

which in turn call for substantially more research and analysis. While economists do not have a good track record in predicting the future, we can contribute by modelling different trade-offs as well as the consequences of different policy choices.

What will the financial sector of the future look like? Different scenarios can be envisioned. With respect to digitalisation, Beck et al. (2022) focus on three scenarios for Europe's banking system, but similar scenarios can be envisioned for other advanced countries. In a first scenario, incumbent banks continue to dominate and maintain their central role in money creation and financial intermediation, by aggressively countering the competitive threat through technological adaptation, acquiring FinTech companies and lobbying. FinTech companies continue to focus on specific niche markets, while BigTech companies offer payment services but do not have access to central bank clearance and payment systems (they might cooperate with incumbent banks). The banking system renews itself by incorporating new providers and new products.

In a second scenario, incumbent banks retrench, while BigTech companies offer financial services through regulated subsidiaries and capture the hard data, transaction-based lending market. Incumbent banks increasingly focus on relationship-intensive services, at both the high end (investment banks) and low end (community banks) of the market. The banking system shrinks, especially because medium-sized and small banks are no longer able to exploit scope economies. This scenario would lead to a structural change in the financial system.

In a third scenario, the issuance of retail central bank digital currencies, under certain intermediation models, leads to a very different structure of the financial system. Incumbent banks face higher funding costs and a more volatile funding base, as the traditionally stable retail deposit clientele switches, at least partially, to the digital currency. Financial intermediation moves away from incumbent banks, while the central bank plays an increasing role as an intermediary. Other financial service providers (including FinTech and BigTech companies) offer tailormade and specialised services in lending, asset management and risk management. The traditional banking system no longer plays the role of a stable anchor.

It is important to stress that all these scenarios ultimately depend on the regulatory response to the trends of digitalisation and the entry of new providers.

Another critical influence on the structure of financial system will come through political pressure for the transition to net zero. As discussed above, different forces are at play. On the one hand, there is strong political pressure (from governments but also other stakeholders) on the financial system to support the transition to net zero, which may lead to the entry of new providers, including government-supported institutions. On the other hand, financial institutions are trying to pre-empt such pressure through voluntary and self-regulated actions. The need for financing innovators and firms in new industries points to an increasing role of non-bank finance, including by private equity and debt

providers. Again, these trends point to a potentially smaller role for the banking system in the overall financial sector, but possibly also a stronger role for government-supported financial and non-profit institutions.

These different trends will put additional pressure on the regulatory framework. The regulatory perimeter and the conditions for accessing the safety net will possibly need to be expanded or adapted, to FinTech and possibly BigTech companies. Increased digitalisation in financial services may require a change in regulatory and supervisory practices, which were defined when digitalisation was in its infancy and when non-financial risks were not among the priorities on the regulatory agenda. Global cooperation needs to be enhanced further, since most FinTech and BigTech companies operate on a global scale with no permanent establishment in most jurisdictions where they are present, but also because of the global challenges of climate change. Finally, consumer protection has become increasingly important.

The next decade will see important changes in the structure of financial systems across the globe. Policy choices will have an important impact on the nature of finance in the next decade.

REFERENCES

Allen, F and D Gale (1994), *Financial Innovation and Risk Sharing*, MIT Press.

Aghion, P, P Howitt and D Mayer-Foulkes (2005)," The Effect of Financial Development on Convergence: Theory and Evidence", *Quarterly Journal of Economics* 120: 173–222.

Aghion, P, S Guriev and K Jo (2021), "Chaebols and firm dynamics in Korea", *Economic Policy* 36: 593-626.

Alfonso, V C, C Boar, J Frost, L Gambacorta and J Liu (2021), "E-commerce in the pandemic and beyond", *BIS Bulletin* 36, Bank for International Settlements.

Arcand, J L, E Berkes and U Panizza (2015), "Too Much Finance?", *Journal of Economic Growth* 20: 105-48.

Auer, R, G Cornellio and J Frost (2020) "Covid-19, cash, and the future of payments", *BIS Bulletin* 3, Bank for International Settlements.

Bazot, G (2018), "Financial Consumption and the Cost of Finance: Measuring Financial Efficiency in Europe (1950–2007)", *Journal of European Economic Association* 16: 123-60.

Beck, T and J Keil (2022), "Have Banks Caught Corona? Effects of Covid on Lending in the US", *Journal of Corporate Finance*, forthcoming.

Beck, T and R Levine (2002), "Industry Growth and Capital Allocation: Does Having a Market- or Bank-Based System Matter?", *Journal of Financial Economics* 64: 147-180.

Beck, T and R Levine (eds) (2018), *Handbook of Finance and Development*, Edward Elgar.

Beck, T, B Büyükkarabacak, F K Rioja and N T Valev (2012), "Who Gets the Credit? And Does it Matter? Household vs. Firm Lending across Countries", *B.E. Journal of Macroeconomics: Contributions* 12.

Beck, T, H Degryse and C Kneer (2014), "Is More Finance Better? Disentangling Intermediation and Size Effects of Financial Systems", *Journal of Financial Stability* 10: 50-64.

Beck, T, T Chen, C Lin and F Song (2016), "Financial Innovation: The Bright and the Dark Sides", *Journal of Banking and Finance* 72: 28-51.

Beck, T, E Carletti and I Goldstein (2017), "Financial Regulation in Europe: Foundations and Challenges", in R Blundell, E Cantillon, B Chizzolini, M Ivaldi, W Leidinger, R Marimon, L Matyas and F Steen (eds), *Economics without Borders*, Cambridge University Press.

Beck, T, R Doettling, T Lambert and M van Dijk (2020), "Liquidity Creation, Investment and Growth", CEPR Discussion Paper 14956.

Beck, T, B Bruno and E Carletti (2021a), "When and how to unwind COVID-support measures to the banking system?", paper written at the request of the ECON Committee of the European Parliament.

Beck, T, T Lee, Y T Kim and Y C Park (2021b), "Fostering FinTech for financial transformation: The case of South Korea", in T Beck and Y C Park (eds), *Fostering FinTech for Financial Transformation: The Case of South Korea*, CEPR Press.

Beck, T, S Cecchetti, M Grothe, M Kemp, L Pelizzon and A Sánchez Serrano (2022), *Will video kill the radio star? Digitalisation and the future of banking*, Reports of the Advisory Scientific Committee No 12.

Becker, B and V Ivashina (2014), "Cyclicality of credit supply: Firm level evidence", *Journal of Monetary Economics* 62: 76-93.

Begenau, J and B Palazzo (2021), "Firm Selection and Corporate Cash Holdings", *Journal of Financial Economics* 139: 697-718.

Benigno, C and L Fornaro (2014), "The Financial Resource Curse", *Scandinavian Journal of Economics* 116: 58–86.

Beyene, W, K de Greiff, M Delis and S Ongena (2021), "Too-big-to-strand? Bond versus bank financing in the transition to a low-carbon economy", CEPR Discussion Paper 16692.

Bindseil, U, F Panetta and I Terol (2021), "Central Bank Digital Currency: functional scope, pricing and controls", ECB Occasional Paper Series No. 286

Bolton, P and M T Kacperczyk (2022), "Do investors care about carbon risk?", *Journal of Financial Economics*, forthcoming.

Bolton, P, T Santos and J Scheinkman (2016), "Cream Skimming in Financial Markets", *Journal of Finance* 71: 709-36.

Boot, A, E Carletti, H H Kotz, J P Krahnen, L Pelizzon and M Subrahmanyam (2020), "Coronavirus and financial stability 4.0: Implementing a European Pandemic Equity Fund", in A Benassy-Quere and B Weder di Mauro (eds), *Europe in the time of COVID-19*, CEPR Press

Brunnermeier, M K (2009), "Deciphering the liquidity and credit crunch 2007-2008", *Journal of Economic Perspectives* 23: 77-100.

Cecchetti, S and E Kharroubi (2012), "Reassessing the impact of finance on growth", BIS Working Paper 381.

CCFI and IEA – Climate Change Financial Instrument and International Energy Agency (2020), *Energy Investing Exploring Risk and Return in the Capital Markets*, Version 2.

Cornelli, G, J Frost, L Gambacorta, R Rau, R Wardrop and T Ziegler (2020), "Fintech and big tech credit: a new database", BIS Working Paper 887.

Dagher, J (2018), "Regulatory Cycles: Revisiting the Political Economy of Financial Crises", IMF Working Paper 18/8.

Degryse, H, T Roukny and J Tielens (2020), "Banking barriers to the green economy", National Bank of Belgium Working Paper Research No. 391.

De Haas, R and A Popov (2019), "Finance and Carbon Emissions", ECB Working Paper No. 2318.

Delis, M, K D Greiff and S Ongena (2018), "Being stranded on the carbon bubble? climate policy risk and the pricing of bank loans", SFI Research Paper 8-10.

Dell'Ariccia, G, D Kadyrzhanova, L Ratnovski, and C Minoiu (2021), "Bank lending in the knowledge economy", *Review of Financial Studies* 34: 5036-76.

Demirgüç-Kunt, A and H Huizinga (2010), "Bank activity and funding strategies: The impact on risk and returns", *Journal of Financial Economics* 98: 626-650.

De Vries, A and C Stoll (2021), "Bitcoin's growing e-waste problem", *Resources, Conservation and Recycling* 175.

Doettling, R and L Ratnovski (2021), "Monetary policy and intangible investment", Working Paper.

Eichengreen, B, W Lim, Y Park and D H Perkins (2015), *The Korean Economy: From a Miraculous Past to a Sustainable Future*, Harvard University Asia Center.

ESRB – European Systemic Risk Board (2021), *Financial Stability Implications of Support Measures to Protect the Real Economy from the Covid-19 Pandemic*.

Falato, A, D Kadyrzhanova, J Sim, and R Steri (2020), "Rising intangible capital, shrinking debt capacity, and the US corporate savings glut", Working Paper.

Feyen, E, T Alonso Gispert, T Kliatskova and D S Mare (2020), "Taking stock of the financial sector policy response to COVID-19 around the world: A new global database", World Bank Policy Research Paper 9497.

Feyen, E, J Frost, L Gambacorta, H Natarajan and M Saal (2021), "Fintech and the digital transformation of financial services: implications for market structure and public policy", BIS Paper 117.

Fisman, R and I Love (2007), "Financial dependence and growth revisited", *Journal of the European Economic Association* 5: 470-479.

Gennaioli, N, A Shleifer and R E Vishny (2012), "Neglected risks, financial innovation, and financial fragility", *Journal of Financial Economics* 104: 452-68.

GFANZ – Glasgow Financial Alliance for Net Zero (2021), *The Glasgow Financial Alliance for Net Zero: Our progress and plan towards a net-zero global economy.*

Gobbi, G, F Palazzo and A Segura (2020), "Unintended effects of loan guarantees during the Covid-19 crisis", VoxEU.org, 15 April.

Goldstein, I, H Jiang and D T Ng (2017), "Investor Flows and Fragility in Corporate Bond Funds," *Journal of Financial Economics* 126, 592-613.

Henderson, B J and N D Pearson (2011), "The dark side of financial innovation: a case study of the pricing of a retail financial product", *Journal of Financial Economics* 100: 227-47.

Homanen, M (2022), "Active depositors", *Journal of Banking and Finance*, forthcoming.

Kneer, C (2013), "The Absorption of Talent into Finance: Evidence from U.S. Banking Deregulation", DNB Working Paper 391.

Laeven, L, G Shepens and I Schnabel (2020), "Zombification in Europe in times of pandemic", VoxEU.org, 11 October.

Langfield, S and M Pagano (2016), "Bank bias in Europe: Effects on systemic risk and growth", *Economic Policy* 31: 51–106.

Levine, R (2005), "Finance and growth: Theory and evidence", *Handbook of Economic Growth* 1, pp. 865-934.

Loayza, N and R Ranciere (2006), "Financial Development, Financial Fragility, and Growth", *Journal of Money, Banking and Credit* 38: 1051-76.

Mian, A R, A Sufi and E Verner (2017), Household Debt and Business Cycles Worldwide", *Quarterly Journal of Economics* 132: 1755-1817.

Mueller, K and E Verner (2021), "Credit Allocation and Macroeconomic Fluctuations", mimeo.

Nakamoto, S (2008), "Bitcoin: a peer-to-peer electronic cash system", mimeo.

Oehmke, M and M Opp (2021), "Green Capital Requirements", mimeo.

Park, Y C, S Takagi, K H Lee, C Y Lee and N Veron (2013), *The Road to ASEAN Financial Integration. A combined Study on Assessing the Financial Landscape and Formulating Milestones for Monetary and Financial Integration in ASEAN*, Asian Development Bank.

Park, Y C, J K Kim and H Park (2021), *Financial Liberalization and Economic Development in Korea, 1980-2020*, Harvard University Asia Center.

Patrick, H and Y C Park (eds) (1994), *The Financial Development of Japan, Korea, and Taiwan: Growth, Repression, and Liberalization*, Oxford University Press.

Patrick, H and Y C Park (eds) (2013), *How finance is shaping the economics of China, Japan and Korea*, Columbia University Press.

Philippon, T (2010), "Financiers versus Engineers: Should the financial sector be taxed or subsidized?", *American Economic Journal: Macroeconomics* 2: 158–82.

Philippon, T (2015), "Has the US Finance Industry Become Less Efficient?", *American Economic Review* 105: 1408-38.

Philippon, T (2019), "On Fintech and Financial Inclusion", NBER Working Paper 26330.

Popov, A (2018), "Evidence on finance and economic growth", in T Beck and R Levine (eds), H*andbook of Finance and Development*, Edward Elgar Publishing

President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency (2021), *Report on Stablecoins*, November.

Rainforest Action Network, BankTrack, Indigenous Environmental Network, Oil Change International, Reclaim Finance, and Sierra Club (2021), *Banking on Climate Chaos*, Fossil Fuel Finance Report 2021.

Rampini, A A and S Viswanathan (2010), "Collateral, risk management, and the distribution of debt capacity", *Journal of Finance* 65: 2293-2322.

Reis, R (2013), "The Portuguese Slump and Crash and the Euro Crisis", *Brookings Papers on Economic Activity*, Spring: 143–193.

Rioja, F and N Valev (2004a), "Finance and the Sources of Growth at Various Stages of Economic Development", *Economic Inquiry* 42: 127–140.

Rioja, F and N Valev (2004b), "Does One Size Fit All? A Re-examination of the Finance and Growth Relationship", *Journal of Development Economics* 74: 429–447.

Sahay, R, M Cihak, P N'Diaye, A Barajas, R BI, Y Gao, A Kyobe, L Nguyen, C Saborowski, K Svirydzenka, and R Yousefi (2015), "Rethinking Financial Deepening: Stability and Growth in Emerging Markets", IMF Staff Discussion Note 15/08.

Schmitt-Grohé, S and M Uribe (2016), "Downward Nominal Wage Rigidity, Currency Pegs, and Involuntary Unemployment", *Journal of Political Economy* 124: 1466–1514.

Schneider, M and A Tornell (2004), "Balance Sheet Effects, Bailout Guarantees and Financial Crises", *The Review of Economic Studies* 71: 883–913.

Sutton, T (2021), "The Net-Zero Banking Alliance A (Potentially) Transformative Initiative Toward Green Global Capita", Center for American Progress, 4 November.

Tufano, P (2003, "Financial innovation: the last 200 years and the next", in G M Constantinides, M Harris and R M Stulz (eds), *The Handbook of the Economics of Finance*.

Williamson, S (2018)," Is Bitcoin a Waste of Resources?", SSRN.

Wurgler, J (2000), "Financial Markets and the Allocation of Capital", *Journal of Financial Economics* 58: 187–214.

ABOUT THE AUTHORS

Thorsten Beck is Professor of Financial Stability and Director of the Florence School of Banking and Finance at the EUI. He is also (Co)-Editor of the *Journal of Banking and Finance*. Before joining the EUI he was Professor of Banking and Finance at Bayes Business School (formerly Cass) in London between 2013 and 2021. He was Professor of Economics and founding Chair of the European Banking Center at Tilburg University from 2008 to 2013. Previously he worked in the research department of the World Bank and has also worked as a Consultant for, among others, the ECB, EIB, IMF, the European Commission, ADB, and the German Development Corporation.

His research and policy work has focused on international banking and corporate finance and has been published in *Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Monetary Economics* and *Journal of Economic Growth*. His research and policy work has focused on Eastern, Central and Western Europe, Sub-Saharan Africa and Latin America. He is also Research Fellow in the Centre for Economic Policy Research (CEPR) in London and a Fellow in CESifo. He studied at Tübingen University, Universidad de Costa Rica, University of Kansas and University of Virginia.

Yung Chul Park is Professor of Economics(emeritus) at Korea University. From 2008 to 2021 he was Distinguished Professor in the Division of International Studies, Korea University. He was also Visiting Professor at Graduate School of International Studies, Seoul National University from 2005 to 2008.. Previously he served as the Chief Economic Adviser to the President of Korea, as President of the Korea Development Institute, and as President of the Korea Institute of Finance. He also worked for the International Monetary Fund. His main research areas include financial development and liberalization and regional monetary and financial integration. He has published as author or editor several books including *Financial Liberalization and Economic Development in Korea, 1980-2020* (co-authored with J.K. Kim and H. Park, Harvard University Asia Center, 2021).

DISCUSSIONS

Ugo Panizza, *The Graduate Institute, Geneva and CEPR*

Thorsten Beck and Yung Chul Park provide an excellent and comprehensive review of the challenges that will be faced by financial intermediaries and regulators in the next decade.

They correctly highlight an immediate challenge related to the macroeconomic response to the Covid-19 pandemic and two structural challenges related to digitalisation and the need to finance the transition to carbon neutrality. I will focus on the first two challenges and comment on how they are potentially linked. I will also say something about the future of bank concentration with a special focus on the European Union.

At time of writing, inflation in both the United States and the euro area is at record levels (7% and 5%, respectively). The ECB and the Federal Reserve still think that risks to long-term price stability are limited. However, they are also moving towards a more hawkish stance, and contemplating increases in policy rates in the near future.

In principle, a switch from near zero to moderately positive interest rates should have a positive effect on the profitability and stability of the banking system. Higher interest rates should also create incentives for shifting back to credit intermediation and reducing fee-generating and trading activities (Borio et al. 2019). This would be a good development because, as highlighted by Beck and Park, these fee-generating activities do not have a positive effect on real economic activity.

Things are complicated, however, by the current high levels of public debt and by the fact that a lot of this debt sits on the balance sheets of domestic banks. An increase in interest rates that leads to a sudden drop in sovereign bond prices can weaken bank balance sheets and reinject the bank-sovereign doom loop that was at the centre of the European sovereign debt crisis (Acharya et al. 2014). It would be déjà vu all over again, but with higher debt levels. Could Italy and other European peripheral countries survive substantially higher rates?[15]

What if central banks decide to tolerate high inflation? While this would lead to an immediate debt reduction, given the existing term structure the effect on debt ratios would be limited. Moreover, higher inflation expectations would lead to an increase in long-term rates, even if central banks do not increase their (short-term) policy rates. Central banks could try to affect long-term rates through unconventional monetary policy tools. These tools worked well when inflationary expectations were low. However, if inflationary expectations become unanchored, unconventional monetary policy could backfire (for a discussion of past experience with yield curve control, see Bartsch et al.2020). The only alternative would then be financial repression (Reinhart and Sbrancia 2015).

15 Devastating debt crises in emerging market economies are also a likely outcome of a sudden increase in interest rates in advanced economies.

Abstracting from its macroeconomic distortions and redistributive effects, it is worth asking if financial repression is now feasible at all and what its effect would be for banks and other financial intermediaries.

One key component of financial repression consists of forcing economic agents to keep their savings in assets (money or government bonds) that pay negative (or below market) real returns. This was relatively easy in a bank-dominated world with limited capital mobility. Implementing financial repression will be more difficult in a world in which savers can allocate their assets globally with just a few clicks on their smartphone. An attempt to implement the policies of the 1970s could lead to a migration from the traditional financial system to the decentralised global financial system. Such a migration, if it were to happen quickly, would have massive negative implications for financial stability and for the allocation of credit to the economy.[16] I fully share Beck and Park's scepticism of speculative cryptocurrencies and I fear that financial repression would direct a large number of unsophisticated savers towards these speculative assets, leading to an overall misallocation of resources.

Technological changes are likely to increase the fixed costs related to running financial intermediaries and, by increasing minimum optima size, may lead to a change in the competitive landscape in the financial sector. Here, it is interesting to compare the European Union with the United States.

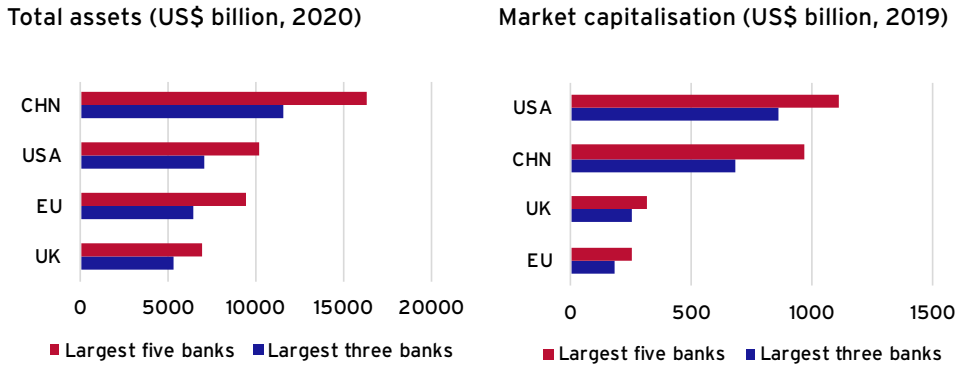
When we look at total bank assets (left panel of Figure 1), we find that the five largest US banks are not much larger than the five largest European banks (the same applies if we focus on the largest three banks). If scale economies are an issue, this suggests that European banks are not at a disadvantage with respect to US banks.[17] However, four of the five largest European banks by assets are French (Santander is the only non-French bank in this group) and there is no large bank with a presence across Europe.

The difference between Europe and the United States is striking when we focus on market capitalisation. In this case, European banks appear very small, with a market capitalisation which is about 20% that of US banks (right panel of Figure 1).[18]

A key question is whether European banks will need to consolidate to be globally competitive and, if so, whether large European countries like Germany or Italy will allow foreign-owned banks to have a dominant position in their domestic financial market.

16 What I have in mind is a disorderly transition to the second scenario described by Beck et al. (2022).
17 Chinese banks are much larger, but not directly comparable with US and European banks
18 Even more striking, the capitalisation of the largest five banks headquarter in the United Kingdom is 125% that of the largest EU banks, while the GDP of the European Union is more than six times that of the United Kingdom.

FIGURE 1 ASSETS AND MARKET CAPITALISATION OF LARGE BANKS IN THE UNITED STATES, EUROPEAN UNION, CHINA AND THE UNITED KINGDOM



References

Acharya, V, I Drechsler and P Schnabl (2014), "A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk", *Journal of Finance* 69(6): 2689–2739.

Bartsch, E, A Bénassy-Quéré, G Corsetti and X Debrun (2020), *It's all in the mix: How monetary and fiscal policies can work or fail together*, Geneva Report on the World Economy 23, ICMB and CEPR.

Beck, T, S Cecchetti, M Grothe, M Kemp, L Pellizzon, A Sánchez Serrano (2022), *Will video kill the radio star? Digitalisation and the future of banking*, Report of the Advisory Scientific Committee No 12, ESRB.

Brei, M, C Borio and L Gambacorta (2019), "Bank intermediation activity in a low interest rate environment", BIS Working Paper No. 807.

Reinhart, C and B Sbrancia (2015), "The liquidation of government debt", *Economic Policy* 30(82): 291-333.

Young Do Kim, *Korea Institute of Finance*

Professors Beck and Park discussed several major trends in current finance. First is the problem of increasing household debt due to the expansionary household loan, second is the investment in intangible assets, and third is the development of non-bank financial institutions. Household finance already accounts for almost half of bank loans.

In their efforts to prevent the increase in the amplitude of the financial cycle triggered by household debt, Korea's policy authorities have strengthened macro-prudential policies such as loan-to-value (LTV) and DSL regulation to consider borrowers' repayment ability in bank lending. According to the Korea Institute of Finance analysis using macro data, when the interest rate rises by one percentage point, almost 10% of borrowers from the

bank have to bear the burden of increased repayment, which amounts to more than 5% of their total income. This increase inevitably raises the possibility of a household finance insolvency.

On the issue of intangible investment, the Bank for International Settlements suggests that the existing financial system, which provides credit with tangible assets as collateral, may not sufficiently support the development of the technology industry. Korea's financial system my not properly evaluate intangible assets, including intellectual property rights. In that case, the financial system may hinder industry development in the future.

There is also concern about the growth of shadow finance in Korea. The expansion could expose vulnerabilities of the financial system in safeguarding financial stability. However, despite the voices of concern, there are few cases where shadow finance has been responsible for setting off a financial crisis.

As for the financial activities of BigTechs in Korea, the problem is that they seek to bypass the existing financial regulation system when they enter the financial business and disrupt the competitive structure of the financial system. They have to be regulated, but it is necessary to determine the detail of regulation and supervision following the principle of the same rule for the same function and in line with other countries' regulatory policies.

Finally, I want to touch on the role of finance in moving towards a carbon-neutral economy. It is well recognised in Korea that the role of financial institutions is very important in developing measures for reducing carbon emissions. Financial institutions are currently materialising this by suspending loans to coal power plants. Both non-financial and financial firms are emphasising the practice of environmental, social and goverance (ESG) management. When it comes to whether the decarbonisation process should be delivered by existing banks or should be market-oriented, I believe both channels should go together.

Panel discussion

Moderator
Yung Chul Park, *Korea University*

Panel members
Daron Acemoglu, *MIT and CEPR*
Thorsten Beck, *European University Institute and CEPR*
Jong-Wha Lee, *Korea University*
Maury Obstfeld, *University of California, Berkeley and CEPR*

Yung Chul Park (moderator)
Thank you very much for joining us for the panel discussion this morning. Yesterday, we had three very stimulating sessions of paper presentations and debate. I want to ask each panel member to comment on the papers other than the one you wrote in today's panel discussion. The paper presenters might not have had enough time to respond to yesterday's discussants. In that case, please expand further on your rebuttal. I have also invited Professor Jong-Wha Lee from Korea to give us a critical review of all three conference papers from the perspective of Korea and other East Asian emerging market and developing economies (EMDEs). I will ask him to present his discussion first.

Jong-Wha Lee
My job today is to discuss some issues raised by Daron Acemoglu and Maurice Obstfeld yesterday, in particular from the perspective of the Korean economy. I'm very honoured to be here today for the panel discussion with these prominent scholars who have shaped the field of economics.

I may not need to summarise the main points of their presentations, but considering that many people may have forgotten what they had said overnight, let me summarise their presentations. Daron emphasised five major existential challenges to the global economy: increasing inequality, rapid ageing, climate change, the retreat of democracy, and the collapse of the global order. He emphasised that we need a new institutional framework centred on the regulation of technology and different responsibilities from firms. This new international framework should be based on four pillars: the 'welfare state 3.0', democracy, a broader vision of the responsibilities and objectives of corporations, and global coordination.

Maurice Obstfeld explained that the global economy is currently in an expansive stage of the global financial cycle, but it may turn around when major central banks, including the Federal Reserve, start to tighten. EMDEs will be very vulnerable to an uneven global rebound. So, Maurice said we need to enhance the financial system's resilience by strengthening the regulation of nonbank financial institutions, the global financial safety net (GFSN), capital flow measures, and exchange rate flexibility.

I believe these presentations provide a very nice overview and assessment of the global economy during and after Covid-19. However, I would like to raise three issues just for clarification and discussion, from the perspective of emerging markets and developing economies and Korea.

First, Daron argues that automation is a major factor that has worsened the income distribution in the United States as well as in other countries. I believe automation, or labour-saving technology, has had negative effects on wage equality. However, a question remains regarding to what extent automation has contributed to income inequality and will do so in emerging economies. This basically leads to the practical policy question: what should we do to improve the income distribution?

Second, Daron rightly pointed out that we should build stronger democracy institutions and a new institutional framework to solve the major challenges in the global economy. Yes, I agree. But I want to ask him whether and how we can strengthen democracy in this region. I know he explained a lot about the situation in the United States. In this region, including South Korea, people's demand for populism or authoritarianism prevails.

Third, a question directed to Maurice. He discussed fiscal vulnerabilities for EMDEs. He pointed out that EMDEs' fiscal responses to the Covid-19 crisis have made them more vulnerable to US interest rate hikes that could set off the contractionary phase of global financial cycle. In particular, I want to ask him about the mid-term fiscal sustainability and the risk of fiscal debt crisis in EMDEs, particularly in Korea. Lastly, Maurice suggested several issues on the agenda regarding strengthening the global financial system. One such issue is how to assess the future role of the dollar and digital currencies.

The first question on income inequality is really an important agenda item for every country at this moment. Automation or technological development must be an important factor for income inequality. Daron provided very compelling evidence from US data. But despite the acceleration of automation, existing data show that we have not observed a deterioration of the income distribution in the recent decade. Data compiled by the World Inequality Lab show that the income distribution measure was basically more stable between 2007 and 2019, during which time automation accelerated. This means that especially in emerging economies, other factors such as education, skill formation and trade seem to play more important roles for the income distribution.

My recent study on wage inequality indices and the college wage premium in Korea shows that wage inequality declined significantly between 1980 and 1994. Afterwards the trend reversed, with inequality increasing to its peak in 2008. Since then, there has been a gradual decline in wage inequality. The main driver of wage inequality has been the movement in the college wage premium as the relative supply of college graduates has expanded and there has been an increase in relative demand for high-skilled labour due to the expansion of Korea's trade with China. The policy implication of my study is that regulating automation or big technology may not be the only, or the main, solution to this problem.

A second question is the fiscal debt crisis issue. In his presentation, Maurice Obstfeld pointed out that the Covid-19 responses are putting a severe strain on the government's fiscal position in many emerging economies in Asia, and even in the advanced economies. But since advanced economies have key international currencies, the implications of fiscal debt are maybe small for the them compared to the emerging economies.

Projections by the Korea's National Assembly Budget Office show that the government deficit will continue to expand after 2022. The growing deficit will make it difficult for South Korea to resume high growth and normalise its fiscal balance at the same time. This is because Korea still needs significant infrastructure investments to take care of digitalisation and the environment, in addition to a significant increase in social expenditures in particular to care for the elderly. In South Korea, which is very open to the global economy, the fiscal deficit will continue to increase, fiscal debt will be accumulated over time, and the growth rate will decline significantly, partly due to the shrinking labour force. How could Korea assess the possibility of a fiscal debt crisis in the future? The assessment, of course, will depend on the global financial cycle that Maurice emphasised. I want to hear about his broader view on these issues.

A third question is related to the global reserve system issue. This is a fundamental issue necessary to strengthen the global financial system. As we all know, the US dollar has been the dominant reserve currency. So the dollar gives seigniorage and prestige to the United States. But there are always conflicts of the interest between US domestic monetary policy goals and other countries' demand for reserve currency – what is known as Triffin's dilemma. Since the Global Financial Crisis in 2007 and 2008, there have been discussions on how to promote an alternative international reserve currency such as SDR and even the renminbi. It is very difficult to change the existing dominant currency due to network externalities. But nowadays, there are lots of debates on the role of the digital currencies such as cryptocurrencies, stablecoins and central bank digital currencies in the global financial system. Major central banks are studying a virtual form of their currencies; the People's Bank of China is now testing out the E-CNY. So the question is how much this new development centred on digital currencies, especially central bank digital currencies, will impact the global financial system, especially the global reserve system.

Yung Chul Park

Thank you very much. I will now call on the other participants to select some of the issues raised by the authors of the other papers, as well as by Jong-Wha. I will do this in alphabetical order: Professor Acemoglu, Professor Beck, and finally, Professor Obstfeld. So, Professor Acemoglu, would you make some comments on the other papers as well as on Jong-Wha's discussion?

Daron Acemoglu

Dr. Jong-Wha Lee has raised many interesting problems, and I don't want to hog all the time, but I want to talk about a few things. First of all, I have not studied in detail inequality trends in Korea. I have seen them, but I have not looked into the different causal factors. But I think the Korean case is, of course, different because there is very rapid educational upgrading, very rapid changes in the composition of trade, demographic changes, and also obviously a very rapid adoption of robot and other automation technologies. I think all of these are playing a role.

The other factor that I'm looking into at the moment, but don't have anything to report on, is of course changes in labour market institutions in Korea, which I think is also a very interesting case from the military period where there was a lot of labour repression. Labour organisation in collective bargaining has changed a lot. It's actually one country that is going in the opposite direction to many other industrialised nations in terms of labour representation increasing. So I think all of those make it very interesting, but I don't have anything concrete to say.

In terms of democracy, however, I think that for any country at the moment, democracy is a very challenging process. Globalisation and nationalism are two wildcards that have changed political dynamics. Both political scientists and economists, I think, have underestimated the effects of globalisation on domestic politics. And also, we have sort of ignored how stubborn and resurgent nationalism would be. In some sense, one thing that's common across very different countries – Turkey under Erdoğan, the Philippines under Duterte, Brazil under Bolsonaro, India under Narendra Modi – is that there is a lot of nationalism that is being leveraged by these leaders in their populist authoritarian, or whatever you are going to call their particular brand of anti-democratic politics. And in that respect, I actually see Korea as relatively successful because this line has been avoided and it's a very participatory process.

Again, the data I have seen suggest there is much greater engagement of civil society and politics in Korea, and the fact that there is a growing budget deficit may not be so surprising in the sense that, if my observations are relevant (which they may not be), I think growing demands on state institutions are going to be constant across many nations. And I think many other countries, especially if their democracy is functioning, are going to see pressure for greater spending. And then the question is, how much of that is going to be dumped in terms of deficits, and how much of it is going to be immediate tax increases? I think if the United States had more functional politics right now, we would see greater expenditure there as well. So in some sense, I don't see the growth of spending as necessarily a failure of democracy in Korea. But obviously, Dr. Lee is absolutely right that it does raise a lot of questions about how to encourage economic growth in the age of higher taxes or higher budget deficits.

I think US-China conflict is very important. Actually, I have a lot to say about that but I don't want to take too much time, so perhaps I can come back to the issue of US-China conflict because I think it is obviously a major issue for South Korea, especially. And I'm not entirely sure that the current vogue in international relations circles or among political scientists for describing this as a new cold war is particularly productive. But I'm certainly open to hearing the South Korean perspective on this. I want to make one comment or question for Maurice and also for Thorsten, rather than commenting on their papers, which were both excellent, but I want to bring it to a point of unity or intersection between our presentations.

I think what we have seen over the last two decades is the developing countries struggling with democracy, often reversing democracy, in the age of cheap money. And this I think has been both a blessing and a curse. It has been a blessing in the sense that they had some resources, even when there were institutional problems. But it has also been a curse because I think many of these regimes have been able to get away with lots of irregular behaviour both at the macroeconomic level and the institutional level. And I agree exactly with Maurice that we are at a different stage of, if you're going to call it the global cycle, so interest rates are going to increase in the future, and that's going to make emerging markets less attractive for global investors.

And I think a very important point for technology, but also politics, will be how emerging markets react to higher interest rates. My guess is that this is going to be a rude awakening for many of them, but some of them might actually weather the storm. My guess again, I would love to hear more from Maurice and Thorsten and as well as Jong-Wha Lee. Actually, South Korea is in a very good position because what distinguishes Korea is that it has much stronger democratic institutions, a much better rule of law than India, Turkey, South Africa, the Philippines, Brazil and much of Latin America. So, I think that even though there is a budget deficit here, when interest rates increase, when international interest rates increase, this might not be as big of a shock to South Korea as it will be, say, for Turkey or for Brazil. But I would love to hear more and understand also the boarder implications. Thank you.

Yung Chul Park
Would you respond to the comments by your discussant Professor Naidu yesterday? I don't think that you had enough time to respond to these. He was rather critical about some of your propositions, and we would very much like to hear about your opinion.

Daron Acemoglu
Well, I think I gave a very brief answer, but it was too brief. Let me expand on that. I think the disagreement was perhaps over whether regulation would work, what the political economy of regulation would be, and the role of global versus domestic politics. And I don't have any way of disproving the concerns that Suresh Naidu raised. So to repeat, one would be that the regulatory capacity is not there, or the regulatory will is not there, even if it can be agreed that we have a problem at the moment. The second would

be that the democratic process wouldn't support regulation. And then the third would be dealing with global problems for the global civil society and global solutions, including international migration.

My take is very different. First of all, I think absolutely that the regulatory capacity in the United States has been decimated, but that's endogenous. It's been decimated because we have destroyed what we expect from the state and the civil services' ethos. And the best, the only way of rebuilding that is actually increasing the demand from the state. When the civil service is playing a useful role, antitrust authorities are dealing with antitrust issues and NSF and NIH are at the forefront of scientific research, I think it will attract better people. It will attract more of a dedicated cadre, and with the support that comes from both civil society and the political process that can be made to work, it will gradually, in fact quite rapidly, build state capacity.

So, if you look at the United States during historical periods, it has sometimes built state capacity very quickly. Now of course that brings the question of whether the political economy of that work. And yes, absolutely not at the moment. There's too much polarisation. There's too little trust between the right and the left for it to work in the United States. So there needs to be some sort of political transition, but I think that political transition will have to involve some sort of consensus that some of these challenges are severe enough, such as climate change and inequality. And again, we're definitely not seeing any evidence of that taking place in the United States, but we're seeing some of that in the European right, that the European right is struggling with some of these issues.

And I think there will be a big transformation of centre-right parties in Europe, especially in Germany, for example, but also in the United Kingdom and the Netherlands. And then finally, unfortunately, I wish Suresh was right that global civil society or global institutions could be built like that. Unfortunately, I think politics is local and will continue to be local. And the only way of building global cooperation is actually to start from domestic politics. I hope I'm wrong on that and there is a way of building global democracy with strong global institutions. That would obviously be much better. I just don't think it's feasible. So I'm not entirely pessimistic, because I think domestic politics can turn around, but I'm not optimistic enough to think that we're going to have some sort of global democracy anytime soon.

Yung Chul Park
Thank you very much. And Thorsten, your turn.

Thorsten Beck
Thank you for giving me the opportunity to be part of his panel today. I want to pull out a couple of points from the other presentations and refer back to some of the valuable points made by Professors Obstfeld and Acemoglu. So the first thing Professor Obstfeld mentioned yesterday was that international cooperation is somewhat more advanced now than it was, for example, in 2008. And I would agree and disagree with this statement

when it comes to the financial sector. The structure we have in place now goes beyond Basel III – what Professor Obstfeld was referring to – and extends to crisis management groups and supervisory colleges. A lot has happened in terms of cooperation across countries in preparing for crisis situations, be it on the bank level or on a more systemic level. And again, we've also seen certain coordination during crisis situations, such as the foreign exchange swaps, for example, which were put in place relatively quickly. But there are also counter-trends, and one of these relates to Brexit (a topic I just can't avoid since I've spent the last couple of years in London). Brexit, especially when it comes to financial sector cooperation, is going to be a bit of an elephant in the room in terms of cross-border supervisory cooperation, because there's a bit of a standoff right now between the EU and the UK. Any common sense would tell us that there should be very close cooperation between the UK and the EU, where the latter is benefiting from the financial centre, London, even though it's outside of the EU, but the politics just tells us no. So I think the financial sector cooperation will be a kind of pawn in the broader negotiations between the EU and the UK. But this has also implications for economic structure, including in the UK. For example, if the role of the financial centre in London decreases, with consequent efficiency losses, this could simply be interpreted as meaning that maybe the financial sector has grown too big for its own benefit, and for the benefit of the society that it's supposed to support. So maybe somewhat higher transaction costs, some more sand in the wheels, and some reduction of the importance of the financial centre in London can be beneficial not just for the UK, in terms of the income distribution, but maybe also for the rest of the world.

The other thing I think Proferssor Obstfeld mentioned is the banking union, the Single Supervisory Mechanism and the Single Resolution Mechanism. On the supervisory side of the banking union a lot has happened, such as the building of a common supervisory culture in the euro area. On the Single Resolution Mechanism, I think there is more on paper than in reality. Or maybe simply there hasn't been a failure of a major cross-border bank in Europe to test the new mechanism yet. But whenever we discuss here in Europe the new supervisory architecture, I always like to point to the United States, where it took 200 years and 12 systemic banking crises to get to a proper banking union. So I think it's going to be a long process in Europe as well.

I think another very interesting point that Professor Obstfeld made yesterday was on fiscal sustainability. And one additional point to add here is that the role of China in Africa as a creditor has become increasingly important; unfortunately, not necessarily in a very transparent way. We also have challenges with sovereign overindebtedness in Europe. In this respect, there are two extreme scenarios, the first one being a virtuous cycle that started basically at the onset of the crisis in 2020. Monetary and prudential authorities did as much as they could, and ultimately the European Union then also followed up with joint debt instruments, which I would describe as first step towards a fiscal union. This has been a very positive development, which also has the potential to speed up the recovery process. The opposite could lead to a vicious cycle. The idea of going

back to the fiscal rules of the Maastricht agreement as quickly as possible could lead to the same problems that we saw ten years ago during the euro debt crisis. This in turn could also affect the banking system; I laid out some channels yesterday. It's a scenario that I would not like to happen, but it could be the consequence of political decisions. There is also pressure rising concerning higher inflation, and the question of whether it is transitory or there is a structural element to it. What will the ECB do? The problem of potential fiscal dominance, i.e. of not being able to raise the interest rate because this could undermine sovereign debt sustainability of some of the member countries of the euro area, will be a challenge. But I would love to hear Professor Obstfeld's view on that.

Now, on the fascinating presentation yesterday by Professor Acemoglu. When I read the paper and listened to the presentation, what came to my mind is the very interesting book by the FT journalist Martin Sandbu, *The Economics of Belonging*. Martin, of course, doesn't claim any originality for the ideas that he forwards in his book. But he focuses on the policy implications of these ideas, which are very similar to what you could call a developmental state 3.0. You can also call it a new manifesto for the social democratic movement. So, yes, automation and globalisation may be primarily due to technical progress and have resulted to a certain extent in a smaller workforce in manufacturing. But it doesn't really have to always be like in the United States, where manufacturing workers lost their jobs and then ended up working in fast food restaurants. In an interesting study on Denmark published a few years ago in *Economic Policy*, for example, the authors show that there has been a shift, sometimes within the same companies, from manufacturing into services.[1] The production part is being outsourced somewhere else, but the services part is still in Denmark. At the same time, manufacturing workers, while losing their jobs to outsourcing and having to look for new ones, are actually not necessarily worse-off. And of course, you can say that well, Scandinavia is almost a different planet, but I think that these policies can be a glimpse on what is possible – flexible labour markets with a very tight social safety net. This brings me back to the question for you, Professor Acemoglu: what about universal basic income? Is that something we ultimately have to move to?

Another point I want to make – going towards politics – is on the negative view of the EU, as put forward by Professor Naidu. I disagree with that, actually. I think the EU has been a very positive influence within Europe. I've been very critical of how the euro debts crisis was addressed and managed, so I'm not ready to defend the EU and its policies at any price. But if you look at the bigger picture, the EU has been an incredibly successful experiment. There hasn't been any military conflict between EU members for the past 75 years. And take one specific recent policy – common procurement of vaccines, which initially has been very much criticised, especially in the country where I used to live until three months ago (the UK), as it resulted in a very slow rollout. But, ultimately, all other

1 Andrew Bernard, Valerie Smeets and Frederic Warzynski (2017), "Rethinking Deindustrialization", *Economic Policy* 32: 5-38.

problems left aside, including vaccine hesitancy, there has been a certain equity in terms of vaccine distribution across the EU. Just think of the counterfactual for a moment. There was a short period of tension between the UK and the EU on vaccine procurement. Now imagine this happening between the 27 member countries of the EU! So, I think that this example is a huge success story. My only wish were we could do this also at the global level. But I guess it's a bit beyond what we can expect.

Now, on the topic of populism and political polarisation. Yes, that's a very difficult topic, but let me offer some remarks. There is a supply side and a demand side for populist policies. First, on the demand side, a very interesting study for Europe, also published in *Economic Policy* a few years ago, suggests that it's not so much about the absolute change in income inequality, but the relative position.[2] So, if you are, let's say, in the fifth quintile and then suddenly you see the first or second quintile catching up, these people tend towards right-wing parties. The ones in the same quintile who suddenly see people in the eight or ninth quintile moving up, on the other hand, may be looking for left-wing parties. So it is relative income rather than absolute income. Second, there's also a supply factor here. I think Brexit is the best example. Brexit had been a relatively minor idea in the UK polity until six years ago. But it was driven by the right-wing press who feared the loss of influence. For example, Rupert Murdoch was once asked why he hated the EU so much, to which he answered, "[w]hen I call 10 Downing Street, somebody invites me to dinner with the prime minister, if I call Brussels, nobody picks up the phone". So, the whole idea of Brexit was driven by a small group and amplified by the right-wing press. Take austerity policies in the first part of the last decade, the Brexit vote can be very much seen as a vote against the London establishment rather than the Brussels establishment.

But the result of Brexit goes beyond the relationship between the UK and the EU. Institutions and democracy in the UK have deteriorated significantly over the last couple of years in terms of corruption, the undermining of specific institutions such as the judiciary, and ultimately, the undermining of democratic norms and standards. That's a little bit similar to what Professor Acemoglu has described, and some people call this the 'Orbanisation' of the UK. This actually brings me to another point, the fact that the UK, as you know, doesn't have a written constitution. A lot of rules are based on norms, and they have been violated quite a lot. I think the scene is somewhat similar to what almost happened on 6 January 2021 in the US.

One last point I want to make refers to something Professor Acemoglu mentioned – the decline of democracy during periods of cheap money. What do these leaders do when interest rates go up? We know what the 'Central Bank of Erdogan' (previously known as the independent Central Bank of Turkey) would do. And we've seen already that it doesn't work very well. So I think this is really about both the role of institutions and the role of leaders. There are some that argue that leaders don't matter and that is all about

2 Brian Burgoon, Sam van Noort, Matthijs Rooduijn, and Geoffrey Underhil (2019), "Positional Deprivation and Support for Radical Right and Radical Left Parties", *Economic Policy* 34: 49-93.

history and institutional persistence. I disagree with that to a certain extent. I think leaders can actually matter quite a lot. But it's also about the institutional environment in which leaders work. Let me relate this statement to populism in times of cheap money. Cheap money results in credit booms, often consumer credit booms. We know from the literature that I briefly mentioned yesterday that consumer credit booms can end up in recessions and financial crisis. One way to contain such boom-bust cycles seems to be macroprudential policies. The question is: who is responsible for macroprudential policy? Is it purely political, or is it the central bank that should have power over these tools? Even if the politically independent central bank formally has the power, the central bank governor might not want to take away the punch bowl because he or she doesn't want to come under political pressure. And we've seen a tendency towards this, for example in 2019 in the US with tension between Powell and Trump. So, it is about institutions and norms but also about individuals. I don't have any easy solutions here, but I think that's something that we should certainly think more about. Let me stop here, thanks.

Yung Chul Park
Professor Obstfeld, your turn.

Maurice Obstfeld
I have to say what a pleasure it is to see Jong-Wha Lee here again. I remember distinctly the day you first walked into my office at Harvard when I was visiting with a paper on labour markets. Jong-Wha covered a lot of ground in his comments and it's impossible to respond to everything. So let me just respond to a few points that have been made and then touch on the main topic that I'm interested in exploring, which is international cooperation – a matter very much related to Jong-Wha's question about China. On the Korean fiscal situation, Korea's general public debt-to-GDP ratio is projected to rise over 60% by mid-decade; Japan is at 260%. I think the greater threat would be from a financial crisis that would force the government to take many private sector assets onto its books.

In that respect, a number of authors, including of the paper yesterday afternoon, have mentioned the issue of high consumer debt, which was certainly problematic before the Covid crisis and I think going forward is an even bigger issue. The fiscal sustainability issue also arises in Europe, as Thorsten pointed out. I do worry going forward about countries like Italy. We're putting a lot of faith in Mario Draghi being successful with his very laudable project, deploying NextGenerationEU funds in a way that raises infrastructure and productivity (which is also an issue for Korea, by the way) – achieving structural reforms that have long eluded any government. So I think a lot is on the line and we cannot rely on the ECB to provide exceptional accommodation forever. It's just not going to be politically feasible. So we have to pray for Mario. But also, we have to pray for a more permanent fiscal union, one based on a complete banking union. As Thorsten rightly pointed out, the euro area banking union remains very incomplete at the moment, and that creates vulnerabilities. Europe actually also needs a strong capital markets

union to move forward. And the new German coalition in the person of the incoming chancellor has made positive noises. But the nature of that coalition raises the doubt: will they really be able to deliver?

Daron asked the fascinating question about cheap money and politics. I don't know the answer, but the possibility is very interesting. If you look at the trajectory of emerging markets since the 1990s, which was a decade of crises, there was a movement toward reform. In addition, the first decade of this millennium leading up to the Global Financial Crisis was one of ample global liquidity and of booming commodity prices. It was particularly favourable for emerging markets, which in terms of their growth rates really broke decisively away from the group of advanced economies over that period. And if you looked at some of the pictures I showed yesterday, you can see that debt-to-GDP ratios went down dramatically.

I believe that this improvement in fiscal conditions, coupled with continuation of low interest rates after the Global Financial Crisis, with increasing distrust of elites and institutions and increasing exposure of corruption, gave rise to more social demands. The increases in public debt-to-GDP ratio which we've seen in 2020 and since began years before that. So, in another words, increasing social demands and increasing social tensions amid low interest rates and seemingly stronger public finances led to more demands on governments. Political polarisation, a collapse of the moderate centre, has often followed. Chile is a great example of this and it is astounding to me that after selecting a slate of very left-wing delegates to draft a new constitution, the country is facing the prospect of a far-right wing president who is nostalgic for General Pinochet. If someone could write me a political economy model, that would be great. But I think any such model has to include distributional struggles, because many earlier reforms gave rise to higher inequality and backlash of a populistic or nationalistic nature.

Let me say a few words about international cooperation. This has come up at various stages of this conference and most prominently in Daron's presentation, because implementing his idea of directing technology in a way that creates good jobs has to be an international project. Otherwise, you basically have to close down international trade. So where you might advance on his agenda will depend on international cooperation. It is not out of the question that countries could reach some sort of common view on what might be considered a predatory evolution of technology, one that is exploitative of workers, and align policy internationally on that basis. We're obviously far away from that. But leaving aside that issue, there's a range of areas where cooperation is necessary.

On disease, we've become all too aware of the magnitude of the problem. And a solution goes way beyond what we have equipped the WHO to do. It requires transfers of resources to emerging markets in large quantities to help them upgrade their health infrastructures, starting with the infrastructure for vaccinating people and getting their hands on vaccines. There's climate as well. I agree with Daron's throwaway comment

about the disappointment of COP26. This is not flashing red; it is a solid red alarm now, and the global community failed to step up. There's financial regulation, which we talked about.

This also impinges on the digital currency space. Probably central bank digital currency is a good idea, if only to help push out the cryptocurrency sector, which in my view is a menace along many dimensions. But to leverage this to get a more efficient payment system internationally, which was the original idea of Libra – which is now called Diem by Meta, which used to be called Facebook – we need very close central bank cooperation, and also cooperation on a fiscal level because the issues are fundamentally fiscal issues. Additional fiscal cooperation on taxing international business is also very important. International cooperation on limiting corruption is a huge agenda. And corruption is one of the most potent forces sapping democracy and feeding populism, in the sense that it supports a narrative that everything is rigged in favour of the elites and those with resources.

These are huge challenges which can't be met unless the US and China get on the same page and realise that the threats they face on these issues outweigh their differences. I'm not sure exactly how that happens. One key issue is dialogue. I think the greatest threat on this was underscored in a speech in London recently by the director of Britain's MI6. The threat is miscommunication, just the possibility that intentions are read incorrectly, leading to hostilities. This was a frontline issue during the Cold War between the US and the Soviets. It's something that I think can be managed, but both sides have to realise how important it is. Now, unfortunately, I worry that the conditions are not good for international cooperation. Cooperation won't happen simply because the Biden administration declares that the United States is back. And that's because the United States isn't back; it just is not reliably back.

I recently completed with some co-authors, one economist and two historians, a paper to commemorate John Maynard Keynes 1919 book, *The Economic Consequences of the Peace*. We make the case that our part of the 21st century today is much more like 1919 than 1945, when the global community was much more successful in building some structures of international governance that have been pretty useful and successful. Importantly, these structures provide venues where countries with very different ideologies can speak to each other frankly and work together. I saw this in action at the IMF in meetings of its executive board. One of the big differences with 1945 is simply that then, the US was the indisputable hegemonic power. And it knew that if it provided public goods that stabilise the world economy, it would internalise to a great degree those benefits in a number of ways, not least its ability to export to the rest of the world. In contrast, 1919 was a lot like now in more ways than I like to think about.

Woodrow Wilson, in the Versailles Treaty, put forth his vision of the League of Nations. When he returned from Versailles, he returned to a United States in which Black people were being lynched in Washington, DC and in other cities such as Chicago – just the

beginning of the cycle of years of violence toward Blacks that included the Tulsa Riot. It was driven by industrial transformation in the economy and by the migration of Black people from the South to northern cities where suddenly industrial jobs were available (and also by seeing Black soldiers in uniform, which enraged some segments of the population). And there was also anti-immigration sentiment which led to highly restrictive legislation in the early 1920s. The next US administration also levied huge import tariffs, which made it (even more) difficult for allies in Europe to repay war debts. As you know, of course, the US ended up not participating in the League, and its absence crippled it from the start. After hearing Wilson speak, the world expected the US to be present in a position of leadership, but it wasn't.

Fast forward a hundred and two years. Biden has declared that America is back, but we're not living in a unipolar world. We now have a united Europe, but perhaps more importantly, we have a rising and aggressive China. The US is riven by cultural and class conflicts that eerily mirror the ones that were present in 1919. And the political environment is poisonously polarised. A year ago, when Joe Biden won the presidential election, the world eagerly anticipated that, perhaps, the US would revert to what they had thought to be a more normal pattern. Now, they see that there is a new normal. And the US' ability to make commitments is in question. Certainly, some of the areas of cooperation I've talked about could be messaged to voters in a way that might build popular support within the US. But that's a process that needs to be pursued very aggressively.

So, where do we go in the next few years as we attempt to solve global problems? To echo what Daron said, we face a very narrow corridor. It requires the US administration to do many good things domestically in an unfavourable environment. It requires a very skillful management of the relationship with China in a way that produces win-wins and that also defuses some of the anti-China sentiment in the US. It definitely will not be easy, and even at best, it is unlikely not to be a monotonic process. There may be reversals, but hopefully also advances. I think the best we can hope is that the advances are greater than the reversals. But if so, I'd have to say that we're in for a rough ride. And in the meantime, the problems of disease and climate cannot wait.

There was also, by the way, a 1918–1919 worldwide pandemic that led to the deaths of tens of millions. It was not effectively controlled and many of the same tensions about masks, for example, arose then, and related cultural issues around 'freedom' versus community responsibility. It may be that before we get to another 1945 moment, we have to go to another interwar period. I hope that is not the case, but it's something we should definitely factor in. In contemplating cooperation, the US, China, and the EU worry about their sovereignty, but the stakes for a country like Korea are high because Korea's sovereignty is enhanced when the big powers feel obliged cooperate in ways that limits their unilateral actions. Therefore, Korea has a big stake in a successful outcome.

Yung Chul Park

Now we can have a free discussion among the participants. For the topics, I'd like to ask you to comment on two questions on finance. One is about the regulation of cryptocurrency and the crypto industry.

At present, the cryptocurrency market cap is a little over $2.5 trillion. The size of the decentralised financial market is very close to $250 billion. A year ago, it was less than $600 million. So the cryptocurrency and decentralised financial markets are growing very fast, although their combined size is very small compared to the international financial markets or international banking. They are totally outside of the regulatory regime. My question to Professor Acemoglu: is it possible or is it desirable to regulate them?

The second question to all panel members is related to this alliance of 450 international financial institutions raising $130 trillion, which is a lot of money to be dispersed over the next 30 years to finance industries that will reduce carbon emissions. Whose money are they thinking of spending? Are they capable of deciding which industry should receive their lending? After all, they have fiduciary duties, and they may be using my own money or your money. Would Professor Acemoglu start first?

Daron Acemoglu

Yes, I'd be happy to. So, on the cryptocurrencies, I completely endorse everything that Maurice said. I think cryptocurrencies are quite dangerous. I worry about various problems they are creating and I think they need to be regulated, but it is actually not clear how they can be regulated at the moment. And I think they're going to have a variety of negative consequences, and they already are. And I'm not optimistic that central banks having digital currencies will deal with the cryptocurrency issues. So I think a different approach is necessary.

But let me talk a little bit more about your second point. I think a lot of economists subscribe to what is sometimes called the Tinbergen principle, which is that you have policies that are narrowly targeted to specific distortions. And I think that's a good economic framework for normal times, and for systemic failures of markets. I think when it comes to climate, both of these conditions are violated. So we are not in normal times. This is really an existential crisis. And there are systemic failures – failures in innovations; failures in the pricing of carbon; failures in all the externalities that are created by various different types of sectors, from agriculture to transport to manufacturing to home sectors. So I think we need to abandon the Tinbergen principle and use many instruments.

So in that sense, I very much welcome the efforts that will be led by Mark Carney, for example, to bring climate issues on the agenda of central banks. So I think we could all be happy if indeed financial institutions and government agencies were using all of our money for clean energy. Unfortunately, I think these pledges that you're talking about actually don't go very far. First of all, a lot of the big energy companies are positioning

themselves to be recipients of subsidies and finance for many of the green technologies. If you look at that, there was a huge number of new patterns early on in green technology. Not many of them came from big energy, but now big energy is trying to dominate that space.

My fear would be that a lot of the money that's being placed will actually go back and be captured by existing traditional energy companies. And money is fungible. So it is not clear where it's going to be used and I have zero confidence that BP or Exxon Mobil or Chevron are really committed to combating climate change or reducing emissions. So I think something much more systematic is needed. As Suresh raised and you emphasised, Dr. Park, we cannot trust the government's capability to regulate very much. There are a lot of weaknesses of state capacity and obviously trust issues – many people thinking that you cannot leave such things in the hands of governments and bureaucrats.

But I certainly would not trust financial institutions in deciding where really clean dollars should go or where dollars should go for clean energy. They have so far not been very good at supporting clean energy and instead poured billions into fossil fuels. I think a much more robust framework for government-led regulation is necessary for channeling money to clean technology, and all of that, of course, has to be complemented by a global carbon tax that probably needs to be much, much higher than anything we've seen right now. Sweden's tax is the highest, at around $120 per metric tonne I think right now with the exchange rate, and that even that is probably too low, especially when you take into account other implicit subsidies that carbon emitters are receiving.

Thorsten Beck

Maybe I can come in very briefly here with a comment on these two questions. So, first on the cryptocurrencies, I also agree that this is the Tulipmania of the 21st century. Yes, you can, of course, construct the theoretical argument that if one of these currencies is going to suddenly be accepted as money, it actually has value. But as long as it doesn't happen, the value, I would say, is effectively zero. So I'm very critical, not even to mention the enormous environmental costs. I'm a bit more sceptical than Professor Obstfeld about these central bank digital currencies, as it depends on how you structure them. If it's a substitute for cash, or cash-like instruments such as bank deposits, the banks might lose their privilege of private money creation. You could argue that maybe it's about time – good riddance – but it will certainly lead to a disruption, and there might be certain transitions risks. And then we have to think carefully about where these savings and deposit balances are going. So, there has to be a cost-benefit analysis.

On the Tinbergen principle, I'm going to push back a little bit, Professor Acemoglu. I always think about the Tinbergen principle with respect to specific tools, for example capital requirements. Does it make sense to have a green discount, or a brown factor premium for capital regulations or not? There are two issues here: the prudential and the environmental side. What I would completely agree with is that central banks cannot ignore climate change. Absolutely not. For example, their asset purchases should also

reflect a certain green bias. And it's completely in line with the actual mandate of the ECB, which is to support the general policies of the European Union, which include climate change. Further, there is environmental risk which leads, of course, to a performance risk of these assets on banks' balance sheets. There's a regulatory risk which can turn some of these assets into stranded assets. But is there an additional element beyond the prudential risk that supervisory authorities should take into account or should it be left to somebody else to account for environmental externalities? In general, I would say that carbon taxes are a much more powerful tool in order to get where we want to go in terms of the transition to net zero. And maybe as a final point, and I know you asked the questions in a provocative way, Professor Park, if I understand correctly, but I see the global alliance also more as an ambition than a firm commitment on which we can count. But I think it is important to see that there is – beyond political, regulatory and central bank pressure – a general stakeholder pressure on banks and the financial markets to provide support for the green transition. So, if in this context this global alliance can play a role, by all means. Do we take all of it seriously? Probably not. Do we still need prudential restrictions with respect to stability concerns arising from environmental risks? By all means!

Yung Chul Park

Maurice, are there any final comments you would like to make?

Maurice Obstfeld

Fortunately, there's little left to be said because I agree strongly with what Daron and Thorsten have said. On cryptos, my goodness, yes, the space is too manic. And it's hard to think of any regulatory action short of shutting them down that would not undermine the fundamental business model, which is based on absolute secrecy. One can think of them as a harmless casino, but I think they're much worse than a harmless casino. On climate finance, $130 trillion, even if over 30 years, is a lot of money – it's significantly more than a year's global GDP. But it's just not clear how those funds get allocated efficiently and that there will be follow-through.

To my mind, it's a critical issue because salvation is going to come from the development of green technologies that are more economical than fossil fuels. The only reason why whales still swim around in the ocean is because we developed electricity, which is cheaper than going out and killing whales and boiling down their fat to make candles. We want fossil fuels to stay in the ground, and we therefore need new cheaper technologies. One area that is quite urgent is that developing countries, particularly in Africa, have huge infrastructure needs given their growing populations. If those are met on the basis of fossil fuel-intensive technologies, we are really in trouble. So I think the global community has a great common interest in making resources available with some conditionality to promote cleaner alternatives for these new infrastructure projects. Otherwise, the planet definitely won't make it.

Yung Chul Park
Jong-Wha, would you like to make a final comment? KIF President Park told me this morning that more than 9 million people in this country own crypto assets. There is strong pressure to classify these currencies as alternative assets. The classification is going to create a serious political and economic problem in this country. So I would appreciate your comments on this crypto issue very much. And I'm very happy to hear that you all agree with me that at least they have to be regulated out.

Jong-Wha Lee
I do not have any cryptocurrency. So I completely agree with all of your opinions that we should regulate it. And I don't know the answer to the question of how we could really effectively regulate it. I think the discussions today in the panel actually pointed out a lot of important issues. So I learned a lot and thank you very much for sharing your insights. Especially, Daron mentioned the interrelations between cheap monetary policy and political development. I think that's a very interesting observation that clearly has implications for Korea's political development. And I hope we can have another chance to discuss this issue.

I am sure, as you emphasised, that it has a lot of implications for other countries, not just for Korea. And another thing that Maurice mentioned – the analogy between 1919 and the current situation, rather than between 1945 and now – is a very interesting observation. And he really emphasised a couple of risks for the Korean economy. The fiscal risk as well as the spillovers from the US–China conflict, I think, really presents a lot of challenges for the Korean economy. I am really appreciative of your comments. And the financial issues are also very important. And I'm not sure this is my job, but thank you, KIF, for organising this very important conference.

Yung Chul Park
I would like to thank all panel members for your inspiring discussion and comments. Thank you very much.

CENTRE FOR ECONOMIC POLICY RESEARCH

As the world is (hopefully) emerging from the Covid-19 pandemic, major challenges await for societies across the world related to climate change, inequality, digitalisation and the undermining of democracy. Economists can contribute to this debate, based on historic insights, theoretical models and analysis of data. This book contains three papers presented at the 30th Anniversary Conference of the Korea Institute of Finance (KIF), as well as the contributions of the discussants and a summary of the panel discussion.

Daron Acemoglu argues that the rise in inequality can be explained by the rise of artificial intelligence, which has replaced numerous low- and middle-skill workers with machines and algorithms. Digital technologies have also played an important part in the retreat of democracy and steep falls in trust in public institutions. To counter these trends, Acemoglu calls for the rebuilding of domestic and global institutions capable of harnessing the power of large corporations and significantly redirecting technological change. At the same time, global solutions for climate change are called for.

Maurice Obstfeld chronicles the evolution of the global financial markets since the Global Financial Crisis, focusing on changes in the markets' domestic impacts, the strains that have emerged due to the Covid-19 crisis and risks that may lie ahead. He calls for expanding the regulatory perimeter to non-bank financial intermediation, expanding the scope of bilateral central bank swap lines, revisiting the use of capital flow measures and a new architecture for sovereign debt restructuring.

Thorsten Beck and Yung Chul Park discuss the challenges for financial systems across the globe in the wake of the pandemic, long-term trends in the structure of the financial system and the possibly disruptive impact of digitalisation. Finally, they point to climate change, which both poses problems for the financial system but also requires the critical function of the financial system in resource allocation.

ISBN: 978-1-912179-58-9

33 Great Sutton Street | LONDON EC1V ODX | UK
TEL: +44 (0)20 7183 8801 | FAX: +44 (0)20 7183 8820
EMAIL: CEPR@CEPR.ORG
WWW.CEPR.ORG