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The New Monetary Policy Revolution:

Advice and Dissent

By Philip Turner

National Institute of Economic and Social Research

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National Institute of Economic and Social Research Occasional Papers LX.

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The New Monetary Policy Revolution: Advice and Dissent[1]

By Philip Turner

1 The phrase "advice and dissent" is borrowed from the title of the autobiography of the former Governor of the Reserve Bank of India, Y V Reddy. I am very grateful for discussions on this subject and for his comments on an earlier version of this paper. I am also indebted to many officials in central banks, the BIS and the IMF for illuminating discussions and, in several cases, for comments on earlier versions. This paper was also much improved by comments and suggestions from Bill Allen, Sebastian Barnes, Jagjit Chadha, Stefan Gerlach, Morris Goldstein, Charles Goodhart, Patrick Honohan, Paul Mizen, Lars Svensson, Anthony Turner and Graeme Wheeler. I am especially grateful to Graham Hacche for his detailed and perceptive suggestions on several versions. This OP represents my own view, and not necessarily that of the National Institute of Economic and Social Research.

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Abstract

Central banks have undertaken a revolution in monetary policy. They reluctantly abandoned conventional wisdom designed to keep them out of political trouble. This paper looks at this revolution through the lens of the divergent perspectives of the IMF and the BIS. The Jeremiahs predicted this revolution would fail to reduce unemployment and lead only to financial ruin. The Jeremiahs were proved wrong on both counts. Radical whatever-it-takes monetary expansion rescued a depressed world economy. Regulatory reform kept financial risks in check. Because central banks now have two distinct monetary policy instruments – their balance sheet as well as the policy interest rate – monetary policy may have financial stability as an objective in addition to its traditional macroeconomic one. The questions for 2021 and beyond are two. The first is: if the mix of large balance sheets, a sudden jump in government debt and yet-to-be-determined regulatory failures creates new financial stability or macroeconomic risks, what should central banks do? The second is: will governments let them?

JEL classification: E52; E58; G18

Keywords: Monetary policy, financial stability, financial crisis, fiscal dominance, QE, lender of last resort, macroprudential policy, central banks, Fed, ECB, Bank of England, Bank of Japan, Basel Committee, BIS, CGFS, FSB, IEO and IMF

About the author

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Foreword

The practice of central banking has always relied on the notion of timelessness; that it has always been the case, or this is how we have always done things. The narrative of historical custom and practice has always seemed redolent of the unwritten constitution that hovers over the executive and legislature in the UK. But change in operating practices, instruments and objectives and its management is a constant feature of the central banking world. As our ways of "getting and spending" change, so will the underlying financial structure with all its incentives and market failures that will then pose new questions for those striving for monetary and financial stability at central banks. In this personal account, Dr Philip Turner, outlines how central banks after the financial crisis of 2007-8 have extended their roles, in a revolutionary manner, to encompass deep involvement in government debt markets and the correction of financial frictions in lending markets, which if unchecked tend to amplify economic cycles. He also provides an insider's perspective on how policy develops at the IMF and BIS and the way consensus is challenged and then changes. The development of new tools and responsibilities though poses a political question that I think may prove to be more problematic for central banks. While a more simple interest rate strategy was broadly understood, long-lived and complex operations in financial markets and intermediaries may been seen either as supporting the well-off beneficiaries of previous government interventions or interfering in the pricing of risk in markets. Central banks are setting up both a knife-edge path and criticisms from the people and the politicians. So far, they have been insulated but that simply increases the need for a more open and wide-ranging debate and a new settlement.

Jagjit S. Chadha
Director
NIESR
January 2021

Key points

- A sequence of three huge shocks – the Global Financial Crisis, the near-collapse of the Euro and now COVID-19 – led the major central banks from 2009 to embark on a path of unprecedented balance sheet expansion, with new instruments being developed at each stage. The central bank balance sheet has replaced the policy interest rate as the main instrument of monetary policy, and is likely to remain dominant for some time.
- Everybody struggled to understand the new world of monetary policy after earlier orthodoxies had been abandoned (chapter 1). Many feared that these radical measures, taking the central bank well beyond short-term and safe operations, would create large financial risks. The argument that monetary policy should "tame the financial cycle" (or that financial imbalances/risk should constrain monetary expansion even in a downturn, with inflation low) is hardly new. And it had been demolished by Dennis Robertson almost a hundred years ago. Policy experience and very many studies have since confirmed that his *Principle of Price Stabilisation* was the "sole and sufficient objective" of monetary policy.
- Central banks after each of the three shocks were prepared to use their balance sheets in many, new diverse ways (chapter 2). These measures provided effective macroeconomic stabilization – surprising even those who had advocated such policies from the start. There has been no financial meltdown. On the contrary, avoiding a depression, preventing a collapse in asset prices and ensuring that long-term interest rates fell substantially reduced bankruptcies, helped the banks and made the international financial system much safer.
- Whether the inflation-targeting framework for monetary policy helped or hindered central banks to meet financial stability objectives had been much debated in the 1990s (chapter 3). Some blamed the Fed and other central banks for failing to moderate successive bouts of asset price inflation. Yet a substantial increase in short-term interest rates from mid-2004 onwards failed to deter risk-taking in financial markets

which rose on almost every metric. It became clear that banks needed larger capital and liquidity buffers than Basel 2 had provided.

- The international policy agenda after the GFC was devoted to tightening bank regulations, initially by the adoption of Basel 2.5 (raising the capital charges on securitised products) and then by Basel 3. The BIS's view at that time that tighter monetary policy was also necessary to curb financial risk-taking got little support (chapter 4). By 2015, the success of expansionary balance sheet policy was clear. Indeed, many economists *and governments* came to view what had been regarded as unconventional (wrongly given the historical precedents) was an almost magical instrument.

- It is true that the radical use of its balance sheet has given the central bank a second powerful, and in principle distinct, monetary policy instrument (chapter 5). The Tinbergen counting rule means that monetary policy *may* now have two independent objectives. But using the balance sheet also creates new intersections with the policies of the Treasury and of other agencies of government – setting only the overnight interbank interest rate had allowed central banks to sidestep such complications.

- There is also an international problem. The simultaneous rise in the balance sheets of all the major reserves-issuing central banks has increased global liquidity. This has been magnified by global capital markets, creating systemic risks which international regulators have failed to contain. The heightened fragility of market intermediation was laid bare during the March 2020 implosion of global liquidity. Although central banks got markets to function again, the vulnerabilities have yet to be addressed.

- New macroprudential policies represent one of the great successes of post-GFC policies (chapter 6). Having a wide range of new instruments that can be used at a particular time to target specific vulnerabilities gives monetary policy more room to support aggregate demand. But macroprudential policies largely focus on banks and fail to get at capital market intermediation. A related question remains to be answered: in what circumstances should a central bank use its balance

sheet as a macroprudential instrument aimed at market intermediation? Should it sell assets related to sectors it judges as over-leveraged or overpriced?

- The exit from exceptional monetary expansion is likely to be bumpy (chapter 7). Central bank balance sheet policies and regulation have acted together to depress long-term interest rates. The regulators have induced banks and other financial institutions to lower the credit risk of their assets but at the price of increasing their interest rate risk exposures by holding long-duration government bonds. The Basel Committee failed once again to agree a Pillar 1 capital charge for interest rate risk on bonds held in the banking book, and compounded this by allowing banks to count long-term government bonds as a liquid asset in the new liquidity rules.

- Real long-term interest rates are likely to rise as the effects of these policies fade. And uncertainty about future inflation might well at some point spook bond markets – whether underlying inflation rises or not. The sharp drop in the equilibrium real short-term interest rate (**r*** or the natural rate), reflecting the global saving glut and secular stagnation (lower potential growth or **g**) suggests that central banks will keep the average policy rate through the cycle lower than in the past. This is what markets expect at present. But large fiscal deficits for two or three years globally will depress excess global savings without necessarily lifting potential growth. Any rise in **r*** ***minus*** **g** would not only worsen government debt dynamics but would also make it harder to justify expansionary monetary policies. How would central banks manage a bond market crisis is such circumstances when they have such large holdings of debt?

Introduction

The global financial crisis (GFC), the near-collapse of the Euro and now the COVID-19 pandemic have led to a revolution in monetary policy. Central banks progressively abandoned the conventional wisdom that they should act only in very short-term interbank markets. They now act directly also in other markets which matter for the real economy - for companies, for banks, for households and for governments. And to do this they have accepted huge balance sheets and assumed new financial risks.

But the fundamental focus on macroeconomic objectives has not changed. Some still argue that monetary policy should aim instead to limit "asset price inflation", a controversy that is hardly new. During the 1920s, the Fed followed the wrong principle - what it called the *Principle of Productive Credit*. It resisted all forms of "speculative" credit, especially when used to support overvalued equities on Wall Street. Why adherence to such a principle would destabilize the real economy was demonstrated by Dennis Robertson in an LSE lecture in 1928. The Fed at that time took little notice and, with other like-minded central banks and treasuries, helped to destroy the world economy in the 1930s. The *Principle of Price Stabilization* (Robertson's phrase) was the "sole and sufficient objective of (central) banking policy".

Virtually all central banks have for years followed some variant of the Principle of Price Stabilisation. "We're pursuing maximum employment and stable prices," said Jay Powell, the chairman of the Fed after the June 2020 FOMC meeting. He dismissed "the concept that we would hold back because we think that asset prices are too high" as detrimental to "the people that we are actually supposed to be serving".[1] But because low interest rates for so long create financial vulnerabilities, the question of how worries about future financial instability should influence monetary policy remains live as the minutes of the January 2020 FOMC, a Fed

1 The FT report is Politi and Smith (2020). Source: Fed transcripts of Chair Powell's press conference, 10 June.

discussion paper issued in August (Goldberg et al (2020)) and the remarks of Loretta Mester at the MMF's October annual monetary and financial conference (MMF (2020)) all make clear.[2]

This paper reviews the controversy about how financial stability considerations should enter monetary policy frameworks. It reviews its evolution over the past 25 years through the eyes of the IMF and the BIS. Both organisations employ excellent statisticians and economists, and both touched on almost every dimension of the current debate. They analysed the same monetary and financial situation, but came to very different conclusions. Comparisons of contemporary perspectives go some way to addressing the wisdom-after-the-event criticism of any historical review.

The revolution is that the central bank balance sheet – not the policy interest rate – has become the main instrument of monetary policy in the advanced economies. If natural (or equilibrium real short-term) interest rates remain low for years, central banks will continue the active use of their balance sheets to set policy. This could transform many old controversies. When monetary policy had only one instrument, the case for having a single macroeconomic objective was compelling. But as soon as monetary policy has two or more instruments that can be applied independently, the case for giving monetary policy a second objective (e.g. financial stability) *could* become stronger. The central bank balance sheet (containing a large and diverse portfolio of long-term paper and credit risk assets) could also become a key instrument of macroprudential policy – directed notably at financial stability risks coming from capital markets.

2 In the session on monetary policy implications with Charlie Bean, Kristin Forbes and Loretta Mester (Chair: Paul Mizen) at www.mmf.ac.uk.

1

Prologue: a history

Central banks had no blueprint as they set off on the path of unprecedented and repeated balance sheet expansion. At first, they hoped the Bagehot-like lender-of-last-resort (LOLR) measures they had taken from August 2007 would calm the panic in financial markets. Interest rate cuts were too long delayed. One study finds that what might have been a solvent but illiquid investment bank (Lehman) was allowed to fail in September 2008 (Ball (2018)). It was the post-Lehman collapse of global markets which forced interest rate cuts and put large central bank balance sheet expansion at the centre of monetary policy. The often-repeated allegation that the major central banks were over-eager to intervene and protect the banks at the first sign of financial turbulence is false.

The sharp contraction in output in the United States seemed to hit bottom by mid-2009, with unemployment very high and growth prospects uncertain.[3] Central banks hoped they could return to more "normal" policies. By the end of 2009, both Bernanke and Trichet had given speeches about how they might soon "exit" from their exceptional balance sheet policies.

But the GFC was far from over, and central banks were instead forced to be ever more radical in their unconventional monetary policies (UMP). The scale of asset purchases was huge, and the range wide. These radical emergency measures worked, perhaps better than even their proponents dared hope. This amounted to a revolution – a label central banks understandably resist. The Fed was the leader following the GFC, closely followed by the Bank of England. Their successes with unconventional policies encouraged others to follow. Large central bank balance sheets have now become the new normal. Central banks had good reason to believe that these policies would successfully counter dysfunction in financial

3 The NBER subsequently put the trough of the recession at June 2009. The previous cyclical peak was put at December 2007.

markets and prevent a depression. But they knew little about the size of the macroeconomic impact. Nor could they be sure about possible side-effects on future financial stability risks.

Is this revolution merely as a temporary by-product of economies hitting the zero lower bound (ZLB) of short-term interest rates? The answer is surely "no". The successes of central banks have convinced governments and the public that more adventurous balance sheet policies actually filled a pre-GFC policy gap. Would a future governor be able to distance herself or himself from a "wrong" government bond yield as did Greenspan with his conundrum remarks in February 2005? In any event, huge balance sheets cannot be reduced quickly, so central banks will have to decide how and when to act. In addition, the question of policy symmetry (i.e., eventually using the balance sheet to *tighten* monetary policy) is now debated.

The proposition that a central bank need only set the overnight interbank rate to implement monetary policy, taking no additional balance sheet action to achieve its policy objectives, was never warranted. Such a view – prevalent in many advanced economy central banks before the GFC – depends on demanding assumptions about smooth and unconstrained arbitrage across different assets. It assumes a high elasticity of substitution between short-term government bills and long-term bonds, and a strong pass-through from the risk-free long-term interest rate to risky long-term assets. It also assumes that banks do not face capital or liquidity constraints on their market arbitrage positions. In calm times, indeed, high elasticities of substitution across financial assets and strong bank balance sheets may make the assumption of perfect capital markets a good first approximation: changes in policy rates are smoothly transmitted throughout the financial system so that interventionist central bank balance sheet policies may not be needed.

In the real world where monetary arrangements help navigate an uncertain future, however, it is precisely because of financial market imperfections and capital or liquidity constraints on banks that central bank balance sheets may need to be used to implement monetary policy. This was why Keynes argued forcefully that central bank balance sheet policies needed to play a crucial role in macroeconomic policy. He rejected in 1930 as outdated an exclusive monetary policy focus on the short-term rate.

Nor did he believe that the central bank could stimulate the economy by "printing new words, not new money."[4] Indeed, assiduous forward guidance by HM Treasury and the Bank of England in the 1930s that short-term interest rates would be kept very low for years was not enough (Howson (1975)). Central banks must, Keynes said, buy bonds on a large scale to lower the market long-term rate.[5] Because he feared that a central bank acting alone to drive down its long-term interest rate would just induce capital outflows, Keynes suggested (in the last chapter of *Treatise on Money*) that the just-founded BIS should help central banks co-operate in cutting their long-term interest rates together. The BIS's chief economist at that time (Per Jacobsson) strongly supported such policies, consistently arguing that lowering short-term rates would not be enough. He appears to have persuaded Montagu Norman (April 1932) that deliberate measures had to be taken to get long-term rates down.

Tobin in the 1960s formulated Keynes's thinking more rigorously. Monetary theory was, he argued, simply the theory of portfolio choice under uncertainty "taking as its subject matter stocks of assets and debts (including money proper) and their values and yields. Its accounting framework is the balance sheet."[6] This reasoning in terms of portfolio choice under uncertainty applies also applies when monetary policy has to be tightened. It is not an artefact of the ZLB (Friedman (2014), (2017)).

4 Barwell et al (2020), who argue that only "Odyssean" forward guidance (sending a message that the monetary policy reaction function has changed) really works.

5 "My remedy [for a persistent slump]" he wrote in his Treatise on Money, "would be … the purchase of securities by the central bank until the long-term market rate of interest has been brought down to the limiting point." In the *General Theory* he repeatedly attacked this blind spot of central banks: "The monetary authority often tends in practice to concentrate upon short-term debts and to leave the price of long-term debts to be influenced by belated and imperfect reactions from the price of short-term debts – though … there is no reason why they need to." Congdon (2007) and Tily (2010) reiterate this conclusion in some detail. Tobin in the 1960s was to make this analysis more rigorous using models of portfolio choice under uncertainty. In such models, changes in central bank balance sheets force the private sector to change the composition of their portfolios. The more imperfect the substitutability of assets, the more relative prices will have to bring about the required portfolio rebalancing onto the private sector.

6 The quote is from a book introduction Tobin wrote with Hester (Hester and Tobin (1967)). This portfolio-based approach shows why government decisions (e.g. on the average maturity of debt issuance) are effectively decisions on monetary policy (section (a) in chapter 5).

But the particular monetary models prevailing when the GFC broke had abandoned these portfolio choice theories. Balance sheet variables were virtually banished, and indeed the leading textbook (Woodford's *Interest and Prices*) is a virtuoso performance of monetary economics without quantities – the exact opposite of Tobin's perspective. The unique policy focus became the setting of overnight interest rates in interbank markets. This narrow theoretical framework was of little use to central banks as they embarked on unprecedented balance sheet policies which would force changes of private sector asset holdings.

Early New Keynesian macroeconomic models, embodying rational expectations, typically assumed perfect financial markets. Many models assumed automatic convergence to a unique full employment equilibrium.[7] The "Keynesian" label was justified only by wage rigidity or some form of price stickiness. The models contained little or nothing on the inevitable uncertainty involved in intertemporal choices or on the likelihood of multiple equilibria. These two features are surely the essence of Keynes (Tily (2010)). For some, even the idea that central banks should intervene in anything but very short-term markets became an anathema. Incorporating financial imperfections into New Keynesian models is still work-in-progress. Banks were not modelled seriously. Nor were the implications of bankruptcy. Whole areas of microeconomic theory developed in the 1980s, which had analysed how the inherent imperfections in financial markets can help explain behaviour, were ignored.[8]

There were important exceptions to this blind spot. Bernanke's historical and theoretical work on credit effects (debt creating borrowing constraints, declining value of collateral limiting borrowing opportunities and so on) stands out. Mishkin (1991)

7 Farmer (2017) shows that rational expectations do not guarantee a unique equilibrium. There are inevitably multiple equilibria and he argues that the state of expectations determines where the economy settles. In a similar vein, Aglietta (2019) makes beliefs about future liquidity conditions the key determinant. In both perspectives, central bank balance sheet policy can play a key role.

8 Hahn and Solow (1995) argued that early New Keynesian models evaded the important issues of a monetary economy by assuming perfect financial markets: "In a decade that has seen vast progress in our study of asymmetric information, missing markets, contracts, strategic interaction, and much else precisely because those aspects are regarded as real phenomena that require analysis, macroeconomics has ignored them all." The GFC has led to renewed efforts to add financial frictions to DSGE models: see Jeanne (2018).

looked at the role of credit in 130 years of US financial crises through the lens of asymmetric information theory. Kiyotaki and Moore (1997) showed the importance of asset prices in determining collateral constraints on lending.

By the early 2000s, however, practical thinkers about monetary policy had identified the need to take greater account of finance theory and practice in monetary theory and policy. King (2000) noted that the empirical failure of both the uncovered interest parity (UIP) theory of exchange rates and the expectations theory of the term structure of interest rates was due to changing risk premia. Expansionary monetary policy works, he argued, by lowering risk premia on a wide range of assets "both at zero rates of interest *and more generally*". This was not an artefact of the zero lower bound. Markets are inefficient, wrote Goodhart (2003), because of "a woeful shortage of long-run speculators. The public sector, notably the central bank, may fill the gap, and act as a stabilising (and hence ultimately profit-making) speculator itself, by direct intervention in markets." The message from both King and Goodhart was: "Think twice before criticising monetary policy as distorting markets".

Nevertheless the radical departures of monetary policy from orthodoxy from 2010 led to almost daily criticisms of the Fed in the financial press. A famous open letter to Ben Bernanke from 24 economists in November 2010 told the Fed to discontinue quantitative easing which "risks currency debasement and inflation. It will distort financial markets." The authors also noted that "the Fed's purchase program has also met broad opposition from other central banks, and we share their concerns that quantitative easing by the Fed is not helpful in addressing either US or global economic problems (Asness et al (2010))".

When the surge of inflation predicted as a consequence of these policies failed to materialise, the financial commentators began to say that massive monetary stimulus would generate yet again a new financial bubble that was destined for a devastating crash.[9] Former senior BIS officials accused the G7 central banks of being like "Goethe's sorcerer's apprentices whose spells have called up

9 A former BIS chief economist White argued that by stoking debt bubbles central banks had incubated a Fisherite debt-deflation (White (2016)).

powers of the underworld they can no longer control". They had sown the seeds of the next systemic crisis (Hannoun and Dittus (2017)).

Similar criticisms had been levelled at the Fed during 2003 and the first half of 2004. The fed funds rate had been reduced to just 1% but this did not generate a dangerous asset price bubble as some had feared. Nevertheless, the FOMC itself became worried about how financial markets might react once they began to raise rates. In the event, however, financial markets calmly absorbed increases in the fed funds rate amounting to 4¼ percentage points from mid-2004 to mid-2006.[10] Despite this substantial albeit gradual rise in short-rates, real long-term interest rates remained low. Risk spreads and market volatility continued to fall until early 2007. It was exposures assumed in 2006 and 2007 which would do most damage the banks. Hence the Fed's easing of monetary policy during 2001-04 cannot be to blame for the GFC (Dooley (2010), Turner (2010) and Turner (2017b)).[11] Nor is it credible that the advanced economies as a whole by 2007 had got into an unsustainable boom that central banks failed to halt in time. More generally, Cerra and Saxena (2017), using historical data from 160 countries, found no evidence that GDP tends to be abnormally high just before recessions – refuting the thesis that "unsustainable booms" tend to precede crises.

The two international financial institutions providing advice to central banks on monetary policy – the IMF and the BIS – struggled to come to terms with what the monetary policy revolution meant for the financial system. For most of the past decade, they disagreed with each other as a familiar question took new forms. Was it enough for monetary policy to focus on macroeconomic stabilisation? Yes, said the IMF. Or should the aim of limiting asset price bubbles constrain monetary policy expansion? Yes, said the BIS.

10 But Greenspan did worry that this very predictability would itself create financial stability risks (section (c) in chapter 3).

11 To state what is obvious: this does not mean the Fed's timing of interest rate increases from mid-2004 was perfect. Dooley (2010) is succinct: "Easy monetary policy cannot depress real interest rates for seven years. There is no model that tells you that continuously expansionary monetary policy for seven years does anything but cause inflation."

The IMF publicly endorsed from the beginning the radical monetary steps taken by the major central banks, but some staff had private reservations and the Fund became a strong advocate only from 2012. An influential research programme was launched (IMF (2013b), IMF (2013c)). The BIS, by contrast, was critical of the monetary policies of the major central banks for almost the entire decade. Only from 2018 did the BIS recognise the considerable macroeconomic achievements of central banks in difficult circumstances. In Pringle's (2019) words, central banks had become the "indispensable institutions of market economies everywhere".

The monetary policy advice of the IMF was recently the subject of a review by its Independent Evaluation Office (IEO (2019)), based on a thorough examination of both its published and its internal papers.[12] The quality of the papers documenting the IMF's decision-making processes and proper archiving does much to facilitate such reviews. A recent account by a former Bank of England official historian of the destruction of key records at the Bank of England is a sobering reminder not to take official transparency about the past for granted (Capie (2018)).

The IEO found that the IMF eventually rose to the challenge of radical new policies. "From the vantage of 2019," wrote the IEO, "the Fund was fundamentally right to support quick and aggressive actions by the major central banks, articulating its views consistently and clearly." This is most significant because the IMF in the past had sometimes been seen as too wedded to out-of-date economic doctrines. Nevertheless, the IEO identified a number of significant gaps and concluded that the IMF needs to "raise its game" on monetary policy advice.[13]

As were many others, the IMF was slow in the first years of the crisis to see the need for very expansionary monetary policies. Its macroeconomic forecasts in 2007 and 2008 did not recognise that

12 In this paper, views expressed in the main flagship publications (that is, the *World Economic Outlook* and the *Global Financial Stability Report* in the case of the IMF and the *Annual Report* in the case of the BIS) are taken as reflecting institutional views. IMF reports are discussed by the Board before publication as the view of the IMF staff. The resultant Board Summing-Up reflecting the views of the Board is also published. The central bank governors on the BIS Board do not discuss the *Annual Report* before its publication.

13 Collyns and Loungani (2019) summarise the main points in a VOX essay.

the severe impairment of most international banks would lead to sharp declines in real GDP and in asset prices.[14] The IEO found that, during 2009-11, the IMF's views on the Fed's unconventional policies were a mixture of "private concerns and public endorsement" (Ball (2019)). The records of the IMF staff's weekly surveillance meetings with management reveal disagreements about the likely costs and effectiveness of unconventional monetary policies. The compromise was to not express publicly the internal doubts about these policies but to advocate exit from them as soon as feasible. The IMF's Article IV reports on the United States were implicitly more hawkish than the Fed's monetary policy reports even though the Fund was more pessimistic about macroeconomic prospects (Ball (2019)). The Fund advocated exit from exceptional measures as soon as feasible ("no rush" said the Fed), and in 2011 even advocated cutting the monetary base from $2.8 trillion to $1 trillion over a period of six years.

Only from 2012 did the Fund become a wholehearted supporter of the Fed's unconventional policies – and, even then, the Monetary and Capital Markets (MCM) department of the Fund continued to doubt whether the macroeconomic benefits justified the financial stability risks. At the Jackson Hole annual meeting of central banks in 2013, IMF Managing Director Lagarde responded in strong terms to criticism of the Fund's support for UMP.[15] By 2015, the Fund had turned more dovish than the Fed – arguing the Fed should allow inflation to overshoot and approach its 2% target from above.

Lipton (2017) explains why the IMF has supported the focus on the macroeconomic objectives, and not on asset prices. He said that encouraging business and households to take on more risk "is precisely an intended effect of an accommodative monetary policy." A faster withdrawal of monetary stimulus than macroeconomic conditions warrant to address supposed credit-fuelled asset price bubbles would not be justified. This had been the IMF's consistent position since the late 1990s when central banks were

14 The IMF was not alone in this forecasting error. Feldstein (2007) explained at the time why the Fed had made the same mistake.

15 She rejected criticisms of the IMF for being "soft" on countries pursuing UMP. She insisted these policies had helped to support both economic activity and financial stability – domestic and global. No rush for the exit, she said. On the contrary, she insisted, there was "a good deal of mileage to be gained from UMP in Europe."

first confronted with the coexistence of low inflation but strong asset price increases. Only on infrequent occasions and subject to stringent preconditions might a surge in asset prices justify pre-emptive monetary policy tightening (see section (b) in chapter 3). It remains a position that is supported by almost all historical and empirical evidence. Tightening monetary policy would be less effective in countering any excessive build-up of credit than using regulatory tools, and depressing the domestic economy would create its own financial stability risks.

The contrast with the BIS's public position on monetary policy is striking. Caruana (2011) argued that monetary policy strategies need to "lean against the build-up of financial imbalances even if near-term inflation remains low and stable." Because financial imbalances take a long time to build up, he argued, interest rates might have to be held above levels justified on macroeconomic grounds *for years*. In addition, the BIS warned that macroprudential policy tightening might not work if not supported by higher interest rates (Caruana (2010)). At the same time, however, Cecchetti (chief economist at the BIS at that time) sounded a note of caution about this emerging house view. He warned that there were fundamental theoretical and empirical difficulties of integrating financial stability considerations into the macroeconomic frameworks governing monetary policy.[16]

Once Cecchetti had left at the end of 2013, the management of the BIS became more dogmatic in its house view that central banks were following the wrong monetary policy framework by not trying to reduce financial imbalances. Former chief economist White (2017) repeated his long-held view that the pursuit of a low-inflation target had deluded "central bankers into missing the monetary-policy forest for the trees." Attempts to demonstrate the financial risks of low interest rates dominated successive BIS annual reports

16 Note that the BIS's annual report in June 2013 had foreshadowed Lagarde's support for UMP. This report said that "central bank actions since the start of the crisis had played a critical stabilising role. The crisis has not discredited the core elements of pre-crisis monetary policy frameworks … notably] the price stability orientation. Integrating financial stability considerations … raises serious analytical challenges." This view was to be echoed a year later by Yellen in her rebuttal of the BIS annual report of June 2014 .

and coloured numerous articles in the BIS's *Quarterly Review*. The BIS's blunt criticism of central bank policies in the annual report in June 2014 provoked an immediate rebuttal from Fed chair Yellen.[17]

Even low and declining inflation in the advanced economies in 2015 and 2016 failed to produce any change in the policy advice of the BIS. In June 2016, the BIS argued that monetary policy objectives should include an explicit financial cycle variable. It surprised monetary policy experts by asserting that US GDP would have been 12% higher if the Fed had followed such a rule from early 2003 (BIS (2016a)).

With no statutory body like the IMF's IEO to review its policy advice, the BIS in December 2015 established an Independent Panel (Franklin Allen, Sir Charles Bean and José de Gregorio) to conduct the first-ever review of BIS research and policy advice (Allen et al (2016)). This distinguished panel had excellent access to key senior officials (including central bank governors) and top professional economists. They were thorough in conducting and analysing statistical surveys. Their assiduity in visiting BIS economists and statisticians ensured they found out what had been going on behind the scenes. BIS management was given the opportunity to respond in detail to their findings before the report was finalised, presented to the governors who make up the BIS's board and then published. The panel found that BIS economists had done much creditable work.

Of particular relevance for the subject of this paper, however, the panel found that many key stakeholders questioned the theoretical and empirical support for the BIS's house view that monetary policy should aim to limit financial imbalances. The panel also noted that this view was mostly expressed in BIS publications free of external peer review. Finding that BIS research staff had been pressured to support this view, the report suggested (recommendation 3, page 23) that BIS research should in future be conducted in an open and

17 Yellen (2014) referred to views from "certain quarters", avoiding mention of the BIS. Other governors were more explicit: see section (b) in chapter 4. Even the Bundesbank – which was hostile to unconventional monetary policies on fiscal dominance and other grounds – opposed using monetary policy to further financial stability objectives. Weidmann (2018) described adding a financial stability objective as a "perilous proposition" – entirely in line with the Bundesbank's longstanding worry that the central bank could be pressured to reduce financial exposures by generating higher inflation to reduce the real level of debt.

unbiased fashion, and not tailored to support the BIS house view (Atkins (2017)). Although there was subsequently some toning down of public BIS criticism of the monetary policies of the major central banks, the BIS's house view was maintained.[18]

It seemed clear, by early 2019, that UMP post-GFC had not led to the excessive risk-taking in financial markets that some had feared. There had been no "debt trap" created by surge in the private sector debt/GDP ratio. This ratio had actually fallen since 2010 in those economies adopting UMP.[19] Nor was there much evidence of any persistent or general overvaluation of equities or corporate bonds (Cecchetti and Taboga (2017)). These indicators support Blanchard's (2018) retrospective judgement that the risk-taking caused by UMP had been quite limited.

The IEO report therefore concluded that the Fund had been justified in supporting the radical expansion in the balance sheets of advanced economy central banks. It agreed with the IMF that the associated financial risks would be better contained by regulatory and macroprudential policies, rather than by limiting monetary expansion needed on macroeconomic grounds. The IEO argued, however, that the IMF needed to improve its analysis of central bank balance sheet policies which could well be needed again to counter future downturns (recommendation 2, page 40).

From 2018, the BIS's hostility to UMP subsided, with a new head of the BIS (Carstens (2018a)) expressing confidence that the expanded tool-kit allowed central banks to meet future macroeconomic threats. A BIS report by a group of senior central bankers for the Committee on the Global Financial System (CGFS) reached similar conclusions to those of the IEO (BIS (2019)). It agreed that UMP had played a key role in ending a deep global recession. Such policies had proved to be an invaluable addition to the tool-kit of central banks. The report also argued that several medium-term trends (such as the secular decline in

18 The BIS's 2017 annual report argued that central banks "may have to tolerate longer periods of inflation below target, and tighten monetary policy if demand is strong, even if inflation is weak, so as not to fall behind the curve with respect to the financial cycle (Financial Times (2017a)." The *Quarterly Review* September 2017 warned that years of monetary ease had created a "debt trap" that would constrain future monetary policy (Financial Times (2017b)).

19 But the ratio did rise in the other advanced economies (Australia, Canada, Norway and New Zealand) and in the emerging markets: see Schaüblin and Turner (2018).

equilibrium real interest rates) could require such policies be used again in the future. It concluded that side-effects (such as financial risks and spillovers to other countries) had not been strong enough to outweigh the benefits of UMP.

The broad conclusions of the IEO and BIS (CGFS) reports in 2019 - on the success of UMP, on their probable future use, on the comparative advantage of macroprudential policies in addressing financial risks and on the role of other policies - are widely shared by the economics profession ((Ball et al (2016), Bean (2018), Carstens (2018a), Farmer (2017), Friedman (2014) and Williams (2014)).

By the end of the decade, however, worries that central banks had run out of ammunition to fight the next recession had grown.[20] Yet the "dash for cash" triggered by the COVID-19 pandemic in March 2020 again elicited a massive and innovative response by the major central banks in the advanced economies. This time the ECB acted quickly and on a large scale - which it had failed to do after the GFC. These measures succeeded in stabilising extraordinarily volatile markets. The view of Gagnon and Collins (2019) that central banks had plenty of reserve power in their balance sheets even at zero short-term interest rates was therefore vindicated.

The "dash for cash" shock also revealed dangerous destabilising forces in financial markets, some of which may have been accentuated by shortcomings in regulation. The reluctance of banks to provide liquidity may have added pressure on leveraged hedge funds to unwind their bond positions in a procyclical way. Increased margins demanded by central counterparty clearing houses (CCPs) aggravated the drain of cash from banks and non-banks alike. Investors had built up large positions through liquidity mismatches and leverage in global investment funds. The sudden reversal of such positions pushed benchmark bond markets close to breaking point. The US Treasury market became dysfunctional, with traditional arbitrage relationships with key interest rate derivatives breaking down (Donnery (2020), Hauser (2020)). The heavy dependence of core financial markets on central bank support is a warning about the disruptions that might follow a warranted change in the interest rate environment.

20 Bean addresses this in MMF (2020).

There is inevitably unease about the longer-term consequences for the financial system of very large central bank balance sheets and near-zero long-term rates for financial stability. Because there is no historical precedent for such conditions lasting for so long, there is no guarantee that the lessons drawn from earlier but shorter periods of low rates necessarily carry over to the present situation. Central banks have seen successive plans (in 2009, in 2013 and in 2018) to "normalise" monetary policy frustrated by weak growth and low inflation (Barwell and Chadha (2019)). Almost everybody had underestimated the structural or secular forces keeping real interest rates low – witness consensus forecasts almost every year overpredicting the level of the long-term interest rate even just one year ahead. Such secular forces commonly cited are: decline in potential output growth; population ageing; increased savings in EMEs in Asian economies following export-led strategies; a reduction in long-term investment projects; and a decline in the relative price of capital goods.

Structural forces cannot be undone by monetary policy.[21] Nor can the impact on asset prices of a lower interest rate increasing the present discounted value of the future earnings of assets. The uncomfortable truth, however, is that we cannot quantify the relative importance of the many structural factors which have been cited. This warrants a degree of scepticism about any calculation of the equilibrium or natural interest rate. In addition, lower trade barriers and increased manufacturing capacity in China and other low-wage countries have reduced global inflation which would also justify lower nominal interest rates.

There have been two stands of the analysis of the interest rate implications of these secular trends. The first focuses on market long-term interest rates. Given international arbitrage, the notion of a "world" long-term interest rate is a good first approximation. One macroeconomic explanation for the long decline in the world long-term rate (see Figure 1 in chapter 2) is that *ex ante* global saving has been running ahead of global investment. Bernanke famously talked about the global savings glut. No central bank,

21 In order to support their emphasis on the financial stability dangers of low interest rates, some BIS writers have downplayed or dismissed the importance of structural influences keeping interest rates low. They argue instead that excessive monetary policy ease has driven down what others measure as the natural rate. But this argument is not widely accepted: see Evans-Pritchard (2016) who concludes "the situation is desperate but not serious".

not even the Fed, controls this. The estimates in Figure 1 suggest that the long-run expectation of the nominal world short-term rate declined from 4% pre-GFC to around 2% since then.

The second strand of analysis is the natural or equilibrium real short-term rate of interest ($r^\star$), estimates of which Laubach and Williams have been publishing for the United States since 2003. The dominant link in their model captures a key microeconomic element of neoclassical dynamic models: the steady state linkage between the equilibrium real short-term interest rate and the growth rate of potential output.[22] The famous speech by Larry Summers at the IMF in April 2013 likewise explained the decline in real interest rates in terms of secular stagnation. He noted that greater financial risk-taking would be almost inevitable if very low interest rates were to be the new normal (Summers (2014)).

According to August 2020 estimates on the website of the Federal Reserve Bank of New York, the equilibrium real short-term interest rate in the United States fell from 2.4% in 2007 Q4 to 0.6% in 2009 Q1 – a very sudden and sharp decline. Since 2011, it has remained very low (in the range 0.4% to 1%). This drop in the natural rate of interest, consistent with the downward trend in potential output growth, is similar to that in most advanced economies. Believing that lower potential growth will lead to a similar decline in $r^\star$ is reassuring – expansionary macroeconomic policies can more easily mitigate the depressive effects of secular stagnation. A lower $r^\star$ would guide central banks to keep their policy rate low. And lower long-term rates would ease the adverse debt dynamics of large fiscal deficits.

Reassuring, but possibly wrong. Hamilton et al (2015) have shown that historical data do not support a strong link between potential growth and the equilibrium real short-term interest rate. Goodhart and Pradhan (2020) agree, and argue that it is better to explain equilibrium real interest rates worldwide not by changes in potential growth but by the difference between global saving and investment *ex ante*. Their view is that population ageing will indeed hold down potential growth but will turn Bernanke's global saving

22 In these models, the real rate of interest is the rate of exchange between goods today and goods tomorrow. Hence at equilibrium (steady state) it must be linked to expected growth. How fast actual variables converge to their steady state is a different question. There have been prolonged periods when the real rate of interest has diverged from the potential growth rate.

glut into a shortage relative to investment demands, and so push up r*. This would also mean that long-term interest rates could rise even if growth remains low – which might have radical implications for interest rate risk discussed in chapter 7.

Bauer and Rudebusch (2020) have developed a reduced form model to integrate these two strands by allowing for slow-moving changes in real interest rates and inflation. Extensive research into interest rate movements is still ongoing. But results so far, drawing on both macroeconomic theory and macro-finance theory, provide several explanations why interest rates, long as well as short, have been near zero or even below for so long *irrespective of the monetary policy strategies of central banks*. Mervyn King used his Per Jacobsson lecture to stress that central banks face an enduring challenge from the risk of secular stagnation (King (2019)).

The cumulative effects on private sector balance sheets of more than a decade of near-zero interest rates have become large. Interest rate risk in banks and other financial institutions has risen substantially – as monetary policies and regulatory policies have pushed in the same direction as underlying structural forces driving long rates down. Currency mismatches have also risen, with dollar exposures of borrowers outside the United States reaching new highs (RTI (2019)). The manageability of such financial stability risks was recently analysed by Forbes in MMF (2020).

2

Stepping into the unknown

Like other observers, the IMF and the BIS struggled to understand the new world of monetary policy in a decade when earlier orthodoxies had to be abandoned. Central banks correctly judged that their radical measures would reassure households and companies and increase aggregate demand. But they had little or no evidence about the impact on key macroeconomic variables such as real GDP, inflation and the exchange rate. Nor did they have much operational experience (the "plumbing") for their new policy tools.

In any case, Tobin's perspective from portfolio choice theory suggests that the market and macroeconomic effects of central bank balance sheet policy will change over time because they depend on expectations and on liquidity constraints on potential arbitrageurs. When panic grips markets, risk premia widen beyond historic norms, creating opportunities for profit. But banks and others may be forced to pass up attractive arbitrage profits by tightening capital- or liquidity-constraints. It is in such circumstances that balance sheet expansion by a credible central bank can be particularly powerful. Once markets calm down, and banks have stronger balance sheets, the impact of central bank asset purchases is likely to decline. In any event, building public confidence in the ability of the central bank to deal effectively with a crisis is crucial – and this was helped by the public support of the IMF in the years which followed the GFC.

For the first year or two of the GFC, the monetary policy response was inadequate. Policy interest rates were cut too slowly in 2007 and 2008. This was partly because almost all macroeconomic forecasts failed to take account of the size and the persistence of the effects of weak bank balance sheets on real GDP and of the strong reinforcing feedback effects.

From the beginning, however, central banks did provide orthodox lender-of-last-resort (LOLR) facilities in an effort to calm financial panic. They provided short-term loans to banks and

also supported markets (repo markets, money market funds and commercial paper markets). These liquidity operations were almost universally welcomed.

But many warned central banks about the moral hazard risk of bailing out financial institutions which had taken too many risks.[23] Such considerations meant that central banks were at first too cautious in their LOLR operations. The Fed, for instance, was able to report to Congress in December 2010 that there had been not a single default on the 21,000 LOLR loans made by the central bank during the crisis (Bernanke (2012)). In such a severe crisis, is this not too good a credit record? Excessive prudence in the early phases of the crisis meant that central banks had to accept in the later phases even larger risk exposures – which Ubide (2017) has eloquently labelled "the paradox of risk".

The failure of Lehman in September 2008 led to greater monetary stimulus. By the end of 2008, with the federal funds rate close to zero, the scope for further cuts in short-term interest rates had effectively disappeared. But a deeper difficulty was that the transmission of monetary policy stimulus from a near-zero fed funds rate had become blocked by the rise in risk premia and the reduction in the risk-taking capacity of international banks.[24] Even term risk premia on (safe) government bonds rose. Hence the sharp reduction in expected future short rates in late 2008 following post-Lehman monetary policy announcements had not been reflected in long-term rates. The term risk premium became more volatile and remained high (Figure 1 below, which updates Hördahl et al ((2016)). Such sharp increases in risk premia and the extremely weak balance sheets of the major banks would

23 For instance, IMF executive directors commenting on the October 2007 *WEO* noted that it was important "to avoid perceptions that central banks will automatically respond to financial distress by taking action to curtail losses." The governor of the Bank of England had made a similar argument: "The risks of maturity transformation by off-balance sheet vehicles were not fully priced. The provision of short-term liquidity against illiquid collateral (is) ex post insurance for risky behaviour and encourages excessive risk-taking (King (2007))".

24 And the unwillingness of virtually all the others to take risks.

have justified decisive central bank balance sheet expansion even without the ZLB. Belatedly, in early 2009, the Fed began in earnest its policies of buying long-term assets.[25]

Ensuring that a change in the short-term policy rate is transmitted to rates further out the yield curve is fundamental. As noted above, Keynes had proposed this in the 1930s and HM Treasury rejected it. It was also a key recommendation of the Radcliffe Report on the working of the UK monetary system in the 1950s – but this time for policy tightening. The Radcliffe Committee argued that policy tightening would be most effective when the whole yield curve moves upwards. The report had noted episodes in the 1950s when the long-term yield on government bonds took so long to follow increases in Bank rate that its peak was reached only after the Bank of England had begun to cut Bank rate – thus the opposite to that intended by monetary policy. HM Treasury rejected such advice – because it wanted to keep down the costs of government borrowing and therefore did not want the Bank of England pushing up the long-term rate for macroeconomic reasons.[26]

Central bank attempts to influence interest rates along the yield curve do not imply interest rate targets. The Fed, for instance, operated by buying certain quantities of bonds providing stimulus while leaving the market free to react to shocks. There have indeed been several instances of large movements in the 10-year US Treasury yield during the QE period (e.g., in the 2013 taper tantrum).

The macroeconomic case for central bank action to lower long-term rates in a recession is well-known: investment by those who borrow at rates linked to bond yields (some household mortgages,

25 In December 2008, the Fed provided strong forward guidance that short-term rates would remain low for some time and foreshadowed future bond purchases (Moessner (2015)). The Fed announced plans to purchase financial assets on a large scale in March 2009 (QE1), in November 2010 (QE2) and in September 2012 (QE3). In September 2011, the Fed announced the Maturity Extension Program (or MEP), lengthening the maturity of its existing assets. The Bank of England launched a modest asset purchase facility in January 2009 and increased it in several steps, reaching a peak of £375 billion cumulative purchases in July 2012.

26 In the early 1960s, James Tobin and Milton Friedman reiterated similar arguments about the importance of the long-term rate, and the inescapable monetary dimension of decisions on the maturity of government debt issuance. Their arguments as well as those of Keynes, J E Meade, R F Kahn and J Tirole are summarised by Turner (2014): see pp 40-45.

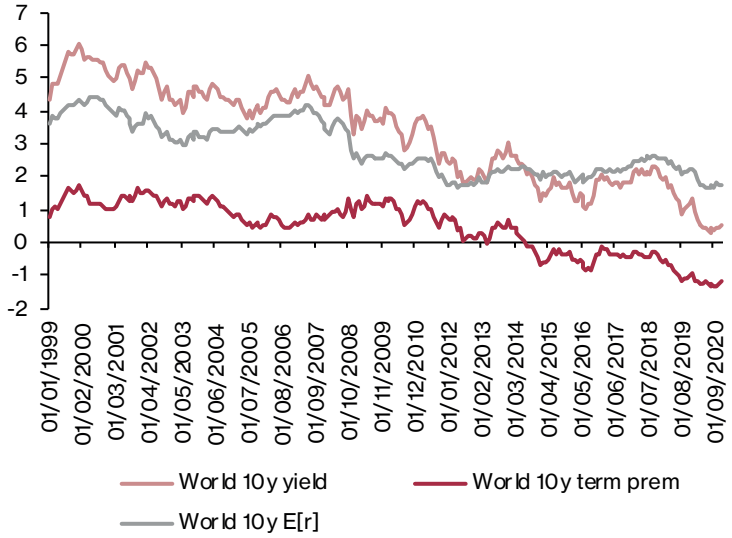
corporate bonds etc.) is stimulated. What gets less attention is that lower long-term rates can provide welcome grease for the financial system, and make it safer. Forcing up the prices of bonds creates capital gains for creditors, often at a time when they are nursing losses on the equities and similar assets in their portfolios. The viability of pension funds, insurance companies and other institutional investors can thus be supported just when they need it most. Banks holding large stocks of government bonds also benefit. Rising bond prices also lifts the value of collateral pledged to guarantee loans in wholesale markets, and thus help leveraged investors avoid margin calls and roll over their maturing debts. Many crises have demonstrated how sudden declines in the value of collateral can intensify recessions.[27]

Hence buying bonds is a monetary policy instrument that can *both* provide macroeconomic stimulus *and* make the financial system safer. (But there is a catch. Keeping the long-term rate below its structural equilibrium means that those holding bonds face increasing interest rate risk. This is likely to magnify the macroeconomic effects of an eventual tightening of monetary policy, an issue addressed in chapter 7).

Buying only risk-free paper such as government bonds may not be sufficient to ensure effective monetary transmission when credit risk premia have been driven up in a financial crisis. In such circumstances, purchases of private sector bonds (mortgage-backed securities, corporate bonds etc) narrow risk premia. Special schemes for lending to banks at better-than-market terms have a similar effect. In addition, such schemes can be designed to encourage banks to increase lending to the private sector: one example was the Bank of England's Funding for Lending Scheme (FLS) introduced in July 2012.

27 Mishkin (2011) put the microeconomics succinctly: in a recession, worsening balance sheets can "intensify adverse selection and moral hazard by removing an important channel through which information asymmetries are mitigated – the use of collateral."

Figure 1 Decomposition of the 10-year world yield



In contrast to the other major central banks, the ECB did not adjust its policy rate to offset strong recessionary forces. The ECB was held back by its own erroneous forecasts of future inflation risks – even in the face of clear downside risks to growth. It raised its main refinancing rate by a quarter percentage point in July 2008 (when the rise in inflation was mainly due to higher energy prices) before cutting rates post-Lehman. Two quarter point rises followed in April and July 2011. Given what we know now about the growth and inflation outcome in 2012 in the euro area, this proved to be an historic monetary policy blunder.

But the ECB did use its balance sheet to lend to banks at successively longer maturities, and announced its first long-term refinancing operation (LTRO) with a six-month maturity in March 2008.[28] It did not at first engage in large-scale purchases of long-

28 The subsequent adoption of fixed-rate full-allotment terms and an expansion in eligible collateral broadened the reach of the LTROs. Twelve-month LTROs were announced in May 2009.

term assets, with some (wrongly) claiming that the Maastricht Treaty's prohibition on direct financing ruled out the purchase of government bonds.[29]

The maturity extension of lending to banks (and the eventual adoption of targeted LTRO policies) meant that the ECB was giving almost unlimited medium-term credits to euro area banks. The full allotment mechanism was radical in allowing the banks, not the ECB, to decide when to borrow and when to repay. This saved the banks in debtor countries but at the price of widening a large and controversial international financing gap. Banks in creditor countries (such as Germany) built up large credits with their central bank (Bundesbank). And conversely for banks in debtor countries. The counterpart was that the Target2 credit balances at the ECB of some countries (notably Germany and the Netherlands) grew while the debit balances of other counties (notably Greece, Ireland, Italy, Portugal and Spain) expanded. How this implicit international financing mechanism will evolve remains unknown (Turner (2017a)).

With the euro area a multi-country construction, the scope for expansionary monetary policy was limited by, as Honohan (2018) puts it, considerations of the "distributional impact as between different countries". ECB President Trichet judged that a political balance on the Governing Council was best maintained by combining unconventional policy tools to address dysfunction in bank funding markets (helping especially banks and countries in the periphery) with higher interest rates to counter predicted inflation pressures. But this so-called "separation principle" made little economic sense and was ineffective. More and more voices

29 The confusion between direct financing (i.e., lending on terms dictated by the government) and monetary financing (i.e., lending with a maturity of less than one year, to use Tobin's cut-off) is common (Breedon and Turner (2016)).

were raised in favour of stronger monetary stimulus. As Modi (2018) and Honohan (2019) vividly describe, by the end of 2011 the euro area crisis had become existential.[30]

Monetary policy in the euro area then slowly took a more expansionary turn. The "whatever it takes" speech of ECB President Draghi in July 2012 signalled a determination to take radical measures irrespective of Bundesbank opposition. As the expansion in the Fed's balance sheet neared its end, the balance sheet of the ECB rose strongly reaching 40% of area GDP by 2017 – much higher than the peak reached by the Fed (25% of GDP). In June 2014, the ECB made the interest rate on deposits with it negative. Benchmark long-term rates fell to close to zero. The LTROs became targeted at encouraging bank lending to the real economy: the first announcement of targeted longer-term refinancing facilities (TLTROs) was in June 2014 to mature in September 2018.

The Bank of Japan, with a history of quantitative easing since the 1990s, expanded their outright purchases of government bonds and corporate paper from December 2008. The BoJ was reluctant to buy long-term paper. During 2010-12, the IMF forcefully advocated stronger monetary easing policies in Japan: Ball (2019) mentions the "strong" involvement of the First Deputy Managing Director and "frank" debates with BoJ officials. The BoJ would not budge. In the end, it was the arrival of a new government (with Abenomics in early 2013) which led to more radical policies of monetary expansion.[31]

Ball also notes significant disagreement on monetary policy frameworks within the IMF: MCM suggested that the BoJ consider dropping its 2% inflation target and so acquiesce in lower inflation, a step resisted by other departments. Quantitative and

30 The euro area crisis depressed growth in the rest of Europe. The Riksbank began to cut its policy rate from late-2011 (reversing a period of significant rises that had started in July 2010) and then purchased government bonds. Strong capital inflows into the Swiss franc prompted In the SNB to impose in September 2011 a limit of 1.20 Swiss francs per euro. The SNB bought foreign exchange on a massive scale, with growing purchases of foreign equities. Negative deposit rates were introduced in December 2014, and the exchange rate limit was abandoned in January 2015 (although intervention continued to hold the Swiss franc down).

31 But both the Fund and the BoJ rejected the more radical proposals of monetised fiscal expansion ("helicopter money") and an exchange rate peg.

Qualitative Easing (QQE) was introduced by the BoJ in April 2013. The "qualitative" refers to the purchase of assets to narrow various risk spreads. Term premia were reduced by buying longer-term government bonds. Other risk premia were reduced by the purchase of ETFs tracking Japanese stock market indices and of local real estate investment trusts. The deposit rate was lowered to negative levels in January 2016. In September 2016, the targeting of the yield curve became more explicit, and the BoJ committed itself to a temporary overshooting of the inflation target.

By mid-2018, the success of UMP in Europe, Japan and the United States was well established (e.g. Bean et al (2010), Casiraghi et al (2016), Farmer (2013b), Joyce (2013), Gagnon (2016), Panetta (2016), Williams (2014) and Wolf (2014b)). It took time but economic growth was restored without creating the inflation problem that had worried some. The financial stability effects were on balance benign – not malign as some had feared in 2012 and 2013 (Siviero (2018)). The reason, explored further in section (b) in chapter 4, is that expansionary monetary policy fathered a virtuous financial cycle that helped deleveraging which left economies stronger.

3

Financial risks and monetary policy: pre-GFC assessments

The monetary policy mandates of most central banks centre on macroeconomic stabilisation. It is true that legislation on their mandates often refers to financial and well as macroeconomic variables.[32] However, no central bank would target any financial variable (such as asset prices, credit-to-GDP ratios etc) as a monetary policy objective in its own right.[33]

Yet financial variables – financial market prices and aggregates such as bank lending or bond issuance – still give vital clues about future macroeconomic developments which standard models miss.[34] It is not just the baseline forecast of a macroeconomic variable which matters. The other moments of the probability distribution of a variable (e.g., the variance to measure the dispersion of expectations and skewness to measure which end of the distribution has a fat tail[35]) are also relevant for policy. Similarly, using options prices to derive the probability distributions of future market prices can give greater depth to any "reading" of the state of expectations.

32 The Fed, for instance, has a triple (not dual) mandate because its monetary policy also has to support a third goal, that of "moderate long-term interest rates."

33 This is discussed more fully in section (a) in chapter 4. Note that the Central Bank of Norway does explicitly take account of financial variables in assessing macroeconomic scenarios. But it does so in order to address tail risks in future macroeconomic outcomes.

34 Hamilton et al (2015) argue that a boom in equity prices might even signal that the natural rate of interest ($r^\star$) has risen before this is visible in macroeconomic data: "if changes in $r^\star$ reflect variation in the marginal product of capital and if the equity market sniffs this out quickly" then adding equity prices might improve a monetary policy rule based on macroeconomic data alone. But they warn that any link from equity prices to $r^\star$ is likely to be very noisy.

35 This could refer, for example, to the question of whether the left tail of the real GDP growth distribution is fatter (i.e., a negative growth surprise) than the right tail (a positive growth surprise).

In short, there are many reasons why central banks watch financial variables very closely. In addition, the balance sheet positions of firms, households and financial institutions help to determine the economy's resilience to shocks, and this can influence the cost of correcting monetary policy errors. A financial shock occurring when banks are weak, for instance, can lead to a sudden and prolonged tightening in credit conditions that depresses aggregate demand, which further weaken the banks. This can undermine the transmission of monetary easing to the real economy.

All central banks try to read how changes in financial variables today will affect macroeconomic outcomes tomorrow. But this is very, very hard. This was notably the case in the months before the failure of Lehman. Over the years, many mistakes in monetary policy can be attributed to such errors, rather than to central banks ignoring financial variables, still less to following the wrong monetary policy framework.

(a) The inflation-targeting monetary policy framework

The monetary policy frameworks of most central banks are forward-looking, focused primarily on forecasts of inflation and real GDP relative to objectives. All relevant information could shape such forecasts. This obviously includes asset prices to the extent they shape such forecasts (how well is discussed in section (d) below). "Flexible inflation targeting" describes the objective function of this policy framework. It does not entail an explicit monetary policy reaction function such as a Taylor rule.[36]

There is no simple "normal" for the policy rate because key macroeconomic relationships (output gaps, Phillips curves, productivity growth etc) are constantly changing. In particular, policy must take account of the large apparent decline in the natural

36 In a BIS conference on monetary and financial stability , Bean (2003) explained why this is a crucial distinction in considering the question whether inflation targets are enough to guide monetary policy. In his comments, Visco (2003) pointed out that that Bean did not rule out a monetary policy reaction to financial imbalances which might have macroeconomic consequences. But Bean did object to the BIS view that "if the monetary policy reaction function does not incorporate financial imbalances, the monetary anchor may fail to deliver financial stability." A flexible inflation targeting framework is general enough, argued Bean, to accommodate judgement and information extraneous to the econometric models used by central banks without explicitly adding asset prices to the monetary policy reaction function.

rate of interest in most advanced economies in recent years.[37] Central banks, like other observers and researchers, struggle to keep abreast of these developments. Many central banks have inflation targets of around 2%. Low inflation is desirable but the choice of a specific low number is arbitrary, and might be changed.[38]

Monetary policy committees can form a view on how the key variables are related by examining the results of one or more models. They can be classic income-expenditure macroeconomic models or newer DSGE models. Members can challenge these models, and successive iterations can be prepared. The use of models has the virtue of attempting to take account of the interactions between many variables and of imposing some consistency, including among variables related to each other by accounting identities. The use of good models guards against reaching strong conclusions on the basis of partial equilibrium reasoning.

Many arguments about the financial risks of expansionary monetary policy have fallen into this partial equilibrium trap. They do not go beyond saying that, other things equal, higher interest rates tend to reduce financial risk-taking. This might be true as a partial microeconomic proposition but it is not necessarily true as a macroeconomic proposition. This is because higher rates also change other macroeconomic variables. Just think about two key variables – GDP (which is lowered) and the exchange rate (the domestic currency usually appreciates). Both changes can

37 A key benchmark for the degree of monetary stimulus/restraint is the distance between the policy rate and the natural rate of interest. As outlined in chapter 1 above, this is the rate of interest consistent with full employment and meeting the inflation target. It is not observable but is constructed on the basis of a model.

38 The debate about whether a higher target for inflation would be helpful by raising inflation expectations and reducing the frequency of short-term rates hitting the lower bond (Blanchard et al (2010), Ball (2014)) was made prominent by Blanchard when the IMF Economic Counsellor in early 2010. Some BIS economists countered by arguing for a lower inflation target (0 to 2%) because prices were declining due to technological change and globalisation. Would moving from a 2% to a 4% target not have the drawback of leading to a 2 percentage point jump in government bond yields? In any event, the Fed recently decided to keep 2% as the long-run target but (a) to aim at inflation above 2% for some time to compensate for the recent years of below-target inflation and (b) avoid any pre-emptive tightening as the unemployment rate fell.

undermine financial stability.[39] This conclusion is reinforced if monetary tightening weakens the solvency of the banking system. The Independent Panel on BIS research (Allen et al (2016), discussed further in section (c) in chapter 4), stressed that models provide an essential check on any policy advice.

Tail risks also matter for policy decisions. There is no reason to assume that shocks likely to hit the economy will have the symmetric and well-behaved tails of the normal distribution. On the contrary, uncertainty facing the economy is likely to be skewed in one direction or another, especially after major financial disruptions (Mishkin (2011)). If the tail risk of above-target inflation is greater than that of a recession, for instance, it may be appropriate to set interest rates higher than would be justified by the baseline forecast alone. Hence a GDP-at-risk focus can inform monetary policy decisions (Cecchetti (2001)). The costs of correcting policy errors also matter. If it would be harder for the central bank to correct an unexpected recession than an overshooting of the inflation target, interest rates might be set lower than justified by the baseline forecast. Central banks did not pay enough attention to either of these two considerations in the early stages of the GFC – as Feldstein had clearly warned at the time (see section (d) in chapter 4).

(b) Low inflation and asset price booms

Some blamed the coincidence of low inflation and strong asset price booms in the 1980s and the 1990s on the monetary policy frameworks of central banks. Some even argued that the failure of monetary policy in the advanced economies (especially in the United States) to curb asset price booms was the common causal factor of the whole series of recent financial crises, especially in the emerging markets. One view, advocated for many years by the chief

39 The evidence is that the risk-taking channel of currency appreciation can be strong (Hofmann et al (2016)). Currency appreciation stimulates private consumption, and may even persuade households that their permanent income has risen so they borrow more. And the banks think that local borrowers have become better risks (Bruno and Shin (2012)). Borrowers with foreign currency debts (e.g. in an emerging market) see their balance sheets strengthen when the domestic currency appreciates, and banks are willing to lend them more. Historically credit expansions and currency appreciation have indeed gone together, suggesting that they actually reinforce each other (Gourinchas and Obstfeld (2012)).

economist at the BIS, was that central banks were asymmetric in their reactions to asset price movements. Their actions displayed a chronic Monetary Easing Bias in refusing to temper asset price highs but fighting all the lows. From the early 1990s, he argued, the Fed had been too eager to cut interest rates during each financial crisis and then too hesitant to raise rates afterwards (White (2003)) – the Greenspan put. [40]

The corollary of this perspective was that the various *microeconomic* causes of each financial crisis – which regulation might be expected to address – were mere symptoms of a fundamental *macroeconomic* failure of (especially US) monetary policy.[41] The Fed was at the time tolerant of this heterodox hypothesis. After all, the financial risks of monetary policy decisions were high on their research agenda. But it did object to US monetary policy being blamed for each financial crisis since 1990. Other central banks, although often worried about the financial risks of too much monetary stimulus, also rejected White's general argument because the alleged downward bias to US interest rates for 20 years was hard to square with the trend decline in US core consumer price inflation since the early 1980s.

Singling out US monetary policy as the common cause of the emerging market crises of those years was also at odds with almost all analyses of such crises, including those at the BIS. Bisignano

40 "Every time an international financial crisis had erupted … there has been a tendency to lower interest rates. The headwinds in the US in the early 1990s led to a sharp easing of monetary policy … after the Asian crisis, low inflation led to interest rate increases being put on hold, which contributed to inflows into Russia and the massive use of leverage by LTCM. Subsequent interest rate decreases were then followed by a further 150% increase in the value of the NASDAQ. When this bubble collapsed, sharp reductions in interest rates were followed by major increases in house prices (White (2003))." Even in the 2008 recession, White continued to warn about the dangers of cutting interest rates. He has maintained this view until the present day: "Each slowdown … from the stock market collapse in 1987 to the COVID-19 crisis was met by monetary easing. Thus interest rates have ratcheted down towards zero in recent decades (White 2020)." Note, however, that his contrarian perspective in the early 2000s was meant as a contribution to a debate (and not a fixed BIS house view). White did not prevent the publication of Andersen's BIS Working Paper in 1997 which argued that an asymmetric monetary policy response to asset price movements might well be optimal, an idea recently echoed by the IMF's work on GDP at risk.

41 This reasoning was frequently repeated (e.g., in the June 2008 BIS annual report): shortcomings in the regulation of financial innovations were mere symptoms that should not distract policy-makers from the underlying cause (that is, in its view, lax monetary policy).

(1999) stressed microeconomic failures: moral hazard created by government guarantees; weak regulation of banks and non-bank financial intermediaries; and poor corporate governance. The Yale lectures by Lamfalussy (2000) in addition highlight the recklessness of international lenders. Markets ignored the warnings that excessive growth in international bank lending, which the G10 governors tried but failed to curb. Pegging exchange rates to the US dollar and heavy short-term borrowing in dollars made EMEs vulnerable to sharp changes in dollar interest rates and the policies of international banks.

Contrary to White's assertions, the historical evidence is that monetary ease has not been a pre-condition for asset price booms (Posen (2010)). The pre-GFC tightening phase of US monetary policy reached its peak in June 2006, taking the fed funds rate to 5¼%. But this did not prevent banks and others continuing to take on more risky exposures. Nor is there reliable and consistent evidence that financial asset prices help to predict future output – recall Samuelson's old quip about the stock market predicting nine of the past five recessions (Walsh (2009)).[42] This is not surprising because what any given rise in equity prices foretells about future aggregate demand depends on what has driven that rise. It could be higher expected future earnings or a lower discount rate or a lower equity risk premium. Hence an automatic monetary policy response to *any* single asset price change without knowing the cause would not be justified (Bean (2003), Gourio et al (2017)). And even experienced forecasters using all available financial indicators have always found it hard to measure the macroeconomic force of financial shocks. This helps to explain the inadequacy of the initial monetary policy response to the GFC (section (d) below)).

But there is evidence that booms and busts in residential property markets, especially those synchronised across countries, can inflict serious macroeconomic damage. Some have worried that excessive global monetary expansion could induce such synchrony. However, the great diversity of house price rises over the past decade across countries all following expansionary monetary policies suggests

42 Except after a very sharp decline in equity prices as Andersen (1997) and recent IMF work on GDP-at-risk have demonstrated.

that monetary policy has not this time been the main driver.[43] In any event, higher interest rates aimed at bringing about a significant lowering of house prices would depress GDP by an amount no policy-maker could accept.[44]

Almost all studies, including those by central banks, by central bank groups at the BIS and by IMF staff, have concluded it would be unwise to raise interest rates to counter a sharp rise in asset prices when there is little evidence of wider inflationary pressures.[45] The difficulties have been known for years. It is hard to know *ex ante* if a rise in asset prices is justified by fundamentals or not. Even the sign of the impact of monetary policy action on financial markets is ambiguous, let alone the magnitude.[46] Nor do central banks have a mandate to try to lower market prices bringing an end to an apparently sustainable economic expansion even when inflation is under control. Pringle (2014) argues that it is "politically naïve" to suppose that politicians would give central banks *carte blanche* to play safe and stop an economic upswing in its tracks whenever there was a faint whiff of a financial boom. Allowing the control of inflation to be overridden by ill-defined financial stability objectives, argues Pringle, "would surely be a weak and unreliable policy framework, at a time when markets urgently needed clear, robust rules."[47] Likewise, Tucker (2018) dismisses the view that monetary

43 The changes from 2010 to mid-2019 were: United States (+52%), United Kingdom (+35%), Canada (+63%), France (+10%), Germany (+49%), Italy (-16.2%), Sweden (+58%). There is, however, evidence that the global factor in growth in residential investment has been unusually high since 2014, which suggests some risks from global synchrony (Kohlscheen, E et al (2020))

44 In an analysis covering 17 countries, Assenmacher-Weshe and Gerlach (2008) discover a three-to-one rule: to bring down real house prices by 15% would require monetary tightening strong enough to depress GDP by 5%. Even Iacoviello (2005), who demonstrated that induced changes in the value of collateral dramatically raised the impact of house price shocks on aggregate demand, found that allowing monetary policy to respond to house price shocks would do little to stabilise inflation or output.

45 The leaning-against-the-wind debate is considered in section (a) in chapter 4.

46 The sign is ambiguous because monetary policy decisions, dependent as they are on unfolding economic developments, are often in line with what the market wants and expects. There have been instances when higher policy rates have coincided a continued rise in equity prices because they have convinced investors that an expansion has become more sustainable.

47 Even central banks that have talked too much about financial stability in presenting monetary policy decisions have found that this undermines market confidence in their inflation target (see Jansson's comment in section (a) in chapter 4).

policy should put less weight on stabilising the business cycle and more weight on managing the financial cycle. BIS's advocacy that monetary policy aim at managing the financial cycle, he argues, could undermine political support for central bank independence because the financial cycle cannot be operationalised in a way that legislators could monitor.

To repeat: the absence of asset prices from the central bank's macroeconomic objective function does not mean they are ignored in monetary policy deliberations – as the BIS annual report of June 1997 made clear (section (a) in chapter 4)). The IMF has also tackled this question on several occasions. A chapter on "Asset prices and the business cycle" in the May 2000 *WEO* concluded that macroeconomic policy should take asset price movements into account when such movements contained new information about future inflation and the output gap.[48] Macroeconomic policies had gone wrong in the 1980s and early 1990s, the IMF argued, because they had not taken account of the impact of asset price changes on private sector balance sheets. Monetary policy had therefore failed to curb excess demand promptly enough, "requiring a substantial policy tightening at a later stage of the cyclical upswing".

Foreshadowing later debates about market failure, the May 2000 *WEO* also noted that financial markets had failed to stabilize demand in that period. In particular, bond yields had not worked well as automatic stabilizers. In theory, forward-looking agents might have been expected to see that policy rates would have to be increased in order to address the eventual inflationary effects of the asset price boom. If they had, long-term interest rates would have risen, the *WEO* noted, "obviating the need for a pre-emptive policy response to such an asset price change."

The IMF further noted that pre-emptive policy action might be needed on "some infrequent occasions", and laid down three pre-conditions for such action:

- *Overvaluation* (or undervaluation) had to be widely present in asset markets, and in particular evident in both equity and house prices.
- Asset price inflation had to be accompanied by *rapid credit* or *money growth*.

48 Developing an earlier analysis in the October 1999 *WEO*.

- There had to be significant *macroeconomic imbalances* (such as a current account deficit in excess of 4% of GDP).

In any case, the *WEO* argued, policy actions other than higher interest rates would probably be more effective in tackling an asset price boom. It mentioned three: tighter financial regulation; counter-cyclical fiscal policy; and tax increases to lower the real post-tax return on asset holdings. It also pointed out that monetary policy in a common currency area could not deal with asset price bubbles affecting only some member countries. It observed that real short-term rates in the euro area were perversely lower in those countries where inflation was higher. Hence it concluded that in the euro area greater weight would have to be put on national fiscal and regulatory policies.

There is one important question which repeatedly occupied monetary policy committee discussions in several countries in the early 2000s: did an asset price bubble create a risk of above-target inflation or did it create a risk of a sharp recession once the bubble burst? The reason often given for a pre-emptive increase in policy rates not warranted by the baseline macroeconomic forecast was that a sudden unwinding of an unsustainable increase in debt "would increase the risk of undershooting the inflation target in the medium term." Cecchetti (2006) developed a GDP-at-risk framework to counter significant tail risks of a slump in GDP following a collapse in house prices, a perspective recently revived by the IMF (see section (d) in chapter 4).

Box A summarises such a debate at the Bank of England in the early 2000s. Basing policy on such putative effects arising at some unspecified future date beyond the two-year forecast horizon of the central bank is hazardous. It is hard to be confident *ex ante* whether such effects would materialize, and hard to verify ex post without a specific date. It is therefore difficult to rely on for interest rate-setting purposes – and harder still communicate.[49]

49 Related issues might be raised by the IMF's development of Financial Conditions Indices to cover how too-bouyant financial conditions today can create downside risks for GDP two or three years hence. Such indices, however, are designed to indicate the need to use macroprudential policies rather than to suggest pre-emptive monetary policy tightening: this is discussed in chapter 6.

Box A House price increases and GDP-at-risk: the debate at the Bank of England in 2002

Given strong domestic demand, continued house price increases and a rise in core inflation from zero to 2%, the Bank of England did not follow the sharp cuts in the federal funds rate during 2001. By mid-2001, the UK had the highest real short-term interest rate in the G7. Although core inflation declined, the Bank of England kept Bank rate at 4% for all 2002. The MPC minutes of October 2002 said that one reason was that, with the economy growing close to potential, cutting interest rates would just further boost house prices and household borrowing which were already increasing strongly. The macroeconomic rationale put forward in the minutes was that house prices might fall and in a recession leveraged borrowers might not be able to meet their debts. This might provoke a sudden unwinding of this debt-fuelled boom "increasing the risk of undershooting the inflation target in the medium term." A senior Bank of England official explained to the BBC's economics correspondent in 2003 that the Bank was keeping "interest rates a bit tighter because we are worried about … financial imbalances creating problems beyond the two-year horizon of our inflation target".[50]

One member of the Monetary Policy Committee, Stephen Nickell, rejected this argument. He did so because he had not seen evidence for, and he did not believe, the assertion of the putative effect on GDP over the period beyond the two-year horizon of the Bank forecasts presented to the MPC. He voted for a rate cut at the MPC: without this, he argued, inflation was likely to undershoot target in 2004. Nickell (2005) reported a simulation suggesting that eliminating the surge in house price inflation in 2003-04 would have required a 300 basis points rise sustained for more than three years.

In the event, higher interest rates did not moderate the house price boom. There was, it is true, a sudden unwinding of debt – but only after the GFC in 2008. And then it was high-risk exposures in securitised debt paper, especially related to the US mortgages, rather than excessive mortgage lending at home which hit the economy.

50 See pp 192-93 Peston (2012)

In the event, higher UK interest rates did not achieve the hoped-for objective. Eddie George, the governor at the time, said that higher rates had attracted capital inflows, leading to an unwanted appreciation of an already strong currency. The strong pound may even have added to house price pressures as households felt richer and banks were more willing to lend. Therefore, he said, higher rates might have perversely stimulated the non-tradable sector at the expense of the tradable sector.

(c) Financial risk assessments and Fed monetary policy before the GFC

The bust of the dot-com bubble in 2000 and 2001 involved a substantial destruction of paper wealth. Yet the US recession that started in March 2001 and was aggravated by the 9/11 terrorist attacks was mild, and lasted only eight months. The Fed responded by cutting the fed funds rate in steps to 1%. By mid-2003, US real GDP was rising faster than potential and by the end of the year core inflation was increasing (but still well below 2%). The *WEO* of April 2004 noted that: "In a low-interest-rate environment … asset prices, which have already rebounded substantially, could get ahead of fundamentals, but that future interest rate rises – especially if abrupt or unexpected – could lead to financial market volatility, and could possibly adversely affect the recovery." At the BIS, White had been arguing that the Fed had been too hesitant in the past to raise interest rates after a financial crisis.

The minutes of the FOMC in January 2004 show that participants shared the worry about an out-sized reaction of markets when the Fed would begin to raise rates.[51] Once markets had calmly digested the first increase in June 2004, however, the FOMC in September

51 Mallaby (2016) notes, "At their interest-rate meeting in January 2004, Timothy Geithner, then president of the New York Fed, warned of future distortions in financial markets that can only be unwound with some drama. Alan Greenspan sounded even more worried. When we get down to the rate levels at which everybody is reaching for yield, at some point the process stops and untoward things happen, he said grimly." The minutes also show, however, that by September 2004 (i.e., a few months after the first increase in the fed funds rate) the FOMC had become much more relaxed. Mallaby's biography of Greenspan published in 2015 on his investigations of the policy debates is very valuable because of its detailed review of the FOMC transcripts.

had become more relaxed. The Fed proceeded with a major but very gradual and predictable tightening in monetary policy over the following two years.

By mid-2006, there had been seventeen consecutive increases of 25 basis points. Not a single move of 50 basis points: was the Fed scared of the bond market? Even Greenspan worried that the Fed was being too predictable (Geithner (2014)). The Fed's logic was that the risks of big market over-reactions to even modest changes in monetary policy would justify a more gradual path of rate increases than any Taylor rule might prescribe.[52]

Nonetheless many rightly worry that such a gradualist approach to monetary policy adjustment might create market perceptions of near-certainty about the future path of short-term interest rates, making bond carry trades too attractive. No one would argue for creating artificial uncertainty about the interest rate path. But Greenspan's doubts about monetary policy strategy (and the worry it might encourage greater leverage) would be greater if investors believed that the Fed was trying to stabilise the bond market. Stein and Sunderam (2018) is perhaps the most persuasive warning about such a trap if central banks are perceived as becoming too market-led.

In any event, the September 2005 *WEO* judged that the measured pace of Fed tightening had been appropriate. Monetary policies in the euro area and Japan, the IMF argued, might have to be eased.[53] The BIS in its annual report in June 2006 took a more hawkish view. Although the fed funds rate had risen to 5¼ %, the BIS was still warning that easy monetary policies continued to allow the build-up of financial imbalances, "which would seem to call for more resolute monetary tightening".

The IMF correctly identified the breakdown in the transmission of US monetary policy to long rates that was to play a determining role in the GFC. A significant rise in the fed funds rate had failed to

52 See the 4-page box "Monetary policy rules and their role in the Federal Reserve's policy process" in Federal Reserve (2017).

53 The *WEO* identified the risk that monetary policy would be too tight in the euro area: "if inflationary pressures remain restrained, and expected recovery fails to materialise – or if the euro appreciates significantly – an interest rate cut should be considered". The Fund also argued that the quantitative easing policy of the Bank of Japan "should remain in place until deflation is unambiguously defeated".

lift longer-term rates (the Greenspan conundrum), largely because of a global saving glut. The *WEO* warned that low long-term rates on benchmark government bonds had induced investors "to boost returns through increasingly complex and leveraged strategies".

Crucially, the IMF did not suggest the Fed tighten monetary policy even more. This would hardly be a rational response to a breakdown in monetary transmission. It recommended instead enhanced "vigilance by supervisors and regulators". This analysis echoes the famous paper at the annual conference of the Federal Reserve Bank of Kansas City at Jackson Hole by Raghu Rajan, then the Economic Counsellor at the IMF (Rajan (2005)). He argued that technological change, financial liberalization and institutional factors had created some perverse incentives and had made reactions of different firms more positively correlated: the risk of a catastrophic meltdown needed greater attention from central banks and regulators.[54]

The rise in the fed funds rate to 5¼% in mid-2006 was accompanied by increases in policy rates in other major jurisdictions. Markets expected these rises to be sustained and generalised internationally. The long-run expectation of the expected future world policy rate had risen by about 125 basis points from mid-2004 to mid-2007: see Figure 1. Yet this failed to curb financial market risk-taking on almost any measure.[55] On the contrary, risk-taking increased. Share prices continued to rise, credit spreads narrowed and the volatility of core financial markets declined.[56] Financial markets woke up only after the macroeconomic effects of higher interest rates had become clear with the downturn in the US housing market in early 2007 threatening a recession.

The failure of higher rates worldwide to curb risk-taking by banks (and in financial markets generally) troubled almost every central bank governor in the major advanced economies. From early 2006,

54 He did not advocate a global tightening of monetary policy. He noted as an alternative to his view the argument of BIS economists for higher interest rates based on their view that the focus of monetary policy only on keeping goods and services inflation low had created asset price booms.

55 This is consistent with Posen (2010): his statistical examination of a large number of earlier cases found no evidence that monetary ease was a pre-condition for asset price booms.

56 A composite indicator of five such measures is shown in Graph 1 in Turner (2017b).

Trichet (in his function as chairman of the committees of governors meeting at the BIS) repeatedly told his BIS press conferences that governors judged the financial markets had become over-extended, and warned them that they should prepare for a significant correction: see Trichet (2018). Central banks had prepared the ground by raising interest rates substantially as economies neared full employment but markets had remained far too complacent.

The IMF reports in April 2007 (the last before the crisis) recognized the macroeconomic risks that financial excesses were creating. The *GFSR* worried about the greater risk-taking in less-well-understood markets and instruments.[57] And it correctly identified the macroeconomic tail risks from any sudden tightening in financial conditions. Nevertheless, the *WEO* said that global economic risks had declined since the September 2006 *WEO*. This misjudgement shaped their policy advice. The Fed's stance of keeping the policy rate at 5¼% even in the face of weaknesses in the latest economic data was supported by the IMF; the ECB was encouraged to raise rates; but the BoJ was urged to remove monetary accommodation only gradually.

The BIS meetings in May 2007, however, were haunted by a much deeper unease. Kohn (then chairman of the BIS's Committee on the Global Financial System (CGFS)) coined the phrase "irrational calm" of financial markets, inverting Greenspan's famous remark about irrational exuberance. "But disquiet beneath the surface," he added. Geithner echoed the prescient warnings he had given about the risks in a speech in March (Geithner (2007)). He identified three risks from decades of credit market innovations: greater liquidity risks; market discipline being impeded by complexity (hidden leverage); and the difficulty of "unscrambling the eggs" meaning that it would be extremely complicated to unwind a large bank active in OTC derivatives and leveraged loans. Banks needed larger capital and liquidity buffers.

Many agreed that major international banks indeed did not have enough capital to cope with the macroeconomic risks they faced. The shortcomings of Basel 2 notably with respect to securitised products were now clear. But getting international agreement on

57 It warned that the indirect effects of difficulties in the sub-prime mortgage market could lead a more pervasive tightening of credit conditions including for prime mortgages, consumer credit, high-yield corporate paper and other new collateralized products.

correcting this would take time – and in the end it took the near collapse of the global banking system to force regulatory action. Because strong asset price inflation still raised questions about monetary policy frameworks, there was also a discussion about historical episodes of large movements in asset prices. There was no support for further tightening monetary policy to address high asset prices. The focus was almost entirely on shortcomings in the prudential oversight of an overleveraged and increasingly opaque financial system.

(d) August 2007 to September 2008: inadequate monetary stimulus

In August 2007, the GFC broke as some European banks struggled to rollover short-term dollar funding. The sheer scale of the ECB's emergency lending to European banks – criticised at the time by many in markets and even by other central banks – was vindicated by subsequent events. It proved to be the canary in the mine. From that moment, it was clear that the pressures that had seemed to be confined to US mortgage markets would shake the foundations of global banks. The big banks, knowing their own exposures, were fully aware of the dangers they faced. Yet despite clear signs that several markets had become illiquid and major international banks were in difficulty, the *WEO* in October 2007 made only a modest downward adjustment to its baseline forecast to growth in the advanced economies in 2008.[58] This might, some hoped, prove to be a temporary squall and central banks should support banks through a severe liquidity squeeze. The IMF nevertheless urged central banks to "remain alert to inflation pressures".

The main impediment to wider lender-of-last-resort operations and more expansionary monetary policy was an exaggerated worry about moral hazard.[59] Monetary policy, the *WEO* said, was shaped partly by "a concern to avoid perceptions that central banks would

58 But the report did say that a deeper credit crunch than envisaged in the baseline forecast (loss of confidence in risky securitisations and banks' weakened balance sheets) would have a "considerably greater macroeconomic impact".

59 Many even opposed modest proposals that central banks should lend to banks at longer maturities and against a wider range of collateral than was customary. Such opposition was rationalised by saying that such action would in the future lead banks to under-price liquidity risk or hold poor collateral.

automatically respond to financial distress by taking actions to curtail losses, which could raise moral hazard issues, reduce credit discipline, and impart an inflationary bias to policy setting."

This policy prescription was mistaken. Too-sanguine official macroeconomic forecasts had ignored the extreme disruption in financial markets. Neither the CEOs of major banks nor their supervisors knew how to solve the most severe banking crisis in 30 years. The reappraisal of risk in global financial markets was assuming systemic dimensions. Overnight LIBOR had risen from 5.3% in May to 6% by August. This was but the tip of the iceberg because some major banks had lost market access. Many had already suffered huge losses, and faced the prospect that the activation of under-priced credit lines would lead to an involuntary explosion of lending to risky borrowers. Banks would not lend to other banks holding assets which could not be valued. Goodhart (2007) saw though the official smokescreen of the talk of liquidity strains: the problem was capital, he said, and some large banks were insolvent. This was not the time to put moral hazard high on the policy agenda. It was the time for governments to make clear "they stood 100% behind their banking systems … (accepting) the need for capital injections (Pringle (2014))". Policy-makers took too long to absorb (or re-learn) the lesson of history that banking sector distress almost always led to sharper and more protracted downturns than stress in other markets.[60]

Many informed observers at that time, especially those who knew the major banks were crippled, judged the 50 basis point cut in the fed funds rate on 18 September as insufficient. Feldstein (2007), in a prescient final summary of the annual Jackson Hole conference at the end of August, argued for a more aggressive cut (of up to 100 basis points).

The two reasons he gave for his recommendation are relevant to the debate about monetary policy frameworks. The first was that financial forces such as disruptions in credit and banking markets were "inadequately captured by the formal macroeconomic models

60 This empirical conclusion had been well-established years before the GFC (section (d) in chapter 4).

used by the Federal Reserve and other macro forecasters".[61] In particular, model-based projections inevitably underestimated the serious tail risk of a big decline in GDP. The second reason was that making an upside mistake on inflation at that juncture would be the "lesser of two evils ".[62] He argued that the Fed could persuade markets that such a risk-based approach to cutting rates with current inflation still a little high was not an abandonment of "its fundamental pursuit of price stability". But it would struggle much more fighting a downturn once feedback effects between income declines and banks too weak to lend had driven the economy into a deeper recession.

"Adjust standard macroeconomic forecasts for financial factors" is easy to say but hard to do. Forecasters have made big mistakes in both directions – paying too much attention to financial factors as well as too little. As noted above, the IMF argued with hindsight in 2000 that macroeconomic policies in the early 1990s had been too loose because they had not taken enough account of how the boom in asset prices had affected private sector balance sheets. Mussa, the IMF's Economic Counsellor between 1991 and 2001, said that the market turbulence triggered by the Russian default in 1998 and the collapse of the hedge fund LTCM had led him to his greatest error in 25 years of forecasting the US economy: at the end of 1998 he reduced his forecast of US growth in 1999 to 1.8%. The out-turn was 4.2%. He had over-estimated how much financial turbulence would hit the real economy. Hence, by his judgement, the 75 basis point cut in the fed funds rate in 1998 was, with hindsight, an error.[63]

61 The general issue of monetary policy after a financial shock is reviewed in section (c) which follows. Many believe that the pre-GFC policy mistakes partly reflected the failure to take proper account of financial forces in preparing macroeconomic forecasts. There was insufficient understanding of "liquidity effects, imperfect asset substitutability, agency costs, credit constraints and other financial frictions as determinants of economic activity (Shigehara and Atkinson (2011))".

62 Geithner echoed this thought at the January 2008 FOMC meeting: "it would be easier to correct the mistake of doing too much than to escalate too slowly."

63 Stockton said the Fed's mistake in 1998 was that it had failed to appreciate how strong the US economy had been as it entered that period. Both citations are given in Ubide (2017).

Most central banks continued up to the collapse of Lehman to under-estimate the macroeconomic impact of the financial crisis and to overstate moral hazard risks. The August crisis of European banks had forced the ECB to back off from the interest rate rise planned for September 2007. Thereafter, in the face of the deepening financial crisis, it held its policy rate constant until bizarrely raising it in July 2008. The Riksbank raised rates. The Bank of England made only modest reductions: at the time of the Lehman bankruptcy, Bank rate was still at 5%. By 30 April 2008, the fed funds rate had been cut to 2%, 325 basis points below its pre-crisis level. As the US slipped further into recession, however, a hawkish minority on the FOMC continued to be very vocal on inflation and moral hazard risks. It took time for Bernanke to fully distance himself from these hawks.[64]

Even as late as August 2008, US monetary policy was constrained by (minority) worries about inflation and about the moral hazard risk that the Fed might be seen as protecting investors from losses. Such worries were underlined by the FOMC minutes published shortly after the 5 August 2008 meeting – which sent the wrong signal to markets. The transcript of this meeting – published years later – reveals that Dudley's description of the deterioration in financial conditions could not have been clearer. Bernanke said that there was "little doubt that, despite the lower rate on overnight bank lending, the rates that matter for economic activity are largely higher than a year ago." He continued that macroeconomic prospects are "going to depend on bank balance sheets".[65] A preliminary analysis indicated that five of the biggest banks would see their capital ratios decline by 30 to 50% over the subsequent two years, he noted. He echoed the view of Mishkin that the financial system was more fragile, with less capital and fewer shock absorbers, than it had been in August 2007.[66] Yellen said that a serious credit crunch was underway and "we are likely seeing only the start of what will be a series of bank failures that could make matters much worse." Kohn said that developments since the previous meeting had "reduced the uncertainties around the projection … of a wider output gap and

64 Geithner (2014) reports that Bernanke told him in January 2008 that, "if I'm going to be hung, I want to be hung for my judgements, not theirs."

65 He looks back at this theme in his Per Jacobsson lecture on the real effects of "disrupted credit": see Bernanke (2018).

66 Recall Geithner's warning in March 2007 that capital and liquidity buffers of the banks were inadequate.

lower inflation over the next 18 months than in recent quarters". Given the worries about inflation that some FOMC members had strongly expressed, Bernanke nevertheless opted to send the "slightly hawkish" message in the minutes that "members generally anticipated that the next policy move would be a tightening".

Events soon overtook such hawkishness. Lehman filed for bankruptcy on 15 September, and major central banks faced a global financial system on the verge of collapse. They were not prepared.

Nevertheless, the Fed deserves praise for easing monetary policy faster and taking radical measures sooner than other major central banks – in the face of an often-hostile financial press. The failure of other central banks – especially the ECB – to take similar early action meant that an opportunity to mitigate the deflationary effect of a global banking crisis had been missed. The Fed also gets the credit for leading the co-ordinated cuts in interest rates by the major central banks on 8 October. Crucially, this co-ordination "provided a mechanism to help the ECB turn away from its focus on inflation (Kohn (2014))".[67]

It is easy to forget that, during much of 2008, there had been very strong opposition in some parts of Europe to lowering interest rates. The BIS's annual report in June 2008 wrongly asserted that "unusually low real interest rates for much of the decade" had been one cause of the GFC so that "many suspect easier monetary policies will only stimulate another unsustainable credit and asset price bubble". The BIS warned that "the temptation to use still more credit expansion and higher inflation to paper over the problems (of bad debts and high debt service burdens built up over many years) must be firmly resisted." Focusing only on regulatory reform, it said, would be a mistake because "to focus on shortcomings in recent financial innovations tempts policy-makers to address symptoms, not underlying causes". Mody (2018) notes

67 Mody (2018) says that Bernanke appealed to the other governors in late September for a co-ordinated cut in interest rates, and that ECB President Trichet was at first sceptical. But doing nothing "while the global financial system sank would have brought great ignominy to the ECB." Trichet persuaded the governing council to go along with the others and cut its interest rate by 50 basis points. On several key occasions Trichet, as chairman of the BIS committees of governors and bank regulators, stood up to some powerful euro area central banks and regulators as he forged a global consensus on concrete measures. "The world," he would often say, "expects us to act decisively together."

the divergent advice of the BIS and the IMF. The BIS was in favour of raising interest rates: inflation "was actually rising", it said, while significantly lower growth was "only a possibility". The IMF in June 2008 strongly urged the ECB not to raise rates.

4

Should monetary policy target financial variables directly?

No one disputes the importance of financial variables for monetary policy. Central banks seek to stabilise the real economy through their operations directly affecting financial variables. LOLR and similar balance sheet policies seek to keep financial intermediation operating in the face of financial panic, and reassure investors by putting a floor under asset prices after a collapse. Lower risk-free interest rates also encourage investors to take larger positions in risk assets. Investors are induced to seek profits by extending the duration of their assets (for instance by buying longer-maturity government bonds) or buying equities, corporate bonds and other risk assets. Lower yields on financial assets then encourage producers to invest in real, productive assets and stimulate residential construction with ancillary spending on consumer durables.

It is, however, not true that monetary easing necessarily leads to greater bank risk-taking. It is correct to say, in a partial microeconomic sense all else held constant, that lowering the return on safe assets will encourage banks to take more risk by expanding lending or by buying risk assets. But monetary easing also has a crucial countervailing macroeconomic consequence for banks: the capital conservation effect. Lower interest rates or central bank asset purchases lift the value of the bank's assets. The higher value of safe assets (e.g. government bonds) makes poorly capitalised banks more confident of their survival, and so less inclined to take gambling-for-resurrection risks. This was demonstrated in an insightful 2010 IMF staff position note.[68] Such a capital conservation effect, especially significant in the aftermath of a financial crisis, was reinforced by stronger bank regulation after the GFC.

68 De Nicolo et al (2010) cite evidence that monetary easing increases risk-taking by poorly capitalised banks less than is the case for well-capitalised banks.

If expansionary monetary policy succeeds in stabilizing the real economy, limiting the declines in both real incomes and asset prices during a recession, the financial system will generally emerge stronger than if the recession had been allowed to deepen further. Greater risk-taking by well-capitalised banks and other financial institutions can help achieve this favourable outcome.

In such circumstances, the main questions for financial stability are two. First, do financial firms manage well the risks they take in response to the interest rate environment created by central banks? The answer from the experience during the past decade may be "not entirely". This is because recent financial regulations – notably Basel 3 – have encouraged banks and other regulated financial firms to take increased interest rate risk without the necessary capital buffers (see chapter 7). The second question is: have the increased revenues of banks and other financial firms (as the economy has recovered) been used to build stronger capital and liquidity buffers to absorb future shocks? The answer seems to be "yes" thanks at least in part to regulatory reforms since the crisis, which have made the balance sheets of banks stronger (notably with respect to credit risk) and more liquid than before the crisis.

Delineating the distinct functions of monetary policy and financial regulatory policy in this way reflects the policy frameworks that have guided almost all central banks during recent years. But such a separation has been challenged by those who argue that monetary policy should look beyond meeting its inflation target and "lean against financial risk-taking". As noted above, the BIS was until recently associated with the view that the monetary policies of the major central banks had a chronic easing bias. Their view was that the absence of a financial stability variable from the objectives of monetary policy had led the Fed and other central banks to keep interest rates too low for years and so acquiesce in unsustainable asset price increases that had triggered a whole series of financial crises.

(a) Leaning-against-the-wind (LAW) monetary policy

This criticism of central bank policies challenges not just recent practices but also a long-standing tenet of monetary theory and practice. This is that monetary policy should not make avoiding asset price bubbles an objective – the mistaken focus of the Fed in the first decade or so of its existence. Its objective in the 1920s was

to avoid "speculative excesses" – especially related to bank credits for investments on Wall Street. It was guided by what it called the Principle of Productive Credit: the financial system is kept safe if banks lend only to support real investment (in goods or real activity), not speculative financial investments.

Dennis Robertson pointed out in his 1928 LSE lecture that the principle was flawed. It ignored the risk of deflation, which he saw then as the major threat facing the world economy. Even investment in real assets is risky if prices fall – look at the devastation caused by the collapse of commodity prices in the 1930s. The logic of central bank lending only against commercial paper which represented real goods absurdly implied that, if the real economy contracted, so should credit (Gerlach (2020)).

Robertson proposed instead a Principle of Price Stabilisation: "the stabilisation of the price level as the sole and sufficient objective of (central) banking policy." Robertson's indictment of the Fed's monetary policy framework, reinforced by Keynes and Irving Fisher, has surely stood the test of time. Post-war economists have almost all linked monetary policy to objectives of macroeconomic stabilisation of some sort.

Recent research has confirmed what Keynes argued in the *General Theory*. Interest rates high enough to curb an asset price boom in one sector could well cripple the rest of the economy (Persaud (2010)). The studies reviewed by Smets (2014) conclude that the macroeconomic costs of raising interest rates to counter a property price boom would be too high. Wolf (2014b) is sympathetic to the view that the (private) financial system can create credit and money in a destabilising way. But attempting to counter this through interest rate policy "might destabilize inflation and inflation expectations, thereby making the real economy more unstable, not less so".

Few practitioners in central banks would support having asset prices as an objective of monetary policy (Cecchetti et al (2002), Icard (2007)). The annual research meeting of central bank economists at BIS in 1997 revealed widespread scepticism about the view of BIS's chief economist that asset price movements should be a target of monetary policy (BIS (1998)). Objections were based partly on the evident lack of stability in the relationship between expectations which help to determine asset prices and macroeconomic and policy variables. A similar lack of stability was noted in the transmission mechanisms from monetary policy to

asset prices. For instance, empirical studies suggest that the effects of changes in interest rates on equity prices – even if a statistically significant link can be estimated – explain very little of the large historical movements in equity prices. Finally, many felt that any systematic short-run response of the policy rate to an asset price movement could actually make that price more volatile.

A chapter entitled "Monetary policy and asset prices in the industrial countries" in the BIS's annual report of June 1997 concluded that, "while it seems inappropriate to react automatically to asset prices, the information that may be contained in them can be incorporated in the central bank's forecast of future economic conditions, and in this way play some role in the formulation of policy". A G10 report in 2002 (to which both the IMF and the BIS contributed) struck a similar note of scepticism (Heikensten et al (2002)): when asset prices set off in the opposite direction to aggregate demand and inflation, the report noted, monetary policy cannot simultaneously target price stability and financial stability.

History shows that financial crises have been tail-probability events (or combination of events), in which non-linearities have been important (Bordo and Jeanne (2002)). Bordo (2018) argues that the coincidence of credit booms and serious financial crises has been rare. Brunnermeier and Oehmke's (2012) historical review of booms in asset prices puts emphasis on economic fundamentals or financial innovation as triggers and on the complexity of amplification mechanisms in the formation of risk perceptions. Simon (2015) shows that low interest rate environments have not been inherently unstable – either in creating macroeconomic instability or in destabilizing the financial system. Many reflections of central bankers who have tried some (even modest) version of LAW (e.g., Eddie George cited above) suggest that higher interest rates have usually failed to counter threats to financial stability.

But there is one qualification of great practical significance suggested by Reddy: highly visible joint Treasury/central bank action can settle very volatile expectations. The government will sometimes want the central bank to change interest rates to reinforce the signal sent by government policies better suited to the task at hand. Reddy explained this was why he (as governor of the RBI) acceded to heavy government pressure to raise interest rates outside the calendar of

monetary policy statements.[69] A deputy governor of the Riksbank, Jansson (2017), similarly notes that some degree of LAW could raise the risk awareness of the "public, market participants and economic decision-makers". But he stressed that this had to be used very sparingly: after a period in which too much talk by the central bank about financial imbalances had undermined confidence in the inflation target, he explained, the Riksbank abandoned its leaning-against-the-wind policy orientation in late-2014.

The recent empirical debate has been dominated by Svensson's rigorous assessment of the expected costs and benefits of LAW monetary policy (Svensson (2017)). He devises many alternative ways of formulating the possible financial stability gains, and uses empirical estimates of such effects that would be favourable to the LAW view. Nevertheless, he shows that because leaning against the wind increases both the non-crisis and the crisis unemployment gap, the marginal cost of a LAW policy would exceed the marginal benefit (mainly the lower probability of a crisis). His findings have been robust to challenges, and are consistent with most empirical research on this question (Svensson (2018)). The overwhelming consensus of researchers is therefore that the impact of higher interest rates on financial stability variables is too weak or too unreliable to alter the orthodox prescription that monetary policy should focus on its macroeconomic objectives.

The effect of the bank risk-taking channel of monetary policy is too small and too imprecisely defined statistically to reverse Svensson's conclusion. IMF economists Dell'Ariccia et al (2017) and others have established a risk-taking channel that operates via bank lending. Svensson (2018), however, points out that the effect identified is very small compared with other influences on bank lending. Their estimates imply that a 1 percentage point rise in the real fed funds rate lowers their bank-loan measure by only 6.1% of its standard deviation. In simple words, then, most of the historical variation in bank risk-taking reflects influences other than monetary policy – which is exactly the case for using regulatory policy. This was the policy lesson of the GFC. As discussed more fully in chapter 6, the regulators had allowed innovation which created the opacity that helped banks evade market discipline – leading to risky credit expansion even in the face of a substantial tightening in monetary policy.

69 See pp 258-61 of Reddy (2017).

Economists continue to explore how changes in financial variables affect future macroeconomic outcomes. Adrian et al (2018) at the IMF argue that "central banks should continue to extend their analytical frameworks as new evidence emerges on macro-financial linkages." Echoing Cecchetti (2006), they stress that financial conditions contain "powerful information about future economic conditions, particularly downside risks." Andersen (1997) at the BIS reached a similar conclusion. But economists advising policy-makers need to analyse first what is driving the shock to credit or asset prices.[70] The IMF accordingly reiterated the conclusions of their research in the 1990s. It concluded that "based on our current knowledge, … raising interest rates more than warranted by price and output stability objectives" would not generally be the right policy (IMF (2015)). This policy position was consistently maintained in its flagship *WEO* and *GFSR*. But in a number of Article IV consultations with individual countries, the IEO found that the Fund had on occasion been too deferential to the majority view of the central bank's monetary policy committee, leading to some inconsistencies in advice across countries (IEO (2019)).[71]

(b) The financial cycle

The BIS took the opposite side of the LAW debate to that of the IMF for more than a decade. In the first year of the GFC, the BIS warned that monetary policy easing risked stimulating "another unsustainable credit and asset price bubble". The BIS subsequently argued that low interest rates and quantitative easing had led to a

70 See Bean (2003). Gourio et al (2017) develop a DSGE model which distinguishes between "efficient" and "inefficient" credit in order to examine the conditions under which a LAW policy might be warranted. In their model, when credit swings are driven by productivity and demand shocks, the Bernanke and Gertler (1999) conclusion that stabilising inflation is sufficient applies: the central bank which controls aggregate demand also controls credit and limits the risk of a financial crisis.

71 The IMF's Article IV review of Sweden in 2014 supported the leaning-against-the-wind view of the Riksbank that monetary policy should be tighter than warranted by macroeconomic conditions. This was inconsistent with the monetary policy advice the Fund was providing to other advanced economies in similar circumstances: see Svensson (2014) and Honohan (2019). The Riksbank was the first advanced economy central bank to raise interest rate after the GFC, attracting criticism from Yellen and some Riksbank MPC members. Because decision-takers were left feeling that they had just had a near-death experience, argues one dissenting MPC member (Ekholm (2013)), financial stability over-shadowed standard business cycle stabilisation objectives.

dangerous rise of financial imbalances. In its view, central banks were required in these circumstances to tighten monetary policy even with inflation below target for years. As an assessment of a specific macroeconomic or financial conjuncture, such an opinion is unremarkable. Many disagree with central bank assessments or policies at some point or other. No central bank can keep inflation at target at all times and temporary deviations have little significance. What was remarkable was the BIS's regular advocacy of this controversial policy line as a general rule for more than a decade without any convincing evidence that monetary expansion (either pre-GFC or post-GFC) had led to increased financial risk-taking of systemic dimensions.

The BIS's post-GFC policy line had its roots in the views (discussed in section (b) in chapter 3) of White, the chief economist between 1995 and 2008. He had argued for years (e.g., White (2003)) that international financial crises had become more common because of the Fed's policy bias in not resisting asset price booms but taking strong action to limit asset price declines. This was, he said, the common fundamental cause with other crisis-specific elements being mere symptoms. His Monetary Easing Bias view even at that time was disputed by many economists at BIS and was not the view of BIS management.

Nor was it shared by Cecchetti, White's successor at BIS. Before coming to BIS, Cecchetti had written several influential articles on the (difficult) issue of how to incorporate financial stability considerations into monetary policy frameworks. Current macroeconomic models had shortcomings in incorporating financial effects, he acknowledged, but there was no simple and generally valid rule about how monetary policy should react to financial stability concerns. He ensured that the BIS annual reports prepared on his watch were even-handed in the treatment of this issue – see for instance the 2013 annual report mentioned in chapter 1. Pre-crisis monetary policy frameworks had not been discredited, he argued, and integrating financial stability considerations into these policy frameworks "faced serious analytical challenges". He insisted that those who advocated alternative monetary frameworks should produce models other economists could understand, and be ready to subject any theory to refutation. After Cecchetti's departure in late 2013, however, the BIS became more single-minded in promoting what progressively became its house view (summarised Box B).

Box B Leaning against the wind: the BIS's House View

The BIS's view was that limiting financial imbalances required tight monetary policy – even if inflation remained below target for years. Regulation was not enough.

"Macroprudential policy tightening may not work if not supported by higher interest rates" (Caruana (2010)).

"Monetary policy strategies need to … lean against the build-up of financial imbalances, even if near-term inflation remains low and stable" (Caruana (2011)). Higher rates might be needed for extended periods because "financial imbalances can build up gradually over many years".[72]

The weak global recovery from 2009 had shown the ineffectiveness of monetary policy after balance sheet recessions.[73] "Easing aggressively during busts … but not leaning against booms … induces a downward bias in interest rates and an upward bias in debt." (BIS annual report 2014).

" … which makes it hard to raise rates without damaging the economy – a debt trap" (BIS annual report 2015).

Monetary policy should address financial stability risks by following a financial cycle-augmented Taylor rule (BIS annual report 2016).

In December 2016, the Independent Panel on BIS Research warned the BIS to be prepared to expose its own house view to critical evaluation.

Central banks "may have to tolerate longer periods of inflation below target, and tighten monetary policy if demand is strong, even if inflation is weak, so as not to fall behind the curve with respect to the financial cycle (Financial Times (2017a), summarising the BIS's annual report 2017 and press conference)."

72 Recall Nickell's (2005) estimate that eliminating the surge in house price inflation in 2003-04 in the UK would have required a 300 basis points rise in Bank rate sustained for more than three years.

73 Krugman (2014) pointed out that balance-sheet models from Irving Fisher onwards suggest exactly the opposite conclusion. Forcing deleveraging by keeping interest rates high produces huge, unnecessary costs: when debtors default, the assets of their creditors lose value and many creditors in turn become net debtors. Deflation increases the real burden of debt: see the discussion of the 1920s and 1930s below.

One key element of the BIS's "story" does not accurately describe what happened to aggregate private sector debt in the post-GFC period. This is that in most advanced economies private sector debt (using the BIS's own figures of the debt of household plus non-financial companies) actually fell as a proportion of GDP from its 2009 peak.[74] Monetary ease might have encouraged the explosion of private sector debt the BIS fretted about – but it did not.

Why did easy monetary policy not lead households and firms to borrow even more? One reason is that the near-death experience for many in the crisis made borrowers more cautious (Ekholm (2013)). Another reason is that credit conditions were tightened by a major strengthening in bank regulation and new macroprudential policies. Bank lending to the private non-financial sector in the advanced economies which followed the most expansionary monetary policies actually declined as a share of GDP.

In such circumstances, monetary policies post-GFC generated a virtuous financial cycle. By boosting both GDP and asset prices, these policies made it easier for borrowers to service (and if necessary repay) their debts. The IMF at the time made the correct analysis. The April 2015 *GFSR* quantified how accommodative monetary policies had helped balance sheet deleveraging.[75] In several countries (notably Japan, the United Kingdom and the United States), higher asset prices led to even larger reductions in net financial debt. By lifting the value of the collateral held by banks against non-performing loans, the strong recovery in asset prices helped to accelerate debt write-offs, and ultimately improved the capacity of banks to extend new loans.

The history of the interwar period also shows clearly that expansionary monetary policy is the way to reduce debt burdens in economies with high unemployment. Without defaults, debt ratios cannot be reduced by higher interest rates when real incomes, consumer prices and asset prices are all falling. An enlightening

74 See graph 1 in Schäublin and Turner (2018). But note that this does not include the increased debt of the financial sector which includes private equity groups, special purpose vehicles etc. Leverage did rise in some financial sectors, and there is concern about leveraged loans. There is also concern about weak covenants in some bond issues. Non-financial debt in the emerging economies rose strongly.

75 See the section "Macroeconomic deleveraging: what is in the mix?" pp 9-12 of the April 2015 *GFSR*.

chapter in the October 2012 *WEO* entitled "The good, the bad and the ugly: 100 years of dealing with debt overhangs" laid out the historical record. The UK's disastrous economic policies after the first world war ultimately shaped subsequent thinking on debt and economic policy. The first world war had left the UK with public debt of 140% of GDP, which it sought to reduce by running a large primary fiscal surplus throughout the 1920s (7% of GDP).[76] Aiming to return sterling to the gold standard at the pre-war parity, the Bank of England raised interest rates when prices were falling. Real interest rates went through the roof. This policy mix failed to reduce the burden of debt: by 1930, public debt had risen to 170% of GDP. The IMF estimated that high interest rates and deflation added 12 percentage points of GDP a year to the stock of debt.

In the deflationary environment of the early 1930s, the United States and other countries made similar mistakes. Total US debt (public as well as private) rose from 185% of GDP in 1929 to almost 300% by 1932. Austerity and tight monetary policy did not lower aggregate debt. But it did create massive losses for the banks and other creditors.

The BIS's annual report in June 2014 argued exactly the opposite case – that tighter monetary policy was needed to reduce debt. The criticism made by White a decade earlier that cutting interest rates in response to the previous stock market crashes had worsened global financial crises was repeated – the so-called Bernanke "put" now following that of Greenspan. The main task, the BIS said, "was to adjust policy frameworks so as to make growth less debt dependent and to tame the destructive power of the financial cycle." This recommendation left the impression of a certain cognitive dissonance as most central banks imagined at that time they were struggling against the persistence of *deflationary* forces. The financial press was left in no doubt that BIS had "the courage to accuse its owners – the world's main central banks – of incompetence", as Wolf (2014a) wrote in *Financial Times*.

The IMF also expressed disagreement with the BIS's annual report. The reason was that the IMF was at that time strongly pressing the ECB to step up its purchases of long-term assets in view of the deflationary threat, and the hawks on the ECB governing council

76 Once account is taken of interest payments, there was a small fiscal deficit.

drew support from the BIS's position. Most central bankers, the *Financial Times* noted, were intellectually closer to the IMF that of the BIS (Jones (2014)).

The public criticism of the BIS by the major central banks was on an unprecedented scale. The Fed, the ECB, the Bank of Japan and the Bank of England were unanimous that June 2014 was not the time to raise rates. Within a few days of the publication of the BIS report, Fed chair Yellen had devoted her Michel Camdessus lecture at the IMF to rebutting the logic of the new monetary policy framework proposed by the BIS. She repeated the Fed's view that current macroeconomic conditions did not justify any monetary tightening.[77] "Monetary policy" she said "faces significant limitations as a tool to promote financial stability. Its effects on financial vulnerabilities, such as excessive leverage and maturity transformation, are less direct than a regulatory or supervisory approach." Almost all central bank practitioners agreed with her dismissal of any financial cycle as a policy guide: "there is no simple rule that can prescribe, even in a general sense, how monetary policy should adjust to shifts in the outlook for financial stability."

The BIS's criticism of the Fed, however, did succeed in raising the public profile of BIS publications. The September 2014 issue of *The International Economy* ran a special feature on "Yellen versus the BIS: whose thesis makes better sense?", canvassing the opinions of twenty economists. The dispute aroused the intellectual interest of some distinguished economists who connected it with several fundamental strands of macroeconomic theory. Krugman found that the BIS had strong echoes of the liquidationist theories of the 1920s associated with Hayek and others (the view that any macroeconomic stimulus "leaves the work of depression undone")

77 Yellen (2014), however, avoided referring to the BIS by name ("certain quarters" was her expression). At a parliamentary committee in the UK (Treasury Committee, 15 July 2014), Carney was asked about the BIS's advice that central banks should exit from loose monetary policy. His reply was that the BIS had produced an "analysis that is outside the political and economic reality. It is a report that is made in a vacuum, the vacuum of Basel". Draghi of the ECB said that people would not agree with raising interest rates and "the first line of defence against financial stability risks should be macroprudential policies". King said that where the BIS goes wrong is suggesting that "we should just raise interest rates. I don't see that as being beneficial at all, because that would simply weaken demand. Central banks have backed away time and time again from raising rates (Jeffery (2016))."

– which Keynes argued so strongly against.[78] Disagreement on how to interpret Wicksell was another dimension: Yellen argued that the natural rate of interest had fallen (with high asset prices being an equilibrium reaction to that) but the BIS argued that loose monetary policy had artificially depressed the natural rate. Divergent interpretations of the economics of balance-sheet recessions was a third dimension.[79]

The avalanche of criticism led to no change in the BIS's house view. On the contrary, it stimulated renewed efforts by some BIS economists to make more specific its advice that monetary policy lean against financial imbalances. A fundamental difficulty was that there is no accepted definition of terms such as "financial cycle" or "financial imbalances". The first obstacle to any simple definition is that the macroeconomic consequences of a financial boom depend on what has driven it. A boom will impact many different financial market variables, and economists will usually disagree about which is key. Look at the many variables in the literature: equity prices (Farmer (2017)); bond spreads (Lopez-Salido et al (2014)); financial sector leverage (Woodford (2012)) and so on. A second obstacle is the lack of a firm basis for calibrating the equilibrium value for each variable – without that, how can evidence of a gap be established (i.e, the difference between the current reading and the equilibrium level of some variable) that provides a signal requiring policy action?

The subsequent BIS rejoinder to central bank critics was to formulate a specific financial cycle variable for monetary policy decisions.[80] The BIS's annual report in 2016 proposed a Taylor rule augmented by a financial cycle variable based on the credit-to-GDP ratio, asset prices and the debt-service-to-income ratio. Had the Fed followed this rule from early 2003, the BIS argued, the GFC

78 Hayek always maintained his view that monetary rigour was needed to contain booms. He later said, however, that his mistake in the 1930s had been to assume that this reasoning (applicable to booms) would extend to slumps when asset prices had collapsed. This did not follow logically because a slump would create entirely different conditions than a boom – and here Hayek acknowledged Keynes had been correct.

79 Those who engaged in this debate included Gavyn Davies, Brad DeLong, Paul Krugman and Martin Wolf.

80 See "The financial cycle, the natural rate of interest and monetary policy." pp 78-79 in BIS's *Annual Report* of June 2016. This simulation exercise seems flawed (Turner (2017b)).

would have been avoided. The hypothetical fed funds rate would have been almost 2 percentage points above the actual rate in mid-2004 and would not have had to be raised above 3½%, compared with an actual peak of 5¼% reached in mid-2016. According to the BIS, following this rule would have added a cumulative 12% to US GDP. Few believe that *any* monetary policy rule could add so much to US GDP.

The BIS's continued reliance on credit-to-GDP ratios as *the* indicator of systemic risk in the banking system – let alone as a guiding light for monetary policy – is also questionable. It is true that a statistical construction based on the deviation of the ratio from its long-term trend was used by the Basel Committee on Banking Supervision (BCBS) as an indicator for triggering counter-cyclical capital buffers under Basel 3. But this choice reflected the desire of BCBS members to have one simple-to-explain indicator available for all countries. It did not reflect an endorsement of this ratio as the systemic risk indicator – few central banks would accept such an interpretation.

A BIS paper issued in 2018 concluded from a cross-section study of 25 jurisdictions that the "credit-to-GDP gap was flashing red for Canada, China, Hong Kong and Switzerland" (Aldasoro et al (2018)). However, similar red alerts had been issued for two of these economies in BIS annual reports from 2014 (China and Switzerland) and a third (Canada) since 2016. Hong Kong was not rated before 2018. By late-2020, however, the banking systems in these four jurisdictions were still standing. The credit-to-GDP gap, then, has not proved to be the decisive systemic risk indicator for some important banking systems that the BIS believed. A recent Bundesbank discussion paper seems to have demonstrated this convincingly (Hartwig et al (2020)).[81] Hence macroprudential policies pay as much attention to the *structure* of credit (denominated in foreign or domestic currency, short-term credit versus long-term credit, its sectoral allocation, concentration risks from large borrowers and so on) as they do to aggregate credit. Indeed, macroprudential constraints framed in terms of aggregate credit can be destabilising (section (c) in chapter 6).

81 The authors argue that those setting countercyclical macroprudential policies need to consider several variables – including movements in asset prices (especially house prices).

Claessens (2016) put well the general point that systemic financial imbalances cannot be summarised by any single variable: "systemic risk … cannot be fully captured by metrics that are static or backward-looking". Likewise, past correlations between movements in financial variables and the occurrence of financial crises are not generally strong or stable enough to override the usual macroeconomic guideposts for monetary policy.

Almost all central bankers would agree with Bundesbank president Weidmann (2018) that adding a financial variable to the monetary policy objective would be a "perilous proposition".[82] For Weidmann, the danger of adding a financial stability objective is that monetary policy could be used to increase inflation to reduce the real level of debt – thus mitigating financial imbalances. It could also send markets exactly the wrong signal. Giving the impression that financial imbalances shape interest rate decisions even when inflation is very low would suggest that the central bank is no longer serious about meeting its inflation target – as the Riksbank discovered when its talk about financial imbalances limiting the scope for interest rate cuts led to long-run inflation expectations falling below target.

(c) Independent Panel on BIS research

The Independent Panel established to assess BIS research – the first such external review in the BIS's history – questioned the theoretical and empirical support for the BIS's House View that monetary policy should lean against the wind (LAW) to mitigate financial stability risks (Allen et al (2016)). From the late 1990s, groups of central bank economists at the BIS had repeatedly

82 One advanced economy central bank with an explicit mandate for monetary policy "to counteract the build-up of financial imbalances" is the Norges Bank. It also produces alternative financial stability-oriented monetary policy scenarios in their Monetary Policy Review. The logic of this approach is explained in Gerdrup et al (2017), and reviewed by Walsh (2017). Contrary to Svensson, the Norges Bank economists argue that the benefits of a LAW monetary policy exceed the costs in terms of higher volatility when excessive credit growth leads to deeper and more protracted recessions – "credit bites back". The difference in practical policy terms, however, between this formulation and the view that monetary policy may react to changes in tail risks of future macroeconomic outcomes – which the same financial variable may foretell – may not be large. In addition, effective macroprudential policies may be more efficient than using monetary policy.

examined this proposition – and rejected it (section (b) in chapter 3). Nor did most economists at the BIS believe that monetary policy was best suited to address financial stability concerns. The BIS's contrarian house view was thus rather idiosyncratic, and never reflected an institutional consensus. The panel reported that several key stakeholders thought that the BIS view rested on only rather flimsy theory and limited evidence. And their canvass of senior central bank officials found that it had cut little ice with those actually responsible for setting monetary policy.

The panel recommended:

- *Avoid bias in research*. Several BIS staff reported pressure from senior management to deliver research findings to support a pre-determined house view.[83]
- *Use macroeconomic models to check advice*. Advising central banks to raise interest rates would be more credible if supported by a macroeconomic simulation which incorporated key macroeconomic variables.
- *Conduct more research on regulatory design questions.* An excessive focus on the implications of monetary policy for financial risks had meant that regulatory design had received too little attention.[84] Hence there was "relatively little relevant BIS research to guide the initial thinking of regulators at the outset of the crisis." The BIS's inputs, they said, "seem to have been predominantly reactive rather than anticipatory". Questions the panel identified include optimal capital ratios, the design of liquidity regulation and the practicalities of macroprudential regulation. This gap is puzzling since the secretariats of the Basel Committee on Banking Supervision and the Financial Stability Board – which played such successful roles in coordinating global regulatory reforms after the crisis – are both hosted at the BIS.

83 The panel wrote that "if the BIS is to adopt a critical and unconventional stance with respect to its stakeholder central banks, it should also be prepared to expose its own views to critical evaluation. This should start with ensuring that its own in-house research is always conducted in an open and unbiased fashion, rather than tailored to support the house view."

84 Too much emphasis on the financial risks of monetary policy had also distorted the BIS's analyses of macroprudential policy: see chapter 6

Since 2018, however, with Carstens as its new head, the BIS has broadened its analysis of key questions of interest to central banks. It abandoned its view that financial stability risks should be countered by tighter monetary policy.[85] He noted that the crisis had led to a lot of innovation in central banking: "we have managed to do things we had not imagined before". The expanded war chest of central banks could be used again if needed. Central banks want to get the timing of exit right because large balance sheets can generate distortions (Carstens (2018b)). He was asked by Bloomberg about BIS worries prior to his arrival that central banks would tighten monetary policy too late. He said the risks were balanced. Too aggressive central bank tightening, he warned, could generate financial instability. The opposite was also possible. There is no single rule, he said, no magic solution.

At the same time, the BIS has continued to analyse financial stability risks. The June 2018 annual report noted that buoyant conditions in financial markets (narrow credit spreads, low volatility and high asset prices) had created material financial vulnerabilities – which should be countered by macroprudential policies (Carstens (2018c)). He did not say that the Fed should tighten monetary policy more quickly, but noted that the normalisation of monetary policy had to depend on country-specific circumstances. Carstens (2019) described the success over the past decade of the "forceful actions" of central banks but warned that monetary policy alone could not bring sustainable economic growth. Fiscal policy needed to stimulate investment and growth-damaging trade restrictions needed to be avoided – relying only on yet further monetary stimulus would increase the risks to financial stability. More recently, he combined strong support for the fast and massive central bank responses to COVID-19 ("to flatten the mortality curve of businesses") with warnings about the dangers of assuming fiscal functions and about the fragility of some core financial markets (Carstens (2020)).

85 Carstens told his Bloomberg interviewers on 28 October 2018 of his intention "to serve our stakeholders … our intention is not to create frictions … but at the same time, we should not censor ourselves." There was no "obsession", he said, with supporting any house view (Carstens (2018c)).

(d) Monetary policy after a financial shock

The inadequate response of monetary policy in the first year of the GFC teaches some lessons about the reaction to financial shocks. Although there is no simple rule to guide monetary policy, two generalisations seem to have stood the test of time.

The first generalisation is that financial downturns tend to have larger macroeconomic effects than upturns. A senior BIS economist had shown in 1997 that financial variables help to predict macroeconomic outcomes in downturns but not in upturns. This suggests that there is a need to adjust macroeconomic forecasts based on standard models downward after a sharp fall in asset prices (and to change monetary policy accordingly). But it is not usually necessary to adjust them upwards during financial upturns.[86] There are three reasons for this asymmetry:

- Financial downswings are more sudden, coming often as a shock.
- A decline in asset prices tightens budget constraints, forcing spending cuts (leading banks to tighten credit supply quite quickly and in unison) while a rise merely permits higher spending.
- Market magnification effects are greater in a falling market – when the price volatility of financial assets often spikes dramatically. Forced sales by leveraged investors to meet margin calls is one factor. Loss aversion from psychology – people seek to avoid losses more keenly than achieve gains (Kahneman (2012)) – might also explain this.

The GFC did indeed show that a sudden rise in credit spreads and an increase in the risk aversion of banks helped to depress GDP much more than standard macroeconomic models had predicted. Hall (2011) showed how a sharp rise in financial frictions (creating a wedge between what savers receive and borrowers pay) has a very sizable macroeconomic effect. Farmer (2013a) shows that the stock market crash was a major cause of the recession after the GFC. Recent IMF work in the *GFSR* has developed these insights.

86 The economist was Andersen (1997), who reviewed a large sample of forecasts produced by standard macroeconomic models, and found that a financial variable "explained" errors in "bad" times (i.e. asset prices falling) but not during "good" times.

Adrian and Duarte (2017) argue that a deterioration in financial conditions increases the downside tail risk to real GDP and so justifies easier monetary policy than in a classic Taylor rule. Such a policy not only reduces the left tail risk of real GDP but also moderates financial vulnerabilities.[87]

The IMF reported in a chapter on "Financial conditions and growth at risk" in the October 2017 *GFSR* that their Financial Conditions Indices contain powerful signals about downside tail risk to the global economy but are less informative about the baseline growth forecast and about booms. Unlike the studies of Andersen, Hall and Farmer (who examined how sharp financial downturns depress GDP more than standard forecasting models predicted), the IMF work examines whether booming financial markets today create downside risks to GDP tomorrow.

The second generalisation is that financial downturns characterised by banking sector distress have large macroeconomic effects, an insight that was highly relevant after the GFC. The IMF in 2007 might have taken greater heed of its own excellent analysis in the chapter on "Recessions and recoveries" in the April 2002 *WEO*. The *WEO* of October 2008 built on this work in a chapter on "Financial stress and economic downturns". The summary of the IMF Board's discussion published in the *WEO* shows that Executive Directors recognised that "the risks of an intensified feedback loop between the financial system and the real sectors of advanced economies had risen". But the policy prescriptions in the October 2008 *WEO* stressed policies other than monetary policy.[88]

It took the post-Lehman financial stress to drive the monetary policy lesson home. In the April 2009 *WEO*, a chapter entitled "From recession to recovery: how soon and how strong?" stressed that recessions which followed financial crises and which were highly synchronised across countries were deeper and longer than other recessions. A graph summarising historical experience showed that, even three years after the start of a recession-cum-financial crisis, output had barely risen. The nominal interest rate was almost 400 basis points lower, compared with 125 basis points lower after other

87 They also note that "perfect macroprudential policy would eliminate the need for monetary policy to condition on vulnerability".

88 It said that the legal and institutional mechanisms to deal quickly with distress need to be in place and that the impact of financial distress on the real economy needed to be contained "directly" – presumably meaning by fiscal action.

recessions. The chapter noted that financial crises had impaired the interest-rate and bank-lending transmission channels of monetary policy. Hence it proposed a fiscal solution: governments could break the negative feedback effects between financial conditions and the real economy by acting as "spender of last resort". But governments soon after 2009 reverted to fiscal restriction, and the burden of stimulus fell back on to central bank balance sheets.

5

The central bank balance sheet

Monetary policies pursued since the GFC have once again made the central bank's balance sheet a key policy instrument. "Once again" because the pre-GFC theory, at least in academic circles, that monetary policy could be reduced to setting a very short-term policy interest rate – and quantities such as credit or money virtually ignored – was a break from the analytical and practical frameworks of earlier monetary theorists which gave quantities an indispensable role. The remark attributed to the governor of the Bank of England during the 1950s ("the central bank is a bank, not a study group") was forgotten.[89]

This break meant that key questions about central bank balance sheets and related quantity variables which earlier generations had struggled to understand (not always successfully!) were assumed away.[90] The balance sheet was used for little more than implementing monetary policy decisions defined by an overnight interbank rate. It had little or no independent macroeconomic significance. Accordingly, the size of central bank balance sheets in many advanced economies had been shrinking from the early 1980s. The Fed's balance sheet, for instance, was extremely small by historical standards when the GFC struck.

Yet historically the central bank's balance sheet has been an instrument of monetary policy aimed at macroeconomic objectives. But changes in short-term rates may not be enough to have the

89 From Goodhart (2010), who wrote, "I take this to mean that the essence of central banking lies in its power to create liquidity, by manipulating its own balance sheet. Setting officlal interest rates is not essential for a central bank. It could easily be done by a study group, as many monetary policy committees really are."

90 See notably Friedman (2014) and (2019). The standard textbook on interest rate-centred theory was Woodford's *Interest and prices*. But Fischer's review of Woodford's contribution to monetary economics (2016) pointed out that the absence of money (or other central bank balance sheet variables) in many monetary models is an assumption, not a theorem. It was not an assumption shared by Wicksell who expressed monetary policy in terms of the gap between banks' lending rate and the natural rate.

desired effects on the government bond yield (the risk-free long-term interest rate), on risk spreads in credit markets, on bank lending or on the exchange rate. Central bank operations in the relevant market – such as for government bonds, mortgage-backed paper, corporate bonds, equities or foreign exchange – in such circumstances help to achieve the objectives of monetary policy.

Central bank asset purchases work by forcing a change in the asset composition of private sector balance sheets – and so affect relative asset prices and interest rates (the portfolio balance effect). They can also signal future policy intentions. In addition, the associated increases in central bank liabilities, which usually take the form of increased bank reserves ("money"), may change the lending behaviour of banks. In the extreme case where the interbank rate has reached the zero lower bound, the central bank will have to expand its balance sheet to provide macroeconomic stimulus.

Even central bank guarantees or commitments which may never be activated can reduce tail risks facing market participants, and thus have significant macroeconomic effects. Central bank balance sheets were also used to control the share of liquid assets on the balance sheets of commercial banks. It is sometimes forgotten that liquid asset ratios were the key regulatory metrics before the adoption internationally of capital-based regulation in Basel 1. Such ratios were often supplemented by reserve requirements.

The existence of two major, and in principle distinct, instruments – the policy rate and the balance sheet – has far-reaching implications. The Tinbergen Rule would mean that monetary policy *may* now pursue two objectives. Worrying about the financial stability effects of monetary policy becomes inevitable. Two different monetary policy instruments could have similar macroeconomic effects but quite different financial stability effects. The use of balance sheet instruments seems likely to have larger and more direct financial stability consequences than using the policy rate. In the first place, the balance sheet is more likely to be used to achieve a financial stability objective (e.g., in LOLR operations) rather than a macroeconomic objective. In the second place, balance sheet expansion aimed at narrowing risk premia in specific sectors is likely to encourage leveraged private investment in those very sectors. Balance sheet policies may also get more entangled with regulatory policy.

The application of the Tinbergen Rule is quite general. Add another instrument to the central bank's monetary tool-kit and you can in principle add another objective. Forex intervention might be a third monetary policy instrument. This could be used to meet a third objective (to avoid a mis-alignment of the exchange rate, for instance).[91]

Having multiple monetary policy instruments means that the choice of which instrument to use in pursuit of the central bank's core macroeconomic objective will depend on the relative impacts on other objectives – financial stability, the exchange rate or whatever. For instance, the central bank may want to stimulate aggregate demand but limit the risk of driving the exchange rate down. It may then prefer not to cut the policy rate (because the exchange rate responds more to interest rate differentials at the short end than those at the long end) and instead concentrate on bond purchases (CGD-IDB (2020)). The recent COVID-19 response of several EME central banks was indeed to resort to QE (buying bonds) even when the policy rate was well above zero. Which monetary policy instrument to use depends on their relative effectiveness, an empirical question best analysed in a Mundellian framework (see chapter 6).

(a) Analysis of instrument choice

Central banks now have at their disposal a much wider range of tools that before the GFC. Many were hesitant at first "to leap into the unknown". Yet almost all came out of the GFC reassured that much of the earlier criticism of their use of new and unorthodox policy tools had, by the end of 2019, generally proved to be unfounded. During that decade, many of the studies published especially by the BIS but also by the IMF had had an implicit critical tone, highlighting the financial risks of the new or unconventional instruments.

91 The integrated inflation-targeting framework proposed by Agénor and Pereira da Silva (2019) addresses this issue. Because the exchange rate and domestic monetary conditions in emerging markets are hyper-dependent on financial conditions in the advanced economies, forex intervention and capital controls can become monetary policy-like instruments.

Even at the time, central banks felt that such studies had failed to do justice to the context of their policy decisions. They had three reservations about such studies, two general and one practical. The first reservation was that the partial equilibrium nature of some studies made them misleading. Unconventional measures had not come out of the blue. They had been an endogenous response to shocks, and the choice of instrument depended on the specific nature of the shock. For instance, drastically expanding bank liquidity in response to the flight to liquid assets in a financial panic is neither inflationary nor especially risky. It would be quite different if the economy were booming and the banks gung-ho to increase lending. Likewise buying risk assets in response to a flight from risk (earning fat credit spreads for the central bank or Treasury) from holders who have already suffered large losses has limited implications for moral hazard.

The second caveat was that the adoption of UMP took place when strong market pressure and major regulatory reforms were forcing banks to reduce risks on their balance sheets. Over the decade since the GFC, banks' risk-weighted capital ratios increased and they faced new rules on leverage and liquidity ratios. The impact of such slow-moving changes is inevitably difficult to quantify, and timing even more so. But a long process of de-risking did make banks more viable – an objective helped by huge central bank purchases which lifted asset prices, raised real incomes and reduced non-performing loans. Exceptional monetary ease and tighter regulation made the global financial system safer.

The third and practical source of dissatisfaction in central banks was the general lack of BIS or IMF interest in practical matters such as the design and implementation of new tools or on how to minimise undesirable side-effects. Such practical advice came mainly from other central banks. One major exception noted by Ball (2019) was the close involvement of the IMF once the ECB had decided to adopt more expansionary policies, a fruitful collaboration due in no small degree to a pro-active IMF mission chief. A second, less widely known exception is the important practical role played by the BIS's Markets Committee of central banks. Its codification of operating procedures was time-consuming and luckily it had been

launched before the GFC. It proved invaluable to central banks as they compared notes on the "plumbing" of their balance sheet policy measures.[92]

The greater range of monetary policy tools inevitably widens those areas where they intersect with the responsibilities of other agencies of government. Increasing central bank purchases of government bonds when budget deficits are widening may weaken market discipline on governments (Weidmann (2016)).[93] Other arms of government will be involved in other more technical dimensions:

- The *bank regulator* may require banks to hold government bonds as a liquid asset. The post-GFC reforms imposed more demanding liquidity rules, and this affected bond yields at least in the transition ((Bernanke (2017), Gagnon and Sack (2014), Goodhart (2017)).
- *Financial market regulators* will worry if large central bank purchases disturb market functioning.
- Current administrative arrangements mean that *government debt managers* will decide on the average duration of issuance even though this is essentially a monetary policy choice.[94] If debt managers alter the maturity of issuance when fiscal deficits change, they effectively link changes in monetary conditions to fiscal policy (Turner (2011 and 2014)). In both the United States and Europe, such steps have undermined the central

92 See "Monetary policy frameworks and central bank operations", first published by the BIS in December 2007 and updated.

93 The risk of fiscal dominance (pressure from governments to keep interest rates lower than warranted by inflation prospects) did not materialise during the GFC when fiscal policy in the major countries was too restrictive. The political question within the euro area of transfers from high-income countries with strong fiscal positions to other countries continues to be disputed.

94 Because it shapes the risk-free yield curve and determines the creation of liquid assets. Turner (2011) summarises how Keynes, Tobin and Milton Freidman all agreed on this now-neglected point.

> bank's post-GFC intent of easing monetary policy.[95] The average maturity of debt issuance by most advanced economy governments has increased since the GFC – just when central banks were trying to reduce duration in the market and get long-term rates down. Until recently, the ECB neglected this important issue. In the early years of the euro area, national debt managers had taken advantage of the failure of the Maastricht Treaty to limit short-term debt issuance which served to provide monetary stimulus quite independent of the ECB.[96]

Such intersections create new complexities. Juggling different responsibilities has made the management of a central bank as an institution much harder (Oritani (2019)). The managers of forex reserves at central banks need to take account of the new monetary policy activism (Bjorheim, ed (2020)). Greater account needs to be taken of how the actions of other policy-makers may impinge on the macroeconomic objectives central banks. Governance issues have thus acquired many new dimensions, about which there is much debate (Tucker (2018)). Covid-19, coming after the post-GFC years of low growth, has indeed increased political tensions, leading Tucker (2020) to argue that the time is ripe for rethinking the central bank's position within the economic policy framework.

95 Chadha (2014) shows that decisions about the maturity of government debt matter for monetary policy. As fiscal deficits grew in the early 2000s (tax cuts from 2001 and the second Gulf war from 2003), US Treasury policy was to concentrate new issuance at the shorter end. The average maturity of US Treasuries fell from 70 months in late-2001 to a low point of 56 months in March 2005, just after Greenspan made his remarks (on 17 February in his semi-annual testimony on the Fed's *Monetary Policy Report*. According to Chadha et al (2013), this reduced 10-year yields by between 150 and 170 basis points. Hence part of the explanation of Greenspan's conundrum is US Treasury-implemented QE! Greenwood et al (2014) estimated that the Fed's QE policies reduced dollar long-term rates by 1.37 percentage points while the increase in the average maturity of Treasury debt issuance added back 0.48 percentage points. On European experience, see Hoogduin et al (2011). Wolswijk (2020) shows that lower long-term rates from QE got government debt managers in the euro area to increase debt issuance at the long end.

96 Governments may believe they can cut the cost of debt service by shortening its duration but are aware of the risks of advertising on their balance sheet too much short-term debt. Piga (2001) documents how a euro area central bank resolved this dilemma by using interest rate swaps to effectively finance at short rates whilst maintaining the appearance of long-dated issuance.

This is not the place to review the pros and cons of specific instruments. The experiences of the past decade should help central banks design and operate balance sheet tools. Much has been learnt about how to make instruments more effective and how to limit any drawbacks. The most authoritative review to date is the report of the central bank study group chaired by Frank Smets and Simon Potter (BIS (2019)).

(b) Global liquidity

Economists continue to grapple with the implications for global liquidity of larger central bank balance sheets world-wide. Greenspan used to say in the early 2000s that it was the huge expansion in balance sheets of the emerging market central banks (particularly China) – not the Fed's monetary policy! – that was fuelling global liquidity. The private sector pays much attention to global liquidity (Ghymers (2019), Howell (2018)), especially after the post-GFC explosion in central bank balance sheets. Do aggregates of central bank balance sheets tell us something about the world economy that we might otherwise miss?

Given the nebulous nature of the concept of global liquidity, it is hardly surprising that no widely accepted definition has emerged despite the efforts of the IMF and the BIS. A recent report by a Robert Triffin International Foundation working party used several measures developed by the BIS and the IMF to analyse what it found to be an alarming growth in global liquidity (RTI (2019)).

Quantitative measures of global liquidity developed by IMF staff (Chen et al (2012)) focused on the balance sheets of commercial banks. The liabilities of banks were divided into "core" (that is, what banks can rely upon in normal times, such as retail deposits) and "non-core" (that is, borrowing in the wholesale market or directly from the central bank against collateral). The growth in "non-core" liabilities – usually associated with an increase in leverage of financial firms – was facilitated by abundant liquidity before the GFC. But after 2008, regulatory reforms and market pressures forced banks to be more conservative in their funding. The ratio of core to non-core liabilities rose, making the banks less vulnerable to a sudden flight to liquid assets than they were before the crisis.

The BIS has developed more general measures of global liquidity. It has used such measures to support its view that expansionary monetary policy was creating dangerous financial risks. The central bank group appointed to analyse global liquidity, however, found that monetary policy (in particular low interest rates) was not its major driver (BIS (2011b)). Fiscal and especially regulatory policies had also played a key role. Private liquidity, which had grown more than official liquidity, was created in international financial markets, and here regulatory policies played a decisive role ((Landau (2013b)).

The major policy failure identified in RTI (2019) is that regulators have failed to address risk exposures in capital market intermediation mechanisms. The post-GFC expansion in global liquidity has been driven by a massive increase in international bond issuance. Bond market exposures are opaque and largely unregulated. Global bond funds facilitate liquidity mismatches: as Carney put it, "liquid funds based on illiquid assets are built on a lie." Leverage has also increased. According to the BIS, the dollar debts of non-US non-banks by end-2019 had reached $12 trillion, 14% of world GDP compared with 10% in 2007.[97] In addition, the dollar funding of non-US banks, dependent at the margin on cross-currency swaps is fragile (IMF (2019a)).

Events during COVID-19 seem to have vindicated these worries about the fragility of new forms of capital market intermediation. The sudden reversal of positions in bond funds in March 2020 pushed bond markets close to breaking point, forcing central banks to intervene on a large scale. A financial system made vulnerable by liquidity mismatches and opaque/unknown leverage in bond funds seems dangerous. It is worrying that even core government bond markets were revealed to be so dependent on central bank support.

97 The RTI's report identifies shortcomings in the BIS measure. By measuring only liabilities, it overstates the underlying risk exposures because it fails to take account of foreign currency assets. The financial operations of large non-financial corporations will generate both assets and liabilities in foreign currency, and account should be taken of both. This is a particular problem in examining the exposures of China.

(c) Lender of last resort (LOLR) after the crisis

The GFC brought to light inadequacies of central bank LOLR operations, both domestically and internationally (Obstfeld (2009)). Some critics of central bank policies in 2007 and 2008 echoed Bagehot's criticism of the too-conservative Bank of England in the nineteenth century – which was too wedded to its customary practices.[98] The GFC became so severe because contagion spread panic almost indiscriminately. As Allen (2013) and Moessner and Allen (2015) document, some central banks, confronted with a massive and prolonged flight to safe and liquid assets, were at first ultra-prudent in their LOLR operations. Only as the crisis persisted did they decide to buy (or lend against) illiquid and riskier assets (such as long-term paper, private assets, commerciaI bank loans and so on) in order to break the downward liquidity spiral.

Central bank reticence sometimes reflected a desire not to trespass on the territory of governments. Sometimes it was driven by a desire not to provoke hostile legislators. But the reality so often is that the central bank is the only institution able to act quickly and decisively in a crisis (Oritani (2019)). Delay or feebleness of the central bank has in the past magnified the eventual costs that taxpayers have to bear. Contrary to accusations by Paul Volcker that the Fed's actions after the GFC had "transcended long-embedded central bank principles and practices", central banks have historically often gone beyond Bagehot's rule about not bailing out financial institutions (Mishkin and White (2016)).

Only the central bank issuers of the main international currencies have the ability to supply official liquidity at the global level on a massive scale. In such circumstances, the Fed needs more, not fewer, powers (Scott (2016)). Yet the GFC prompted the Congress to legislate new constraints on the Fed. Geithner (2016), one of the key architects of the GFC response, underlined his worry that new post-crisis limits on the powers of the Fed and the US Treasury could make future crises much harder to manage.

98 He wrote in Lombard Street (1896/1873) that "an idea prevails at the Bank of England that they ought not advance during a panic on any kind of security on which they do not commonly advance. But the ordinary practice of the Bank of England is immaterial. In ordinary times the Bank is only one of many lenders, whereas in a panic it is the sole lender." Chapter 23 of Tucker (2018) explains how central banks must improvise in addressing hard-to-predict liquidity crises, and that this has often attracted Treasury or parliamentary criticism.

Swap arrangements between central banks – notably the Fed providing dollars (to the tune of $600 billion) were decisive following the GFC.[99] The international dimensions of central bank LOLR operations raise controversial questions. A 2017 report written under the auspices of the CGFS gave a sober warning. Many issues related to how central banks would manage liquidity stresses which straddle national borders remain unresolved. Nakaso (2018, 2019) has identified several practical quandaries. One is the "trap of transparency": insisting that all counterparties immediately disclose liquidity support could be counter-productive. Another is the absence of ex ante agreements about what assets would be accepted as collateral in a crisis.

But so far, so good. Faced with the COVID-19 crisis, the Fed took radical new measures in March 2020 to support the economy. As a major credit crunch in corporate bond markets was already looming, the single new policy that stands out was the Fed's decision, with US Treasury support, to buy investment grade corporate debt in both the primary and the secondary markets.[100]

The sizable and increasing dollar exposures of non-US borrowers at the onset of the COVID-19 pandemic made increased dollar swap lines essential. The Fed deserves credit for quickly reactivating its swap lines for foreign central banks. Indeed, it went beyond earlier practices by lending more cheaply and going beyond the usual 1-week maturity (offering an 84-day lending option). The new facility for lending to central banks against US Treasuries as collateral was a particular help for EME central banks not part of the swap agreement.

The policy frameworks of central bank liquidity provision will continue to evolve. It is important not to constrain central banks by artificial (and often unhistorical) dogmas of what central banks can or cannot do with their balance sheets.[101] The LOLR function

99 Kohn (2014). Bilateral central bank swap lines can create pressure on exchange rates if the non-dollar currencies received are exchanged by the recipient central bank for dollars (Iwata (2018)).

100 The Treasury used its funds from the Exchange Stabilisation Fund to provide the capital for the SPV behind the corporate bond programme. This can be done without Congressional approval.

101 Ramaswamy and Turner in Bjorheim (2020) argue that larger and more policy-responsive central bank balance sheets will be the new normal for monetary policy for many years.

(originally for banks) has grown with the expansion of Market Maker of Last Resort (MMLR) functions – inevitable given the rise of market-based finance.[102] King et al (2017) in an IMF staff paper seek to develop a "frame of reference that draws from economic theory *and central bank practices*." The emphasis is added.[103] The IMF can be very effective when it can distill and summarise its up-to-date practical knowledge of what central banks have actually done and provide objective measurement of macroeconomic and other effects.

Nor is it wise to define generally applicable "best practices" for LOLR and MMLR operations – because they are too dependent on the nature of the shock which, almost by definition, is unexpected. The IMF is, however, well-placed to put central bank emergency liquidity frameworks in the wider policy context. The IMF's country assessments under its Financial Sector Assessment Program (FSAP) which carry weight with the policy community have included excellent discussions of emergency liquidity frameworks.[104] One issue especially relevant for monetary policy is the new international bank rules on liquidity. The Basel Committee monitors closely how well they are working in practice. The IMF and the BIS should both contribute to such reviews by examining how liquidity rules interact with central bank liquidity frameworks.

102 The MMLR function is hardly new. Hauser (2021) cites several historical central bank operations designed to backstop market liquidity from Bank of England large scale purchases at the outbreak of the first world war in July 1914 to similar measures by the Fed at the time of civil disorder during the Vietnam war. Allen (2018) shows how the Bank of England regularly acted as MMLR for much of the post-war period.

103 An earlier IMF discussion note on the "new normal" for monetary policy was disappointing in the almost cursory attention it gave to LOLR policies of the central bank (Bayoumi et al (2014)). The IEO report recommended that the IMF improve the practical monetary policy expertise of its staff. The need for greater collaboration with major central banks and the BIS was stressed by the IMF Board.

104 The FSAP assessment of the United Kingdom is a case in point (IMF (2016))

6

Macroprudential policy and monetary policy

The main policy failures that led to the GFC before the crisis were mistakes of international rule-making combined with weak prudential regulation/supervision nationally. "The culprit," de Gregorio (2013) concludes, "was unrestrained financial innovation that generated deep distortions that neither markets nor regulators were able to predict." And those regulators who had wanted to tighten the rules often faced strong political opposition. The deregulation lobbies in the United States and the United Kingdom became ever stronger from the 1980s, and their influence was subsequently widened by the globalisation of trade and finance.[105] Reddy (2012) underlined in his Per Jacobsson lecture the power of the financial industry to capture public policy related to the industry.[106] "The concentration of a significant systemic risk in an under-regulated financial system," Erdem Basçi told a G20 meeting (BIS (2016)), "was an unstable and fragile global economy."

(a) Pre-GFC: twenty years of crying wolf?

Economic theory has produced a rich menu of possible market failures which mean that private competitive forces cannot be counted on to keep the financial system safe. That is the rationale for regulation. And systemic risks may not be evident in the balance sheets of individual banks. Hence the need for a "macroprudential"

105 There were many specific roots to opposition to tighter regulation in the years before the GFC. One was the desire of politicians to make mortgage finance cheap and readily available to low-income households. Another was the determination of some European governments to keep "their" big banks at the forefront of dollar-based international banking.

106 He blamed this capture on the short-term horizon of the political leadership, the domination of a few giant financial firms and the offer of highly paid jobs to those employed in regulatory agencies and Treasuries. Bisignano (2004) put it poetically:

In regulation try not to annoy
Those who your talents later may employ

policy focus – to use the term coined in 1979 by David Holland at the Bank of England (Bank of England (1979), Maes (2011)). At that time, a G10 group chaired by Lamfalussy examined what could be done about such systemic risks.[107] Some officials from the Bank of England argued in these meetings that systemic threats might require increases in bank capital ratios and limits on maturity supervision. But those responsible for bank supervision over-ruled them. Bank supervisors cited a "lack of prudential justification" for such action and underlined their wish to steer clear of any conflict between macroeconomic and prudential policy objectives (Davies and Green (2010)). This narrowness of supervisory vision was to contribute to the fatal pre-GFC regulatory failures.

Many central bank reports under the auspices of the BIS from the mid-1980s to the mid-2000s documented many potential market failures that could be created by unregulated financial innovation and the growth of capital market intermediation. Especially far-sighted was the Cross Report of G10 central banks in April 1986 (BIS (1986)). This report explained the systemic market failures that financial innovation (new financial instruments and greater capital market intermediation) could create (Box C). It also pointed out how banks were taking advantage of innovation to circumvent regulations and prudential oversight.

107 Alexandre Lamfalussy shaped the modern BIS. He was Chief Economist (Economic Adviser) at BIS 1976-85 and then General Manager 1985-93. Among many other roles, he chaired the Euro-currency Standing Committee (so-called because it was to analyse the Eurodollar market) which was later renamed the CGFS. The General Manager ceased to chair the CGFS from January 1997.

Box C **Foreshadowing the GFC: a 1986 BIS report on gaps in financial regulation**

New financial (often off-balance-sheet) instruments and greater capital market intermediation create complex systemic risks and give banks new ways to circumvent regulation.

Four warnings foreshadow the GFC

"The presumed superior liquidity of securitised assets over bank loans may turn out to be a mirage if many creditors attempt to liquidate their holdings simultaneously. The liquidity of these assets may disappear when most needed … exposing banks to liquidity pressures from drawdowns on commitments which backstop securitised assets"

"Many new instruments appear to be underpriced due to intense competitive pressures."

"Increased efficiency of financial innovation at the individual firm level will not necessarily improve economic welfare overall innovations are manoeuvering their way around official measures, such as capital adequacy requirements, imposed in the interest of safety and soundness of the financial structure, or measures to deal with liquidity problems or to promote market stability."

"The unbundling of risks and the complexity of linked transactions can mask the interlocking of risks for bank management, regulators and market participants alike."

Key new policy

Macroprudential policy "the safety and soundness of the broad financial system and payments mechanism".

In the early 2000s, many of these themes were re-examined in three reports by groups of central bank specialists under the auspices of the CGFS at the BIS. Banks had begun to securitise high-quality assets to reduce their risk-insensitive capital requirements under Basel 1, which was subsequently facilitated by the growing availability of credit-risk derivatives. From 2000 onwards, it was becoming clearer that more of the new, complex but highly rated securitised products were far riskier than they had been made to

appear.[108] The 20% risk weighting the Basel Committee was about to offer AA- or better-rated companies created incentives for such structures. As Goodhart (2011) documents, however, the Basel Committee had traditionally resisted any CGFS interference in "their" jurisdiction.[109]

IMF studies in the *GFSR* over many years also sounded similar alarms about the hidden risks created by financial innovation. Many economists at that time distrusted the big banks, and shared the pre-GFC lament of a former senior official at the BIS (Bisignano (2004)):

Behind my verse there is but one assumption:
Finance is still the greatest school for scandal,
And stand amazed at the absurd presumption
That there's no crisis central banks can't handle,
To whom no one can ever hold a candle.
While central banks deserve the praise they meet,
You should take note, there are more banks that cheat.[110]

108 The first and key report was that by a working group of G10 central banks on securitisation and credit risk transfer (CRT) in general. The group started work in 2001 and published its report in January 2003 (BIS, 2003). All members bar one were worried about the potential financial stability risks of CRT. It could lead to the creation of new and under-priced risks. And it might concentrate risks in a non-transparent way. The dissenting view, unusually made explicit in the published report but without identifying the central bank, was that CRT had successfully dispersed credit risk more widely. The report noted the dearth of information even at the level of individual institutions. Central banks were attempting to develop databases but the banks opposed an additional reporting burden. A later report was commissioned in May 2003 to examine the incentives encouraging rating agencies to expand their business and give high ratings to opaque new debt structures (BIS (2005)).

109 In May 1994, Padoa-Schioppa as chairman of the Basel Committee attended a meeting of the Euro-currency Standing Committee (the earlier name of the CGFS) on the reporting of derivatives activities. He made it crystal clear that "in areas where so-called macro- and micro-prudential issues overlap, proposals should not be brought to the Governors unless agreed with the Basel Committee. This general point was accepted (Goodhart (2011), p467)." The risks cited by the CGFS reports in the early 2000s certainly had implications not only for the BCBS's capital ratios but also for liquidity rules (on which the BCBS had failed to reach agreement). Such implications were not raised with the Governors in any formal way.

110 Bisignano was head of research at the BIS from 1985 to 2004 and wrote a satire on international finance and the BIS in the form of a poem addressed to Montagu Norman, usually seen as the father of the BIS.

"Innovations are manoeuvering their way around official measures" was how the Cross Report put it in 1986. Why did regulatory policy in the early 2000s fail to react?

One reason was just bad luck. The early 2000s were exactly the years when Basel 2, which reduced the capital charges on bank credits to highly rated companies and *highly rated securitisations,* was being finalised. The first public draft of the general principles of Basel 2 (still on the BIS's website) was issued in June 1999, with details after the initial consultation published in January 2001 – at an early stage of what was to become an avalanche of doubtful but highly rated securitised debt. The public consultation process (and negotiations within the US's fractured regulatory system) took far longer than expected. The final version, published in June 2004 – a full five years after the first public draft – took scant account of the new risks for banks created by the rapid spread of securitisation. Basel 2 was thus born unfit for purpose. The BCBS had begun discussions on correcting it well before the crisis erupted. In the event, however, the capital charges for securitised assets were substantially raised only in July 2009 (so-called Basel 2.5). Nor had much been done to correct the lack of information on securitised products identified by the CGFS's 2003 report: action was taken only in September 2009.

But it would be a mistake to put all the blame on international regulation. There was a second, more lethal failing. This also arose from the best of intentions: to nurture a market-led banking system disciplined by clear pre-announced capital ratios or rules – and not subject to *ad hoc* direct limits on bank lending or similar administrative measures. Jumping from this legitimate aim to the (convenient?) conclusion that regulatory ratios never needed to be adjusted – even when macroeconomic or financial system indicators were signalling danger ahead – was a huge leap of logic. Bank supervisors were no more willing to adjust regulatory ratios that they had been in 1979/80 when Lamfalussy's G10 group was underway. In several jurisdictions, moreover, supervisors even

neglected the independent checking of the financial accounts of the banks: they trusted the banks, the auditors and stock market analysts to relieve them of the need for official oversight.[111]

A September 2002 report to G10 Ministers and Governors (supported by both the IMF and the BIS) was lucid in questioning the policy presumption about not tightening regulatory ratios during periods of unusually high risk-taking. While a negative shock (e.g., the 1987 stock market crash, the attacks of 11 September 2001) elicited "a quick response of the authorities to prevent a collapse in asset prices … there is considerable hesitation when regulation was mentioned as a policy option to dampen asset price booms (Heikensten et al (2002))". Given the difficulties of using monetary policy to counteract asset price bubbles, the report argued for "policy tools of a microeconomic nature" mentioning the possibilities of raising capital requirements for certain loans and reducing loan-to-value ratios as house prices rise. No major central bank in the advanced economies seems to have followed this advice. Reddy (2017), however, noted how he had advocated such counter-cyclical policies in his first policy statement as RBI governor in November 2003 "despite severe criticism and contrary to global wisdom".

"Crying wolf" – by the mid-2000s, this had become the all-too-common reaction to twenty years of warnings about financial risks from central banks, from the CGFS (BIS) and from the IMF. After all, the global financial system had absorbed many severe macroeconomic and financial shocks. Rajan's presentation at the Kansas City Fed's 2005 Jackson Hole seminar should have served as a wake-up call. He put the public spotlight on the complacency of regulators, especially those in the major financial centres. His speech contained nothing that had not already been aired in the CGFS reports. Yet the hostile reaction he suffered showed that policy-makers had become too complacent about relying on market forces and too confident that the self-interest of large banks would

111 Honohan (2019) recounts how the Irish financial supervisors were seduced by the model of supervision made fashionable by the UK's Financial Services Authority, "based on the assumption that a bank that had sufficient capital, a sound governance structure and good internal rules for decision-making would be very unlikely to fail. This model of supervision was cheap … relatively little had to be checked by the supervisors … accounts already being audited in line with international standards."

keep the financial system safe. Bayoumi (2017), Mishra (2019), Pringle (2014), Ramaswamy (2017), Shafer (2013), Stiglitz (2010) and Wolf (2014b) provide lucid expositions of this history.

Yet central bank governors (and their staff) had followed closely the CGFS reports and therefore knew about the new, more opaque risks related to securitisation.[112] They also knew that major non-US banks had become increasingly dependent on external short-term funding for their growing dollar books. Whether governors and their staff grasped the implications of these risks for the Basel Committee's capital ratios and failure to develop liquidity ratios is not known. Higher short-term dollar interest rates relative to bond yields from mid-2004 had not limited these growing risks. From 2006, they were well aware that trouble was brewing. The three vulnerabilities pin-pointed by Geithner (2007) have clear echoes of the Cross Report twenty years earlier:

- *Liquidity risk*: the more credit came from leveraged non-banks, the greater the risk that any rise in asset-price volatility would reduce credit supply.
- *Market discipline* was increasingly impeded by complexity which served to hide leverage. Nor was there any history of how these new instruments would perform under stress.
- "*Unscrambling the eggs*" had become impossible: could anyone handle the failure of a large bank active in OTC derivatives and leveraged loan markets?

Geithner concluded that "the most productive focus of attention" was stronger bank capital and liquidity buffers and more resilient market infrastructure.

112 But public messages about these risks were rather muffled. Shigehara and Atkinson (2011) found that BIS, IMF and OECD did warn at an early stage about the vulnerabilities from new financial instruments. But the BIS subsequently in its annual reports maintained an overly positive perspective on structured products; the IMF failed to give enough prominence to a very clear warning in the April 2006 *GFSR*; and the bilateral surveillance reports of the OECD and the IMF gave too little attention to structured products.

(b) The policy assignment question

More effective regulatory oversight and new macroprudential policies did indeed shape the post-GFC policy agenda. New macroprudential tools gave greater flexibility in tackling increased systemic risks (Mizen et al (2018)). As Tucker (2014) put it, the key role of the central bank in the credit system meant that it needed "not merely a monetary constitution, but a money-credit constitution … with macroprudential policy its instrument of first choice to preserve systemic stability".[113] Macroprudential policy can change monetary transmission in crucial ways, especially when it, like monetary policy, responds to cyclical movements (Chadha (2018)). Tucker also stressed that macroprudential policies can also work as a coordinating device to get competing banks to collectively de-risk.[114] The importance of this new agenda in G20 discussions is underlined by Kenç (2016).

The policy assignment proposed by Tucker recognises the complexities of the trade-off between macroprudential policy and monetary policy. Both policy areas have their own distinct objectives and employ different instruments. The transmission of one policy is not independent of the other. IMF (2013a) recognised the "strong complementarities and interactions between monetary policy and macroprudential policy".

A good place to start the analysis is Mundell's (1962) principle of effective market classification, which he applied to fiscal and monetary policies. Policy outcomes are improved when instruments are assigned to the objective of their relative effectiveness. Starting with a joint macroeconomic and financial stability objective function, Fahr and Fell (2017) and Fell (2020) apply Mundell's principle and make the theoretical case for assigning monetary policy to the achievement of price stability and macroprudential policy to that of financial stability. An inappropriate assignment of policies might mean neither objective is achieved.

113 This theme is developed further in chapter 20 of Tucker (2018). He stresses that the aim is to foster a resilient financial system, *not* "to keep various market risk premia in line with economic fundamentals."

114 Spencer (2017) notes that banks in New Zealand, which were at first worried that the imposition of loan-to-value limits for mortgages would divert business to other firms. In the end, they "recognised the benefit of an external constraint that prevents an escalation of mortgage risk as banks compete for market share through greater risk-taking".

(c) IMF versus BIS

For much of the post-GFC period (until 2018), the IMF and the BIS took different views about what objectives should guide monetary policy and macroprudential policy (IEO (2019), Turner (2019)). The IMF shared the consensus among central banks and monetary experts that monetary policy should focus on macroeconomic objectives, with macroprudential policies addressing financial stability risks (IMF (2015)).

The BIS disagreed. In order to buttress its house view that monetary policy had to lean against the build-up of financial imbalances, the BIS argued that tightening macroprudential policy would not be enough. This policy perspective was allowed to shape the BIS's research agenda. "One might have expected the BIS to be in the vanguard of thinking about regulatory design questions … undertaking more work on the practicalities of macroprudential policies," observed the Independent Panel on BIS research. But "BIS research and advice instead continued to focus instead on the use of LAW monetary policy to mitigate financial stability risks (Allen et al (2016))".

The BIS rejected as flawed the usual Tinbergen-type rule (interest rate policy to stabilise prices and prudential policies to maintain financial stability). Caruana (2010) said this was "because the two objectives are interrelated and complementary … Prudential policies may not maintain financial stability if not supported by monetary policy … because short-term interest rates are the primary determinant of the cost of leverage". This assertion is puzzling. Does it mean that financial regulation works only if supported by monetary policy tighter than warranted by macroeconomic conditions? This is doubtful. There are two objections, one logical and the other empirical.

The logical objection is that the existence of inter-relations between two distinct policy objectives does not make the Tinbergen rule any less applicable. Landau (2013a) explains why macroprudential and monetary policies may have to move in opposite directions. For example, a positive productivity shock which lowers prices may require monetary stimulus. But it may also feed excess optimism and generate speculative borrowing in new areas, requiring macroprudential policy tightening to counter greater financial risks. The complaint that macroprudential and monetary policies

throughout the 2010s were "working at cross purposes, far from the original BIS suggestion that these policies should support each other (White (2019))" seems misguided.

The empirical objection is that there is no evidence that tightening macroprudential rules is ineffective when interest rates are low but has a positive impact when interest rates are somewhat higher. Nier and Kang (2016) show empirically that macroprudential policies were not in general more effective when interest rates were higher. The prevailing level of interest rates might well influence the decision on *which* macroprudential instrument to use (and indeed on the calibration of any instrument). A given debt service/income rule for mortgage lending, for example, becomes less constraining when interest rates fall, but not so a debt/income rule. In addition, there is no reason why two or more constraints cannot be imposed simultaneously with circumstances determining which constraint binds.

The IMF's analysis of the interactions between monetary policy and macroprudential policy, summarised by Nier and Kang (2016), is more convincing.[115] The most important point is that macroprudential policy can help preserve the effectiveness of monetary policy in financial downturns by ensuring that banks had built up buffers when financial conditions were easy. Banks can then continue to lend in financial downturns.[116] Monetary tightening, on the other hand, does not help to build resilience by increasing buffers.

The second Nier-Kang conclusion is that macroprudential policy can counter unwanted side-effects from expansionary monetary policy, which is vital when interest rates are close to zero and the temptation to seek higher gearing is stronger. This allows monetary policy to be easier than otherwise.

Central banks in several advanced economies have reported effects which are consistent with these IMF conclusions. In the case of New Zealand, Wheeler (2014) notes that the introduction of macroprudential speed limits on high loan-to-value lending for mortgages "moderated excesses in the housing market, thereby

115 See also IMF (2013a).

116 Weidmann (2018)) also stresses how macroprudential rigour can protect monetary policy – laxity could leave monetary policy having to reduce the real burden of private debt by inflation.

enabling the Bank to delay the tightening of interest rates, and reducing the incentive for further capital inflows into the New Zealand dollar". Aikman et al (2018) find that the countercyclical capital buffer should be tightened in a credit boom, with its macroeconomic impact cushioned by loosening monetary policy. Sinclair and Allen (2017) put the point well: when monetary and macroprudential policies need to pull in opposite directions, "the best answer may be to increase the dosage of both – and not to do nothing".

Rebucci and Zhou (2019) found that the IMF placed particular emphasis on macroprudential policies in managing the risks related to house price booms.[117] The IEO's assessment is that, during the past few years, the IMF has put itself at the forefront of international efforts to develop and assess new macroprudential policies.

Macroprudential policy might help to achieve other objectives beyond its classic systemic risk function. The concept of GDP-at-risk developed in Cecchetti (2006) is useful. Adrian (2017) argues that excessively easy financial conditions are a good predictor of downside GDP tail risks in the medium term. The IMF's policy prescription in such circumstances would be to strengthen macroprudential buffers.

Another possible objective is to reduce the financial stability risks of sizable exchange rate misalignments. Macroprudential policy tightening which forces banks to reduce domestic bank lending will tend to drive down bond yields and lead to currency depreciation. Monetary tightening will have the opposite effect and the fear of significant currency overvaluation has often led central banks to keep interest rates down (de Gregorio (2010), Turner (2018)). In addition, foreign exchange market intervention can offset the impact of destabilising swings in capital flows. This might also serve the macroprudential function of keeping the exchange rate from reaching unsustainable values (Kim and Lee (2017), Agénor and Pereira da Silva (2019)).

A number of studies have shown that the greater importance of foreign currency borrowing in emerging markets increases the effectiveness of macroprudential instruments relative to monetary policy (Ozkan and Unsal (2018), Kenç (2020)). A key lesson is that macroprudential policies can help to stabilise domestic

117 Detailed guidance on instruments is given in IMF (2014).

lending (both in size and in nature) in the face of external shocks – leaving monetary policy freer to focus on domestic objectives. Vujcic and Dumicic (2016) show how macroprudential restrictions and marginal reserve requirements imposed in Croatia during the boom in capital inflows led banks to build up extra buffers which could be drawn down in the post-GFC recession. Soner Baskaya et al (2016) demonstrate how macroprudential policies in Turkey not only reduced the sensitivity of loan growth with respect to changes in global risk premia but also curbed foreign currency lending. Gonzalez et al (2016), reporting work at the central bank of Colombia, show that large and persistent commodity price swings seriously destabilise the allocation of credit between the tradable and non-tradable sectors of commodity-exporting economies. They show that macroprudential policies targeting only aggregate credit – that is, making no sectoral distinction – can make matters worse. All these studies reinforce a general conclusion: the more macroprudential policy can be targeted at specific sources of vulnerability, the greater the advantage over monetary policy in addressing financial stability risks.

Governors and other central bank officials have tended to react strongly against any suggestion that "macroprudential policies are for wimps" … merely a fig-leaf for central banks too scared to raise interest rates. The truth is the opposite. The targeted nature of macroprudential measures (e.g., on those seeking mortgages) means that the targets usually squeal. In contrast, the effects of higher interest rates are spread widely so that particular groups do not feel especially aggrieved. For this reason, Balls (2017) warns about the traps in delegating without proper political safeguards macroprudential policies to experts. "The definition of financial stability is opaque," he says. "The distributional impact of using macroprudential policies, with different levers overtly discriminating between different groups, is likely to be first order."

(d) Gaps in the macroprudential tool-kit

Gaps in the macroprudential toolkit which affect the linkages with monetary policy (including central bank balance sheet policies) may influence decisions on policy assignments.

The first gap is that current liquidity rules applying to banks do not change over the economic cycle – quite unlike capital rules (which incorporate a countercyclical buffer). Landau (2016)

argues that the macroprudential toolkit should include the cyclical regulation of liquidity creation and maturity transformation within banks. Goodhart (2017) echoes this criticism of the new liquidity rules which require banks to wastefully maintain "a hugely inflated amount of high-quality liquid assets (HQLA)". Much better would be a contingent, pre-positioning scheme to allow banks to swap their illiquid assets into HQLA during a crisis, as Mervyn King has proposed (King (2016)). This would reduce the moral hazard from emergency lending by central banks (discussed in chapter 5).

As part of their macroprudential work, both the IMF and the BIS need to be fully engaged in identifying when micro-based financial regulations fail to address (or, worse, increase or create new) systemic risks in the financial system. How the many new regulations introduced since the GFC will interact with each other is not fully understood. Nor is the impact of regulations on monetary policy transmission. Research on the overall effects of regulation by several different bodies is essential to help the international community understand how the new regulations are working in practice. Unintended side-effects of financial regulations are inevitable, and will need to be addressed.

There is one major liquidity issue relevant for the analysis of central bank balance sheet policies: how far did new banking regulations act pro-cyclically during the GFC by reinforcing the already-strong global demand for liquid assets? Allen (2013) argues persuasively that the timing of the new regulations did indeed aggravate the global liquidity squeeze – thus lowering global GDP in the middle of the recession. Little attempt was made by policy-makers to take account of the aggregate effects of rules imposed on individual banks.

The second gap concerns the behaviour of non-banks and the risks of destabilisation coming from market structures. An IMF Working Paper in 2016 found clear evidence that quantitative macroprudential constraints on banks have a strong substitution effect driving credit to non-banks (Cizel et al (2016). Ahnert et al (2018) similarly show that macroprudential regulations reduce forex lending by banks but increase foreign currency debt issuance by companies and so "shift the snowbank of forex vulnerability" to non-banks.

How to tackle this issue is a major challenge for those responsible for macroprudential policies (Knot (2018), Villeroy de Galhau (2018)). A former Vice-President of the ECB argued for an expanded macroprudential toolkit to cover maturity mismatches and leverage in non-bank financial institutions. Without this, he said, there will be other financial crises that monetary policy cannot prevent (Constâncio (2017)). The chairman of the Financial Stability Board (FSB) recently underlined that the underlying fragility of the non-bank sector (which has become more diverse and interconnected, he said) may require a regulatory response (Quarles (2020)).

But regulation is only part of the story. The classic way for central banks to influence risk premia in financial markets is to use their own balance sheet. This may indeed be the only way to influence the behaviour of the large and diverse non-bank sector. Since the GFC, central banks have repeatedly and extensively used their balance sheets to counter illiquidity or excessive risk premia in many markets they had previously avoided. Some non-bank products or intermediaries were "saved" by such actions. The market exposures assumed by central banks often turned out to be profitable.

Such policies, however, force central banks to confront many new thorny issues. The severe financial market disruption seen in March 2020 revealed, in the words of a Bank of England official, "vulnerabilities in financial markets which have been staring us in the face for some time – and will only grow in importance in the years ahead (Hauser (2021))." A recent report on balance sheet policies by the Bank of England's Independent Evaluation Office found that the Bank had "excelled at delivering at pace and under pressure, drawing on very effective staff from multiple areas (Bank of England (2021a))".[118]

The report nevertheless found that the Bank of England's approach to QE had shortcomings – hardly surprising given the use of new balance sheet policies on such a scale. The three general issues which stand out, and the steps the Bank of England intends to take to address them (Bank of England (2021b)), apply also to other central banks. First, more work is needed to understand how QE

118 My own direct experience at the BIS supports this positive assessment: Bank of England staff (and indeed successive governors) have played a very influential role in international policy work.

works: the transmission mechanism; the nature, size and timing of unintended side-effects; and the interactions with other policy instruments. Secondly. the governance and risk management of QE needs to improve given the complexity and political sensitivity of many asset purchases. Finally, the Bank needs to upgrade its communication strategy to help the public understand what she is trying to do. With QE, a central bank can transform any asset into money, and should therefore take to heart the warning of Giles (2019) that too "cavalier use of such power will call into question the legitimacy of independence to set monetary policy."

A final question, related to the issue of exit from large scale purchases, is: what stops central banks acting in a symmetric way? If they see systemic dangers in over-leveraged investors dangerously inflating asset prices in specific markets (rather than a general overvaluation of asset prices), might they not sell the assets they believe have become overpriced? The central bank's own balance sheet could on occasion be a very powerful instrument of macroprudential restraint acting directly on markets.[119]

119 Ben Friedman (2014) argued that one advantage for a central bank holding risk assets (e.g., mortgage-backed securities) on its balance sheet is that it could sell them when it wanted to take restrictive measures on a particular sector (e.g., real estate). When central banks historically operated by discounting private label paper they would signal doubts about specific assets by imposing large haircuts or simply refusing to accept them.

7

Exit: interest rate risk

Interest rate markets are surely the first place to look for the financial risks created by unconventional monetary policies. The common domestic element of UMPs in advanced economies has been lowering the long-term interest rate in local currency.[120] In many countries, long-term rates have hit historic lows, with some 10-year yields becoming negative. The reactions of financial firms to this persistently low interest rate environment are not well understood. The Independent Panel suggested that BIS research focus more on the impact on the business models of banks, asset managers and insurers and on the structure of financial markets (Allen et al (2016)).

Figure 1 in chapter 2 showed how far the world long-term rate has fallen. International arbitrage means that yields on bonds in the major currencies tend to move together irrespective of domestic influences. A country can therefore be hit by an interest rate shock that is independent of domestic circumstances and its own monetary policy.

The current configuration of regulatory, monetary and (very recently) fiscal policies has accentuated the medium-term risk of a rise in long-term interest rates. Goodhart and Pradhan (2020) persuasively argue that the world is on the edge of a great demographic reversal which will push inflation and real long rates up. At present, given the global recession, worry about such a prospect might seem out of place. But huge budget deficits in the major advanced economies in 2020 and 2021 imply a large rise in full-employment government debt/GDP ratios almost everywhere. At some point, this is bound to lift benchmark long-term interest rates in the major currencies irrespective of monetary policy decisions. As pointed out in chapter 1, and echoing the analysis of Goodhart and Pradhan (2020), it cannot be assumed – as do many models – that secular stagnation will keep real interest rates low.

120 "Domestic" element because in several cases the impact on the exchange rate (not considered in this paper) has been important.

How might central banks respond to a jump in market rates? If inflation expectations show signs of becoming unhinged on the upside (e.g., inflation risk premia in bond markets rise) and aggregate demand is strong, central banks might conclude that a market-led tightening in monetary conditions is warranted. They may decide to raise their policy rates. Or they may conclude that the implicit market tightening is enough. One difficulty will lie in assessing the macroeconomic effects of a sudden rise in long-term rates. How banks and other financial firms will react given their very large but opaque interest rate risk exposures is not known. Their reactions could well magnify the macroeconomic impact of any market-led tightening in monetary conditions.

A second difficulty would be the appearance of fiscal dominance in some guise or other. Huge central bank holdings of government bonds plus higher public debt mean that the "interactions between public debt and monetary policy will become more immediate and intense (Landau (2020))". There is nothing intrinsically wrong with this: large economic shocks often require that fiscal and monetary policies be closely coordinated (Barwell et al (2020), Svensson (1999)). The worry is that governments have a history of telling central banks to help keep long-term interest rates down – "moderate" long-term interest rates is the third leg of the Fed's triple mandate. In a very uncertain macroeconomic environment, when market signals can be hard to read, even unspoken government pressure may become influential. Landau is right to insist that "interest rate increases must be allowed if inflation pressures materialise whatever fiscal situation exists at the time."

(a) An unintended side-effect of regulation?

Regulatory reforms have added to the impact of central bank bond purchases in depressing benchmark long-term rates. Banks and other regulated financial institutions were induced to lower the credit-risk of their assets but at the price of holding longer-duration risk-free assets, especially government bonds. Such reforms include Basel 3, Solvency 2 for insurance companies in Europe and International Accounting Standard 19 for defined benefit pension schemes (Ramaswamy and Turner (2018)). As banks and other regulated firms adapted to these policies, their increased demand

for government bonds reinforced downward pressure on long-term rates. This effect, strong in the transition, will fade once firms have met the new norms.

The market behaviour of financial firms – regulation shares the blame for this – has also become much more pro-cyclical. Firms may lengthen the maturity of their assets to maintain yield. Or expectations of even lower future yields may induce them to buy longer-dated bonds to cover the reinvestment of bonds maturing in the future. Such pro-cyclical responses would magnify any initial shock to the long-term rate.

Recent market developments have added new destabilizers to bond markets. The decline in the world 10-year yield from 5% pre-GFC to below 1% by late-2020 has generated large capital gains for investors. Many asset managers and investment firms have used leverage to magnify such gains. Liquidity mismatches have been deliberately increased with bond funds offering investors liquid products based on illiquid bonds. The greater use of interest rate derivatives to alter the duration of asset portfolios or debt structures has made interest rate markets more pro-cyclical (IMF (2019b)). As noted above, COVID-19 triggered sudden redemptions in bond funds, deleveraging and (probably) attempts to cut liquidity mismatches. This brought to light crippling dysfunctions in normally deep and liquid benchmark interest rate markets. The warning that such structural market fragilities could be very disruptive once the interest rate environment changes could not have been clearer.

Current international rules do not require banks to hold enough capital to cover interest rate risk on bonds held in the banking book. Under Basel 3, there is still no Pillar 1 capital charge for interest rate risk for bonds held in the banking book.[121] Government bonds in the local currency effectively have a zero risk weight in the risk-weighted assets calculation of required capital. In addition, Basel 3 liquidity rules allow banks to count long-term government bonds as high-quality liquid assets even though regulations in the 1970s (when liquid asset ratios were a key regulatory variable) did not. Only bonds with a maturity no longer than six months counted

121 Since the 1990s, the Basel Committee has attempted but failed to reach agreement on a global Pillar 1 capital charge (Goodhart (2011)). Yet, as the key Basel 2 document put it in 2001, "the Committee remains convinced that interest rate risk in the banking book is a potentially significant risk, and one that merits capital" (BIS (2001)).

as a liquid asset. As BIS (2018) documents, banks are especially exposed to the snap-back risk that long-term interest rates rise more sharply than markets currently expect.

(b) Snap-back risk: IMF and BIS scenarios

A weak economy, low inflation and announced central bank monetary policy plans at present hold down future expected short-term rates. By late-2020, the long-run expectation of the world short rate had fallen to 1¾% (Figure 1) – feeding into a very low long rate. Slow-moving structural factors have reinforced this. Population ageing has increased saving for retirement, Asian saving rates are still high and capital formation could be held down by slower labour force growth. The Wicksellian natural rate of interest could be negative without significant fiscal deficits – see the subtle analysis of von Weizsäcker (2013).

The worrying risk of a snap-back in long-term interest rates was at the centre of policy attention during the "taper tantrum" in 2013. The IMF's *GFSR* of October 2013 noted that the shift into fixed-income assets and longer duration portfolios had lifted interest rate risk. It estimated that a 100 basis point increase in long-term rates would lead to $2.3 trillion aggregate losses on global bond portfolios, larger than the average for the tightening of monetary policy in 1994-95, 1999-2000 and 2004-06.[122] The *GFSR* regarded it more likely that interest rates would rise gradually, permitting "a smooth portfolio rebalancing out of longer-duration assets" and a repricing of credit risks. (A similar scenario forms the baseline in BIS (2018) discussed below).

Yet it is also possible that interest rates will remain lower than historical averages for a long time (the low-for-long scenario). This scenario is analysed in the *GFSR* of April 2017, which looked at how structural factors (not monetary policy) might generate a steady state of lower growth with lower nominal and real interest rates. Flatter yield curves and lower real long-term interest rates would challenge the business models of banks, insurance companies and pension funds.

122 Their analysis of the long-term rate distinguished between those variables the Fed could control (market expectations of the future interest rate path, the size and persistence of asset purchases) and those which it could not (macroeconomic fundamentals, macroeconomic volatility and financial market volatility).

A Working Group of major central banks chaired by Ulrich Bindseil and Steven Kamin recently conducted a very useful scenario analysis of interest rate risk in the financial system (BIS (2018)). It found that the low interest rates of recent years have led banks, insurance companies and pension funds to engage in only a relatively limited amount of additional credit risk-taking – thanks partly to tighter regulation. Even so, the lengthening in the maturity of asset portfolios and the shifting of bank loans to the interest-sensitive real-estate sector has made the financial sector, and especially the banks, more vulnerable to snap-back risk.

The BIS report produced three scenarios for the period to 2027:

- The *baseline scenario* takes from the October 2017 *WEO* the IMF's projections to 2022. Thereafter the real 3-month rate converges to the natural rate as the economy reaches full employment. The 10-year yield gradually rises so that the term spread returns to its 1999-2016 average. Under this scenario, the dollar 10-year yield rises to almost 5%.
- In the *low-for-long scenario*, inflation falls short of target so short rates remain below the natural rate. The term spread returns to only one-half of it earlier average. In this case, the dollar 10-year yield stays at around 2 1/2%.
- In the *snap-back scenario*, there is a run-up in inflation which leads to a rapid increase in both short and long rates. The 10-year yield rises to over 6% with inflation in the 3-4% range. Banks would be hard hit by "valuation losses on their longer-term securities, higher funding costs, increased delinquencies on their loans and reduced credit growth." Portfolio losses could be even greater because of the associated re-pricing of assets other than bonds (e.g. property held as collateral, equity prices) and mark-to-market losses.

That the baseline scenario has the future dollar 10-year yield rising to almost 5% is an indication that current yields might be below equilibrium. The very wide range for the 10-year yield in the three scenarios at their end-points (2½% to 6%) is an additional warning.

Questions about the future paths of world interest rates remain key for current prospects of financial stability. Some form of regular scenario analysis by the IMF and the BIS for both banks and non-banks would be helpful. Preparing such scenarios in a comparable way each time would help to monitor the evolution of interest rate

risk. Periodic studies of specific elements conducted at different periods of time using different methodologies – as IMF and BIS studies often are – fail to do this. Such scenarios could be used to shape stress tests. Although stress tests by national supervisors have improved in recent years, major shortcomings remain (Goldstein (2017)). Given the current environment of exceptionally low interest rates despite very large fiscal deficits, and the knowledge that capital requirements do not adequately cover interest rate risk in banks, stress tests for upward shocks to government bond yields are essential.

8

Conclusion

The threat of global deflation in 2008-09 forced reluctant central banks into a revolution in the practice of monetary policy. A track record of low inflation plus a clear, undistracted and mandated focus on measurable macroeconomic objectives ensured that central banks could maintain public confidence as they stepped into the unknown. Repeated criticisms by many pundits failed to undermine this confidence.

For more than a decade, additional monetary stimulus has come from larger and more risk-absorbent central bank balance sheets. The immediate trigger was that the short-term policy rate lost further traction once it had hit the zero lower bound (ZLB). At first, the Fed and other central banks hoped that this would be temporary, with many governors in late-2009 talking about the need to exit from exceptional balance sheet policies. But it gradually became clearer that fundamental structural factors had driven down the real natural rate of interest, perhaps close to zero in the United States. The scope for varying the policy rate in the future seems therefore to have narrowed. The Fed and other central banks face the prospect of having to use their balance sheets – which have become much more heterogeneous – more actively than in the past. Buying (or lending against) the risk assets they had avoided in the past (long-term government bonds, medium-term loans to banks, mortgage-related paper, bonds issued by private firms, equities and foreign assets in a massive scale) may become the new normal.

A significant part of the financial press in the 2010s highlighted claims that the policies of central banks were creating major threats to financial stability. Many said other policy-makers should do more (relating, e.g., to fiscal policy or to structural policies) but few put forward alternatives that were within the remit of central banks. Some said banks would be encouraged to take even more dangerous risks than they had before the GFC. Others that hedge funds would run riot with increased leverage. But the radical monetary policies

of the major central banks were vindicated by events, and the main criticism is that they should have acted in unison and with greater force, notably before the collapse of Lehman.

This paper explains why the Jeremiahs were proved wrong. A comparison of the diverging views on monetary policy of the IMF and the BIS illuminates the key issues. Both institutions at first struggled with this revolution in monetary policy practice, and were too constrained by preconceptions of what central banks should or should not do. Subsequently, efforts have been made in both institutions to deepen their analyses of the workings of monetary policy.

A recent review of the IMF's work by its Independent Evaluation Office (IEO) noted that convincing research by IMF economists over many years had concluded that monetary policy was most effective in achieving macroeconomic objectives with financial stability risks best left to regulatory or fiscal policy. This view was maintained when monetary policy was implemented with new balance sheet tools ("unconventional monetary policy" or UMP). The IEO found that the Fund's support for UMP was initially mainly reactive but then took an active and influential role (especially with respect to the ECB). The IMF's judgement that financial stability risks were not serious enough to undermine the pressing case for UMP was well-founded, and indeed widely shared by policy-makers and academic experts. But the IEO also welcomed the IMF's openness to recalibrating its views if the balance of risks shifts or if new evidence emerges.

The IEO found that the Fund's multilateral surveillance of global financial risks had well supported its policy advice. The *Global Financial Stability Report* (*GFSR*) is now a world-leading product. The IMF also took the leading role at the international level in the development of a new macroprudential toolkit to manage financial stability risks. The IMF had become an international clearing house for evidence on design and effectiveness of different macroprudential policy instruments. The IEO reported that policymakers saw this work as providing high value added and having considerable traction.

Notwithstanding this positive assessment of the IMF's work, the IEO found that the Fund had fallen behind over the years and needed "to raise its game" to keep abreast of new developments in monetary policy and practice (Collyns and Loungani (2019)).

In contrast to the policy position developed by the IMF, the BIS until recently had become progressively more wedded to a heterodox view on monetary policy that some BIS economists had developed in the late-1990s. The BIS objected to monetary policy aimed only at macroeconomic objectives (such as an inflation target). The BIS's house view was that monetary policy should also aim at limiting financial imbalances, if necessary by keeping interest rates for years above levels justified on macroeconomic grounds.

This criticism of the monetary policy frameworks of almost all central banks aroused controversy. An Independent Panel comprising of Franklin Allen, Sir Charles Bean and José de Gregorio was commissioned by the BIS in December 2015 to review its research activities. They found that many key stakeholders questioned the objectivity of BIS research. Too often research had been tailored to find evidence in support of a house view laid down by BIS management (Allen et al (2016)). This house view, at odds with most research, was never very credible with economists and, the panel noted, never had much influence with central banks.

As for research on financial stability, the Independent Panel praised the BIS's "considerable practical support to the post-crisis regulatory effort, in particular through the secretariat of the BCBS." But the BIS, it said, had "failed to be in the vanguard of thinking about regulatory design questions (which should surely be the first line of defence against the risk of financial instability). Instead the focus was on the implications for the conduct of monetary policy." The BIS had also failed to persuade central banks that macroprudential policy tightening often required setting interest rates higher than warranted by macroeconomic conditions.

Since 2018, however, the BIS has been more constructively engaged with central banks on the links between monetary policy and the financial system. The BIS has further developed its influential role in analysing risk exposures in global financial markets. Taking advantage of its unparalleled international banking and bond statistics, as well as its close connections to the secretariats of the BCBS and the FSB, the BIS has been well placed to quantify such exposures, to monitor market dynamics and to assess the implications for banks and other financial firms. The important questions the BIS has raised about the big post-

GFC rise in global liquidity, about corporate leverage, about fragile maturity transformation and about currency mismatches (notably the increased dominance of dollar borrowing) remain unanswered.

Central banks today have a range of policy tools that would have been thought impossible a decade ago. Policy can seek to influence not only interest rates across the maturity spectrum but also risk premia in specific markets. The much more active use of its own balance sheet offers the central bank a set of new, more targeted tools. New macroprudential policies aimed largely at banks have become firmly established worldwide. But these policies do not deal effectively with threats to financial stability coming from capital markets. One way to plug this gap might on occasion be the targeted use the central bank's own balance sheet in a restrictive direction to counter threats coming from some specific markets or instruments.

Nostalgia for the less complicated, pre-GFC world is only natural. When setting overnight interest rates in interbank markets was their sole instrument of monetary policy, central banks could avoid some controversial and politically sensitive choices. No longer. The use of their balance sheet to finance massive purchases of all types of foreign and domestic assets has increased their financial risk exposures. It has also meant they are caught more frequently in the political cross-fire.

Having three broad classes of policy instruments (interest rates, the balance sheet and macroprudential tools), each containing several innovations, means that central banks may be expected to achieve – or at least minimise the harm to – many more objectives. Monetary policy is today much more complicated and more linked to the policies of other official bodies than it was before the GFC. It has also become more controversial. The interactions between monetary and regulatory policies – and now perhaps fiscal policy – are much more extensive. They are not well understood. One example suffices. The joint impact of monetary policy and new financial rules on the size and distribution of interest rate risk in banks and institutional investors has been substantial. Assessing how big a threat this could be to the financial system requires better data on the exposures of banks and others and on the interconnections between financial firms (notably on who has hedged interest rate risk with whom).

The higher government debt/GDP ratios worldwide that now seem inevitable will at some point increase long-term interest rates – whatever monetary policy strategies central banks follow.

As central banks navigate a new and probably more bumpy terrain, they will need an informed public debate about what they are trying to do and about which policy tools are most suitable. Neither is easy. The analyses of central bank policies by the major international financial institutions with responsibilities and expertise in this field – the IMF and the BIS – have much to contribute to this debate. But their analysis will be influential only if it is professional and unbiased. Maintaining these standards requires some form of regular and independent review. Nowhere is this better done than by the IMF's Independent Evaluation Office which is fully independent of the IMF's management and staff, operating at arm's length from its Board of Executive Directors. The IEO has been realistic on what practical steps it can recommend to improve the IMF's operations. It is not utopian. On occasion, it has been a thorn in the side of some Executive Directors – and rightly so. The Independent Panel on BIS research in 2016 set a similarly high standard.

The major central banks should also establish their own IEOs. The IEO of the Bank of England recently produced a valuable review of the Bank's approach to quantitative easing.

To repeat: the monetary policy revolution requires an open and informed public debate which will involve dissent on issues that are complex and politically sensitive. "The problem is not only that there is a good deal that we do not know," Bockelmann, chief economist at the BIS 1985-95, used to say, "but that a good deal of what we do know is wrong." The aim is not to devise some new simplistic policy mantra for central banks. Trying to arrive at some diluted international consensus on the new normal for monetary policy would be pointless. Especially dangerous would be imposing new constraints on the central bank's ability to act in new and unfamiliar market environments.

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