

BIS Papers

No 140

Central banks, macro-financial
stability and the future of the
financial system

Monetary and Economic Department

October 2023

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ISSN 1682-7651 (online)
ISBN 978-92-9259-702-3 (online)

Foreword

The 22nd BIS Annual Conference took place in Basel, Switzerland, on 23 June 2023. The event brought together a distinguished group of central bank Governors, leading academics and former public officials to exchange views on the topic “Central banks, macro-financial stability and the future of the financial system”. The papers presented at the conference are released as BIS Working Papers, nos 1136, 1137 and 1138.

BIS Paper no 140 contains keynote speeches on “Monetary policy and financial stability: A US perspective” by Esther L George (Former President and CEO, Federal Reserve Bank of Kansas City) and on “Power and progress: Our thousand-year struggle over technology and prosperity” by Daron Acemoğlu (Institute Professor, Massachusetts Institute of Technology). It also contains remarks from two panel discussions. In the first panel, the topic of the “Future of crypto” is debated by Hilary J Allen (Professor of Law and the Associate Dean for Scholarship, American University Washington College of Law), Jón Daniélsson (Director of the Systemic Risk Centre, London School of Economics and Political Science) and Fabio Panetta (Member of the Executive Board, European Central Bank). In the closing panel, the question of “What is the remit of central banks?” is addressed by Ida Wolden Bache (Governor and Chair of the Executive Board, Central Bank of Norway), Shaktikanta Das (Governor, Reserve Bank of India) and Tiff Macklem (Governor, Bank of Canada).

Programme, 23 June 2023

- 9:00–9:05** **Welcome** Hyun Song Shin, Bank for International Settlements
- 9:05–10:20** **Session 1: Fiscal-monetary interactions and macroeconomic stability**
- Chair Lesetja Kganyago, South African Reserve Bank
- Speaker John Cochrane, Hoover Institution, Stanford University
- Discussants Lucrezia Reichlin, London Business School
 Pablo Andrés Neumeyer, Universidad Torcuato Di Tella
- 10:20–10:45 Coffee break
- 10:45–12:00** **Session 2: Banks, NBFIs and capital markets**
- Chair Philip Lowe, Reserve Bank of Australia
- Speaker Wenxin Du, University of Chicago, Booth School of Business
- Discussants Robin Greenwood, Harvard Business School
 Dimitri Vayanos, London School of Economics and Political Science
- 12:30–13:00** **Lunch keynote: The state of monetary policy and financial stability**
- Speaker Esther L George, Former President and CEO, Federal Reserve Bank of Kansas City
- 13:30–14:45** **Session 3: Central banks and bond market functioning**
- Chair Chang Yong Rhee, Bank of Korea
- Speaker Darrell Duffie, Graduate School of Business, Stanford University
- Discussants Imène Rahmouni-Rousseau, European Central Bank
 Andrew Metrick, Yale School of Management
- 14:45–16:00** **Panel on the future of crypto**
- Moderator Cecilia Skingsley, BIS Innovation Hub
- Panellists Hilary J Allen, American University Washington College of Law
 Markus K Brunnermeier, Princeton University
 Jón Daniélsson, London School of Economics and Political Science
 Fabio Panetta, European Central Bank
- 16:00–16:30 Coffee break

16:30–17:45 Closing panel: What is the remit of central banks?

Moderator Agustín Carstens, Bank for International Settlements

Panellists Ida Wolden Bache, Central Bank of Norway

Shaktikanta Das, Reserve Bank of India

Tiff Macklem, Bank of Canada

20:30–21:00 Dinner keynote: Power and progress: our thousand-year struggle over technology and prosperity

Speaker Daron Acemoğlu, Massachusetts Institute of Technology

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Keynote by Esther L George: “Monetary policy and financial stability: a US perspective”

Esther L George, Former President and CEO, Federal Reserve Bank of Kansas City (2011–23)

Thank you to the BIS and Agustín Carstens for the invitation to participate in this year’s meeting. Having recently concluded more than 40 years of service with the Federal Reserve earlier this year, it’s nice to be back among familiar faces, although I do not envy the challenges facing the central banking community.

I recently read this characterisation of economic and financial affairs:

*A deep current of unrest flows through financial markets these days, carrying with it a feeling that things are, in some way, out of kilter. There is a general uneasiness about the fabric that binds and solidifies our financial system as we witness spectacular bank failures, a seemingly endless stream of innovations, and concern about macroeconomic disequilibria.*¹

This characterisation came from the opening session of the Kansas City Fed’s 1987 Jackson Hole symposium, where the discussion focused on a changing financial landscape. It was a time of rethinking regulatory settings in response to economic and financial instability. And while the structure and nature of financial markets and macroeconomic policy since then have continued to evolve in dramatic ways, the longstanding relationship between economic health and the resilience of the financial system remains core to achieving central bank objectives. Recent bank failures and policymakers’ response to arrest potential contagion are a reminder of this tight linkage.

My remarks today will focus on the current state of monetary policy and financial stability from a US perspective, acknowledging the post-Great Financial Crisis enthusiasm for the use of macroprudential regulatory approaches. I’ll offer a perspective on opportunities to rethink some of the assumptions behind monetary and regulatory framework in the long-run interest of promoting resilience in the financial system.

The relationship between monetary policy and financial stability

Prior to the Great Financial Crisis, a common view held that monetary policy should not lean against apparent financial market imbalances – except to the extent they affected the outlook for growth and inflation – but, instead, clean up after a crisis. This line of thinking rested on three assumptions. The first is that spotting asset price bubbles or financial imbalances in real-time is notoriously difficult – something that is just as true today as in the past. Knowing at what point and how aggressively to

¹ This comment has been edited for clarity. For the original, see F Edwards, “Can regulatory reform prevent the impending disaster in financial markets?”, in *Restructuring the Financial System*, proceedings of the Federal Reserve Bank of Kansas City Jackson Hole symposium, August 1987.

intervene using monetary policy also poses a number of practical challenges. A second assumption is that monetary policy can be effective at limiting the damage to the broader economy after the adjustment in asset valuation. The pre-crisis consensus viewed a collapse of asset prices as having the potential to inflict sustained damage to the broader economy, but also held that monetary policy could mitigate the fallout. A third assumption supporting the pre-crisis consensus is what I will call “the separation principle,” in which regulators concern themselves with oversight of the financial sector while monetary policymakers focus on macroeconomic objectives, such as inflation and, in the case of the United States, employment. The goal of price stability was seen as largely complementary with that of financial stability, given a well-designed regulatory structure that monitored the risk exposures of the financial sector.

The collapse of the housing market in the United States and the global economic events that followed posed fundamental challenges to the thinking about the role of monetary policy in maintaining financial stability. And without doubt, financial instability inflicted damage that pulled many central banks far from their objectives for a prolonged period.

A macroprudential approach

Given this experience, central banks continue to digest a growing body of research on the appropriate roles of monetary and regulatory policy in fostering financial stability. And without question, important steps have been taken to explicitly acknowledge the monetary policy and financial stability linkage and to strengthen macroprudential moorings. For example, the Federal Reserve’s *Statement on Longer-Run Goals and Monetary Policy Strategy* notes that sustainably achieving maximum employment and price stability depends on a stable financial system. And that the Committee’s policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee’s goals.

The Federal Reserve assesses these risks to the financial system in its biannual Financial Stability report. The framework for its analysis focuses primarily on assessing vulnerabilities, with an emphasis on four broad categories (valuation pressures, business and household leverage, financial sector leverage, and funding risks) and how those categories might interact to amplify stress in the financial system. It is worth noting that its most recent report (May 2023) cited near-term risks as including the current stance of monetary policy and banking system stresses as threats to financial stability.

Periodically, FOMC participants have the opportunity to comment on financial stability risks as part of monetary policy deliberations. No actions are taken by the Committee, however, in response to noted risks. Rather, the Federal Reserve’s actions to promote the resilience of the financial system are best described through its supervision and regulation of financial institutions as it works with other domestic agencies and through the Financial Stability Oversight Council (FSOC). In other words, monetary policy has largely remained focused on inflation and employment, leaving financial stability to regulators and their macroprudential approaches. The separation principle remains largely intact.

In fact, the deployment of macroprudential tools may be perceived as further removing the need for monetary policy to be concerned with financial stability. For example, countercyclical capital policy can be used to reduce the banking sector's leverage and expand its loss-absorbing capacity during an expansion. Calibrating the appropriate timing and degree for using this tool, however, poses some practical challenges that are similar to those associated with monetary policy. The Federal Reserve's assessment of financial vulnerabilities informs decisions about the use of countercyclical capital adjustments.

In addition to countercyclical capital, policymakers and regulators have embraced macroprudential approaches to liquidity requirements. These steps are designed to guard against excessive maturity transformation, which in the past has led to asset fire sales and large swings in asset valuations. With the new rules, banks must hold a minimum amount of highly liquid assets under stressed conditions to ensure adequate funding and prevent fire sale losses and related externalities.

And finally, to evaluate whether the capital and liquidity positions of individual institutions aggregate to a stable banking system, stress testing has been used to provide a horizontal view of systematically important firms and their vulnerabilities to a variety of shocks. While stress testing has been widely accepted as a useful tool, the results can be quite sensitive to a number of factors, such as model specifications and estimation periods.

Recent bank failures have also served to highlight the importance of traditional microprudential, or firm-specific, supervision and regulation. Indeed, the success of macroprudential regulation depends on individual banking organisations operating in a safe and sound manner as a prerequisite to their ability to withstand the economic and financial shocks that can lead to financial instability. Timely risk identification and supervisory response, further highlighting the strong complement between micro- and macroprudential tools.

Financial stability and monetary policy interactions

To be sure, regulatory policies play central roles in fostering the financial system's resilience, but so does monetary policy. It is often argued that macroprudential policy should be the "first line of defence" for maintaining financial stability. This approach, however, may expect too much of tools for which our understanding is imperfect. In addition, a growing body of research shows monetary policy plays a key role in affecting risk appetite and risk premiums. Asking regulators to ensure risk-taking does not endanger financial stability may ask too much of the regulatory infrastructure, especially in periods of highly accommodative or rapidly tightening monetary policy.

Indeed, the Federal Reserve and other central banks have used zero interest rates and large-scale asset purchases or quantitative easing as a type of accommodative policy that aims to affect risk-taking, asset valuations and economic growth. Even as economic activity is affected via this channel, such policies can also create financial market vulnerabilities, especially if sustained for a prolonged period. If financial imbalances in one sector turn out to have systemic consequences, then a reliance on the risk-taking channel of monetary policy to stimulate economic activity could prove more detrimental than beneficial over the longer run for achieving stable inflation and employment.

In particular, a monetary policy that fails to take into account building systemic or tail risks exposes the economy to potential large setbacks in the future. Investors fluctuate between being more or less concerned about these unlikely but severe economic outcomes. These concerns are often incorporated in risk premiums, which reflect the degree and likelihood of severe events. For example, a rise in risk premiums can indicate a recession may be on the horizon, even when macroeconomic data may be providing no such signal. Alternatively, unusually low risk premiums, such as were experienced in 2003–05, reflected investors who were underestimating the severity and likelihood of a downturn in the housing market.

Research points to the effect monetary policy has on several aspects of risk-taking. For example, after taking into account economic conditions, low policy rates are correlated with overall easier financial conditions, as we see banks increase the share of risky assets they hold, credit quality decline, risk premiums on syndicated loans fall, lending standards soften, and financial institutions move towards shorter-term funding and higher leverage.² Many of these factors manifest themselves in elevated asset valuations and rising credit growth. Once asset values or credit growth has risen to a level warranting concern, it is likely too late for monetary policy to smoothly unwind these imbalances without triggering a sharp reversal that ultimately inflicts damage on the real economy.

A focus on risk-taking and risk premiums in the context of monetary policy leads to two questions. The first is whether risk premiums are useful for predicting economic activity. Research from the Federal Reserve Bank of Kansas City suggests they are, but they offer more of a signal about the future when they are rising than when they are falling.³ That is, rising risk premiums signal poor economic performance in the future, while declining risk premiums are not necessarily a good indicator of strong economic performance. Low risk premiums, however, may sow the seeds for future financial instability. The second question is whether monetary policy can affect risk premiums. This research also suggests monetary policy does alter risk premiums. As policy eases, risk premiums have a tendency to decline, suggesting that attempts to lower already low risk premiums will likely do little in terms of future economic activity but may foster conditions that pose risks to financial stability. This suggests to me that modestly tighter policy earlier in the business cycle expansion could moderate risk-taking and the potential for destabilising financial imbalances to build. Prior to the Great Financial Crisis, it is clear that some countries effectively identified a number of risks that played important roles in the crisis but underestimated their severity.⁴ Identifying “excess” risk-taking always carries challenges, particularly in finding the right benchmark with which to assess risk-taking. Still, a number of these reports highlighted risks, but late in the business cycle when there was little monetary policy could do except wait to clean up. In addition, using monetary policy to react after imbalances have developed, to slow elevated

² See eg Rajan (2005); Jimenez et al (2012); Maddaloni and Peydo (2011); Stein (2012, 2013); Adrian and Shin (2010); Adrian et al (2009). Adrian and Laing (2014) provide a comprehensive overview.

³ See T Cao, G Doh and D Molling, “Should monetary policy monitor risk premiums in financial markets?”, Federal Reserve Bank of Kansas City, *Macro Bulletin*, 26 February 2015.

⁴ J Christensson, K Spong and J Wilkinson, “Financial stability reports: how useful during a financial crisis?” Federal Reserve Bank of Kansas City, *Economic Review*, vol 95(Q I), 2010.

levels of credit growth, or to encourage firms to scale back on high levels of leverage are likely to end poorly.

The bottom line is that it is difficult to address stability concerns in particular sectors after they have developed. Instead, it may be appropriate to adjust policy to address suppressed risk premiums early in the expansion rather than late. Once valuation pressures emerge, or underwriting standards have been stretched, then it is often too late. As a result, interest rate policy used earlier in the cycle has the potential to foster a more stable financial landscape as a business cycle matures.

Revisiting the consensus

As policymakers continue to evaluate the linkages between monetary policy and financial stability, today's landscape warrants careful assessment of assumptions that have guided the thinking about the proper relationship between monetary policy and financial stability. In particular, I see several factors as relevant considerations for revisiting the assumption that monetary policy and macroprudential regimes can be used independently.

First, technological change and market innovations are sure to continue challenging the existing regulatory framework. The delivery of financial services is unfolding in a variety of ways with important financial stability implications. For example, non-bank entities are operating beyond the perimeters of a regulatory apparatus that has been defined for decades by charter types rather than by activity types. These innovations, alongside digitalisation and speed in the delivery of financial services, will require broad public policy considerations where tighter intersections and complexities are at play, including an understanding of their global dimensions.

Second, the innovations and evolution of monetary policy tools warrant new thinking about the separation principle. In the interest of addressing market functioning and economic distress, aggressive policies associated with near zero interest rates and massive quantitative easing have been deployed. These powerful and in some cases lingering interventions have expanded the central bank's footprint in financial markets. Achieving near-term objectives must consider the risk of longer-run consequences. Given the significant risk-taking incentives accompanying today's policy toolkit, the dynamics between balance sheet policies and policy rates should be better understood. This is not to suggest adding an explicit mandate but ensuring the policy framework incorporates more clearly its role in contributing to stability – both economic and financial.

Closing

Over the past 15 years, technology and innovation have continued to alter the financial services landscape even as monetary policy has introduced new strategies and levers for achieving its goals. Refocusing the lens of assumptions about the linkage between financial stability and monetary policy calls for rethinking existing frameworks. A comprehensive approach is needed – one that views the critical intersections of monetary, macroprudential and financial institution supervision in today's context, rather than as independent complements. Such an approach offers the chance to both foster resilience in the financial system and deliver on the long-run objectives of central banks for sustainable economic growth.

Keynote by Daron Acemođlu: "Power and progress: Our thousand-year struggle over technology and prosperity"

Reprinted with permission from D Acemođlu and S Johnson, *Power and progress: Our thousand-year struggle over technology and prosperity*, MIT Press, 2023, part of Chapter 1.

Control over Technology

In the Fall as recorded in the book of Genesis, man underwent a loss of innocence and a weakening of his power over creation. Both of these losses can be to some extent made good, even in this life—the former by religion and faith, the latter by arts and sciences. —Francis Bacon, Novum Organum, 1620

Instead, I saw a real aristocracy, armed with a perfected science and working to a logical conclusion the industrial system of to-day. Its triumph had not been simply a triumph over Nature, but a triumph over Nature and the fellow man. —H. G. Wells, The Time Machine, 1895

Since its first version in 1927, *Time* magazine's annual Man of the Year had almost always been a single person, typically a political leader of global significance or a US captain of industry. For 1960, the magazine chose instead a set of brilliant people: American scientists. Fifteen men (unfortunately, no women) were singled out for their remarkable achievements across a range of fields. According to *Time*, science and technology had finally triumphed.

The word *technology* comes from the Greek *tekhne* ("skilled craft") and *logia* ("speaking" or "telling"), implying systematic study of a technique. Technology is not simply the application of new methods to the production of material goods. Much more broadly, it concerns everything we do to shape our surroundings and organize production. Technology is the way that collective human knowledge is used to improve nutrition, comfort, and health, but often for other purposes, too, such as surveillance, war, or even genocide. *Time* was honoring scientists in 1960 because unprecedented advances in knowledge had, through new practical applications, transformed everything about human existence. The potential for further progress appeared unbounded.

This was a victory lap for the English philosopher Francis Bacon. In *Novum Organum*, published in 1620, Bacon had argued that scientific knowledge would enable nothing less than human control over nature. For centuries, Bacon's writings seemed no more than aspirational as the world struggled with natural disasters, epidemics, and widespread poverty. By 1960, however, his vision was no longer fantastical because, as *Time*'s editors wrote, "The 340 years that have passed since *Novum Organum* have seen far more scientific change than all the previous 5,000 years." As President Kennedy put it to the National Academy of Sciences in 1963, "I can imagine no period in the long history of the world where it would be more exciting and rewarding than in the field today of scientific exploration. I recognize with each door that we unlock we see perhaps 10 doors that we never dreamed existed and, therefore, we have to keep working forward." Abundance was now woven into the fabric of life for many people in the United States and Western Europe, with

great expectations for what would come next both for those countries and the rest of the world.

This upbeat assessment was based on real achievement. Productivity in industrial countries had surged during the preceding decades so that American, German, or Japanese workers were now producing on average a lot more than just twenty years before. New consumer goods, including automobiles, refrigerators, televisions, and telephones, were increasingly affordable. Antibiotics had tamed deadly diseases, such as tuberculosis, pneumonia, and typhus. Americans had built nuclear-powered submarines and were getting ready to go to the moon. All thanks to breakthroughs in technology.

Many recognized that such advances could bring ills as well as comforts. Machines turning against humans has been a staple of science fiction at least since Mary Shelley's *Frankenstein*. More practically but no less ominously, pollution and habitat destruction wrought by industrial production were increasingly prominent, and so was the threat of nuclear war—itsself a result of astonishing developments in applied physics. Nevertheless, the burdens of knowledge were not seen as insurmountable by a generation becoming confident that technology could solve all problems. Humanity was wise enough to control the use of its knowledge, and if there were social costs of being so innovative, the solution was to invent even more useful things. There were lingering concerns about “technological unemployment,” a term coined by the economist John Maynard Keynes in 1930 to capture the possibility that new production methods could reduce the need for human labor and contribute to mass unemployment. Keynes understood that industrial techniques would continue to improve rapidly but also argued, “This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour.”

Keynes was not the first to voice such fears. David Ricardo, another founder of modern economics, was initially optimistic about technology, maintaining that it would steadily increase workers' living standards, and in 1819 he told the House of Commons that “machinery did not lessen the demand for labour.” But for the third edition of his seminal *Principles of Political Economy and Taxation* in 1821, Ricardo added a new chapter, “On Machinery,” in which he wrote, “It is more incumbent on me to declare my opinion on this question, because they have, on further reflection, undergone a considerable change.” As he explained in a private letter that year, “If machinery could do all the work that labour now does, there would be no demand for labour.” But Ricardo's and Keynes's concerns did not have much impact on mainstream opinion. If anything, optimism intensified after personal computers and digital tools started spreading rapidly in the 1980s. By the late 1990s, the possibilities for economic and social advances seemed boundless. Bill Gates was speaking for many in the tech industry at the time when he said, “The [digital] technologies involved here are really a superset of all communications technology that has come along in the past, e.g., radio, newspaper. All of those things will be replaced by something that is far more attractive.”

Not everything might go right all the time, but Steve Jobs, cofounder of Apple, captured the zeitgeist perfectly at a conference in 2007 with what became a famous line: “Let's go and invent tomorrow rather than worrying about yesterday.” In fact, both *Time* magazine's upbeat assessment and subsequent techno-optimism were not

just exaggerated; they missed entirely what happened to most people in the United States after 1980.

In the 1960s, only about 6 percent of American men between the ages of 25 and 54 were out of the labor market, meaning they were long-term unemployed or not seeking a job. Today that number is around 12 percent, primarily because men without a college degree are finding it increasingly difficult to get well-paid jobs.

American workers, both with and without college education, used to have access to “good jobs,” which, in addition to paying decent wages, provided job security and career-building opportunities. Such jobs have largely disappeared for workers without a college degree. These changes have disrupted and damaged the economic prospects for millions of Americans.

An even bigger change in the US labor market over the past half century is in the structure of wages. During the decades following World War II, economic growth was rapid and widely shared, with workers from all backgrounds and skills experiencing rapid growth in real incomes (adjusted for inflation). No longer. New digital technologies are everywhere and have made vast fortunes for entrepreneurs, executives, and some investors, yet real wages for most workers have scarcely increased. People without college education have seen their real earnings decline, on average, since 1980, and even workers with a college degree but no postgraduate education have seen only limited gains.

The inequality implications of new technologies reach far beyond these numbers. With the demise of good jobs available to most workers and the rapid growth in the incomes of a small fraction of the population trained as computer scientists, engineers, and financiers, we are on our way to a truly two-tiered society, in which workers and those commanding the economic means and social recognition live separately, and that separation grows daily. This is what the English writer H. G. Wells anticipated in *The Time Machine*, with a future dystopia where technology had so segregated people that they evolved into two separate species. This is not just a problem in the United States. Because of better protection for low-paid workers, collective bargaining, and decent minimum wages, workers with relatively low education levels in Scandinavia, France, or Canada have not suffered wage declines like their American counterparts. All the same, inequality has risen, and good jobs for people without college degrees have become scarce in these countries as well. It is now evident that the concerns raised by Ricardo and Keynes cannot be ignored. True, there has been no catastrophic technological unemployment, and throughout the 1950s and 1960s workers benefited from productivity growth as much as entrepreneurs and business owners did. But today we are seeing a very different picture, with skyrocketing inequality and wage earners largely left behind as new advances pile up.

In fact, a thousand years of history and contemporary evidence make one thing abundantly clear: there is nothing automatic about new technologies bringing widespread prosperity. Whether they do or not is an economic, social, and political choice.

This book explores the nature of this choice, the historical and contemporary evidence on the relationship among technology, wages, and inequality, and what we can do in order to direct innovations to work in service of shared prosperity. To lay

the groundwork, this chapter addresses three foundational questions:

- What determines when new machines and production techniques increase wages?
- What would it take to redirect technology toward building a better future?
- Why is current thinking among tech entrepreneurs and visionaries pushing in a different, more worrying direction, especially with the new enthusiasm around artificial intelligence?

The bandwagon of progress

Optimism regarding shared benefits from technological progress is founded on a simple and powerful idea: the “productivity bandwagon.” This idea maintains that new machines and production methods that increase productivity will also produce higher wages. As technology progresses, the bandwagon will pull along everybody, not just entrepreneurs and owners of capital. Economists have long recognized that demand for all tasks, and thus for different types of workers, does not necessarily grow at the same rate, so inequality may increase because of innovation.

Nevertheless, improving technology is generally viewed as the tide lifting all boats because everyone is expected to derive some benefits. Nobody is supposed to be completely left behind by technology, let alone be impoverished by it. According to the conventional wisdom, to rectify the rise in inequality and build even more solid foundations for shared prosperity, workers must find a way to acquire more of the skills they need to work alongside new technologies. As succinctly summarized by Erik Brynjolfsson, one of the foremost experts on technology, “What can we do to create shared prosperity? The answer is not to slow down technology. Instead of racing against the machine, we need to race with the machine. That is our grand challenge.”

The theory behind the productivity bandwagon is straightforward: when businesses become more productive, they want to expand their output. For this, they need more workers, so they get busy with hiring. And when many firms attempt to do so at the same time, they collectively bid up wages.

This is what happens, but only sometimes. For example, in the first half of the twentieth century, one of the most dynamic sectors of the US economy was car manufacturing. As Ford Motor Company and then General Motors (GM) introduced new electrical machinery, built more-efficient factories, and launched better models, their productivity soared, as did their employment. From a few thousand workers in 1899, producing just 2,500 automobiles, the industry’s employment rose to more than 400,000 by the 1920s. By 1929, Ford and GM were each selling around 1.5 million cars every year. This unprecedented expansion of automobile production pulled up wages throughout the economy, including for workers without much formal education.

For most of the twentieth century, productivity rose rapidly in other sectors as well, as did real wages. Remarkably, from the end of World War II to the mid-1970s, the wages of college graduates in the US grew at roughly the same rate as the wages of those workers with only a high school education.

Unfortunately, what subsequently occurred is not consistent with the notion that there is any kind of unstoppable bandwagon. How productivity benefits are shared

depends on how exactly technology changes and on the rules, norms, and expectations that govern how management treats workers. To understand this, let us unpack the two steps that link productivity growth to higher wages. First, productivity growth increases the demand for workers as businesses attempt to boost profits by expanding output and hiring more people. Second, the demand for more workers increases the wages that need to be offered to attract and retain employees. Unfortunately, neither step is assured, as we explain in the next two sections.

Automation blues

Contrary to popular belief, productivity growth need not translate into higher demand for workers. The standard definition of productivity is average output per worker—total output divided by total employment. Obviously, the hope is that as output per worker grows, so will the willingness of businesses to hire people. But employers do not have an incentive to increase hiring based on average output per worker. Rather, what matters to companies is *marginal productivity*—the additional contribution that one more worker brings by increasing production or by serving more customers. The notion of marginal productivity is distinct from output or revenue per worker: output per worker may increase while marginal productivity remains constant or even declines. To clarify the distinction between output per worker and marginal productivity, consider this often-repeated prediction: “The factory of the future will have only two employees, a man and a dog. The man will be there to feed the dog. The dog will be there to keep the man from touching the equipment.” This imagined factory could churn out a lot of output, so average productivity—its output divided by the one (human) employee—is very high. Yet worker marginal productivity is minuscule; the sole employee is there to feed the dog, and the implication is that both the dog and the employee could be let go without much reduction in output. Better machinery might further increase output per worker, but it is reasonable to expect that this factory would not rush to hire more workers and their dogs, or increase the pay of its lonely employee.

This example is extreme, but it represents an important element of reality. When a car company introduces a better vehicle model, as Ford and GM did in the first half of the twentieth century, this tends to increase the demand for the company’s cars, and both revenues per worker and worker marginal productivity rise. After all, the company needs more workers, such as welders and painters, to meet the additional demand, and it will pay them more, if necessary. In contrast, consider what happens when the same automaker installs industrial robots. Robots can perform most welding and painting tasks, and can do so more cheaply than production methods employing a larger number of workers. As a result, the company’s average productivity increases significantly, but it has less need for human welders and painters.

This is a general problem. Many new technologies, like industrial robots, expand the set of tasks performed by machines and algorithms, displacing workers who used to be employed in these tasks. Automation raises average productivity but does not increase, and in fact may reduce, worker marginal productivity. Automation is what Keynes worried about, and it was not a new phenomenon when he was writing early in the twentieth century. Many of the iconic innovations of the British industrial revolution in textiles were all about substituting new spinning and weaving machines for the labor of skilled artisans.

What is true of automation is true of many aspects of globalization as well. Major breakthroughs in communication tools and shipping logistics have enabled a massive wave of offshoring over the last several decades, with production tasks such as assembly or customer service being transferred to countries where labor is cheaper. Offshoring has reduced costs and boosted profits for companies such as Apple, whose products are made of parts produced in many countries and are almost entirely assembled in Asia. But in industrialized nations it has also displaced workers who used to perform these tasks domestically and has not activated a powerful bandwagon.

Automation and offshoring have raised productivity and multiplied corporate profits, but have brought nothing resembling shared prosperity to the United States and other developed countries. Replacing workers with machines and moving work to lower-wage countries are not the only options for improving economic efficiency. There are multiple ways of increasing output per worker—and this has been true throughout history, as we explain in chapters 5 through 9. Some innovations boost how much individuals contribute to production, rather than automating or offshoring work. For example, new software tools that aid the tasks of car mechanics and enable greater precision work increase worker marginal productivity. This is completely different from installing industrial robots with the goal of replacing people.

Even more important for raising worker marginal productivity is the creation of new tasks. There was plenty of automation in car manufacturing during the momentous reorganization of the industry led by Henry Ford starting in the 1910s. But mass-production methods and assembly lines simultaneously introduced a range of new design, technical, machine-operation, and clerical tasks, boosting the industry's demand for workers (as we will detail in Chapter 7). When new machines create new uses for human labor, this expands the ways in which workers can contribute to production and increases their marginal productivity. New tasks were vital not just in early US car manufacturing but also in the growth of employment and wages over the last two centuries. Many of the fastest-growing occupations in the last few decades—MRI radiologists, network engineers, computer-assisted machine operators, software programmers, IT security personnel, and data analysts—did not exist eighty years ago. Even people in occupations that have been around for quite a while, such as bank tellers, professors, or accountants, now work on a variety of tasks that did not exist before World War II, including all of those that involve the use of computers and modern communication devices. In almost all these cases, new tasks were introduced as a result of technological advances and have been a major driver of employment growth. These new tasks have also been an integral part of productivity growth, for they have helped launch new products and more efficient reorganization of the production process.

The reason that Ricardo's and Keynes's worst fears about technological unemployment did not come to pass is intimately linked to new tasks. Automation was rapid throughout the twentieth century but did not reduce the demand for workers because it was accompanied by other improvements and reorganizations that produced new activities and tasks for workers. Automation in an industry can also push up employment—in that sector or in the economy as a whole—if it reduces costs or increases productivity by enough. New jobs in this case may come either from nonautomated tasks in the same industry or from the expansion of activities in related industries. In the first half of the twentieth century, the rapid increase in car

manufacturing raised the demand for a range of nonautomated technical and clerical functions. Just as important, productivity growth in car factories during these decades was a major driver for the expansion of the oil, steel, and chemical industries (think gasoline, car bodies, and tires). Car manufacturing at mass scale also revolutionized the possibilities for transportation, enabling the rise of new retail, entertainment, and service activities, especially as the geography of cities transformed.

There will be few new jobs created, however, when the productivity gains from automation are small—what we call “so-so automation” in Chapter 9. For example, self-checkout kiosks in grocery stores bring limited productivity benefits because they shift the work of scanning items from employees to customers. When self-checkout kiosks are introduced, fewer cashiers are employed, but there is no major productivity boost to stimulate the creation of new jobs elsewhere. Groceries do not become much cheaper, there is no expansion in food production, and shoppers do not live differently.

The situation is similarly dire for workers when new technologies focus on surveillance, as Jeremy Bentham’s panopticon intended. Better monitoring of workers may lead to some small improvements in productivity, but its main function is to extract more effort from workers and sometimes also reduce their pay, as we will see in chapters 9 and 10.

There is no productivity bandwagon from so-so automation and worker surveillance. The bandwagon is also weak, even from new technologies that generate nontrivial productivity gains, when these tasks predominantly focus on automation and cast workers aside. Industrial robots, which have already revolutionized modern manufacturing, generate little or no gains for workers when they are not accompanied by other technologies that create new tasks and opportunities for human labor. In some cases, such as the industrial heartland of the American economy in the Midwest, the rapid adoption of robots has instead contributed to mass layoffs and prolonged regional decline.

All of this brings home perhaps the most important thing about technology: *choice*. There are often myriad ways of using our collective knowledge for improving production and even more ways of directing innovations. Will we use digital tools for surveillance? For automation? Or for empowering workers by creating new productive tasks for them? And where will we put our efforts toward future advances? When the productivity bandwagon is weak and there are no self-acting correction mechanisms ensuring shared benefits, these choices become more consequential—and those who make them become more powerful, both economically and politically. In sum, the first step in the productivity bandwagon causal chain depends on specific choices: using existing technologies and developing new ones for increasing worker marginal productivity—not just automating work, making workers redundant, or intensifying surveillance.

Why worker power matters

Unfortunately, even an increase in worker marginal productivity is not enough for the productivity bandwagon to boost wages and living standards for everyone. Recall that the second step in the causal chain is that an increase in the demand for workers induces firms to pay higher wages. There are three main reasons why this may not happen.

The first is a coercive relationship between employer and employed. Throughout much of history, most agricultural workers were unfree, either working as slaves or in other forms of forced labor. When a master wants to obtain more labor hours from his slaves, he does not have to pay them more money. Rather, he can intensify coercion to extract greater effort and more output. Under such conditions, even revolutionary innovations such as the cotton gin in the American South do not necessarily lead to shared benefits. Even beyond slavery, under sufficiently oppressive conditions, the introduction of new technology can increase coercion, further impoverishing slaves and peasants alike, as we will see in Chapter 4.

Second, even without explicit coercion, the employer may not pay higher wages when productivity increases if she does not face competition from rivals. In many early agricultural societies, peasants were legally tied to the land, which meant that they could not seek or accept employment elsewhere. Even in eighteenth-century Britain, employees were prohibited from seeking alternative employment and were often jailed if they tried to take better jobs. When your outside option is prison, employers do not typically offer you generous compensation. History provides plenty of confirmation. In medieval Europe, windmills, better crop rotation, and increased use of horses boosted agricultural productivity. However, there was little or no improvement in the living standards of most peasants. Instead, most of the additional output went to a small elite, and especially to a massive construction boom during which monumental cathedrals were built throughout Europe. When industrial machinery and factories started spreading in Britain in the 1700s, this did not initially increase wages, and there are many instances in which it worsened living standards and conditions for workers. At the same time, factory owners became fabulously wealthy.

Third and most important for today's world, wages are often negotiated rather than being simply determined by impersonal market forces. A modern corporation is often able to make sizable profits thanks to its market position, scale, or technological expertise. For example, when Ford Motor Company pioneered new mass-production techniques and started producing good-quality, cheap cars in the early twentieth century, it also became massively profitable. This made its founder, Henry Ford, into one of the richest businessmen of the early twentieth century. Economists call such megaprofits "economic rents" (or just "rents") to signify that they are above and beyond the prevailing normal return on capital expected by shareholders given the risks involved in such an investment. Once there are economic rents in the mix, wages for workers are not simply determined by outside market forces but also by potential "rent sharing"—their ability to negotiate some part of these profits.

One source of economic rents is market power. In most countries, there is a limited number of professional sports teams, and entry into the sector is typically constrained by the amount of capital required. In the 1950s and 1960s, baseball was a profitable business in the US, but players were not highly paid, even as revenues from television broadcasts poured in. This changed starting in the late 1960s because the players found ways to increase their bargaining power. Today, the owners of baseball teams still do well, but they are forced to share much more of their rents with the athletes.

Employers may also share rents to cultivate goodwill and motivate employees to work harder, or because prevailing social norms convince them to do so. On January 5, 1914, Henry Ford famously introduced a minimum pay of five dollars per day to

reduce absenteeism, to improve retention of workers, and presumably to reduce the risk of strikes. Many employers have since tried something similar, particularly when it is hard to hire and retain people or when motivating employees turns out to be critical for corporate success.

Overall, Ricardo and Keynes may not have been right on every detail, but they correctly understood that productivity growth does not necessarily, automatically deliver broad-based prosperity. It will do so only when new technologies increase worker marginal productivity and the resulting gains are shared between firms and workers.

Even more fundamentally, these outcomes depend on economic, social, and political choices. New techniques and machines are not gifts descending unimpeded from the skies. They can focus on automation and surveillance to reduce labor costs. Or they can create new tasks and empower workers. More broadly, they can generate shared prosperity or relentless inequality, depending on how they are used and where new innovative effort is directed. In principle, these are decisions a society should make, collectively. In practice, they are made by entrepreneurs, managers, visionaries, and sometimes political leaders, with defining effects on who wins and who loses from technological advances.

Optimism, with caveats

Even though inequality has skyrocketed, many workers have been left behind, and the productivity bandwagon has not come to the rescue in recent decades, we have reasons to be hopeful. There have been tremendous advances in human knowledge, and there is ample room to build shared prosperity based on these scientific foundations—if we start making different choices about the direction of progress.

Techno-optimists have one thing right: digital technologies have already revolutionized the process of science. The accumulated knowledge of humanity is now at our fingertips. Scientists have access to incredible measurement tools, ranging from atomic force microscopes to magnetic resonance imagery and brain scans. They also have the computing power to crunch vast amounts of data in a way that even thirty years ago would have seemed like fantasy.

Scientific inquiry is cumulative, with inventors building on each other's work. Unlike today, knowledge used to diffuse slowly. In the 1600s, scholars such as Galileo Galilei, Johannes Kepler, Isaac Newton, Gottfried Wilhelm Leibniz, and Robert Hooke shared their scientific discoveries in letters that took weeks or even months to reach their destination. Nicolaus Copernicus's heliocentric system, which correctly placed Earth in the orbit of the sun, was developed during the first decade of the sixteenth century. Copernicus had written out his theory by 1514, even if his most widely read book, *On the Revolutions of the Celestial Spheres*, was published only in 1543. It took almost a century from 1514 for Kepler and Galileo to build on Copernicus's work and more than two centuries for the ideas to become widely accepted. Today, scientific discoveries travel at lightning speed, especially when there is a pressing need. Vaccine development usually takes years, but in early 2020 Moderna, Inc., invented a vaccine just forty-two days after receiving the recently identified sequence of the SARS-CoV-2 virus. The entire development, testing, and authorization process took less than one year, resulting in remarkably safe and effective protection against severe illness

caused by COVID. The barriers to sharing ideas and spreading technical know-how have never been lower, and the cumulative power of science has never been stronger.

However, to build on these advances and turn them to work for the betterment of billions of people around the world, we need to redirect technology. This must start by confronting the blind techno-optimism of our age and then developing new ways to use science and innovation.

The good and the bad news is that how we use knowledge and science depends on vision—the way that humans understand how they can turn knowledge into techniques and methods targeted at solving specific problems. Vision shapes our choices because it specifies what our aspirations are, what means we will pursue to achieve them, what alternative options we will consider and which ones we will ignore, and how we perceive the costs and benefits of our actions. In short, it is how we imagine technologies and their gifts, as well as the potential damage.

The bad news is that even at the best of times, the visions of powerful people have a disproportionate effect on what we do with our existing tools and the direction of innovation. The consequences of technology are then aligned with their interests and beliefs, and often prove costly to the rest. The good news is that choices and visions can change.

A shared vision among innovators is critical for the accumulation of knowledge and is also central to how we use technology. Take the steam engine, which transformed Europe and then the world economy. Rapid innovations from the beginning of the eighteenth century built on a common understanding of the problem to be solved: to perform mechanical work using heat. Thomas Newcomen built the first widely used steam engine, sometime around 1712. Half a century later, James Watt and his business partner Matthew Boulton improved Newcomen's design by separating the condenser and producing a more effective and commercially much more successful engine.

The shared perspective is visible in what these innovators were trying to achieve and how: using steam to push a piston back and forth inside a cylinder to generate work and then increasing the efficiency of these engines so that they could be used in a variety of different applications. A shared vision not only enabled them to learn from each other but meant that they approached the problem in similar ways. They predominantly focused on what is called the atmospheric engine, in which condensed steam creates a vacuum inside the cylinder, allowing atmospheric pressure to push the piston. They also collectively ignored other possibilities, such as high-pressure steam engines, first described by Jacob Leupold in 1720. Contrary to the eighteenth-century scientific consensus, high-pressure engines became the standard in the nineteenth century.

The early steam engine innovators' vision also meant that they were highly motivated and did not pause to reflect on the costs that the innovations might impose—for example, on very young children sent to work under draconian conditions in coal mines made possible by improved steam-powered drainage. What is true of steam engines is true of all technologies. Technologies do not exist independent of an underlying vision. We look for ways of solving problems facing us (this is vision). We imagine what kind of tools might help us (also vision). Of the multiple paths open to us, we focus on a handful (yet another aspect of vision). We then attempt alternative approaches, experimenting and innovating based on that

understanding. In this process, there will be setbacks, costs, and almost surely unintended consequences, including potential suffering for some people. Whether we are discouraged or even decide that the responsible thing is to abandon our dreams is another aspect of vision.

But what determines which technology vision prevails? Even though the choices are about how best to use our collective knowledge, the decisive factors are not just technical or what makes sense in a pure engineering sense. Choice in this context is fundamentally about power—the power to persuade others, as we will see in Chapter 3—because different choices benefit different people. Whoever has greater power is more likely to persuade others of their perspective, which is most often aligned with their interests. And whoever succeeds in turning their ideas into a shared vision gains additional power and social standing. Do not be fooled by the monumental technological achievements of humankind. Shared visions can just as easily trap us. Companies make the investments that management considers best for their bottom line. If a company is installing, say, new computers, this must mean that the higher revenues they generate more than make up for the costs. But in a world in which shared visions guide our actions, there is no guarantee that this is indeed the case. If everybody becomes convinced that artificial-intelligence technologies are needed, then businesses will invest in artificial intelligence, even when there are alternative ways of organizing production that could be more beneficial. Similarly, if most researchers are working on a particular way of advancing machine intelligence, others may follow faithfully, or even blindly, in their footsteps.

These issues become even more consequential when we are dealing with “general-purpose” technologies, such as electricity or computers. General-purpose technologies provide a platform on which myriad applications can be built and potentially generate benefits—but sometimes also costs—for many sectors and groups of people. These platforms also allow widely different trajectories of development.

Electricity, for instance, was not just a cheaper source of energy; it also paved the way to new products, such as radios, household appliances, movies, and TVs. It introduced new electrical machinery. It enabled a fundamental reorganization of factories, with better lighting, dedicated sources of power for individual machinery, and the introduction of new precision and technical tasks in the production process. Advances in manufacturing based on electricity increased demand for raw materials and other industrial inputs, such as chemicals and fossil fuels, as well as retail and transport services. They also launched novel products, including new plastics, dyes, metals, and vehicles, that were then used in other industries. Electricity has also paved the way for much greater levels of pollution from manufacturing production.

Although general-purpose technologies can be developed in many different ways, once a shared vision locks in a specific direction, it becomes difficult for people to break out of its hold and explore different trajectories that might be socially more beneficial. Most people affected by those decisions are not consulted. This creates a natural tendency for the direction of progress to be socially biased—in favor of powerful decision makers with dominant visions and against those without a voice. Take the decision of the Chinese Communist Party to introduce a social credit system that collects data on individuals, businesses, and government agencies to keep track of their trustworthiness and whether they abide by the rules. Initiated at the local level in 2009, it aspires to blacklist people and companies nationally because of their

speech or social media posts that go against the party's preferences. This decision, which affects the lives of 1.4 billion people, was taken by a few party leaders. There was no consultation with those whose freedom of speech and association, education, government jobs, ability to travel, and even likelihood of getting government services and housing are now being shaped by the system.

This is not something that happens only in dictatorships. In 2018 Facebook founder and CEO Mark Zuckerberg announced that the company's algorithm would be modified to give users "meaningful social interactions." What this meant in practice was that the platform's algorithm would prioritize posts from other users, especially family and friends, rather than news organizations and established brands. The purpose of the change was to increase user engagement because people were found to be more likely to be drawn to and click on posts by their acquaintances. The main consequence of the change was to amplify misinformation and political polarization, as lies and misleading posts spread rapidly from user to user. The change did not just affect the company's then almost 2.5 billion users; billions more people who were not on the platform were also indirectly affected by the political fallout from the resulting misinformation. The decision was made by Zuckerberg; the company's chief operating officer, Sheryl Sandberg; and a few other top engineers and executives. Facebook users and citizens of affected democracies were not consulted.

What propelled the Chinese Communist Party's and Facebook's decisions? In neither case were they dictated by the nature of science and technology. Nor were they the obvious next step in some inexorable march of progress. In both cases you can see the ruinous role of interests—to quash opposition or to increase advertising revenues. Equally central was their leadership's vision for how communities should be organized and what should be prioritized. But even more important was how technology was used for control: over the political views of the population in the Chinese case, and people's data and social activities for Facebook. This is the point that, with the advantage of an additional 275 years of human history to draw on, H. G. Wells grasped and Francis Bacon missed: technology is about control, not just over nature but often over other humans. It is not simply that technological change benefits some more than others. More fundamentally, different ways of organizing production enrich and empower some people and disempower others.

The same considerations are equally important for the direction of innovation in other contexts. Business owners and managers may often wish to automate or increase surveillance because this enables them to strengthen their control over the production process, save on wage costs, and weaken the power of labor. This demand then translates into incentives to focus innovation more on automation and surveillance, even when developing other, more worker-friendly technologies could increase output more and pave the way to shared prosperity.

In these instances, society may even become gripped by visions that favor powerful individuals. Such visions then help business and technology leaders pursue plans that increase their wealth, political power, or status. These elites may convince themselves that whatever is good for them is also best for the common good. They may even come to believe that any suffering that their virtuous path generates is a price well worth paying for progress—especially when those bearing the brunt of the costs are voiceless. When thus inspired by a selfish vision, leaders deny that there are many different paths with widely different implications. They may even become incensed when alternatives are pointed out to them. Is there no remedy against

ruinous visions imposed on people without their consent? Is there no barrier against the social bias of technology? Are we locked in a constant cycle of one overconfident vision after another shaping our future while ignoring the damage? No. There is reason to be hopeful because history also teaches us that a more inclusive vision that listens to a broader set of voices and recognizes the effects on everyone is possible. Shared prosperity is more likely when countervailing powers hold entrepreneurs and technology leaders accountable—and push production methods and innovation in a more worker-friendly direction. Inclusive visions do not avoid some of the thorniest questions, such as whether the benefits that some reap justify the costs that others suffer. But they ensure that social decisions recognize their full consequences and without silencing those who do not gain. Whether we end up with selfish, narrow visions or something more inclusive is also a choice. The outcome depends on whether there are countervailing forces and whether those who are not in the corridors of power can organize and have their voices heard. If we want to avoid being trapped in the visions of powerful elites, we must find ways of countering power with alternative sources of power and resisting selfishness with a more inclusive vision. Unfortunately, this is becoming harder in the age of artificial intelligence.

Panel on “Future of crypto”

Remarks by Hilary J Allen

Hilary J Allen, Professor of Law and the Associate Dean for Scholarship, American University Washington College of Law

Before formulating crypto policy, it is critically important that policymakers engage with the preliminary question “why would we want to proceed with blockchain-based finance at all?” Unfortunately, many have been so dazzled by the crypto hype that they have failed to reckon with this and other preliminary but fundamental questions like, “what is the actual problem we want to solve?” Or “what is the benefit of this technology, and who could potentially be harmed by it?” Once policymakers really engage with these fundamental questions, hype around blockchain-based finance dissolves pretty quickly.

There are many reasons to be sceptical of blockchain-based finance, some of which I have articulated [here](#) and [here](#). This presentation focused on the inherent limitations of the underlying public blockchain technology, which are often glossed over. The presentation also explored how crypto proponents are seeking to coopt the law to help foster a market for crypto that the industry is struggling to sustain on its own.

By now, we have all heard a lot of hype about how crypto and the underlying public blockchain technology decentralise or democratise finance. It purports to do this by deploying technology that is controlled by multiple nodes instead of relying on centralised intermediaries. But even when a system has lots of nodes, if someone controls most of the nodes, they can control the system. In other words, blockchain’s technological decentralisation does nothing to guarantee economic decentralisation – and concentration of economic power in crypto is often worse than in traditional financial markets.

Blockchain-based finance will never be meaningfully decentralised from an economic perspective. As things scale up, the need for centralised governance (particularly to deal with unexpected events) becomes inescapable, and those who can profit from control will take it. We’ve had the “technology” for decentralised organisations for hundreds of years – a general partnership could theoretically work without centralised economic control. But economic decentralisation doesn’t work at scale, for general partnerships, for the operation of blockchains themselves, or for the apps that run on a blockchain.

The decentralisation rhetoric around blockchains is therefore misleading, and often disingenuous. The crypto industry has been built with funding from venture capital firms, and if new intermediaries couldn’t profit handsomely in the space, why would venture capital firms pursue it so aggressively?

Public blockchain technology is also insuperably inefficient and subject to all kinds of new fragilities that make it a terrible financial market infrastructure. The consensus mechanisms used to verify public blockchain transactions are inherently inefficient and wasteful – they have to be, by definition, or else it would be far too easy for a bad actor to take over. So blockchains can’t process large volumes of

transactions, and the delays and transaction fees can be significant at peak times – inefficiency and waste is a feature, not a bug, and cannot be fixed without moving a significant amount of activity “off-chain” (in other words, using private order books just like traditional finance already does – in which case, what’s the point?).

Still, blockchain technology is often marketed as enhancing efficiency. Part of this is just bluster, although there are some efficiency gains that come from skipping legal compliance requirements (like know-your-customer checks). We should ask whether efficiency gains from evading the law are really socially desirable, though – if they are, perhaps the law should be changed for everyone. There are also claims that efficiency gains arise because there is no clearing or reconciliation step on a blockchain. Although a lot of activity occurs off-chain, if we take the claim at face value, that means there’s no netting on a blockchain. Without netting, the volume of transactions will far exceed what centralised financial infrastructure needs to process, and that volume of transactions must be processed by infrastructure that is inherently less efficient than centralised alternatives.

In evaluating public blockchains as potential financial market infrastructure, it is also important to reckon with the reality of software degradation. Blockchains are software that require monitoring and maintenance or else they will decay and develop security vulnerabilities – this raises the important question, “who is going to invest time and effort in maintaining the resilience of public blockchains?” As a point of reference, the Wall Street Journal recently reported that the Bitcoin blockchain currently depends on five people funded with sponsored grants to maintain its code. For each public blockchain, we would want to know who the core software developers are, what powers do they have, how are they chosen, are they compensated, and if so by whom? Who determines when a software update is needed, who ensures that it is developed, and who ensures that miners/validators will accept it? Can developers/miners/validators be counted on to get the infrastructure up and running in a timely manner after an outage? What if they simply lose interest in maintaining the blockchain – could the digital assets native to that blockchain become stranded?

I’ve now outlined just a few of the reasons why public blockchain-based finance has many new fragilities, and cannot deliver on promises of decentralisation that might be invoked to justify such fragilities. The good news is that thus far, traditional financial services providers have not relied on public blockchains in any meaningful way, and policymakers have generally not allowed crypto to integrate with the traditional financial system.

In my paper *DeFi: Shadow Banking 2.0?*, I focus on how the destabilising forces of complexity, leverage, rigidity and runs in traditional finance are replicated and sometimes exacerbated in blockchain-based finance: I argue that allowing crypto and traditional finance to integrate would be highly dangerous from a financial stability perspective. In the United States, however, we continue to see legislative proposals designed to legitimise crypto and presumably allow banks and mutual funds to invest in it, or to allow stablecoins to have access to government safety nets like a lender of last resort. The silver lining to FTX’s failure last November is that it dampened enthusiasm for this kind of legislation, but momentum is building again.

The irony of this is that most consumers are now very wary of crypto, and even some of the venture capital firms who have been supporting crypto seem to be pivoting towards AI-based investments. It is an open question whether crypto can

survive as anything other than a niche hobby without consumer demand or VC war chests – unless the law makes it a legitimate investment for the traditional financial sector. If that happens, then I fear that we will all be exposed to the vulnerabilities of Shadow Banking 2.0.

Remarks by Jón Daniélsson

Jón Daniélsson, Director of the Systemic Risk Centre, London School of Economics and Political Science

Crypto currencies remain as divisive as ever. The community of crypto supporters seems irrevocably split on whether crypto should remain true to its anti-establishment roots or integrate into the mainstream financial system, while the financial authorities are unsure if crypto should be extinguished, ignored or harnessed for good.

Regardless of how that plays out, crypto currencies are set to leave a fine legacy. The infrastructure of the financial system, the plumbing that is both so essential and usually ignored, remained a niche area of study before crypto, appreciated by the incumbents benefiting from rent extraction.

A key promise of crypto currencies is a more efficient payment system. The flow of new ideas from the crypto world exposes how costly, fragile and inefficient the existing payment system is. Meanwhile, the threat of payments made with digital tokens, overseen by smart contracts but not under the control of any national government, has compelled many authorities to enhance the payment system and remains the primary motivator of central bank digital currencies. Brazil's PIX and India's UPI are excellent examples of what the financial authorities can accomplish when sufficiently motivated.

While the authorities have upped their game, crypto remains strong. Along the way, both the public and private sectors face major challenges. The private sector crypto proponents need to decide on whether to embrace the mainstream financial system or stay as far away from it as possible, while the authorities need to commit themselves to embrace, ignore or extinguish crypto.

Even if an improved payment system is the most visible part of the crypto discussion, crypto currencies are in essence a political movement with a much broader mission. Satoshi Nakamoto's original Bitcoin paper (2008) argues that technology can solve broad problems of the existing financial order, and the adoption of Bitcoin and other crypto currencies has been driven by techno-libertarians who see crypto as the solution to a corrupt and inefficient financial system. While they remain a small fraction of crypto promoters, they have been critical to its success. Without the crypto-libertarians, crypto currencies would never have taken off, and without their continued advocacy, crypto would likely be much less visible and, hence, successful.

Crypto has undergone two phases in its 14-year history and is entering the third. During the first phase, from 2009, when Bitcoin was created, to the end of 2018, crypto stayed outside the mainstream financial system, benefiting from significant price increases, as the price of Bitcoin rose from four US cents to over \$20,000.

The primary transactional use of crypto in the first phase was criminality because of its purported, but never true, promise of private transactions not monitored by law enforcement. Law enforcement was the only government authority that paid close attention to crypto in its first phase.

I choose 2018 as signalling a phase change since that is both when the extremely rapid crypto price rises took hold but also since crypto has never posed more danger to macro and micro stability than in 2018.

Since 2018, crypto has entered the mainstream in its second, more stable phase. Its prices are basically the same today as they were then, and there has been an explosion of technological developments, not least with stablecoins. The financial authorities have started to pay attention, requiring most crypto exchanges to adhere to the law-enforcement-like aspects of financial regulations: anti-money laundering, sanctions and know-your-customer rules.

Crypto is now entering its third and what I think is its final phase, facing stronger threats than ever.

The crypto community is, perhaps irrevocably, split. Crypto businesses are trying hard to fully integrate into the mainstream financial system, desiring it to be regulated like any other financial activity. That is, of course, a red flag to the crypto libertarians, and it will be interesting to observe how the increasingly fractured crypto world evolves. Perhaps crypto will fork into mainstream and non-official versions.

The financial authorities are also split, with three directions mooted. One might be termed control and extinguish, while the more colourful crypto-community labels it "Operation Chokepoint 2". The aim is to manage crypto and limit its adoption as much as possible, sometimes discussed as pouring sand in the works. We see that both with the SEC's outspoken anti-crypto stance in the United States and the less public but more successful European anti-crypto regulations.

The control and extinguish approach is misguided both politically and technically. Anti-crypto measures give ammunition to the crypto libertarians who drive crypto adoption and see the central banks and the private sector as corrupt and inefficient. Many agree with that sentiment, even if they don't have a view on crypto. Stifling progress and perceived unfair treatment of crypto will increase support for crypto and risk it becoming a totem for populists on the left and the right, giving the anti-establishment a shared cause, fuelling crypto rather than eliminating it.

The prudent strategy for those wishing to eradicate crypto currencies is to ask why crypto continues to gain traction and what policies will reduce its attraction, depriving it of the oxygen that permits it to flourish.

Such a constructive policy approach recognises that crypto can be a force for good, even when preferring a fiat monetary system. Crypto drives welcome financial innovation, attracting the attention of high-quality researchers and bringing much needed discipline to the incumbents, enhancing the efficiency of the financial system and reducing rent extraction.

We can see the benefits of crypto in the competition between stable coins and central bank digital currencies. Both aim at the same market and have similar technical underpinnings, strengths and weaknesses. The competition between the two can only lead to a more efficient system of financial intermediation.

Crypto currencies are at a crossroads as they enter their third phase. Will crypto enter the mainstream or split? The government may try to put it out of business or take advantage of the opportunities it affords.

It would be a mistake for the authorities to suppress crypto, as that will likely be counterproductive and fuel the anti-establishment sentiments so fundamental to crypto success. The optimal official strategy is for crypto to exist outside the mainstream financial system and continue to challenge it.

Crypto's greatest legacy is that it has opened our eyes to the inefficiencies and rent extraction of the present arrangement. In the process, strongly motivating the incumbents and the financial authorities to improve the payment infrastructure to the benefit of us all.

Remarks by Fabio Panetta: Paradise lost? How crypto failed to deliver on its promises and what to do about it

Fabio Panetta, Member of the Executive Board, European Central Bank

Introduction

Some 15 years ago, software developers using the pseudonym Satoshi Nakamoto created the source code of what they thought could be decentralised digital cash.⁵ Since then, crypto has relied on constantly creating new narratives to attract new investors, revealing incompatible views of what cryptoassets are or ought to be.

The vision of digital cash – of a decentralised payment infrastructure based on cryptography – went awry when blockchain networks became congested in 2017, resulting in soaring transaction fees.⁶

Subsequently, the narrative of digital gold gained momentum, sparking a “crypto rush” that led to one in five adults in the United States and one in 10 in Europe speculating on crypto, with a peak market capitalisation of €2.5 trillion.⁷

However, this illusion of cryptoassets serving as easy money and a robust store of value dissipated with the onset of the crypto winter in November 2021. The fall in the price of cryptos (Graph 1) led to a decrease of around €2 trillion worth of crypto assets within less than a year. This caught millions of investors unprepared.⁸ An estimated three quarters of bitcoin users suffered losses on their initial investments at this time.⁹

⁵ See S Nakamoto, “[Bitcoin: A peer-to-peer electronic cash system](#)”, *bitcoin.org*, 2008.

⁶ To maintain a system of decentralised consensus on a blockchain, self-interested validators need to be rewarded for recording transactions. In order to achieve sufficiently high rewards, the number of transactions per block needs to be limited. As transactions near this limit, congestion increases the cost of transactions exponentially. See F Boissay, G Cornelli, S Doerr and J Frost, “[Blockchain scalability and the fragmentation of crypto](#)”, *BIS Bulletin*, no 56, 7 June 2022.

⁷ It should be noted that holdings of cryptoassets are often concentrated in the hands of a few holders who could influence supply and prices. Moreover, some investments are the proceeds of illicit activities, which may be price-elastic.

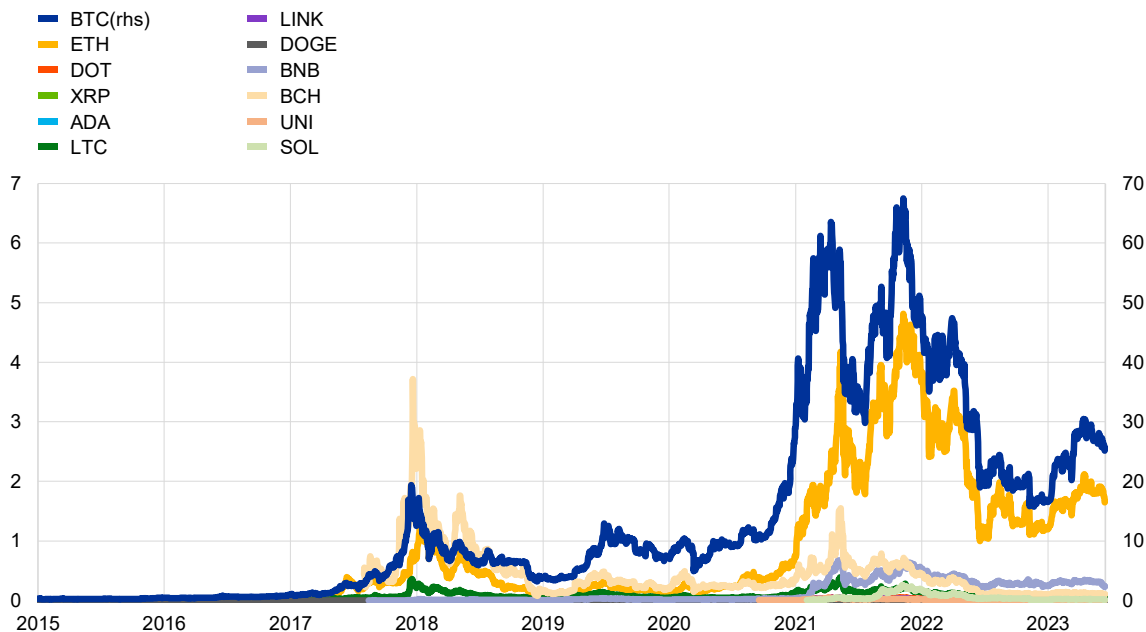
⁸ The market capitalisation of cryptoassets fell from a peak of around €2.68 trillion on 10 November 2021 to €801 billion on 2 July 2022. By 14 June 2023 it stood at €978 billion. Source: CoinMarketCap.

⁹ See R Auer, G Cornelli, S Doerr, J Frost and L Gambacorta “[Crypto trading and Bitcoin prices: evidence from a new database of retail adoption](#)”, *BIS Working Papers*, no 1049, November 2022.

Prices of bitcoin and selected altcoins

USD thousands

Graph 1



¹ The data are for the period from 1 January 2015 to 15 June 2023 and are based on the price of cryptoassets as in the Crypto Coin Comparison Aggregated Index (CCCAGG) provided by CryptoCompare. The altcoins' names are abbreviated as follows: Bitcoin (BTC), Ether (ETH), Polkadot (DOT), Ripple (XRP), Cardano (ADA), Litecoin (LTC), Chainlink (LINK), Dogecoin (DOGE), Binance Coin (BNB), Bitcoin Cash (BCH), Uniswap (UNI), Solana (SOL).

Source: CryptoCompare.

Understandably, many are now questioning the future of cryptoassets.

But the bursting of the bubble does not necessarily spell the end of cryptoassets.¹⁰ People like to gamble and investing in crypto offers them a way to do so.¹¹

Crypto valuations are highly volatile, reflecting the absence of any intrinsic value. This makes them particularly sensitive to changes in risk appetite and market narratives. The recent developments that have affected leading cryptoasset exchanges have highlighted the contradictions of a system which, though created to counteract the centralisation of the financial system, has become highly centralised itself.

Today I will contend that due to their limitations, cryptos have not developed into a form of finance that is innovative and robust, but have instead morphed into one that is deleterious. The crypto ecosystem is riddled with market failures and negative externalities, and it is bound to experience further market disruptions unless proper regulatory safeguards are put in place.

¹⁰ See F Panetta, "[Caveat emptor does not apply to crypto](#)", *The ECB Blog*, 5 January 2023.

¹¹ See F Panetta, "[Crypto dominos: the bursting crypto bubbles and the destiny of digital finance](#)", speech at the Insight Summit, London Business School, 7 December 2022.

Policymakers should be wary of supporting an industry that has so far produced no societal benefits and is increasingly trying to integrate into the traditional financial system, both to acquire legitimacy as part of that system and to piggyback on it. Instead, regulators should subject cryptos to rigorous regulatory standards, address their social cost, and treat unsound crypto models for what they truly are: a form of gambling.

This may prompt the ecosystem to make more effort to provide genuine value in the field of digital finance.

Shifting narratives: from decentralised payments to centralised gambling

The core promise of cryptos is to replace trust with technology, contending that the concept “code is law” will allow a self-policing system to emerge, free of human judgment and error. This would in turn make it possible for money and finance to operate without trusted intermediaries.

However, this narrative often obfuscates reality. Unbacked cryptos have made no inroads into the conventional role of money. And they have progressively moved away from their original goal of decentralisation to increasingly rely on centralised solutions and market structures. They have become speculative assets,¹² as well as a means of circumventing capital controls, sanctions or financial regulation.

Blockchain limitations

A key reason why cryptos have failed to make good on their claim to perform the role of money is technical. Indeed, the use of blockchain – particularly in the form of public, permissionless blockchain – for transacting cryptoassets has exhibited significant limitations.¹³

Transacting cryptos on blockchains can be inefficient, slow and expensive; they face the blockchain trilemma, whereby aiming for optimal levels of security, scalability and decentralisation at the same time is not achievable.¹⁴

Cryptoassets relying on a proof-of-work validation mechanism, which is especially relevant for bitcoin as the largest cryptoasset by market capitalisation,¹⁵ are ecologically detrimental. Public authorities will therefore need to evaluate whether the outside carbon footprint of certain cryptoassets undermines their green transition commitments.¹⁶ Moreover, proof-of-work validation mechanisms are inadequate for

¹² Episodes of fraud, human error and manipulation have eroded the trust of crypto enthusiasts, leading to calls for scrutiny, oversight and public intervention. Research and analysis show that fully decentralised setups are often concentrated on a small number of holders or require other types of human intervention. This makes them prone to manipulation and risks. See for example, S Sayeed and H Marco-Gisbert, “[Assessing Blockchain consensus and security mechanisms against the 51% attack](#)”, *Applied Sciences*, vol 9, no 9, April 2019.

¹³ Blockchain technology may, however, be well suited to other areas, for instance, supply chain management.

¹⁴ See S Shukla, “[The ‘blockchain trilemma’ that’s holding back crypto](#)”, *The Washington Post*, 11 September 2022.

¹⁵ As of 14 June, Bitcoin had a market capitalisation of €465.92 billion. Source: CoinGecko.

¹⁶ See I Gschossmann, A van der Kraaij, P-L Benoit and E Rocher, “[Mining the environment – is climate risk priced into crypto-assets?](#)”, *ECB Macroeprudential Bulletin*, 11 July 2022.

large-scale use.¹⁷ Bitcoin, for example, can only accommodate up to seven transactions per second and fees can be exorbitant.

While alternative solutions for overcoming the blockchain trilemma and proof-of-work consensus shortcomings have emerged for faster and more affordable transactions, including those outside the blockchain, they have drawbacks of their own. “Off-chain” transactions conducted via third-party platforms compromise the core principles of cryptoassets, including security, validity and immutability.¹⁸ Another important aspect is the operational risk inherent in public blockchains due to the absence of an accountable central governance body that manages operations, incidents or coding errors.¹⁹

Moreover, the handling of cryptoassets can be challenging. In a decentralised blockchain, users must protect their personal keys using self-custody wallets, which can discourage widespread adoption due to the tasks and risks involved, for example the theft or loss of a key. Given the immutability of blockchains, they do not permit transaction reversal.²⁰

Instability

Another key limitation of unbacked cryptos is their instability.

Unbacked cryptos lack intrinsic value and have no backing reserves or price stabilisation mechanisms.²¹ This makes them inherently highly volatile and unsuitable as a means of payment. Bitcoin, for instance, exhibits volatility levels up to four times higher than stocks or gold (Graph 2).

¹⁷ Moreover, Makarov and Schoar show that bitcoin mining is highly concentrated: the top 10% of miners control 90% of mining capacity and just 0.1% (about 50 miners) control close to 50% of mining capacity. Alternatively, blockchains based on proof of stake are faster, but also tend towards centralisation, as larger coin holders can reap more rewards, concentrating power and the risk of 51% attacks. See I Makarov and A Schoar, “Blockchain analysis of the bitcoin market”, *NBER Working Papers*, no 29396, April 2022.

¹⁸ See X Soares, “On-chain vs. off-chain transactions: what’s the difference?”, *CoinDesk*, 11 May 2023.

¹⁹ See A Walch, “Open-source operational risk: should public blockchains serve as financial market infrastructures?”, in D Chuen and R Deng (eds), *Handbook of Blockchain, Digital Finance, and Inclusion*, vol 2, Academic Press, 2018, Chapter 11, pp 243–69.

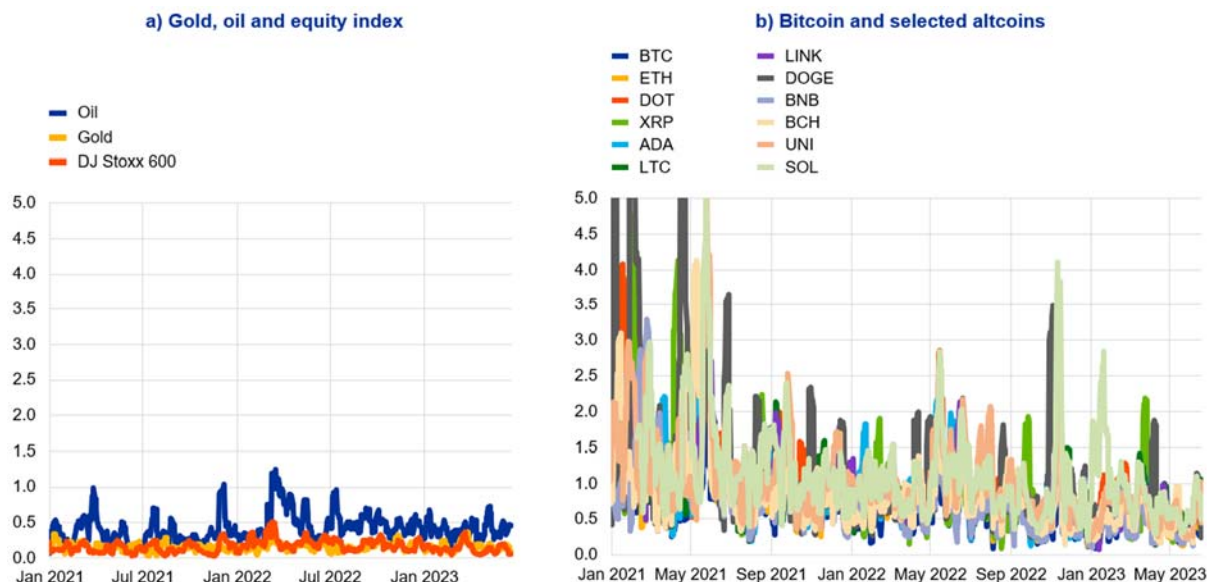
²⁰ Moreover, the fact that data stored on the blockchain are immutable and transparent may put the technology in conflict with digital privacy rights.

²¹ In the absence of flexible supply mechanisms, unbacked cryptos are incapable of effectively responding to temporary fluctuations in demand and thus fail to stabilise their value. Similarly, Bitcoin’s limited supply – at 21 million coins – means that it does not offer protection against the risk of structural deflation.

Price volatility of cryptos compared with other assets

Annualised seven-day rolling standard deviation of daily percentage changes of prices

Graph 2



¹ The data are for the period from 1 January 2015 to 15 June 2023. For visibility reasons, the maximum of the y-axis for Graph 2, panel b is set to 5. Nevertheless, on 30 and 31 January 2021 the price volatility of DOGE exceeded 28. Oil data refer to the European Brent Spot price. The altcoins' names are abbreviated as follows: Bitcoin (BTC), Ether (ETH), Polkadot (DOT), Ripple (XRP), Cardano (ADA), Litecoin (LTC), Chainlink (LINK), Dogecoin (DOGE), Binance Coin (BNB), Bitcoin Cash (BCH), Uniswap (UNI), Solana (SOL).

Sources: CryptoCompare, Bloomberg, Refinitiv and ECB calculations.

Such high volatility also means that households cannot rely on cryptoassets as a store of value to smooth their consumption over time. Similarly, firms cannot rely on cryptoassets as a unit of account for the calculation of prices or for their balance sheet.

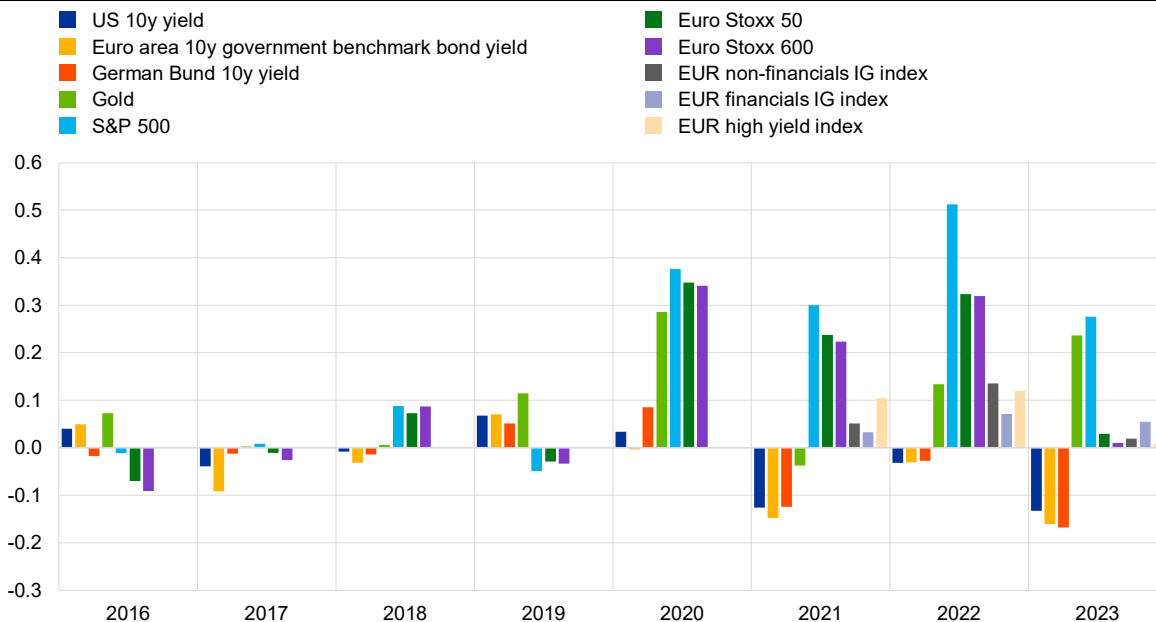
Moreover, unbacked cryptos do not improve our capacity to hedge against inflation. Indeed, their price developments exhibit an increasing correlation with stock markets (Graph 3). And empirical analysis finds that momentum in the cryptoasset market and global financial market volatility do have an impact on bitcoin trading against fiat currencies.²²

²² P Di Casola, M Habib and D Tercero-Lucas, "Global and local drivers of Bitcoin trading vis-à-vis fiat currencies", *ECB Working Paper Series*, 2023 (forthcoming).

Returns correlations of bitcoin vis-à-vis selected financial assets

Yearly rolling correlation

Graph 3



¹ The data are for the period from 1 January 2016 to 16 June 2023.

Sources: Bloomberg, S&P Global iBoxx, CryptoCompare and ECB calculations.

Cryptos as a means of gambling and circumvention

But the very instability of unbacked cryptos does make them appealing as a means of gambling. And their use as such has been facilitated by the establishment of a centralised market structure that supports the broader use of cryptoassets.²³

Crypto exchanges have become gateways into the crypto ecosystem, often providing user access to crypto markets in conjunction with other services like wallets, custody, staking²⁴ or lending. Off-chain grids or third-party platforms have offered users easy and cost-effective ways to engage in trading and speculation, while

²³ The industry's trend towards centralisation is clear. Since 2015 approximately 75% of the actual bitcoin volume has been associated with exchanges or exchange-like entities, including online wallets, over-the-counter (OTC) desks and large institutional traders. See Makarov and Schoar (2022), op cit.

²⁴ Staking is the foundation of the proof-of-stake consensus mechanism, which entails individuals locking up their assets (native coins) on a blockchain to secure the protocol. The stake acts as a form of collateral to ensure that validators, who are responsible for verifying and appending the blockchain, act in a manner that is in line with the protocol's rules. See N Oderbolz, B Marosvölgy and M Hafner, "The economics of crypto staking", *Swiss Economics Blog*, 1 March 2023.

stablecoins are being used to bridge the gap between fiat and crypto by promising a stable value relative to fiat currency.²⁵

Besides gambling, crypto assets are also being used for bypassing capital controls, sanctions and traditional financial regulation. A prime example is bitcoin, which is used to circumvent taxes and regulations, in particular to evade restrictions on international capital flows and foreign exchange transactions, including on remittances.²⁶ These practices may have destabilising macroeconomic implications in some jurisdictions, notably in developing and emerging markets.

Risks from the growing centralisation of the crypto ecosystem

The crypto ecosystem's move away from its original goals towards more centralised forms of organisation, typically without regulatory oversight, is giving rise to substantial costs and an array of contradictions. There are two major facets to this phenomenon.

The re-emergence of classic financial sector shortcomings and vulnerabilities

First, dependence on third-party intermediaries, many of which are still unregulated, has resulted in market failures and negative externalities, which crypto was initially designed to sidestep.

The crypto ecosystem, for instance, has cultivated its own concentration risks, with stablecoins assuming a key role in trading and liquidity provision within decentralised finance markets.²⁷ The difficulties faced by prominent stablecoins in the past year likely contributed significantly to the noticeable downturn in these markets.²⁸

Indeed, stablecoins often pose greater risks than initially thought. They introduce into the crypto space the kind of maturity mismatches commonly seen in money market mutual funds. As we have seen in the past year, redemption at par at all times is not guaranteed, risks of runs and contagion are omnipresent, and liquidation of reserve assets can lead to procyclical effects through collateral chains across the crypto ecosystem.

Another episode of instability driven by high concentration risk was the fall of the FTX crypto exchange. Initially the crisis seemed to primarily affect liquidity, but it

²⁵ They back their value with securities, commodities, as well as fiat money. Interestingly and inevitably, major stablecoin issuers – such as Tether or Circle – adopt centralised organisational structures, directly contradicting the initial ideas as laid down in Satoshi Nakamoto's white paper. The notion that stablecoin issuers might invest in cryptoassets could further concentrate holdings and contradict the low-risk requirements for stablecoin reserves.

²⁶ C Graf von Luckner, C Reinhart and K Rogoff, "Decrypting new age international capital flows", *Journal of Monetary Economics*, vol 138, 1 June 2023.

²⁷ Although it represents only a small part of the cryptoasset market, the stablecoin Tether accounts for close to half of all trading on cryptoasset trading platforms. See the section entitled "Stablecoins' role within the crypto-asset ecosystem" in M Adachi, P Bento Pereira Da Silva, A Born, M Cappuccio, S Czák-Ludwig, I Gschossmann, G Paula, A Pellicani, S Philipps, M Plooi, I Rossteuscher and P Zeoli, "Stablecoins' role in crypto and beyond: functions, risks and policy", ECB, *Macprudential Bulletin*, no 18, 2022.

²⁸ See the May 2023 report by the ESRB Task Force on Crypto-Assets and Decentralised Finance entitled "Crypto-assets and decentralised finance".

quickly evolved into a solvency crisis. This situation arose due to FTX's inadequate risk management, unclear business boundaries and mishandling of customer funds. The repercussions of this event rippled through the crypto ecosystem, causing cascading liquidations²⁹ that underscored the interconnectedness and opacity of crypto markets. Ultimately, it showcased how swiftly confidence in the industry could deteriorate.

Similarities to the FTX case can be seen in the recent civil charges brought by the US Securities and Exchange Commission against the biggest remaining crypto exchange, Binance. These civil charges allege that Binance's CEO and Binance entities were involved in an extensive web of deception, conflicts of interest, lack of disclosure and calculated evasion of the law.³⁰ Should these allegations be proven, this would be yet another example of the fundamental shortcomings of the crypto ecosystem.

The recent crypto failures also show that risk, in itself, is technology-neutral. In financial services, it does not matter if a business ledger is kept on paper, as it was for hundreds of years, in a centralised system as we have now or on a blockchain as in the crypto asset ecosystem. In the end, whether a firm remains in business or fails depends on how it manages credit risk, market risk, liquidity risk and leverage. Crypto enthusiasts would do well to remember that new technology does not make financial risk disappear. The financial risk either remains or morphs into a different form. It is like pressing a balloon on one side: it will change in shape until it pops on the other side. And if the balloon is full of hot air, it may rise for a while but will burst in the end.

Links with the traditional financial sector

The second contradiction arises from the crypto industry's attempt to strengthen ties with actors in the financial system, including banks, big tech companies and the public sector.

Major payment networks³¹ and intermediaries³² have enhanced their support services for cryptoassets. Numerous prominent tech companies, including Meta (formerly Facebook) and Twitter, have explored ways to incorporate crypto into their platforms.³³ By leveraging their large customer base and offering a mix of payments

²⁹ A decentralised finance ecosystem is built around crypto lending that is collateralised by other cryptoassets, using smart contracts to implement margin calls. The failure of FTX had a large impact on the price of cryptoassets serving as collateral for crypto lending. This triggered cascading liquidations by crypto lenders because of the decrease in the value of the collateral.

³⁰ See US Securities and Exchange Commission, "[SEC Files 13 Charges Against Binance Entities and Founder Changpeng Zhao](#)", 5 June 2023.

³¹ In particular, [Mastercard](#), [PayPal](#) and [Visa](#) continue building capabilities and strategic partnerships to support cryptoassets (as well as stablecoins).

³² See, for example, JP Morgan's Onyx Coin Systems Product Team, [Fidelity's Fidelity CryptoSM account](#) and Citi's collaboration with METACO to develop and pilot digital asset custody capabilities.

³³ Meta expressed interest in the metaverse and the potential integration of cryptoassets and blockchain technology within its virtual reality platform. The company has been exploring the concept of a blockchain-based digital currency called "Facebook Diem" (previously known as Libra). Twitter has integrated bitcoin tipping features. It allows users to send and receive bitcoin tips to content creators and other users on the platform.

and other financial services, tech firms, especially big techs, could solidify the ties between cryptoassets and the financial system.

The recent failures of Silvergate Bank and Signature Bank have highlighted the risks for banks associated with raising deposits from the crypto sector. The stability of these deposits is questionable given cryptos' volatility. The discontinuation of the Silvergate Exchange Network and SigNet, which functioned as a quasi-payment system for the crypto investments of Silvergate Bank and Signature Bank clients, also shows how cryptoasset service providers depend on the traditional financial sector for settlement in fiat money.

The crypto industry not only seeks to strengthen its ties with the traditional financial industry. It also seeks to gain access to the public safety net that strongly regulated financial entities benefit from.³⁴ Indeed, Circle, the issuer of the USD Coin (USDC) tried to gain access to the Federal Reserve's overnight reverse repurchasing facility in order to back its stablecoin.³⁵

The crypto industry is seeking to grow by parasitising the financial system: it touts itself as an alternative to the financial sector, yet it seeks shelter within that very sector to address its inherent risks, all in the absence of adequate regulatory safeguards.

The public response: backing, regulating or innovating?

The public sector response can be encapsulated in three main suggestions.

Not giving in to the temptation to offer public backing to cryptos

First, the temptation to offer public backing to cryptos must be resisted.

The idea of permitting stablecoin issuers as non-bank financial institutions to hold their reserves at central banks might seem appealing, but could lead to serious adverse consequences.

By granting stablecoins access to the central bank's balance sheet, we would effectively outsource the provision of central bank money. If the stablecoin issuer were able to invest its reserve assets³⁶ in the form of risk-free deposits at the central bank, this would eliminate the investment risks that ultimately fall on the shoulders of stablecoin holders. And the stablecoin issuer could offer the stablecoin holders a means of payment that would be a close substitute for central bank money.³⁷

This would compromise monetary sovereignty, financial stability and the smooth operation of the payment system. For example, a stablecoin could displace sovereign money by using the large customer network of a big tech, with far-reaching

³⁴ See PYMTS, "[Circle Says Lack of Direct EMI Access to EU Central Bank Accounts Stifles Payments Innovation](#)", 2023.

³⁵ Circle's \$31 billion USDC stablecoin maintains around \$25 billion of its reserves in short-term US Treasury bills in the exclusive Circle Reserve Fund, managed by BlackRock. The fund is registered as a "2a-7" government money market fund. Circle's objective for the fund was to secure access to the Federal Reserve's reverse repurchasing facility through BlackRock, allowing the company to move USDC's remaining cash reserves from partner banks to the fund under a Federal Reserve account.

³⁶ Reserve assets are the assets against which the stablecoins are valued and redeemed.

³⁷ In contrast, the substitutability between central bank money and bank deposits is limited by the fact that, on bank balance sheets, deposits are matched against risky assets (bank loans).

implications.³⁸ Therefore, central banks should exercise prudence and retain control over their balance sheet and the money supply.

Regulating cryptos adequately and comprehensively

Second, regulators should refrain from implying that regulation can transform cryptoassets into safe assets. Efforts to legitimise unsound crypto models in a bid to attract crypto activities should be avoided.³⁹

Moreover, the principle of “same activity, same risk, same regulation” should be endorsed. Cryptos cannot become as safe as other assets and investors should be aware of the risks. Anti-money laundering/countering the financing of terrorism rules should be enforced, and the crypto activities of traditional firms should be carefully monitored.

While some jurisdictions attempt to apply existing regulatory frameworks to cryptoassets, the EU’s Markets in Crypto-Assets Regulation offers a customised regulatory structure that applies to all 27 EU Member States and draws on existing regulation where appropriate (e-money being one example). The EU has also updated existing regulation, for instance by extending the travel rule to crypto transactions.⁴⁰

Despite the EU taking the lead in establishing a comprehensive framework regulating crypto activities, further steps are necessary. All activities related to the crypto industry should be regulated, including decentralised finance activities like cryptoasset lending or non-custodial wallet services⁴¹. Moreover, the regulatory framework for unbacked cryptoassets may be deemed lighter than for stablecoins as it relies mainly on disclosure requirements for issuing white papers⁴², and on the supervision of the service providers which will offer them for trading. The risks posed by unbacked cryptoassets, which are largely used for speculative purposes, should be fully recognised. Enhancing transparency and awareness of the risks associated with

³⁸ See F Panetta, “[From the payments revolution to the reinvention of money](#)”, speech at the Deutsche Bundesbank conference on the “Future of Payments in Europe”, 27 November 2020.

³⁹ See S Chipolina and N Asgari, “[Binance slams US crypto crackdown and makes bid for UK oversight](#)”, *Financial Times*, 10 May 2023.

⁴⁰ The “travel rule”, already used in traditional finance, will in the future cover transfers of cryptoassets. Information on the source of the asset and its beneficiary will have to “travel” with the transaction and be stored on both sides of the transfer. The law also covers transactions above €1,000 from “self-hosted wallets” (a cryptoasset wallet address of a private user) when they interact with hosted wallets managed by cryptoasset service providers. See [Regulation \(EU\) 2023/1113 of the European Parliament and of the Council of 31 May 2023 on information accompanying transfers of funds and certain crypto-assets and amending Directive \(EU\) 2015/849 \(Text with EEA relevance\)](#), *Official Journal L 150*, 9 June 2023, pp 1–39.

⁴¹ Crypto lending is a centralised or decentralised finance service that allows investors to lend out their crypto holdings to borrowers. Decentralised crypto lending platforms use smart contracts to automate loan payouts and yields, and users can deposit collateral to receive a loan if they meet the appropriate requirements automatically (see W Duggan, “[Crypto lending: earn money from your crypto holdings](#)”, *Forbes*, 30 January 2023). A non-custodial wallet, or self-custody wallet, entails the crypto owner being fully responsible for managing their own cryptos. The users have full control of their crypto holdings, manage their own private key and handle transactions themselves (see “[Custodial vs non-custodial wallets](#)”, *crypto.com*, 17 February 2023).

⁴² This is a sort of prospectus for cryptoassets that informs potential holders about the characteristics of the issued cryptoasset before they offer a token to the public or list it on a trading platform.

cryptoassets and their social cost are critical aspects of this approach. Public authorities will also need to address those social costs: for instance, cryptos' ecological footprint cannot be ignored in view of environmental challenges.

Additionally, the experience of FTX, which expanded massively with little oversight, underscores the importance of global crypto regulation and regulatory cooperation. The Financial Stability Board's recommendations⁴³ for the regulation and oversight of cryptoasset activities and markets need to be finalised and implemented urgently, also in non-FSB jurisdictions. The Basel Committee on Banking Supervision's standard on the prudential treatment of banks' cryptoasset exposures is a positive step in this direction. It stipulates conservative capital requirements for unbacked cryptoassets with a risk weight of 1,250%, as well as an exposure limit constraining the total amount of unbacked crypto a bank can hold to generally below 1% of Tier 1 capital. It will be key for the European Union and other Basel jurisdictions to transpose the Basel standard into their legislation by the 1 January 2025 deadline.⁴⁴

However, regulation alone will not be sufficient.

Innovating: digital settlement assets and central bank digital currencies

Third, the public sector needs to contribute to the development of reliable digital settlement assets.

Central banks are innovating to provide a stability anchor that maintains trust in all forms of money in the digital age. Central bank money for retail use is currently available only in physical form – cash. But the digitisation of payments is diminishing the role of cash and its capacity to provide an effective monetary anchor. A central bank digital currency would offer a digital, risk-free standard and facilitate convertibility among different forms of private digital money. It would uphold the singleness of money and protect monetary sovereignty. We are advancing with our digital euro project and aim to complete our investigation phase later this year.

Furthermore, the tokenisation of digital finance may require central banks to modify their technological infrastructure supporting the issuance of central bank money for wholesale transactions. This could involve establishing a bridge between market distributed ledger technology (DLT) platforms and central bank infrastructures, or a new DLT-based wholesale settlement service with DLT-based central bank money.⁴⁵ We will involve the market in the exploratory work that we have recently announced.⁴⁶

⁴³ See Financial Stability Board, "[Crypto-assets and Global "Stablecoins"](#)", 2023.

⁴⁴ See European Central Bank, "[Crypto-assets: a new standard for banks](#)", *Supervision Newsletter*, 15 February 2023.

⁴⁵ F Panetta, "[Demystifying wholesale central bank digital currency](#)", speech at the Deutsche Bundesbank's Symposium on "Payments and Securities Settlement in Europe – today and tomorrow", Frankfurt, 26 September 2022.

⁴⁶ European Central Bank, "[Eurosysteem to explore new technologies for wholesale central bank money settlement](#)", Frankfurt, 28 April 2023.

Conclusion

To conclude, cryptoassets have been promoted as decentralised alternatives promising more resilient financial services. However, the reality does not live up to that promise. The blockchain technology underpinning cryptoassets can be extremely slow, energy-intensive and insufficiently scalable. The practicality of cryptoassets for everyday transactions is low due to their complex handling and significant price volatility.

To address these drawbacks, the crypto ecosystem has changed its narrative, favouring more centralised forms of organisation that emphasise crypto speculation and quick profit. But recent events have exposed the fragility of the crypto ecosystem, demonstrating how quickly confidence in cryptoassets can evaporate. In many respects, this ecosystem has recreated the very shortcomings and vulnerabilities that blockchain technology initially intended to address.

Further complicating matters, the crypto market seeks integration into the financial sector for increased relevance and public sector support. This would not provide the basis of a sustainable future for crypto. If anything, it would only heighten contradictions and vulnerabilities, resulting in greater instability and centralisation.

The public sector should adopt a determined position by establishing a comprehensive regulatory framework that addresses the social and environmental risks associated with crypto, including the use of unbacked cryptoassets for speculative purposes. It should also resist calls to provide state backing for cryptos, which would essentially socialise crypto risks. The public sector should instead focus its efforts on contributing to the development of reliable digital settlement assets, including through their work on central bank digital currencies.

Decisive action of this kind should motivate the crypto ecosystem, including its foundational technology, the blockchain, to realign its objectives towards delivering real economic value within the digital finance landscape.

Panel on “What is the remit of central banks?”

Remarks by Ida Wolden Bache: CBDC and the singleness of money

Ida Wolden Bache, Governor and Chair of the Executive Board, Central Bank of Norway

First, thank you for the invitation to take part in this distinguished panel.

The task we are given here today is a broad one, to discuss the remits of central banks. Several topics come to mind. The effort to bring inflation down is obviously high on most central banks’ agendas these days. This task confronts us with a challenging balancing act. As we tighten monetary policy, we must weigh the short-term costs of lost output against the risk of de-anchoring inflation expectations. Furthermore, we must preserve financial stability. To me, what stands out as most important in the light of the past year’s experience, is to stick to our core mandate, and importantly, to explain to the broad public how by doing so we are contributing to the welfare of society.

Looking ahead, monetary policy will be tested further by the necessary efforts to combat climate change. In the transition from one energy system to another, we should prepare for a potentially higher frequency of negative, and possibly more persistent, supply side shocks originating in the energy market. Moreover, higher carbon prices will imply changes in relative prices that are necessary signals to achieve transition. In my view, forward-looking inflation targeting provides a sound framework to manage these challenges.

Although all these issues deserve a much deeper discussion, I will allocate my remaining time here today to an even more fundamental remit. One that can be seen as a precondition for the other goals we are striving to fulfil. That is to ensure the singleness of money, meaning that all representations of our unit of account trade at par value, and that parity is doubted by none. Without the singleness of money our ability to control inflation may be severely impaired or entirely lost.

As you all know, a unit of account has two main representations available to the public: cash supplied by the central bank – outside money – and deposits created by commercial banks – inside money. These payment assets exist side by side because they each have their competitive edges across different payment situations.

For decades now, the singleness of money has been taken for granted in most developed economies. But in recent years, we have seen developments that could challenge the singleness of money. The first is the declining use of cash, and the second is the emergence of new forms of private assets with potential to serve as money.

Let me discuss them in order.

In some countries, bank deposits have now become so convenient to use for all kinds of payments that cash is becoming marginalised.

The potential demise of cash raises the fundamental question of whether public access to central bank money is a necessary anchor to ensure the singleness of money and trust in the monetary system. If that is the case, and if central bank money in the

form of cash is no longer in demand, the central bank has no choice but to introduce a new, and hopefully more attractive, variant.

But we should also ask whether the safety net that is established around bank deposits could be sufficient to maintain trust? The net consists of banking regulation, deposit insurance and the central bank's lending of reserves as settlement asset between banks. It may be argued that central bank reserves, not cash, are the key to ensure the singleness of money. Even though we still have cash in my country, fewer and fewer people hold it. From our point of view, it is not inconceivable that the system could work without it.⁴⁷

The second potential threat to singleness is the new potential forms of money: Crypto currencies that represent their own units of account, and stablecoins which piggyback on existing national units of account. While neither of them is important as payment assets as of now, this may change in the future. Tokenisation of different types of assets may, for example, lead to increased demand for tokenised money for settlement.

If the new types of money can offer better functionality than our current money, their popularity may increase also for payments in the real economy.

If programmability turns out to be something people really want from their money, and supply is allowed to develop freely, it may threaten the singleness of money. It may lead to several units of account being used in parallel within a country, or a more fragile parity between different representations of the same unit of account.

So how do we, as guardians of the singleness of money, best meet these potential challenges? It seems to me that we have different strategies to choose from:

One is to expand the regulatory perimeter to include the new forms of money.

Another strategy is to develop retail CBDC. If the problem to be solved is the potential demise of cash, CBDC can be designed as digital cash with less emphasis on new functionality. If, instead, the motivation is to meet competition from new forms of money, CBDC must offer functionality similar to that of privately issued tokens.

A third way is to meet competition from new forms of money through cooperation within the established two-tier banking system. To enable this, it might be necessary to offer wholesale CBDC in the form of tokenised reserves that can settle transfers of tokenised bank deposits.⁴⁸

Each of these strategies have their pros and cons, beyond my short discussion here. Furthermore, they need not be mutually exclusive.

Let me sum up with a few concluding points. First, preserving the singleness of money is a fundamental prerequisite for monetary policy to be able to address our current and future challenges. Second, I think protecting the singleness of money is a key justification for considering CBDC. Third, I think new, privately issued payment assets could be a more serious threat to singleness than the potential demise of cash. Finally, we must consider carefully whether retail or wholesale CBDC is the most

⁴⁷ Even though cash usage is low, cash is still important for a secure and efficient payment system, particularly through contributing to payments contingency and financial inclusion.

⁴⁸ Norges Bank is assessing whether to introduce a form of CBDC. However, no decision has been made.

efficient response, or if other measures are better suited to do the job. In any case, our mission is to ensure that the singleness of money endures.

Thank you for your attention.

Remarks by Shaktikanta Das: Finance Track: Approach and Contributions under India's G20 Presidency

Shaktikanta Das, Governor, Reserve Bank of India

Over the years, the G20 has grown into an prominent forum for addressing various global issues and finding global solutions. In my capacity as Finance Deputy, G20 Sherpa earlier and now as Governor of the Reserve Bank of India, I have witnessed the evolution of G20 during the last 10 years or so. In the Finance Track of this year, we have addressed major global challenges in the economic front and worked towards re-energising multilateralism, which is the need of the hour. Our approach to every challenge, be it climate change, fragmented supply chains, debt distress in low and middle-income countries or big tech and third-party risks is to treat these challenges as opportunities and build consensus around the proposed solutions. We feel global cooperation, technology and innovation have a pivotal role in improving the standard of living everywhere. In this context, we see digital public infrastructure as one of the biggest opportunities of the current decade.

Our approach envisions a more inclusive world that thinks and acts beyond national boundaries and works in harmony. In this inclusive journey, we hope to take along all countries, capitalising on the spirit of Vasudhaiva Kutumbakam: One Earth, One Family, One Future. Through Jan Bhagidari (people's participation) programmes throughout the country consisting of events like marathons, quiz programmes, painting competitions, financial literacy events, cleanliness drives, sports events and the like, we have spread this message amongst our citizenry.

India's G20 Agenda has been crystallised on the basis of past experiences, current global issues and future challenges. It is with humility and quiet pride that we take stock of the progress made on our G20 priorities and the tangible outcomes. Against this backdrop, I would like to emphasise that it is incumbent upon us to remain focused on the spirit of Vasudhaiva Kutumbakam and work towards one future for the entire world.

India assumed the G20 Presidency amidst weak global growth, geopolitical tensions, persistent inflation and fragmentation in global economic cooperation. The COVID-19 pandemic, apart from dragging down economic activity, also led to constrained policy space and reduced ability of countries to undertake developmental activities. This situation was further complicated by the conflict in Ukraine, which led to scarcity of fuel, food, fertilisers and critical minerals, with consequent increase in inflation across the world. This was followed by synchronised monetary policy tightening with attendant spillovers. In conjunction with these immediate challenges, the global economy continues to face long-term challenges like climate change and decline in productivity growth. A number of low and middle-income countries are also confronted with severe debt distress.

Against this backdrop, the G20 Presidency gave India the opportunity to set the agenda for global policy cooperation to address these multifarious challenges. We have endeavoured to utilise this unprecedented chance to be the voice of the Global South and flag the issues faced by the emerging market and developing economies (EMDEs) and low-income countries (LICs). The Indian Presidency has worked for many more voices to be heard in the global high table by inviting countries like Bangladesh,

Egypt, Mauritius, Nigeria, Oman and the United Arab Emirates to participate in the G20 deliberations. Under the Finance Track, the Indian Presidency has accorded primacy to the broad themes of climate change and digitalisation with priorities that include mobilising resources for climate transition and sustainable development goals; leveraging digital public infrastructure for enhancing financial inclusion and productivity gains; interlinking of national fast payments systems; strengthening multilateral development banks; and addressing debt vulnerabilities.

On climate change agenda, our priorities included assessing macroeconomic risks stemming from climate change and transition pathways; strengthening financial resilience through sustainable capital flows; financing the sustainable and resilient cities of tomorrow; mechanisms for mobilisation of timely and adequate resources for climate finance and Sustainable Development Goals (SDGs). On all these priorities, a number of deliverables were prepared. One such instance is the G20 report on Macroeconomic Risks Stemming from Climate Change and Transition Pathways. Similarly, the G20 Principles for Financing Cities of Tomorrow will enable cities to develop customised policies that encourage alternative financing sources and enable greater public-private collaboration. The OECD report – Towards Orderly Green Transition Investment Requirements and Managing Risks to Capital Flows, has outlined the trends in portfolio flows to green finance activities and highlighted various aspects that need to be addressed to facilitate greater green capital flows to EMDEs.

Our Presidency has aimed to harness the benefits from the growing footprint of digital economy, while minimising the risks emerging from the same. In this broad theme, our presidency focused on leveraging Digital Public Infrastructure for financial inclusion and productivity gains, interlinking of national fast payment systems for seamless flow of funds and assessing the macro-financial implications of central bank digital currencies (CBDCs). To deal with the emerging risks, our priorities included working towards a global framework for the so-called cryptoassets, stablecoins and decentralised finance (DeFi); efforts for strengthening financial institutions' ability to manage third-party risks and outsourcing, especially in the context of big tech and fintech; and achieving a greater convergence in cyber incident reporting..

Specifically, to address the risks stemming from the rise of so-called cryptoassets, the International Monetary Fund (IMF) and Financial Stability Board (FSB) are preparing a Synthesis Paper, aimed at drawing up a comprehensive policy framework, taking into account the full range of risks, including risks specific to the EMDEs, and ongoing global implementation of FATF standards to address money laundering and terror financing risks. This work is supported by the Bank for International Settlements (BIS) with a report on the key elements and risks of the crypto ecosystem. The BIS report has concluded by stating that "crypto has so far failed to harness innovation to the benefit of society. Crypto remains largely self-referential and does not finance real economic activity. It suffers from inherent shortcomings related to stability and efficiency, as well as accountability and integrity. Crypto's inherent structural flaws make it unsuitable to play a significant role in the monetary system".

Substantial work was also done by the FSB on enhancing the operational resilience of financial institutions, and addressing the challenges arising from their growing reliance on critical third-party service providers including Big techs and fintechs. The FSB has made several recommendations to enhance resilience against cyber risks and achieve greater convergence in cyber incident reporting. It has

provided updates to the Cyber Lexicon and delivered a concept note for a Format for Incident Reporting Exchange (FIRE).

On CBDCs, the Bank for International Settlements Innovation Hub (BISIH) prepared a report highlighting the lessons learnt so far, including the design elements, from various pilot projects across the world.

The Indian Presidency brought out the importance of Digital Public Infrastructure (DPI) in the G20 discussions and showcased the innovations such as the India Stack and the Unified Payments Interface (UPI) among others in promoting financial inclusion.

As part of the Indian Presidency's efforts to mainstream the voice of the global south, our key priorities included strengthening Multilateral Development Banks (MDBs) to address shared challenges of the 21st century; managing global debt vulnerabilities; assessing the macroeconomic impact of food and energy insecurity; improving readiness for large-scale pandemic response; and capacity building of the ecosystem for financing sustainable development. The Indian Presidency convened an Independent Expert Group, which has recommended a triple agenda to harness the potential of multilateral development banks (MDBs). The three elements of this agenda are (i) adopting a triple mandate of eliminating extreme poverty, boosting shared prosperity, and contributing to global public goods; (ii) tripling sustainable lending levels by 2030; and (iii) creating a third funding mechanism which would permit flexible and innovative arrangements for purposefully engaging with investors willing to support elements of the MDB agenda. On managing global debt vulnerabilities, the Global Sovereign Debt Roundtable (GSDR) was operationalised during our Presidency to strengthen communication among stakeholders on the debt restructuring process. The Indian Presidency facilitated discussions on Framework on Economic Vulnerabilities and Risks (FEVR) arising from pandemics, while taking into account country-specific circumstances.

In addition to the above focus areas, Indian G20 Presidency also carried forward some legacy issues. These included, inter alia, discussions on supporting strong, sustainable and balanced growth, IMF governance reforms, and fostering improvements in tax transparency. Under the financial sector issues, there was progress in work relating to non-bank financial intermediaries, liquidity mismatch in open-ended funds and the roadmap for addressing financial risks from climate change.

Another important facet of India's G20 Presidency has been to bring in broader perspectives to the discussions through engagement with experts in academia, international organisations, policy think tanks and industry on priority issues. Several seminars and panel discussions were organised on the sidelines of the main G20 working groups and ministerial meetings. The Presidency encouraged candid exchange of views among Finance Ministers and Central Bank Governors, in separate free-flowing and informal breakfast meetings, preceding the formal meeting sessions. Further, to illustrate the "unity in diversity" of India, the Presidency showcased various aspects of local culture and heritage including local products, cuisines and cultural events, specific to the venue of the G20 meetings.

Overall, our Presidency has endeavoured to prioritise inclusivity, resilient growth and development. We envision a form of globalisation that brings prosperity and well-being to humanity as a whole. The Indian G20 Presidency has presented itself as

the torch-bearer of global cooperation in today's fragmented world, connecting the G20 beyond the member nations to the voices of Global South.

Remarks by Tiff Macklem

Tiff Macklem, Governor, Bank of Canada

Introduction

Thank you, Agustín. I very much look forward to this discussion with you and Governors Bache and Das, to close what has been a very engaging day of discussion about the post-pandemic landscape and the challenges ahead.

The question facing our panel is to the point: “What is the remit of central banks?”

Our remit is easy enough to say: the mission is to restore price stability in the wake of pandemic upheavals and to maintain financial stability. But easy to say doesn’t mean easy to do. We have taken historic monetary and financial stability actions – from market liquidity operations and quantitative easing to the fastest and steepest monetary policy tightening on record. Looking ahead, fulfilling our remit requires addressing the immediate inflation challenge, while managing the financial stability risks and understanding the longer-term structural issues that may alter the global economic and financial landscape.

I want to touch on four considerations for our work in the months and years ahead. First, monetary policy is working to bring inflation down – but its work is far from done. Second, long-term interest rates are likely to be structurally higher than they were before the pandemic, and we must consider what this means for monetary policy and financial stability. Third, we need to work to achieve both price and financial stability. It’s not one or the other. We need both – in fact, each is required to secure the other – and we have tools to pursue both at the same time. And finally, recent banking stresses raise new questions for regulation and supervision, and together we need to learn from these events and work to ensure the safety and stability of the global financial system.

Let me touch on each of these in turn.

Monetary policy is working

Monetary policy is working: inflation is coming down in Canada and globally. But inflation is not coming down as quickly or as smoothly as we had hoped. Monetary policy still has more work to do. Excess demand in the economy has been more persistent than we thought. After solid progress over the last year in bringing inflation down from record highs, the downward momentum in inflation looks to be waning.

Earlier this month, the Bank of Canada raised its policy rate again, after we’d paused for five months to assess whether we’d done enough. We are concerned about elevated core inflation and the tightness in the labour market. Unemployment in Canada remains near record lows, and wage growth needs to moderate to achieve our 2% inflation target. With momentum in demand continuing and underlying inflation looking stickier, we concluded that we should raise the policy rate again to rebalance demand and restore price stability.

We know that rising interest rates have not been easy for consumers and businesses. Many central banks are facing this same pressure, knowing higher borrowing costs are adding to the burden on households and businesses already

stretched by high inflation. But the alternative – not controlling inflation – would be worse, particularly for people living on low or fixed incomes. Moreover, addressing the big structural challenges we collectively face will not be made any easier by allowing the uncertainty created by high inflation to continue.

The neutral rate

That brings me to the longer-run outlook for interest rates. The focus is often on our monetary policy decisions. But there is more to interest rates than monetary policy. Over the two decades to 2020, a number of disinflationary forces fostered solid growth with low inflation and low interest rates. These include open trade and investment, technological advancement and the integration of vast new labour markets into the global trading system. Before the pandemic, these global forces meant that the longer-run neutral rate was low and stable.

But these forces are now shifting. The failure to adequately share the benefits of growth has fuelled populism that is causing countries to turn inward, and geopolitical tensions have increased the vulnerabilities of interconnected trade. The ageing of the population is making labour scarcer, and a shift away from fossil fuels will require massive new investments in clean energy. In short, the structural forces that helped keep the neutral rate low for a long time look like they may be unwinding. That suggests interest rates may be higher in the long run than before the pandemic.

Price stability and financial stability

So if interest rates need to be high in the near term to control inflation, and if the neutral rate may be rising, what does this mean for price and financial stability?

For monetary policy, the possibility of a higher neutral rate means monetary policy may not be as restrictive as we think. Our inflation-targeting frameworks are well designed to manage this type of slow-moving uncertainty, but we do need to be alive to the possibility that we may be underestimating the neutral rate. And we need to be prepared to raise interest rates further if inflation comes in systematically above our forecasts.

For financial stability, the implication is that the financial system needs to adjust to higher interest rates. And recent regional bank failures in the United States have highlighted that some business models are overly reliant on low interest rates.

Some commentators have suggested this creates a trade-off between price and financial stability. While there is certainly interaction between the two, this is a false trade-off. We need both price and financial stability, and they are mutually reinforcing. Price stability – confidence in the value of money – is the foundation of a stable and well functioning financial system. And financial stability is a precondition for price stability. To put it another way, the uncertainty that comes from high inflation is not going to improve financial stability. And severe financial stress will only make achieving price stability more complicated.

Central banks have separate mandates and separate tools for price and financial stability. So we can work to achieve both at the same time. Our primary tool for price stability is the policy rate. But in the event of severe stress in the financial system, we have a range of tools we can use to provide liquidity against good collateral and keep credit flowing.

Of course, price and financial stability can interact, and we have to take this into account. Financial stress will generally have implications for the calibration of monetary policy because it tightens financial conditions. So if financial stress re-emerges and persists, we will need to take that into consideration as we set the policy rate to achieve the inflation target. And if interest rates need to be higher for longer to restore price stability, the financial system needs to adjust to higher interest rates. Through this transition, sound risk management in our financial institutions and vigilant supervision will be essential to manage financial stability risks.

Lessons learned from recent banking stress

Recent banking stress also has some lessons for financial regulation and supervision. We have had bank runs before, and this is not the first time sharp increases in interest rates have led to bank failures. But the speed of deposit withdrawals has highlighted that, in an increasingly digital economy, the time between early warning signs and systemic instability may be getting shorter. This raises several questions we need to reflect on together at the Basel Committee and the FSB.

First, if financial instability is likely to crystallise more quickly, how does supervision keep up? In the case of SVB, supervisors were aware of problems. But they probably thought they had more time to fix the issues they found. If the world is moving faster, the implication is supervision needs to move faster too. But how do we operationalise this? Is it simply a question of supervisors increasing their willingness to act, or do they need new tools to foster better risk management?

The second set of questions relates to prudential regulation. The combination of swift action by US and Swiss authorities and the considerable implementation of Basel III reforms was very effective in limiting contagion in the weeks immediately following the failures of SVB and Credit Suisse. This underlines the imperative of full implementation of Basel III around the world. It also raises some questions we need to investigate.

SVB wasn't systemic in life, but it proved systemic in death. And the speed of deposit withdrawals was like nothing we had ever seen before. But how do we define systemic if being systemic is highly state-dependent? Is the treatment of interest rate risk adequate? And are the deposit run-off assumptions embedded in liquidity metrics like LCR and NSFR appropriate? The Basel Committee is reflecting on these questions, and it will be important to do the analysis and learn the appropriate lessons.

There are also several questions that go beyond supervision and prudential regulation. The somewhat "off-piste" resolution of Credit Suisse suggests we need to assess whether the framework for resolution of global systemically important banks is adequate. We also need to assess the potential for instability from non-bank financial institutions as a result of liquidity mismatch, leverage and interconnectedness, and work to manage these risks. Finally, we need to reflect on the effectiveness of deposit insurance itself.

Whatever we do, it is imperative that the global community stay coordinated, because money, like water flowing downhill, will take the fastest route. And what one jurisdiction does spills over to others.

Conclusion

It's time for me to conclude so that our discussion can begin. Our remit has not changed but the conditions under which we are pursuing it are vastly different. We need to adapt to these changes and be nimble enough to deliver for the citizens we serve.

We have come a long way from the chaos of the pandemic. We need to stay the course and restore price stability even as we manage financial stability risks, learn the lessons of recent years and adapt to the structural forces ahead. As I said at the beginning, our remit is easier to say than to do. But our collective resolve and spirit of cooperation leave me optimistic we will rise to the challenge.

I look forward to our discussion.

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BIS Papers No 138	Financial stability risks from cryptoassets in emerging market economies	August 2023
BIS Papers No 137	Building an integrated surveillance framework for highly leveraged NBFIs – lessons from the HKMA	July 2023
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