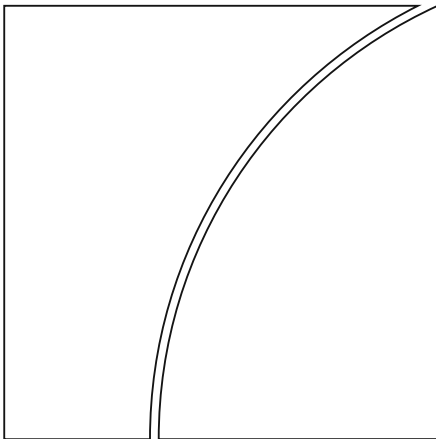




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Foreword

The 14th BIS Annual Conference took place in Lucerne, Switzerland, on 26 June 2015. The event brought together a distinguished group of central bank Governors, leading academics and former public officials to exchange views on the topic “Towards ‘a new normal’ in financial markets?”. The papers presented at the conference and the discussants’ comments are released as *BIS Working Papers* nos 561 to 564.

BIS Papers no 84 contains the opening address by Jaime Caruana (General Manager, BIS), the keynote address by John Kay (London School of Economics) and remarks by Paul Tucker (Harvard Kennedy School).

Programme

Thursday 25 June 2015

18:00 Cocktail and informal conference dinner

Friday 26 June 2015

09:00–09:15 **Opening remarks** **Jaime Caruana**, Bank for International Settlements

09:15–10:40 **Session 1: Banks and markets before and after the crisis**
Chair: **Glenn Stevens**, Reserve Bank of Australia
Author: **Gary Gorton**, Yale School of Management
Discussants: **Randall S Kroszner**, University of Chicago Booth School of Business
Andrei Kirilenko, MIT Sloan School of Management

10:40–11:10 **Coffee break**

11:10–12:30 **Session 2: Investor behaviour and the wider economy**
Chair: **Lars Rohde**, Danmarks Nationalbank
Author: **Andrei Shleifer**, Harvard University
Discussants: **Philipp Hildebrand**, BlackRock
Richard Clarida, Columbia University

12:30–14:00 **Buffet lunch**

14:00–15:20 **Session 3: Who provides market liquidity?**
Chair: **Elvira Nabiullina**, Central Bank of the Russian Federation
Author: **Bruno Biais**, Toulouse School of Economics
Discussants: **Arminio Fraga**, Gávea Investments
Francesco Papadia, Bruegel

15:20–15:50 **Coffee break**

15:50–17:10 Session 4: Has technology changed the nature of risks in financial markets?

Chair: **Rodrigo Vergara**, Central Bank of Chile

Author: **Andrew Lo**, MIT Sloan School of Management

Discussants: **Darrell Duffie**, Stanford University

Benoît Cœuré, European Central Bank (Cancelled)

17:10–18:20 Wrap-up panel: Policy responses to a more interconnected financial system

Chair: **Agustín Carstens**, Bank of Mexico

Panellists: **Raghuram Rajan**, Reserve Bank of India

Paul Tucker, Harvard Kennedy School

19:30 Official dinner

Keynote address: **John Kay**, London School of Economics

Saturday 27 June 2015

10:00 Buses depart for Basel (AGM weekend)

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A “new normal” in financial markets?

Opening remarks

Jaime Caruana¹

Good morning to all of you. It is a pleasure to welcome you to the 14th BIS Annual Conference. The topic for this year is the so-called “new normal” in financial markets. The broad use of this term today shows the ingenuity of financial market participants. Not only do they adapt quickly to new technologies and new regulations, they also invent catchy terms that can mean many things.

Apart from creativity, change has been the only constant in financial markets. But even so, the financial crisis marked a sea change. For the first time since the Great Depression, problems in financial markets threatened to bring economic activity in the largest and most advanced economies to a halt. There had been significant episodes of turbulence in the financial markets of the advanced economies before, for instance the 1987 stock market crash or the collapse of LTCM or the tech bubble. But these had only limited repercussions on real activity. Of course, financial crises had been quite common in emerging market economies, often with great economic and social costs.

The global financial crisis brought about a fundamental reassessment of risks in the financial system. Regulators responded with new, and tighter, regulatory frameworks, which are currently being completed and phased in. Monetary authorities, in turn, cut interest rates sharply and expanded central banks’ balance sheets, first through liquidity programmes, and later through asset purchases.

Rapid action saved the day when markets were impaired during the crisis, but the balance between risks and rewards worsens as time goes by. Interest rates in the largest advanced economies have been close to zero, or even negative, for almost seven years. Central bank actions have compressed the entire term structure of interest rates, driving the term premium deep into negative territory.

At this stage, we don’t fully understand the implications of long periods of low, or even negative, rates for the financial system and the economy as a whole. But some of the less welcome side effects of persistently low interest rates are increasingly becoming apparent. One is that low interest rates imply a low price of leverage and thus stimulate the build-up of debt. Low interest rates in one economy tend to spill over into other economies. It is therefore not surprising that we have seen financial booms in many emerging market economies and smaller advanced economies that were relatively unscathed by the crisis itself. Rapid increases in debt raise concerns about financial stability. But they also have other effects, such as a misallocation of resources. In this year’s Annual Report we provide evidence that financial booms tend to suck capital and labour into sectors with low future productivity growth. We

¹ General Manager, Bank for International Settlements.

estimate that the effect of these misallocations on aggregate productivity growth can be substantial and may persist for many years after the boom has ended.

There are other side effects: low interest rates create incentives to delay the necessary adjustment, both on the financial and the real side of the economy. For example, low rates enable banks to extend and pretend. A third effect is to obscure market signals. Asset prices, including interest rates, are central to the allocation of resources in an economy. A fourth effect is to make exit from extremely accommodative monetary policy ever more complex. But exit is important if we want to go into the next downturn with the ability to cut interest rates.

Given the side effects and financial stability risks, it is hard to think of the current persistently low interest rates as equilibrium rates. We are at risk of getting used to low rates; they may become routine, but they cannot represent equilibrium.

A reassessment of risks, overhauled regulatory frameworks and persistently low interest rates have interacted with pre-existing trends, such as the automation of trading and back office processes, and have profoundly changed financial markets. I am not sure our understanding of financial markets has kept up with the rapid pace of change. But I hope that today's conference will take us a step further.

In the first session, we explore the relationship between banks and markets. The balance between banks and markets is shifting, and has been shifting for some time. The days of CDOs, CDO², CPDOs, CPPIs and other complex structured products are probably history, but we are seeing many large corporations bypass banks and turn to the bond market for their funding. This will have profound implications for the distribution of risk in the economy. In the session, we will zoom in on collateral, which provides an important link between banks and capital markets, and one that was grossly underestimated before the crisis.

Greater reliance on capital markets will increase the influence of investor decisions on the wider economy. In financial markets, both dedicated asset managers and their ultimate clients decide how to invest. These decisions are not independent of each other. For example, the behaviour of the ultimate investors will affect the extent to which asset managers can deviate from their benchmarks. This, in turn, will affect how correlated investment decisions are across managers and asset classes. We will explore investor behaviour in the second session of this morning.

After lunch, the third session turns to liquidity provision. Electronic trading and changes in bank business models have resulted in massive changes to who is providing liquidity in financial markets. Regulatory reform after the crisis accelerated the pace of this shift. In particular, the aim of some of the new regulations was precisely to ensure that liquidity risk is priced and managed and to align capital requirements with the risks they generate. As a result, banks have scaled back their market-making functions. Yet, on some measures and in some instruments, financial markets appear to be as liquid as ever. What we don't know is how reliable this liquidity will be at a time of stress, which is the most important one from the financial stability perspective. We may be suffering from a kind of liquidity illusion, with plentiful liquidity on entry but absent liquidity on exit. So far, events like the sharp jump in prices in the US Treasury market last October or the lack of liquidity in the Swiss franc market early this year have had few if any effects outside financial markets, but how are we to know that this won't be different next time? Do we understand what carried the 10-year German government bond yield from just above zero to over 1% in a matter of weeks?

Session 4 explores how technology has changed the nature of risks in financial markets. Computerisation makes trading more efficient and straight through processing reduces the scope for human error. But does this make the financial system safer? We are becoming more and more reliant on a small number of critical systems. How reliable are they? How can we protect them against attacks? And what happens if some of them do fail? Some years ago, traders might have been able just to go back to the old systems and pick up the telephone. But this fall-back option becomes less feasible as time passes. At some point, perhaps even today, traders may still have a telephone but they may not know whom to call.

The wrap-up panel that closes the conference considers how all this affects central banks. Central bank policy and financial market developments are becoming ever more intimately linked. Large-scale asset purchases and their guidance are making market participants highly dependent on the outlook for monetary policy. Conversely, indicators based on financial market prices are serving as an input of policy analysis. The shift from bank-based to market-based finance that we are observing in some segments is altering the way financial conditions propagate. Highly integrated financial markets are transmitting changes in monetary policy stance across national borders. And, last but not least, central banks are embracing explicit or implicit mandates to safeguard financial stability. All these points raise important questions that I hope we will have the opportunity to discuss.

I wish you a fruitful day for discussions.

The pressing need for more complete central bank policy regimes

Paul Tucker¹

The title of this panel session is “Policy responses.” Policy responses have to be seen in terms of policy regimes and, although this can be no more than a sketch, I want to leave both the central bankers in the room and later readers with a conviction that there is work to be done to fill out the policy regimes for which central banks have delegated or *de facto* responsibility.²

I will set the scene by highlighting three things that the crisis has revealed about central banking, and two things that we still don’t know. I will then relate them to three themes that have been explicit or suggested by the earlier sessions of today’s conference. That will set the scene for what I want to say today about policy regimes.

Three things revealed about central banking by the crisis

One thing everyone – I mean the public and the legislators to whom central banks are responsible – has learned is that the monetary authorities entered the crisis without any well articulated toolkit for crisis management. But also that, at more or less every stage of the crisis, they proved terrifically adept at innovating on the hoof and learning from each other.

The second thing we have learned is that, despite the complete implosion of the banking system, central banks had the monetary tools to avoid the world slipping into a repeat of the Great Depression. That is an enormous achievement. It hasn’t been enough to prevent recovery being painfully slow, but may go some way to explain why, on the whole, central banks have been granted more powers in the aftermath of the crisis rather than, as in the 1930s, having existing powers stripped away or their independence otherwise set aside.

Indeed, the third thing that has been revealed is about power. Through their balance sheet operations and announcements, central banks proved capable of manifesting more power than anyone had conceived them as having. And since the crisis, they have accumulated more formal power. So, to be concrete, central banks have intervened in just about every single capital market imaginable, steering credit to particular sectors and, therefore, up to a point, away from other sectors. And amongst the main central banks, the Federal Reserve, the ECB and the Bank of England have all been given greater regulatory and statutory powers.

¹ Harvard Kennedy School.

² I am grateful to conference participants’ comments and questions during the panel session, and to David Archer, Claudio Borio and Steve Cecchetti for comments on a preliminary draft of this written version.

Two things that we do not know and cannot yet know

If those are three things we have learned, there are also two big things that we definitely don't know.

We have absolutely no idea whatsoever what any "new normal", as people call it, will look like. We don't yet know where any of the key macroeconomic variables are going to settle once steady state is re-achieved. By that, I mean the "trend" rate of growth and the equilibrium real rate of interest, and their underlying drivers. We also have little or no idea what the transition to that steady-state path is going to look like – whether it's going to be smooth, a bit bumpy, or an absolute disaster.

In fact, more than that, we don't even know whether the steady-state "trends" apparent *before* the crisis were in fact an artefact of easy credit conditions and accumulating debt; whether they could have been sustainable but things have been altered fundamentally by the crisis, such as, for example, by different attitudes to risk that it may have induced; or whether the apparent "trends" were sustainable and will, after a protracted period of recovery, be sustained. In some ways, we never knew those things, but it is now clear that a lot is going to be learned over the coming five to 10 years.

That first set of unknowns creates the conditions for my second unknown: the uncertainty that inevitably surrounds the sustainability of central banks' current centre-stage role in economic and financial policy and debates.

The brute truth is that no one can know whether, if things turn out badly, all the power and prestige central banks have accrued are going to wither away – or be taken away, as they were in the 1930s.

How should central bankers respond to the environment I am describing? The outcome will, of course, turn partly on luck and demeanour: just as the gods played their part in twisting the Great Moderation into the Great Financial Crisis and the Great Recession, so they can be counted upon in the future to meet hubris in the eye. For now, central bankers need to emphasise and explain the uncertainties – I guess that's what they are doing, which is no more than honesty sprinkled with common sense.

More important even than appeasing the gods and being open with the public, central banks and their legislative overseers need to get on and identify the minimal regimes that are needed to ground central banks' powers and what can be expected or demanded of them. That means specifying the social purpose of their newly rediscovered powers, and laying down where they should not tread. Without that, expectations of central banks are liable to be random, hostage to their latest achievement, inadvertent remarks here and there, and most of all to events.

Three challenges highlighted by the conference relevant to central banking remits

Today's papers and discussions prompt me to highlight just three of the challenges that are relevant to this business of mandates and missions. There is a fourth too, but I shall save it to the end.

a. The technology of money: central bank e-money?

A good deal was said during the day about the implications of the new technology. But something that didn't come up is whether central banks should contemplate issuing e-money – a 21st century innovation to match bank notes.

Gary Gorton eloquently described how at the beginning of the 19th century, most of the stuff that people thought was *money* was issued by central banks. It was guaranteed by the state. During the 19th century, and into the 20th century, however, private money – essentially, bank deposits – came to be used alongside state money. Eventually the state, led by F D Roosevelt's administration in the United States, concluded that it needed to provide state backing for private money – deposit insurance – in order to underpin the stability of the economy's monetary system, so as to maintain the supply of bank lending and payments services.

Should central banks (and their legislative overseers) so choose, they could, again, by law substitute state-issued money for many of the other monetary instruments currently employed – returning things to an older model. The new technology surely makes that feasible if society were to desire it. It is a question that the authorities are going to have to face over the next few years, before the moment is lost.

A couple of us floated this, as something to think through, at the Bank of England in 2003–04. Ken Rogoff has been positively advocating it as a means to creating the capability of setting negative nominal interest rates. In a world destined to be plagued by cyber crime, it would substitute the state's security capabilities for those of private firms. Just as everyone uses banknotes, it would, essentially, mean everybody "banking" with central banks rather than just banks banking with them. It would not necessarily preclude the choice of banking with private banks too, but it would plainly be a big change.

But, whatever its merits or demerits, it would not address one of the issues Gary raised (both today and in previous work). Of itself, it would not alter the prospect of private non-bank institutions issuing *quasi*-money – shadow banking. In the latest crisis, it turned out that, through their investment managers, enough people and firms were using non-bank liabilities as *de facto* money-like safe assets that the state, particularly in the United States, felt compelled to come to the rescue of that too.

Central banks issuing their own e-money would not change the drivers of private money creation, even if only central bank money could be used to settle debts, as new markets for exchanging money and near-money liabilities would develop. The question of who can issue money cannot easily be separated from the question of whether and how to regulate near-money issuers.

b. Regulatory arbitrage and the futility of traditional regulatory regimes

The second set of issues highlighted by today's discussions is, indeed, the imperative of identifying what on earth to do about regulatory arbitrage. It is completely endemic in finance. Finance is a shape-shifter. This has a number of implications for central banks.

It means that as banks are re-regulated, much of the economic substance of banking is going to move elsewhere, and much of that activity, although not all, is going to be under the jurisdiction of securities regulators.

So society must ask itself whether it is satisfied with the ability of the mission, mandate, culture and capability of securities regulators to meet that challenge. However uncomfortable, central banks cannot step aside from that debate, because, as the lenders of last resort, they will unavoidably be at the scene of the disaster if securities regulation cannot play its part in maintaining systemic stability.

There is a deeper issue, as well. Does anyone still believe that rules-based regulation can work to preserve stability? If regulatory arbitrage is endemic, as I assert it is, then as regulators write detailed rule books, with some rules hundreds of pages long, finding a route through the (inevitable) holes in those rule books becomes legitimate (not just in a narrow legal sense, but in terms of society's values). And, yet, just saying, "Well, we're going to go back to a world of discretion" would be tremendously problematic because society chose to rely on rulebooks in the first place for a good reason. It did so because citizens, legislators don't want regulators – and that includes central banks – to have arbitrary powers. And they're right!

So, this looks like an absolutely appalling dilemma. Use rulebooks: arbitrary powers are avoided, but the regime for preserving stability is doomed to failure. Abandon rulebooks and retreat to principles, and we've endowed central bankers and other regulators with the powers of Plato's Guardians, which is what we want to avoid (in the interests of political equality and freedom).

The broad question this poses for central banks, and for their legislative overseers, is how their responsibilities and powers (and those of other authorities) for preserving stability should be framed. An outline of an answer, not developed here, would be to ensure that there was a clear primary objective (system resilience); that there was a clear standard for such resilience: *and*, crucially, that any detailed rules had to be construed, under law, in line with higher-level *statutory* principles. In other words, we need to dissolve the tension between legally binding rules and non-statutory principles.

c. Market illiquidity, and central banks as potential market-makers of last resort

Let me now make a few comments about market liquidity and the current debate about the unintended consequences of re-regulation.

It is being said that the combination of the leverage ratio, the Liquidity Coverage Ratio and, perhaps, the US's Volcker Rule is sucking liquidity out of financial markets, and that this is going to make the transition back to monetary normality much bumpier than it would otherwise have been. Big picture: I don't see how this could have been avoided if finance was to be put on a decently firm footing. Nor is it a matter of measures designed to repair banking having adverse spillovers on capital markets that were sound and so not in need of repair themselves. When things settle down, the public will be better served by moving on from a world in which the apparently high liquidity of markets in supposedly normal times was in fact illusory, relying on fragile dealers and market-makers. As Philip Hildebrand said this morning, pre-crisis risk-asset ratios were about 1%. Given an average risk weight of around 50%, that is equivalent to leverage of roughly 200 times. These were, in effect,

infinitely elastic dealer balance sheets, which made markets in almost everything look tremendously liquid *provided* everything was going well. But the moment a small bump came – and the US subprime problems *should* have been a small bump – the liquidity completely dried up, sending asset prices crashing, and the economy likewise. The new policy dispensation is, in effect, trading a bit of liquidity in good times for more resilient liquidity in bad times. Stronger intermediaries should be better placed to stay in the market in bumpy conditions³. But there is more to it than that.

Had the upswing of the market liquidity cycle preceding the 2007 crisis been short, the harm would not have been as great. But the illusory good times in fixed income markets persisted for so very long that there was massive underinvestment, intellectually and technically, in market microstructure: the dependence on dealers for instant and cheap liquidity became inscribed into the structure of finance under the prevailing rules of the game. Everyone just relied on dealers being there all the time with infinitely elastic balance sheets, but most if not all of them were, in fact, far too fragile to stay the course.

In today's changed environment, with different rules of the game, there should be strong incentives for people to invest in devising and building market infrastructure more suitable for the heterogeneity of fixed income markets, just as frequent corporate issuers now have incentives to think about the longer-term benefits of more systematic and so more robust debt-management strategies.

All that will take quite a long time, perhaps five to 10 years. It is a long time, but the mutations in the financial system that so weakened our economies and brought us to, and over, the brink of crisis were possibly two decades or more in their gestation. The incentives created by policy regimes, good and bad, can take a long while to work through.

In the meantime, markets might occasionally be very bumpy, and it would be reckless to assert that none of those bumps could do economic harm. The question that poses for central bankers, and for their legislative overseers, is whether, when the bumps come, they are going to act as market-makers of last resort, or not?

Some central banks have said, "Yes, we will", and some have said nothing about this.

We do know, however, just from thinking about it, that this isn't quite the same as being a *lender* of last resort, even though the broad social purpose may be the same. Acting as LOLR, central banks lend against collateral and they can, therefore, control their risks through their valuations of the instruments they take, through the haircuts (or excess collateral) they require, and by insisting on periodic (mostly daily) re-collateralisation.

By contrast, MMLR, acting initially as a *buyer* of last resort, entails outright risk: it is a one-shot game where assets are bought at a price and the value may subsequently fall (for fundamental reasons). So, how should any such operations be designed: what should be their objective and constraints? That needs thought before the event.

³ See Cecchetti (2015): <http://www.moneyandbanking.com/commentary/2015/8/17/bond-market-liquidity-should-we-be-worried>.

The importance of regimes

For me, those observations around three of the challenges aired during today's deliberations lead to the clear conclusion that central banks need well defined regimes covering *all* of their activities – regimes that are as clearly articulated as possible, draw on public debate, and fit together as a coherent whole. I will elaborate with just three examples, starting briefly with MMLR, saying rather more about LOLR, and then trying to put the debate about “credit easing” in a broader context.

MMLR

If any central bank maintains that they will *not* act as a MMLR, that needs to be a credible commitment. If it is judged that it is not possible to make such a policy credible, then central banks need to articulate in advance what principles any MMLR operations are going to follow, including how they would control and cover the risk.

Any such regime would need political buy-in – not least because any losses (or, symmetrically, profits) would affect the transfers of seigniorage to the fiscal authority. That means that material losses go to the people, via public spending or taxation. MMLR operations unavoidably blur the boundary with fiscal policy. That will be a running theme in what follows.

LOLR

Unlike MMLR, where there is need for debate on whether or not it is warranted, the need for a LOLR regime is unavoidable: alongside monetary policy, liquidity re-insurance to (solvent) monetary institutions is one of the two inalienable functions of central banking. As such, it needs to be framed by a regime. The people need to know, and need more than a hand in deciding, what they are getting.

There is an active debate under way in the United States about whether further constraints, going beyond those introduced by Dodd Frank, should be placed on the Fed's LOLR capability, given a sense, misplaced or not, that the Fed went too far during 2007–08. Senators Warren and Vitter have tabled a bipartisan Bill to that end. Now, what strikes me about this debate is that not much, if anything at all, is said about the *purpose* or the objective of LOLR operations. And one can't really find anything in legislation that makes this clear.

I suppose one could point towards the words in the 1913 Act about maintaining “an elastic currency”, but it's a hundred years since then and, at the least, the regime needs re-explaining to today's public. I don't see why *today's* legislators should have a clear conception of what maintaining an elastic currency means, but they are the ones who have been elected and must adjudicate the public interest. And if the *objective* is not clarified, ideally shared, and at least accepted, I don't see how competing views about appropriate *constraints* can make much sense.

This is by no means a point exclusive to the Fed. Without clarity around the social purpose served by the lender of last resort, and the mandate that entails, there is likely to be an adverse reaction from parts of the community whenever a central bank appears to be at or beyond the boundary of its legitimate powers. That adverse reaction may be completely sensible or it may be completely confused, and I don't think central banks can afford to live like this.

So, to cash that out just a bit, I think there are three components to a lender-of-last-resort regime, as indeed to any policy regime. One is a purpose and/or objective. The second is the specification of boundaries for normal circumstances: what is banned. And the third component is what happens when those boundaries to the published regime are reached during a crisis and relaxing them could help promote the public good. For example, should the central bank be able to go further provided that it has authorisation from the elected representatives of the people; and if so, where are the absolute “no go” areas?

I will illustrate how the question of purposes affects the question of constraints (or boundaries) with one example. Say the purpose was to sustain the operation of the monetary system, including therefore the operation of the part of the private sector financial system whose liabilities are used as money by households, businesses and, on their behalf, investment managers. Say, further, that those money-like liabilities are not issued only by *de jure* commercial banks, but by other private sector firms, funds, vehicles. Should the central bank provide liquidity re-insurance to those shadow banks? If so and it makes that clear *ex ante*, should they be regulated as or like banks? If, alternatively, the central bank should *not* in any circumstances make LOLR facilities available to shadow banks, should they be outlawed or taxed in order to reduce systemic risk? Those questions can be answered in a range of reasonable ways, but I suggest that they need to be answered *together*.

Whatever the population of firms that can access the LOLR, there is one boundary condition that I would say is both absolute and necessary for this being within central banking at all. This is that the central bank should not (knowingly or casually) lend to an institution or institutions which are irretrievably, fundamentally insolvent. To do so would be to leave longer-term unsecured creditors worse off when the firm eventually goes into a bankruptcy procedure. Taking good collateral cannot remedy that. Contrary to what sometimes seems to be suggested, it simply protects the central bank and the taxpayer, and does not of itself prevent some people being worse off as a direct consequence of the authorities' actions.

But if this must be a binding constraint, how should solvency be assessed, especially given that a LOLR operation can potentially put the economy (and asset prices) on to a higher path than if the crisis were left to burn itself out. An institution that would have been fundamentally insolvent absent the action may not be so given the action – sometimes but not always, depending on just how bad its initial condition and just how well any LOLR operation works. This is, therefore, about forecasting the expected effects of the operation and the risks around that.

When I have said this on other occasions over the past year or so, one response has been that this way of thinking is unrealistic, because such forecasts can't be made. I reject that. Indeed, central banks have effectively been doing what I describe in the course of producing the macroeconomic forecasts that inform their monetary policy decisions. Since the crisis, all such macro forecasts have had to take into account the impact of central bank liquidity operations (and their monetary policy settings) on the supply of credit, since the slump was partly driven by a collapse in credit. That has required them to take a view on the effect of their various measures on banks and on asset markets. If central banks can put in place an ordered apparatus for producing macro forecasts, I don't see why they cannot, over time, invest in equivalent apparatus to inform their LOLR operations.

I am not saying that this would be easy, especially given the suddenness with which liquidity crises can sometimes erupt (although they are not always sudden as

the agonising period from summer 2007 to autumn 2008 reminds us). But nor was it easy to develop broadly credible and comprehensible operating regimes for monetary policy. I am saying that a similar kind of investment *ought* to be made in the infrastructure for LOLR policy choices. And, I would add, I think that that would be in the interests of central banks themselves, as well as in the wider interests of the public they serve.

Society or, rather, its elected representatives need to decide, or bless, what probability threshold for fundamental solvency has to be satisfied *ex ante* in order for it to be acceptable for central banks to lend. *Ex post* the forecasts on which lending decisions are based are going to be wrong sometimes. But that is true of the monetary policy forecasts. The point is to provide a framework for discipline, explanation and accountability. The forecasts need to be reasonable given the available information, central banks' understanding of how the world works, and uncertainty about the future.

Credit easing

Some of the considerations bearing on LOLR and any MMLR regimes apply to "credit easing", by which I mean buying instruments other than central government bonds in order to stimulate the flow of private sector credit.

The underlying question is: what balance sheet operations are acceptable for a central bank? Is it acceptable, for example, for central banks to buy private sector paper?

My own minimal conditions would include that the central bank should be as parsimonious as possible. So, if they can do whatever is needed to meet their mandate with their interest rate instruments, or they can do so by buying effectively risk-free government paper in the market (QE), that's what they should do and they shouldn't get into private sector paper (or specific types of government-guaranteed paper).

If they do get into buying private sector paper, there should be an explicit endorsement, and effectively an indemnity, from the government, so that it is understood that they are in the fiscal space. Further, I think it important to avoid buying paper issued by only one sector of the economy, so that the allocation of credit to particular sectors is not being preferred on the say-so of unelected technocrats. And if those constraints are to be relaxed in especially dire circumstances, the conditions (substantive or procedural) should be laid down in advance.

Now, those are just my thoughts, and there are, of course, other sets of reasonable constraints. But any regime should recognise two things.

First, whatever set of constraints is chosen, it should be credible – a true statement of policy rather than a wish.

Second, the regime should be drawn up in recognition of the fact that conceptually the dividing line between monetary and fiscal is blurred. It won't do to pretend that it's not blurred. But the absence of sharp natural boundaries – its not being a dichotomy – does not mean that a line cannot be drawn. Any such lines represent a convention that a society has decided to adopt, but that seems to me to be both acceptable and, indeed, unavoidable because, at root, central bank independence (CBI) is itself a convention about the distribution of the state's powers.

CBI is about giving an institution insulated from day-to-day politics delegated powers to change the liability structure and, possibly, the asset structure of *the state's consolidated balance sheet*. Precisely how far those discretionary powers go is what these debates about LOLR, MMLR and credit easing are about. The key things are that the line has to be drawn somewhere, and that everybody should know in advance where the lines are drawn and what happens when they are reached. For central bankers to find themselves in a position where they themselves have to determine what happens at the boundary is, I think, absolutely to threaten the bedrock acceptance of their authority even in normal conditions.

In democracies, those boundaries have to be drawn by the representatives of the people – of course, with the advice of central bankers and others. This is, in a deeper sense, about society's deciding what counts as Political with a capital P, and delegating to central banks things that they have determined are not Political.

How international spillovers create a need for regimes

I have been arguing that central banks need carefully framed regimes for all of their functions, and not only for their monetary policy function. My case has been that that is necessary to underpin the position of central banks within the state.

In case that doesn't persuade the assembled company, let me mention one quite different reason, before concluding with what I see as the even bigger challenge.

When it comes to the LOLR function, there is a coordination problem amongst countries/jurisdictions. Imagine that financial firms are domiciled in one of two jurisdictions but operate in both, and in both currencies. Now imagine that the central bank of one of the jurisdictions says that it is prepared to lend to non-bank financial institutions, and that the other central bank is virtually barred, by legislation, from lending to non-banks. Does that mean that the first central bank would or should lend to the non-banks of the second country through their local operations? I have no idea, but it illustrates why, since the Governors issued their joint statement on LOLR during the Herstatt crisis in the mid-1970s, central bankers have needed some kind of consensus around what their policy is going to be in this area.

The point is that not only does central banking in each jurisdiction need regimes, but that given the internationalisation of finance, those regimes – whether for LOLR, MMLR or, something I have not discussed here, macroprudential policy – need to be grounded, as far as possible, in common principles so that mutual comprehension, cooperation and even coordination are practically feasible.

A troubling strategic interaction between central banks and fiscal authorities

What I have been discussing is putting a framework around the functions that have fallen, once again, to central banks now that their role in preserving financial stability has been remembered and renewed. Designing those regimes is no small task. It took the best part of a quarter of a century to build decent monetary regimes for a post-Bretton Woods world. But I think that there is a deeper challenge.

A couple of years ago, when my fellow panellist Raghu Rajan gave the first speech in remembrance of former BIS leader Andrew Crockett, he talked about central banks being “the only game in town”. As he did so, there was an almost audible (and visible) groan of horror from the room. Mervyn King responded in more or less these words, “Well, if we’re the only game in town, I’m getting out of town”, which, since he was retiring shortly afterwards, was a credible commitment.

The big issue is: why might central banks be the only game in town? I think that things have developed in a way that leaves central banks in a difficult, one-sided strategic interaction with the fiscal authorities. Today’s monetary authorities typically not only have fairly wide powers, but obligations too: mandates with objectives. By contrast, fiscal authorities have almost unlimited capabilities (even in countries with a written constitution), but they have no obligations to do anything at all. Now imagine that something really bad happens and there’s a question of who is going to act. In effect, there is a sequence where the fiscal authority decides first and the monetary authority decides second. Now, the fiscal authority says, “We could perhaps make things better as the public finances are in good order, but there’s going to be a hell of a squabble in the party/legislative assembly and/or with the public. Best to sit on our hands. That will see us OK over the next few years, because we can be sure that the central bank will act.”

Without framing it in exactly that way, the BIS has expressed concerns about this dynamic, effectively saying that the world would be a better place if the central banks didn’t act (as much), since that would incentivise governments to pursue needed structural reforms or, some would add, provide fiscal stimulus (or both). But the difficulty with that argument is that, given central banks’ statutory mandates, it would be contrary to the rule of law and against the deepest principles of democracy for the central banks to sit on their hands and let a deficiency in total spending (excess capacity) drag inflation down to persistently below its target.

I think Raghu’s concerns about international spillovers from advanced economy monetary policy, and likewise Jeremy Stein’s concerns about persistently easy monetary policy fuelling a stability-threatening search for yield within the domestic financial system, can be seen in this light. Although, so far as I know, neither of them has put it this way themselves, these arguments can be seen as suggesting that there should have been a different macroeconomic policy mix: more fiscal stimulus and less monetary stimulus, which would plausibly have resulted in steeper yield curves and different exchange rates, dampening both the internal search for yield and the cross-border carry trade. But the strategic interaction I have described makes that hard to achieve if politicians foresee short-term political costs to their acting and central banks have obligations flowing from statutory objectives.

So here is the *grand dilemma of central banking*. On the one hand, in the interests of efficiency and of democratic legitimacy or, more prosaically, in order to avoid accusations that they have overreached themselves, central banks need clear regimes, with objectives for all of their functions. On the other hand, the articulation of regimes with objectives exacerbates the strategic interaction with the fiscal authorities, leaving them as the only game in town.

This problem is not going to get solved in short order. The underlying driver is not society setting central banks an objective. It is the absence of objectives for the fiscal authority. There should be no retreat from articulating objectives for central banks’ revitalised financial stability functions. Those objectives need to be combined with constraints. And it needs to be clear what happens when the normal boundaries

are reached, and where the absolute *in-crisis* limits lie. A compelling candidate for an absolute constraint is “no lending to fundamentally insolvent firms”, which would fit alongside “no monetary financing of government”.

That project cannot be enough. Work towards refined and more complete regimes for central banking should be accompanied with renewed interest, amongst researchers and central banks themselves, in what a workable fiscal constitution would look like.

A final thought

I will conclude by drawing a comparison with other vital parts of the state delegated to technocratic experts.

It might be suggested that, like the military, central banks can live with under-determined mandates; that it should be understood that they must occasionally exercise discretion on a grand scale for the public good.

But this line of argument, which was aired in our exchanges today, overlooks a few things. While there is the deepest possible consensus that the military must be subordinate, not independent, in order to protect society from their power, that has not been accompanied by equal clarity on who does what. In the post-WW2 world, there has in fact been an active debate – amongst scholars going back to Samuel Huntington and recently amongst soldier-scholars such as Emile Simpson – on where the dividing line should be drawn between civilian (political) control and military discretion. For example, was it acceptable, and sensible, for the President to choose which sites to bomb during the Vietnam War? Or, more recently, where as in Afghanistan mission success might depend on the hearts and minds of the local populations, should military commanders be involved in essentially political activities and will they be sufficiently sensitive to how that will play back home? And those questions arise when the military is meant *not* to be independent.

Or take the other part of the state long delegated to technocratic experts: the high judiciary, who are surely the epitome of truly independent power. The response of some, including prominent politicians, to recent (split) judgments by the US Supreme Court has been how important it will be to get the right appointments made in the coming years and, thereby, shift the balance of the Court.

Now, my concluding point is simply this: if the military and the judiciary, the canonical delegated powers established, tested and debated over hundreds of years, face these challenges and uncertainties, you can bet that the central banks – recent kids on the block, in comparison – will do so, too.

Regimes matter. Inevitably, the crisis revealed holes. As much work and thought is now needed as went into monetary policy regimes a generation ago.

Finance is just another industry

Keynote speech

John Kay¹

Almost 30 years ago, Larry Summers wrote of “ketchup economics”, a disparaging comment on the state of finance theory. “Ketchup economists” he explained, considered whether a quart bottle of ketchup sold for twice the price of a pint bottle of ketchup, but did not delve further into the supply and demand for ketchup.

Summers was criticising the self-referential nature of financial economics, which has generated a literature of its own, substantially divorced from the mainstream of economic thinking. That observation might equally be made of monetary economics, and it is a reflection of the financial world as a whole. Those who work in finance talk to each other, speak a language largely incomprehensible even to other business people and – to an extent that defies the imagination – trade with each other. The total value of foreign exchange dealings exceeds the value of international trade in goods and services by a factor of almost one hundred. Total exposure under derivatives contracts is estimated by this institution at \$700 trillion – two to three times the value of all the assets in the world.

I am a general economist who has from time to time strayed into the world of ketchup. All industries I have encountered think their circumstances are unique, and of course there is always something in that claim, though rarely as much as people in the industry think. But one of the tasks of the business economist is to bring to bear on the study of each industry lessons which have been learned in other industries. This is rarely done in finance, but it is what I want to do this evening, and I hope to draw lessons from the dairy industry, from nuclear power, from aviation and from electricity. I want to renew Summers’ challenge of 30 years ago.

I have described the extraordinary value of secondary market trading that characterises finance today. We are entitled to ask, “What is it all for?” What are the economic and social purposes of this activity? To make an assessment, we need to begin by identifying the services which finance does, or might, provide to households and to businesses outside the finance sector.

Modern societies need finance. The evidence for this is wide-ranging and conclusive, and the relationship is clear and causal. The first stages of industrialisation and the growth of global trade coincided with the development of finance in countries such as Britain and the Netherlands.² If we look across the world today, statistical evidence associates levels and growth of income per head with the

¹ London School of Economics.

² See L. Neal, *The rise of financial capitalism: international capital markets in the age of reason*, Cambridge University Press, 1990.

development of finance.³ Even modest initiatives in facilitating payments and providing small credits in poor countries can have substantial effects on economic dynamism.⁴

And we have experienced a controlled experiment of sorts, in which Communist states suppressed finance. The development of financial institutions in Russia and China was arrested by their revolutions of 1917 and 1949. Czechoslovakia and East Germany had developed more sophisticated financial systems before the Second World War, but Communist governments closed markets in credit and securities in favour of the centrally planned allocation of funds to enterprises. The ineffectiveness and inefficiency of this process contributed directly to the dismal economic performance of these states.

A country can only be prosperous if it has a well functioning financial system, but that does not imply that the larger the financial system a country has, the more prosperous it is likely to be. It is possible to have too much of a good thing. Financial innovation was critical to the creation of an industrial society; it does not follow that every modern financial innovation contributes to economic growth. Many good ideas become bad ideas when pursued to excess.

Finance can contribute to society and the economy in four principal ways. First, the payments system is the means by which we receive wages and salaries, and buy the goods and services we need; the same payments system enables business to contribute to these purposes. Second, finance matches lenders with borrowers, helping to direct savings to their most effective uses. Third, finance enables us to manage our personal finances across our lifetimes and between generations. Fourth, finance helps both individuals and businesses to manage the risks inevitably associated with everyday life and economic activity.

These four functions – the payments system, the matching of borrowers and lenders, the management of our household financial affairs, and the control of risk – are the services which finance does, or at least can, provide. The utility of financial innovation is measured by the degree to which it advances the goals of making payments, allocating capital, managing personal finances and handling risk.

Most people who work in finance are concerned with the first two of these functions. They operate the payments system, they help households with their personal finances. They are not aspiring Masters of the Universe. Mostly, they earn modest salaries. Half of the employees of Barclays Bank earn less than £25,000 (\$40,000) per year. But Barclays also employs 530 “code staff” – people with executive functions – who earn an average of £1.3m each, and there are 1443 who earn more than £500,000 (\$800,000). It is likely that “the one per cent” in Barclays Bank earn a total approaching half of the total wage and salary bill of the bank.

Most of these people are employed in wholesale rather than retail finance. Their activities relate mainly to the other objectives of the financial system – capital allocation and risk management. How well are these tasks performed?

³ See R Levine, 2005, “Finance and growth: theory and evidence”, in P Aghion and S Durlauf (eds), *Handbook of Economic Growth*, vol 1, no 1, pp 865–934, 2005.

⁴ See M Robinson, *The microfinance revolution: sustainable finance for the poor*, World Bank, 2001.

In an ill judged interview with the *Sunday Times* in 2009, Lloyd Blankfein, CEO of Goldman Sachs, claimed that his company was doing “God’s work”.⁵ The Deity’s purpose was “to help companies to grow by helping them to raise capital. Companies that grow create cash. This, in turn, allows people to have jobs that create more growth and more wealth. It’s a virtuous cycle”.⁶ If you asked the occupants of the executive floors of the buildings on Wall Street or in the City of London to explain what the finance industry contributed to the real economy, their answers would echo Mr Blankfein’s (although perhaps without divine blessing). The financial sector raises and allocates capital.

Lloyd Blankfein explained that the work his company engaged in was “to help companies grow by helping them to raise capital”.⁷ There are two mistakes here. “Helping companies grow by helping them to raise capital” was not, in fact, an important part of the business of Goldman Sachs. Raising capital for companies through underwriting and issuance of new debt and equity have together accounted for less than 10% of the company’s net revenues in the last five years.^{8,9} Goldman’s profits are mainly derived from secondary market trading in equities and FICC.

The other mistake is to think that the companies who are the typical clients of Goldman Sachs grow by raising external capital. While major corporations once used the London and New York stock exchanges and other capital markets to raise funds to expand their businesses, this has not been true for many years.

ExxonMobil is both the most profitable company in the United States and the biggest private investor. Massive expenditure on exploration and development and on infrastructure is necessary every year to exploit new energy resources and bring oil products to market. In 2013, ExxonMobil invested \$20 billion. That figure was in itself a significant fraction of total investment by US corporations. Exxon got all of that money from its own internal resources. In 2013, ExxonMobil spent \$16 billion buying back its own shares, in addition to the \$11 billion the company paid in dividends to shareholders. The company’s short- and long-term debt levels were virtually unchanged. It raised no net new capital at all.

Nor was 2013 an exceptional year. Over the five years up to and including 2013, the activities of the corporation generated almost \$250 billion in cash, around twice the amount it invested. ExxonMobil did not raise any new capital in these five years either. Instead the company spent around \$100 billion buying back securities it had previously issued.

Oil exploration, production and distribution are capital-intensive. Many modern companies need very little capital. The stock market capitalisation of Apple – the total market value of the company’s shares – is over \$500 billion. Although the corporation has large cash balances – currently around \$150 billion – it has few other tangible

⁵ J Arlidge, “I’m doing ‘God’s work.’ Meet Mr. Goldman Sachs”, *The Sunday Times*, 8 November. It was not only Goldman which benefited from divine inspiration; Jeff Skilling claimed to have been doing God’s work at Enron. See B McLean and P Elkind, *The smartest guys in the room: the amazing rise and scandalous fall of Enron*, Penguin, 2003. .

⁶ See Arlidge, op cit.

⁷ See Arlidge, op cit.

⁸ Goldman Sachs, 2013 Annual Report.

⁹ Goldman Sachs, 2011 Annual Report.

assets. Manufacturing is subcontracted. Apple is building a new headquarters building in Cupertino at an estimated cost of \$5 billion¹⁰ which will be its principal physical asset. The corporation currently occupies a variety of properties in that town, some of them owned, others leased. The flagship UK store on London's Regent Street is jointly owned by the Queen and the Norwegian sovereign wealth fund.¹¹ Operating assets therefore represent only around 3% of the estimated value of Apple's business.

The first companies to obtain listings on modern markets were companies like railroads and breweries with large requirements for capital for very specific purposes. Building a railway is expensive, and once you have built it the only thing you can do with it is run trains. You cannot do much in a brewery except buy and drink beer. These early utilities and manufacturing corporations raised large amounts of money in small packets from private individuals.

But both the commercial world and the financial world have changed. Today most business premises are offices, shops or warehouses that can be used for many purposes. The companies that operate from these buildings do not need to own them and usually do not. As at Apple, the assets that matter to these businesses are largely intangible – the brands and reputation of the company, the skills and capabilities of the people who work for it. While railroads, car manufacturers and brewers needed additional funds to build new plant as they expanded, new companies today – like Apple or Google – commonly become generators of cash, rather than users, early in their lifetime. When Facebook, unusually, raised \$16 billion in fresh funds in its initial public offering, the company stated in the prospectus that it had no real idea what it would do with the money.¹²

And the nature of share ownership has changed. The external shareholders of companies are no longer dispersed private individuals, who needed a public marketplace if they were to achieve liquidity and a fair price for their holdings. Shareholdings are now concentrated in large institutions.¹³ A paradox of financialisation is that the need for an active share market has diminished at the same time as the volume of trading has grown exponentially.

In an economy dominated by large corporations, the allocation of capital to investment projects is not decided by investors or financial institutions. Nor should it be. Neither shareholders nor investment banks are competent to determine the scale and content of ExxonMobil's capital expenditure programme. The decisions about how much to invest, and where to spend it, are made by the corporation itself: that is the job its senior executives have been trained and selected to do.

Let me turn to risk management. Sitting in this room tonight is Ragu Rajan, who famously challenged the standard risk paradigm of "ketchup economists" at the 2005 Jackson Hole symposium. He queried the value of recent innovation in financial

¹⁰ See P Burrows, 'Inside Apple's plans for its futuristic, \$5 billion headquarters', *Businessweek*, 4 April 2013.

¹¹ See D Thomas, 'Crown Estate to sell Regent Street stake', *Financial Times*, 4 November 2010.

¹² "We intend to use the net proceeds to us from our initial public offering for working capital and other general corporate purposes; however, we do not currently have any specific uses of the net proceeds planned" - Facebook, Form S-1 Registration Statement, United States Securities and Exchange Commission, 1 February 2012.

¹³ See P Gompers and A Metrick, 'Institutional investors and equity prices', *The Quarterly Journal of Economics*, vol 116, no 1, February 2001, pp 229–59.

services and warned of troubles ahead. Rajan's discussant, Don Kahn, made a robust defence of these innovations. "By allowing institutions to diversify risk, to choose their risk profiles more precisely, and to improve the management of the risks they take on, they have made institutions more robust."¹⁴ He went on to explain that "these developments have also made the financial system more resilient and flexible – better able to absorb shocks without increasing the effects of such shocks on the real economy".

If Kohn was critical, he was at least polite: Larry Summers described Rajan's views as "Luddite", and likened his thinking to those who would substitute runners and horses for cars and aeroplanes. Complexity, Summers argued, was inseparable from progress.¹⁵

Greenspan claimed, with the support of his colleagues, that the effect of such innovation was to allocate risk to those investors most able and willing to take it. This proposition was wrong on two levels. The immediate mistake was to believe that the risk transfer he saw represented insurance rather than wagering. Its purpose and effect was not to spread risk more effectively by passing it to those better equipped to handle it, but to dump it on those who understood less about it. Risks were not more, but less, effectively managed as a result of the transfer.

But the larger mistake was to suppose that the risks under discussion at Jackson Hole were the risks that mattered in the first place. The error emerges immediately on parsing Summers' analogy between modern financial innovation and advances in transport. Successive waves of innovation in transport have brought us railways, cars and planes. These innovations have transformed the daily lives of ordinary people. No one could say the same of forward exchange rates, credit default swaps or collateralised debt obligations.

As the symposium proceeded at Jackson Hole, Hurricane Katrina was about to sweep into New Orleans. It would kill 2,000 people and inflict \$100 billion of property damage. But that was not the kind of risk that the participants had in mind when they reassured themselves that risk management had reached new levels of sophistication. They were concerned with the risks associated with volatile securities prices.

The risks that engaged the Jackson Hole symposium – securities default, changing share values, fluctuating exchange rates – do not impinge significantly on Main Street. All of them are risks generated within the financial system itself.

The risks that do concern Main Street are different. They are risks associated with redundancy and unemployment. The pedestrians on Main Street worry about provision for old age, and fear illness and mortality. Relationship breakdown is costly financially as well as personally. These risks are not dealt with through securities markets: they are mostly handled outside the financial system altogether. Such risks are dealt with – to the extent that they are dealt with at all – by social institutions: friends and family, and by government and its agencies.

¹⁴ See D Kohn, "Commentary: Has financial development made the world riskier?", proceedings of the Federal Reserve Bank of Kansas City Jackson Hole symposium, August 2005, pp. 371–379.

¹⁵ See L Summers, "General discussion: Has financial development made the world riskier?", proceedings of the Federal Reserve Bank of Kansas City Jackson Hole symposium, August 2005, pp 387–97.

Market institutions cannot manage these risks, except at the margin. The reasons come under the headings of asymmetric information, adverse selection and moral hazard.

The word liquidity is widely – almost obsessively – used in financial markets, but often without any precise or particular meaning. A casual search of investment dictionaries and encyclopaedias for definitions of liquidity will reveal as many definitions as sources.

The concept of liquidity I will use draws on a homely analogy. In the Edinburgh of 50 years ago, fresh milk was delivered daily. Except at Christmas. The milkman would make a double delivery on Christmas Eve. My father would ask each year how the cows were persuaded to produce twice as much milk. This feeble joke was part of our family Christmas ritual.

The dairy's problem was not, in fact, very difficult. The fresh milk was not so fresh: it had not come from the milking shed that morning. Stocks could be built up, or run down. In the days before Christmas, milk which would normally have been sent to manufacture other dairy products was diverted to household use.

At ordinary times, our demand for milk was stable. But sometimes we would have visitors and need extra milk. My mother would usually tell the milkman the day before, but if she forgot the milkman would have extra supplies on his float to meet our needs. Of course, if all his customers did this, he wouldn't have been able to accommodate them. But that was never likely to happen – except at Christmas, and the dairy made contingency plans for that.

The ready availability of everyday produce is, in this sense, an illusion. An illusion widely, and productively, employed in modern economics. Liquidity is the capacity of a supply chain to meet a sudden or exceptional demand without disruption. This capability is achieved, as it was by the milkman, in one or both of two ways: by maintaining stocks, and by the temporary diversion of supplies from other uses. When the supply chain lacks liquidity, consumers need to maintain stocks for themselves – they keep a spare pint of milk in the fridge. The financial analogue of the spare pint is the necessity for businesses and households to maintain monetary balances. In extreme cases of illiquidity, households end up hoarding cash under the bed. These supply chain inefficiencies may be costly, in both the milk supply chain and the money market.

Nothing illustrates the self-referential nature of the dialogue in modern financial markets more clearly than this constant repetition of the mantra of liquidity. End users of finance – households, non-financial businesses, governments – do have a requirement for liquidity, which is why they hold deposits and seek overdraft or credit card facilities and, as described above, why it is essential that the banking system is consistently able to meet their needs.

But these end users – households, non-financial businesses, governments – have very modest requirements for liquidity from securities markets. Households do need to be able to realise their investments to deal with emergencies or to fund their retirement, businesses will sometimes need to make large, lumpy investments, governments must be able to refinance their maturing debt. But these needs could be met in almost all cases if markets opened once a week – perhaps once a year – for small volumes of trade. As the milkman has discovered, surges in demand are mostly either the result of uncorrelated decisions – the car purchases or round the world

cruise – or predictable events. Christmas reduces our capacity to save as it increases our thirst (not just for milk).

The need for extreme liquidity, the capacity to trade in volume (or at least trade) every millisecond, is not a need transmitted to markets from the demands of the final users of these markets, but a need, or a perceived need, created by financial market participants themselves. People who applaud traders for providing liquidity to markets are often saying little more than that trading facilitates trading – an observation which is true, but of very little general interest. Let me turn to a different analogy.

The overriding need for system stability is embedded in the thinking of everyone engaged in electricity supply. And anyone who thinks electricity supply less complicated than the financial system knows little about the complexities of maintaining the stability of an electricity grid. It has not been usual to think about the financial system in the systemic way which is natural to operators of other networks. And despite recent experience of the consequences of system failure, it is still not usual to think in this way.

The organisational sociologist Charles Perrow has studied the robustness and resilience of engineering systems in different contexts, such as nuclear power stations and marine accidents.¹⁶ Robustness and resilience require that individual components of the system are designed to high standards. Demands for higher levels of capital and liquidity are intended to strengthen the component units of the financial system. But the levels of capital and liquidity envisaged are inadequate – laughably inadequate – relative to the scale of resources required to protect financial institutions against panics such as the global financial crisis.^{17, 18} More significantly, resilience of individual components is not always necessary, and never sufficient, to achieve system stability. Failures in complex systems are inevitable, and no one can ever be confident of anticipating the full variety of interactions which will be involved.

Engineers responsible for interactively complex systems have learnt that stability requires conscious and systematic simplification, modularity which enables failures to be contained, and redundancy which allows failed elements to be bypassed. None of these features – simplification, modularity, redundancy – were characteristic of the financial system as it had developed in 2008. On the contrary. Financialisation had greatly increased complexity, interaction and interdependence. Redundancy – as, for example, in holding capital above the regulatory minimum – was everywhere regarded as an indicator of inefficiency, not of resilience.

In Perrow's analysis, systems lack robustness if they are interactively complex – everything depends on everything else – and tightly coupled – the tolerance for error is low. The interactive complexity and tight coupling of a nuclear power station is an inescapable consequence of prevailing technology. Paradoxically, attempts to increase resilience by incorporating many layers of safety provision may make the system less robust by increasing its complexity. An assembly line is complex but not

¹⁶ See C Perrow, *Normal accidents: living with high-risk technologies*, Basic Books, 1984.

¹⁷ See A Admati and M Hellwig, *The bankers' new clothes: what's wrong with banking and what to do about it*, Princeton University Press, 2013, pp 176–83.

¹⁸ See D Miles, J Yang and G Marcheggiano, "Optimal bank capital", *The Economic Journal*, vol 123, no 567, 2013, pp 1–37.

interactively complex – it depends on a linear sequence of events in which each step logically follows the preceding one. Such a process may be tightly or loosely coupled. The moving belt of the traditional car plant demonstrates tight coupling, while the normally leisurely processing of a book from manuscript to publication is loosely coupled – no one is surprised at the author’s late delivery, nor is the production process upset.

Robust systems are typically linear. The term “regulatory capture” is generally associated with the Chicago Nobel Laureate in Economics George Stigler,¹⁹ but the history of the phenomenon is much older. Regulation of US railroads was introduced as a result of popular agitation, particularly from farming interests, against what were believed to be excessive charges. Railroads naturally began by opposing limits on their freedom to set their own prices, and when the Republicans gained control of the White House they looked to the new Attorney General to abolish or emasculate the newly established Interstate Commerce Commission. But Richard Olney counselled otherwise. He told the roads to bend the Commission to serve their interests. It was good advice. By the time the Commission was finally abolished in 1995 it was generally perceived to be representing not the public, but the firms it regulated.

Perhaps the most extensively studied case of regulatory capture is the airline industry. Regulation of airline safety is self-evidently necessary – few people want to see unsafe planes flying over major cities, or have time or capacity to inspect the quality of maintenance before they board a plane. But the supervision of safety came to extend to control of more and more aspects of airline operation – after all, a company under competitive or financial pressure may skimp on flight safety. By the 1970s, airline regulators effectively operated a cartel on behalf of incumbent firms. The industry notoriously collaborated on the definition of a sandwich, to prevent members checking on regulated prices by competing on food quality.

A coalition of left and right in the US achieved the dismantling of this structure in the 1970s, one side claiming that the process was a racket operated for the benefit of large corporations and the other that consumers would be far better served by the operation of a free market. There was substantial truth in both claims, and a regulatory historian, Alfred Kahn,²⁰ was appointed Chairman of the Civil Aeronautics Board, where he accomplished the unusual feat of winding up the agency which he headed.

The rapid growth of low-cost carriers followed, first in the US and then in other parts of the world. Regulation is focused narrowly on issues of real public interest, and the industry has developed what is known as a “just culture”,²¹ which encourages an openness about failures and sense of collective responsibility which has contributed to the impressive recent safety record of the sector – a concept gaining traction in other areas of commercial activity of public concern, such as medicine.

We need a finance sector to manage our payments, finance our housing stock, restore our infrastructure, fund our retirement and support new business. But very little of the expertise that exists in the finance industry today relates to the facilitation

¹⁹ See G Stigler, “The theory of economic regulation”, *The Bell Journal of Economics and Management Science*, vol 2, no 1, spring 1971, pp 3–21.

²⁰ See A Kahn, *The economics of regulation*, MIT Press, 1970.

²¹ See S Dekker, *Just Culture*, Ashgate, 2012.

of payments, the provision of housing, the management of large construction projects, the needs of the elderly or the nurturing of small businesses. The process of financial intermediation has become an end in itself.

The expertise that is valued is understanding of the activities of other financial intermediaries. That expertise is devoted not to the creation of new assets, but to the rearrangement of those that already exist. High salaries and bonuses are awarded not for fine appreciation of the needs of users of financial services, but for outwitting competing market participants. In the most extreme manifestation of a sector which has lost sight of its purposes, some of the finest mathematical and scientific minds on the planet are employed to devise algorithms for computerised trading in securities which exploit the weaknesses of other algorithms for computerised trading in securities.

Finance exists to serve households and businesses. Individuals and companies engaged in finance should have specific knowledge of at least some of the needs of these users of the financial system. We need focused financial businesses with a clear productive purpose and a management system, governance regime and capital structure appropriate to that purpose. We should aim to restore and nourish the rich variety of institutions and organisational forms that existed in the finance sector before the 1980s.

It is possible to have a smaller, simpler, financial services system that is better adapted to the needs of the non-financial economy – an efficient payments system, effective capital allocation, greater economic stability, security in planning and managing our personal finances, and justified confidence in the people who advise us. We will not wake up tomorrow, or next year, and find such a reality. Is it therefore pointless to articulate that vision? I do not think so. My experience in public policy, business and the academic world has led me to believe in the truth of Keynes' remarks on the long-run power of ideas.

"Madmen in authority, who hear voices in the air, are generally distilling their frenzy from some academic scribbler of a few years back."²² Today, thank goodness, we have few "madmen in authority". The ideas here are intended to represent a guide for the democratic politicians who will be confronted with the next financial crisis. We need a restructuring of the finance industry, to provide a provisional blueprint for how thoughtful policymakers might prepare for the next crisis, and an illustration of how they might have used the control of the finance sector they achieved in the aftermath of the crisis to more useful, and long-lasting, effect.

²² J Keynes, *The general theory of employment, interest and money*, Macmillan, 1936, p 383.

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