

Paul Tucker: The repertoire of official sector interventions in the financial system – last resort lending, market-making, and capital

Remarks by Mr Paul Tucker, Deputy Governor, Financial Stability, of the Bank of England, at the Bank of Japan 2009 International Conference “Financial System and Monetary Policy: Implementation”, Bank of Japan, Tokyo, 27-28 May 2009.

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Everything – and I mean everything – about central banking stems from our liabilities being the base money of the economy. From this flow our roles in monetary policy and financial stability. And, in consequence, the manner in which central banks supply our money – overnight, intra-day, and for term maturities; in routine and in various stressed circumstances – just could not matter more, even if much of the time it seems like an obscure corner of the financial system’s plumbing.

About half a decade ago, I set out the thinking that underpins the Bank of England’s management of our balance sheet, focusing principally on the implementation of monetary policy.¹ Today I want to explain how, over the past eighteen months, we have developed our system for providing liquidity insurance to banks in the interests of preserving financial stability; and how that bears on the prudential regulation of banks’ liquidity. From that discussion of LOLR as Bagehot would have recognised it², I shall go on to air some developing thinking about two other instruments available to the authorities to address financial system distress: Market Maker of Last Resort, and Capital of Last Resort.

The implementation of monetary policy in stressed conditions

Most of the time, central bank operations revolve around the implementation of monetary policy. For the Bank of England, in routine circumstances that means, of course, establishing overnight money market interest rates in line with the Monetary Policy Committee’s policy rate (Bank Rate). It is vital that we should be able to achieve that primary rate-setting Objective in stressed conditions, as well as in peacetime.

Since mid-decade, the reserves part of the Bank of England’s operational framework has, accordingly, made explicit provision for three broad types of contingency: a bank finding itself temporarily short of reserves at the end of the banking day due to technical problems or frictions in the money markets; a widespread shock to the sector’s demand for reserves; and, thirdly, a pronounced shift in the degree to which banks collectively find themselves needing to manage their reserves directly with the Bank rather than via the money markets. To cater for those eventualities, banks can, first, borrow unlimited amounts overnight against the highest-quality collateral, for a modest premium of 25 basis points, designed to leave intact incentives to manage liquidity in the markets rather than with us. Second, banks can increase the size of the precautionary balances or buffer they hold with the Bank by altering their reserves targets in our voluntary reserves system.³ And, third, in the face of, say, a

¹ “*Managing the central bank’s balance sheet: where monetary policy meets financial stability*”, Lecture to mark the fifteenth anniversary of Lombard Street Research, London, July 2004, Bank of England *Quarterly Bulletin*, Autumn 2004, pp359-382.

² So I am using the expression in its older, broader sense, not narrowly to mean bespoke support operations.

³ Under the Bank of England’s Sterling Monetary Framework, individual reserves banks choose each month a level of reserves they wish to target on average over a month-long maintenance period running between Monetary Policy Committee meetings. The Bank supplies, via OMOs, the resulting aggregate level of reserves. In stressed circumstances, the Bank can permit a revision to the target during the monthly

9/11-type event that disrupted the financial infrastructure and effectively closed the money markets, the Bank could temporarily substitute itself for the markets by allowing banks to borrow from, and deposit with, us at no charge relative to Bank Rate.⁴

Beyond monetary policy

All of those contingencies involve events affecting either the demand for reserves or their distribution around the system. And the measures designed to cope with them are therefore part and parcel of the Bank's management of the banking system's *day-to-day sterling liquidity in the course of implementing monetary policy*. Of course, that is helpful to – indeed, is a necessary condition for – the maintenance of financial stability. Most obviously, during the current crisis banks chose to more than double their targets for reserves balances with the Bank in the months following August 2007, and we injected the required increase in money into the system. That was necessary to keep overnight rates broadly in line with Bank Rate; and it was also necessary, although not sufficient, to stabilise the short-term money markets and the banking system. But, as the past 18 months or so have demonstrated, contingency plans centred on managing reserves by no means exhaust the range of market operations and facilities available to central banks to reduce the economic costs of severe disruptions to the financial system.

While not explicitly directed to managing day-to-day monetary conditions, those wider measures absolutely must, nevertheless, be constructed to be consistent with, and supportive of, monetary policy.

Financial stability and commercial banks

How best to construct those facilities turns in part on how we think about financial stability, and so I should probably be clear about the definition of financial stability I employ. It is largely to do with money and the role of the banking system in a monetary economy. Monetary policy is, of course, directed to ensuring stability in the value of central bank money relative to goods and services. Analogously, in significant degree financial stability is about safeguarding the stability of private money (deposits held by households and firms with the banking system) relative to central bank money. Depositors with banks have to be confident that they can exchange their deposits at face value for our money – our notes; or that they can smoothly transfer their deposits to other banks where they could be confident of that. Those two formulations amount to much the same thing, as transfers between banks are settled across our books in central bank money, the economy's ultimate settlement asset.⁵ At the level of the system, we need an "exchange rate" of unity between private money and central bank money. And we need wholesale funders of banks to be confident of that too. Absent that stability and confidence, the payments system and credit creation become severely disrupted, with big social costs.

Of course, banks are not the only lenders in our economies. The current crisis owes a lot to the non-bank financial sector – funds, conduits, SIVs, securities dealers, and so on. But the excessive leverage and maturity transformation in the shadow banking system was in general predicated on the plentiful availability of credit on too-easy terms from the

maintenance period. For more details see paragraphs 74-81 of "The Framework for the Bank of England's Operations in the Sterling Money Markets (the 'Red Book')", *Bank of England*.

⁴ *Ibid.*, paragraph 166.

⁵ Transfers in the main sterling payment systems are settled gross in real time across the Bank's balance sheet. For members of the real-time system, no credit exposures amongst them arise. Transfers between smaller banks are settled across the balance sheets of big commercial banks. The banking sector would probably be more resilient if all banks joined the RTGS system.

commercial banking system. Up to a point, the same goes for the abundant liquidity in asset markets that preceded the crisis. Of course, persistently strong demand for financial assets – crudely, rising prices – created liquidity. But, beyond that, the willingness and terms on which “market-makers” and traders underpinned liquidity depended on generous access to credit for financing inventory and positions. And the ultimate private sector providers of such credit are always the commercial banks.⁶

So commercial banks are special. They are special because their deposit liabilities are money. But they are also inherently fragile. First, as monetary institutions, the liquidity insurance they provide, via demand deposits and committed on-demand lines of credit, entails large mismatches between the maturities of their liabilities and assets (actual and contingent). The accompanying conversion of liquid savings into illiquid loans to households and firms benefits society. But it also exposes the banks to big liquidity risks. Given a first come-first served system of redemption for retail and wholesale deposits, that creates the risk of runs. Secondly, a deposit-taking institution is leveraged, even if it does not fund itself in wholesale markets: retail deposits are debt. So banks’ capital adequacy can quickly be imperilled by a fall in asset prices. In that sense, the “liquidity” and “solvency” explanations of the current crisis are inseparable. Especially in a world in which banks’ trading portfolios are marked to market, a drying up of liquidity in markets brings about a fall in asset prices, and so a depletion of banks’ net worth. All that underlines just why our predecessors placed such great weight on official interventions to maintain the safety and soundness of banks.⁷ If anyone doubted it, this crisis underlines how problems of funding liquidity, asset-market liquidity and solvency are intertwined. And those dimensions of a systemic crisis map into the authorities’ capability, in principle, to be a Lender of Last Resort; a Market Maker of Last Resort; and a provider of Capital of Last Resort.

Central bank provision of liquidity insurance, and LOLR

Bagehot’s famous dictum, in *Lombard Street*, was that, to avert panic, central banks should lend early and freely (ie without limit), to solvent firms, against good collateral, and at “high rates”. One of his great themes was that the Bank of England should acknowledge its role in stemming panics, and set out its principles for doing so: “The Bank has never laid down any clear or sound policy on the subject.”⁸

Over the past fifteen years or so, including during the current crisis, the Bank of England has taken steps to make the Bank’s principles clearer.⁹ Most recently, we have also addressed

⁶ For example, see Brunnermeier M K and Pedersen L H (2008), “Market Liquidity and Funding Liquidity”, The Society for Financial Studies, *Oxford University Press*.

⁷ Bank supervision has its origins not in consumer protection but in preserving stability (and protecting the central bank against risks incurred through its open market operations and discount window lending). This was evident in the remarks, just over twenty years ago, of George Blunden, the Bank’s then Deputy Governor and, a decade earlier, the founding Chairman of the Basel Committee: “Supervisory standards are set not only with an eye to what is required to protect depositors with individual institutions, looked at in the narrow context of their own operations, but also with an eye to protecting them from problems which could be created by wider, systemic, developments. A bank may consider a course of action it wishes to take to be acceptable – as it may well be in a limited context. But the same course might, if widely copied by other banks, have unfortunate effects on the banking system as a whole. It is part of the supervisors’ job to take that wider, systemic view and sometimes to curb practices which even prudent banks might, if left to themselves, regard as safe.” See, Blunden G, “Supervision and Central Banking”, *Bank of England Quarterly Bulletin*, August 1987.

⁸ Page 206 of the 1999 paperback reprint of Bagehot (1873), “*Lombard Street*” in the Wiley Investment Classics series.

⁹ For example, see Eddie George’s 1993 lecture “The pursuit of financial stability”; Mervyn King’s September 2007 letter to the Treasury Select Committee, “Turmoil in financial markets: what can central banks do?”; and, most recently, the document on the Bank’s liquidity insurance facilities, “The Development of the Bank of

some difficult issues around the transparency of collateral policy, and about how to avoid incentivising imprudent liquidity management.

The time-consistency problem and collateral policy

Like so much in central banking, time-consistency is at the centre of it.

That a time-consistency problem can bedevil monetary policy is well known¹⁰, and motivates an institutional framework in which independent central banks have clear mandates for fighting inflation. Much less is said about what might be equally serious time-consistency problems in the sphere of financial stability. They can be especially apparent in central banks' collateral policy.

Given banks' incomplete cover against their maturity mismatch, central banks have long stood ready to "discount" – or lend against the collateral of – certain assets in unlimited amounts. But central banks have also long been worried that, left to themselves, banks will try to avoid holding the best-quality, most liquid assets, because they yield less.

If, in an attempt to induce banks to hold truly liquid assets, the central bank were to declare that it would lend against only the highest-quality collateral, the banking system would know that those assets could be converted into money in all circumstances. But if an otherwise solvent bank gets into trouble and still faces a liquidity problem after taking all of its eligible high-quality assets to the central bank, the authorities face a choice between letting it fail through a lack of liquidity or lending against a wider class of assets. Their choice will turn on an assessment of the trade off between, on the one hand, the risk of financial instability today that could flow from immediate bank failures and, on the other hand, the risk of financial instability in the future that may flow from the central bank being seen to protect banks from their mistakes.¹¹ If during peacetime a bank judges that its failure would be likely to cause widespread systemic distress, it will probably conclude that the central bank's collateral policy will, during wartime, be relaxed, leading it to choose to hold less of the highest-quality eligible assets than otherwise. Crucially, the central bank may then, after all, not be able to stick to its declared collateral policy, just as the bank suspected. In other words, a central bank policy of lending against only the best assets is likely to prove time inconsistent when it comes to the crunch.

This is not an ivory tower problem. It is a real problem.

It is why the Bank of England confirmed last year that we do stand ready, via our public facilities, to lend against a wide range of collateral, subject crucially to appropriate haircuts and other terms. To do otherwise would be futile; it would lack credibility. And to do so is consistent with Bagehot's dictum that central banks should lend against "everything which in common times is good 'banking security' ".¹²

The Bank has already published an initial list of collateral eligible in its dedicated liquidity-insurance facilities. Looking ahead, the Bank plans to expand the list, and to promulgate detailed eligibility criteria reflecting its risk tolerance and experience gained from managing

England's Market Operations: A consultative paper by the Bank of England", October 2008. Mark Carney, Governor of the Bank of Canada, has also set out his principles for the Bank of Canada's liquidity provision.

¹⁰ Broadly, if the monetary authority thinks it can achieve above "trend" output growth or employment for a while by reducing interest rates, it may be tempted to let inflation temporarily rise above the rate it has promised to deliver. But people get used to this – or, in models, anticipate it – and so the extra inflation is simply built into their wage and price setting, without any benefit to output or jobs, but at the cost of a higher steady-state inflation rate.

¹¹ This is discussed in Mervyn King's 2007 letter to the Treasury Select Committee.

¹² Page 205 of the 1999 paperback reprint of Bagehot (1873), "Lombard Street" in the Wiley Investment Classics series.

assets and collateral. In doing so, the Bank recognises that its decisions will have a bearing on the development of markets. For example, for securitised assets, the Bank plans in due course to establish criteria for both the structure of the securitisations and the composition of the underlying portfolios that it will lend against.

The Bank's Discount Window Facility and wider-collateral OMOs: adverse incentives and the terms of liquidity insurance

These expansions of the Bank of England's facilities have required us to be much clearer than, perhaps, ever before about the terms on which we insure against liquidity risk.

As with other types of insurance, without care central banks' provision of insurance could inadvertently have the perverse effect of reducing banks' incentives to contain their exposures to liquidity risk in the first place – no doubt bringing the banks temporarily higher profits, but increasing the potential costs to the wider economy of those liquidity risks crystallising. For broadly similar reasons, we have had to think hard about how to protect the Bank against excessive risk (via eligibility criteria, haircuts, price etc).

The principles that underpin the design of the Bank's facilities, set out last October, are basically as follows:

- They should absolutely not cut across, and should ideally support, monetary policy.
- Crucially, the terms of such liquidity insurance should balance its benefits against the costs of creating incentives for banks to take more liquidity risk than otherwise.
- The Bank should be, and is, prepared to lend against a wide class of collateral subject to applying appropriate haircuts, and provided that we are capable of valuing it and of managing it in the event of a counterparty default. (One of the great problems in our capital markets is that too many firms forgot that collateral and haircuts matter only when a counterparty defaults.)
- Such lending against wider collateral should be for term maturities, as lending in stressed circumstances for only very short maturities creates rollover risk and so may be ineffective in forestalling panic.
- Liquidity-insurance facilities that are permanently available should be delivered via secured loans (repo or collateral swaps) rather than outright purchases, as during the life of a loan we can update the collateral margins and other terms that control the risk to the Bank.
- Permanent facilities providing bilateral liquidity insurance should be made available only to commercial banks, as they unavoidably need such insurance given that their liabilities are money and the vital role they play, as monetary institutions, in the economy and the financial system. (Private-sector institutions seeking to offer monetary (deposit) services should be regulated as banks.¹³)
- Such public facilities should not be available to banks where in the judgment of the Bank there are serious question-marks over their viability or solvency. (That need not exhaust our menu for providing liquidity to individual firms. It is of course open to us to offer that via bespoke support operations.¹⁴)

¹³ This suggests, for example, that constant-NAV money market mutual funds should convert into banks or switch to being variable-NAV funds. Arguably, similar principles should apply to other non-bank banks. See Tucker PMWT (2009), "Remarks at the Turner Review Conference by Paul Tucker", *Bank of England*. Paul Volker's recent Group of Thirty report also argues for this.

¹⁴ This can be effected under the Tripartite Memorandum of Understanding between the UK's Tripartite authorities (HMT, FSA and Bank).

Consistent with those Design Principles, during the current crisis we added to the Bank of England's Sterling Monetary Framework two instruments that are explicitly designed to help contain financial system stress, by providing financing against securities that may become illiquid in stressed conditions:

- *A Discount Window Facility (DWF) making available to commercial banks collateral swaps in which the Bank can lend UK government securities in exchange for a wide range of eligible collateral.*
- *Long-term repos (LTRs) via which the Bank lends cash against collateral comprising a range of high-quality securities going beyond the sovereign securities routinely eligible in the Bank's short-term repo operations.*

For the Bank's short-term repos, eligible collateral has not been widened: it remains essentially high-quality government bonds. That is because the purpose of the weekly short-term OMOs is to manage the Bank's net supply of reserves rather than to provide broader liquidity insurance.

Liquidity insurance and monetary policy

The two new facilities differ from each other in so far as the long-term repos (LTRs) are for a total size determined by the Bank, whereas drawings from the Discount Window Facility are for amounts determined by individual counterparties; and in that the Bank lends cash via the LTRs, whereas we would usually lend securities via the DWF. That affects their interaction with monetary policy. In the case of the DWF, we lend securities (gilts) that are eligible in our OMOs, so they can be turned into cash either in the market or via our repo operations. But, in its usual mode of operation, the DWF does not directly affect the Bank's aggregate supply of reserves.¹⁵ Indirectly, it may even reduce the demand for reserves, as it gives sound banks a source of liquidity insurance separate from holding precautionary balances with the Bank.

By contrast, the wider-collateral LTR OMOs do inject reserves. For a given monthly reserves target, that means that, other things being equal, the Bank has to reduce the size of its weekly short-term OMOs, in order to ensure that its *net* supply of reserves is equal to the target; otherwise overnight rates would sink below the MPC's policy rate. But when, as during the current crisis, the scale of wider-collateral repos is massively increased, reducing short-term repos to zero is not always enough to achieve our monetary objective. The Bank of England has therefore introduced the sale, via auction, of very short-term Bank of England bills to drain excess (ie above target) reserves from the market. That has enabled us to make a very significant (order of magnitude) discretionary increase in our cash-liquidity insurance without cutting across monetary policy. (In my view that is preferable, on technical and presentational grounds, to draining the market by HMG depositing with the Bank the proceeds of increased Treasury issuance, which could be confused with deficit-financing operations.) In economic terms, the net effect for the system in aggregate is to inject reserves against wider-collateral up to some targeted level consistent with monetary policy, together with a further collateral swap of Bank bills against wider-collateral. But the structure employed has distributional benefits too.

Haircuts

Consistency with monetary policy is one constraint on our provision of liquidity insurance. Controlling our risk is another. For its loan (repo and swap) operations, the Bank uses

¹⁵ The Bank has retained discretion to lend cash via the DWF in various circumstances, including where the gilt repo market was not functioning.

valuations,¹⁶ haircuts and daily remargining to leave financial risk with its counterparties. Haircuts can be based on past volatility and on scenario or stress analysis. We increase haircuts for own-name securities, where a market price can no longer be observed, or sometimes in the light of the particular circumstances of individual counterparties. Consistent with its role as central bank, the Bank aims thereby to unbundle liquidity risk from credit and valuation risk. And that means we do not, and could not, lend 100% of our valuation of the collateral, which is a constraint on the scale of the liquidity insurance we provide.

Haircuts are kept under review, and the Bank reserves the right to alter them, including on outstanding transactions. Looking ahead, the Bank aims to take into account structural and cyclical changes in financial conditions. In the future, the Bank might, for example, increase haircuts during “peacetime” if liquidity in the secondary market from a particular type of collateral became impaired; or if the Bank concluded that, as the upswing of a credit cycle developed, risk was plausibly becoming underpriced and so was not properly reflected in the valuations of instruments it was accepting as collateral. Whether or not that would be enough of itself quell a cycle is obviously uncertain; but it would help to protect us against risk and would give a signal.

In short, haircut policy matters.

Pricing

But the Bank does not believe that haircuts can be relied upon on their own to produce the appropriate incentives for banks’ liquidity management. Price matters too. Bagehot said that the rate should be “high”. But since he wrote in the context of the Gold Standard and of domestic financial crises that were typically accompanied by external (or capital account) crises, his notion of a “high rate” was bound up with the central bank tightening monetary conditions to stem the outflows (of gold). But it is clear enough that, although he did not in fact talk of “penalty” rates, the relevant measure for him was the rate charged by the central bank relative to that prevailing in the market in normal conditions, ie before a crisis breaks.

The Bank has adopted, and promulgated, a fee structure for its liquidity-insurance facilities that increases as banks’ borrowing increases and/or is made against riskier, less liquid collateral. That is designed to underpin incentives for banks to manage liquidity risk prudently, in the long-run interests not only of the banking system but of the wider economy. We have published a schedule for DWF pricing with those properties, structured around four broad classes of collateral, grouped according to their liquidity/risk characteristics.¹⁷ We plan, after consultation, to introduce an auction structure for the wider-collateral long-term repo OMOs that delivers the same broad result of counterparties having to pay up to borrow against less liquid collateral.¹⁸

¹⁶ The Bank published its general approach to collateral valuations when it disclosed use of the Special Liquidity Scheme. It stated: “Securities are valued by the Bank using observed market prices that are independent and routinely available publicly. The Bank reserves the right to use its own calculated prices, including where such independent market prices are unavailable. Those calculated prices are designed to deliver valuations taking account of securities’ contracted cash flows and yields of comparable securities, but not individual loan-by-loan analysis of portfolios. To account for the risk that a calculated price is an over-estimate of what a market price would have been had it existed, an additional haircut is added. The Bank’s valuation of all securities is binding.” For more details, see the Market Notice for the Special Liquidity Scheme released on 21 April 2008. www.bankofengland.co.uk/markets/sls/index.htm.

¹⁷ More information on the Discount Window Facility (DWF) can be found in the Bank’s Market Notice, released on 19 March 2009. www.bankofengland.co.uk/markets/money/discount/index.htm

¹⁸ In the auctions there would be separate stop-out rates for lending against liquid and less liquid collateral and the proportion of the Bank’s long-term lending allocated to the different types of collateral would be related to the spread between the stop-out rates. A high proportion would be allocated to lending against less liquid collateral only if, given the bids received, there was an appropriately large spread between the stop-out rates.

Knowledge of the framework's pricing structure can be factored into banks' liquidity management and contingency planning.

Mitigants for the "stigma problem"

But during the turmoil of the past eighteen or so months, around the world banks have at times been reluctant to pay such "penalty" rates of interest for fear of signalling, if somehow their use leaks or is revealed by a "witch hunt", that they have an idiosyncratic problem even when they don't. During 2007 this became known as the "stigma problem",¹⁹ and it caused standing lending facilities, a key piece of central bank machinery for providing overnight liquidity to the payments system, to more or less atrophy in some centres during the first phase of the crisis.

That state of affairs was not sustainable, and it prompted a number of central banks to innovate. Auctions of funds against wider collateral of the kind introduced by the Fed and the Bank of England side-step the stigma problem by having a number of banks borrow at the same time. They have definitely helped to underpin the system. But, compared with a facility, those auctions are available only periodically – fortnightly in the UK at present – rather than every day. The DWF is available on a continuous basis, and is designed to avoid the stigma problem. In particular, in its usual mode of operation, it involves a collateral swap, so there is no give away of its being used in the size of either the banking system's reserves balances or our open market operations. And we publish data on its use on an aggregate, averaged basis and with a lag. This puts onto a permanent footing some of the technology of the Bank's Special Liquidity Scheme, which was used in 2008 to provide 3-year financing, via a collateral swap, for assets that had become illiquid as a result of the crisis.²⁰

How the facilities can work in extremely stressed conditions

Monthly, wide-collateral repos for a 3-month maturity and typically of fairly modest size, together with a continuously available Window for 30-day collateral swaps, are now permanent features of the Bank of England's regime. Various parameters can be adapted in the face of extremely stressed conditions of the kind we have been facing. Thus, the wide-collateral repos have been held fortnightly rather than monthly, and for very large sizes. And the DWF currently offers a 12-month swap option, as well as the standard 30-day facility.

In summary, by providing liquidity insurance the Bank aims effectively to give essentially sound banks and others time to address the problems created by stress, and for the authorities to develop remedial plans, without creating perverse incentives or exposing itself to risk. Given those aims, banks must avail themselves of these facilities. We believe, for example, that all qualifying banks and building societies should sign up for the Discount Window Facility; that they should pre-position with us a range of eligible collateral, so that they avoid operational stumbles when they seek to use the Window; that they should use it regularly in meaningful size as part of testing and making a reality of their contingency plans; and that they should share those plans with the Bank, which, amongst other things, would help us assess applications to draw. In that way, the DWF can truly help to underpin the system's liquidity in the future.

¹⁹ See Tucker PMWT (2008), "The Structure of Regulation: Lessons from the Crisis of 2007", a speech to the LSE's Financial Markets Group Conference; and the Committee on the Global Financial System, Paper No. 31 (July 2008), "Central bank operations in response to the financial turmoil", CGFS Papers, *Bank for International Settlements*.

²⁰ The SLS was introduced in April 2008 and was open until end-January 2009. It enabled banks to swap legacy illiquid securities (principally RMBS and covered bonds) for UK Treasury Bills for a period of three years. The Bank announced in early February that it lent £185bn of TBills, against £287bn (nominal) of collateral.

Prudential regulation of banks' liquidity: how it relates to central bank liquidity insurance

But such insurance is not and cannot be a source of longer-term funding to the banking system. Prudent valuations and haircuts mean that our insurance cannot finance anything like the whole of a bank's balance sheet even in the short run, and also that banks need a clear buffer of surplus capital. Nor is central bank liquidity insurance always going to work.

That underlines why prudent liquidity management must be a major responsibility of the banks themselves. In the normal course of their business, they should insure themselves against liquidity risk in private markets. They can do so by, for example, holding a stock of assets that can unquestionably be exchanged readily in the financial markets for cash in anything other than the gravest market distress; by maintaining funding with a prudent maturity structure relative to that of their assets and contingent commitments; and in the case of smaller banks, up to a point by buying insurance in the form of completely committed lines of credit from larger banks, but also crucially by holding unquestionably liquid assets in case their bank-provider is ailing when they call on the line.²¹ Banks earn a return from providing liquidity services, and so make a trade-off in deciding how much liquidity risk to run. But, because of the spillover effects from bank failures, the overall social cost of banks' liquidity risks crystallising can be considerably greater than the costs for the individual banks themselves. Regulation by the micro-prudential authorities has been the primary tool for dealing with that issue.

There is currently a very important, and long overdue, international debate about how to improve the regulation of liquidity.

I want to dwell today on just one important element of this debate.

This concerns whether or not the assets counted by prudential regulators as part of a bank's liquidity buffer should be defined to include all of the assets held by the bank that are eligible in the operations/facilities of the central banks to which the bank has access. Some argue that they should. The Bank of England would regard that as a big mistake.

For the reasons I have described, the collateral eligible at most central banks goes way beyond securities that can be relied upon in stressed conditions to be liquid in private markets (whether outright or repo). So if they all counted as core-liquidity for regulatory purposes, banks would in effect be liberated from having to hold a buffer of low-yielding assets that they could confidently use in the market before they turned to us. That would be a regime in which central banks would, in effect, be lender of second resort (ie as soon as some markets closed up) rather than LOLR (broadly understood). The equilibrium would surely be one in which less of banks' balance sheets were liquid in the markets than is desirable; and in which the banking system in aggregate could run excess liquidity risk from a systemic perspective. Haven't we seen the results of that already? Isn't the purpose of regulatory standards to avoid that?

Our own favored approach is that the regulators should define the "liquidity buffer" to comprise high-quality securities that can reliably be traded or exchanged in liquid markets, including in stressed circumstances. In practice, that would mean focusing on government bonds in many economies.²²

²¹ See Chapman G, Emblow, A and Michael I (2000), "Banking System Liquidity: Developments and Issues", *Financial Stability Review*, Issue 9, December 2000.

²² Such an approach would be consistent with the 2008 CGFS report on Central Bank Operations on this issue: "Insofar as central bank actions might lead to degradation of market participants' management of liquidity and other risks, a possible offset would be to implement tighter supervisory and prudential policies concerning the management of liquidity and related risks." It would also seem to comply with the 2008 BCBS Principles on Liquidity Risk Management and Supervision, which say that: "With respect to the composition of its liquidity

That is the approach that the UK's Financial Services Authority will be adopting in due course, after a number of years' discussion. We greatly welcome that outcome. Of course, in the midst of the crisis, any such requirement has to be carefully transitioned, but the eventual destination should be clear enough.

For such a policy to deliver its potential, it would be good if regulators, internationally, required all banks regularly to turn over a meaningful share of their "stock liquidity" in the market on a reasonably regular basis. That would also help to put banks in a position to reap the benefits of the Bank's Discount Window Facility, through which, as I have described, sound banks can borrow gilts. Frankly, it has been shocking over the past year or so to discover how many medium-sized banks and building societies did not hold government bonds or other very high quality assets; or, if they did, how many did not have a regular presence in the gilt repo market or even had no capacity to repo at all. Turning up in the core secured-funding markets for the first time for years is an absolute give away of distress. All that has to change.

Market-maker of Last Resort

What I have said so far could be mistaken to imply that only banking markets matter. That would be misleading. The capital markets obviously matter too.

Indeed, the current crisis has illustrated just what a mess can result from liquidity draining out of those markets. Market liquidity is endogenous: participants thinking that it might dry up can contribute to its doing so. In the early phases of this crisis, by virtue of holding large "trading" books that were marked to market, banks and other traders found themselves having to make very large portfolio write downs in the face of sharp rises in liquidity premia in asset markets. As highly-levered institutions, those mark-downs depleted their net worth to the point of imperilling solvency. That caused a retrenchment in the availability of credit, helping to plunge the world economy into recession, and so impairing the value of more traditional loan books, in a vicious spiral.

So it would have been better if, somehow, we could have preserved the liquidity of the markets.

Liquidity insurance facilities that underpin banks' funding are obviously helpful to that, as they increase the probability of bank-dealers being able to finance unwanted inventory. But some voices have argued that the authorities should act more directly to preserve market liquidity; or, in other words, that central banks should stand ready to act as a Market Maker of Last Resort.²³

Certainly, the profound changes in the structure of the financial system over recent decades should not leave us blindly attached to mid-19 century precepts.

But nor can we be blind to the challenges in embarking on acting as MMLR. In the first place, whereas lending to a bank does with certainty give that bank more liquidity, entering a market as a buyer does not automatically enhance the liquidity of that market. Secondly, whereas central banks can protect themselves against the risk in secured loans by requiring more collateral if conditions deteriorate, an outright purchase is a one-off transaction; if we pay too much given the true risk, that's that.

cushion, a bank should hold a core of the most reliably liquid assets, such as cash and high quality government bonds or similar instruments, to guard against the most severe stress scenarios".

²³ For example see, Buiters W and Sibert A (2007), "The Central Bank as Market Maker of Last Resort", *Maverecon – Willem Buiters' Blog* (<http://maverecon.blogspot.com/2007/08/central-bank-as-market-maker-of-last.html>). This section has benefited from internal discussions with Kalin Nikolov and Roger Clews.

So this is new territory. Whereas a trawl of the web reveals over 200,000 articles referring to LOLR, there are around 1,500 mentions of MMLR, most of them published over the past year or so.²⁴ And like all new territory, it needs to be thought through. One recent contribution²⁵ suggested that if the purpose of LOLR in a bank-based system is “to stabilise the balance sheets of banks”, in a market-based system it should be “to stabilise the limit-order book, by placing orders to buy”.

By analogy with the more familiar “LOLR” function, the following thoughts suggest themselves for debate in our community.

First, as with LOLR, central banks cannot engage in MMLR operations if to do so would interfere with monetary policy. Securities are purchased in exchange for cash, entailing an injection of reserves into the banking system. That has to be consistent with the target for the central bank’s net supply of reserves.

Second, a MMLR should aim to charge a penalty (eg buy at a discount) to the fundamental value of an asset. Put another way, any bid-ask spread should be unattractive relative to peacetime conditions in private markets.

Third, any purchase (auction) mechanism should be designed to reveal information about the state of the market and the fairness of prices paid.

Fourth, while the MMLR cannot avoid the risk inherent in outright purchases, it absolutely must not over reach its capital resources.

Fifth, the MMLR should aim to be catalytic, helping ideally to kick-start the market rather than replace it.

Sixth, the MMLR should avoid propping up markets that would not be fundamentally viable once peacetime returns.

I must stress that those are just starters for debate.

But, unfortunately, we cannot always wait for consensus around fully articulated principles. Recently, in the context of its Asset-Purchase Facility programme, the Bank of England has embarked on what could, perhaps, be viewed as two variants of MMLR in the sterling corporate financing markets. Both have been focused on our being a buyer, rather than operating on both sides of the market, but arguably that is what the various MMLR ideas really amount to in crisis conditions.

In the first, we offer to buy Commercial Paper at announced spreads, which are designed to be above those warranted by credit-fundamentals, and above market spreads during peacetime, but below those prevailing in the market before we stepped in. In other words, we are ready to lend without charging a hefty liquidity premium, since we are not liquidity constrained. We offer to buy paper in both the primary market and the secondary market. The latter is in effect a temporary liquidity facility to money market funds and others, at an extra cost of 25bp over the fixed spread, and with the aim of increasing their willingness to buy new paper. The goal has been to stimulate the market to bring market prices to at least our spreads, with market transactions occurring there or more cheaply. A measure of success is not how much paper we buy, but whether providing a backstop assists the functioning of the market.

The Bank’s second facility is in some ways more interesting in the context of the debate about MMLR. We are acting as a back-stop buyer of sterling corporate bonds, by regularly holding auctions in individual securities. To protect against risk, the Bank sets (and updates)

²⁴ Many of them by Willem Buiter.

²⁵ Cecchetti S G (2009), “Central Bank Tools and Liquidity Shortages”, Federal Reserve Bank of New York Conference, 19-20 February 2009. The quote is from the slides used at the conference.

reserve prices, which draw on CDS spreads, models of risk etc as well as qualitative information. The amounts we offer to buy in each auction are small. The objective is explicitly catalytic. It is to reduce the inventory risk run by bank market-makers in the securities, and to reduce liquidity risk for market participants more generally. Perhaps the best way to think about it in the abstract is that it is akin to our stepping into the market with a narrower bid-offer spread than private sector intermediaries would otherwise offer, with a view to those very same dealers bringing their bid-offer spreads inside ours and to investors reducing the liquidity premium they require. To the extent that such measures work, liquidity risk for intermediaries, and so for traders and investors, is reduced; and thus, the spread in corporate bond yields should decline too. There is some evidence that that has occurred since we introduced the facility in March, although it is impossible to control for the more general improvement in global corporate bond markets.

Providing a MMLR facility requires know-how and capital resources. In the UK, the Bank is equipped to offer MMLR when needed in so far as we have the wherewithal to pay for whatever we buy using our money (where, as I described earlier, we can sterilise any monetary effects if we need to). But given the Bank of England's very small accounting capital, we have acted on the back of an indemnity from the government. The presence of tax payer protection is not enough, however, for central banks to ignore risk. Not only does exposure to reputational risk matter. Central banks should not be involved in providing facilities which it is clear would be likely to result in a transfer of resources to the private sector. That is the realm of fiscal policy. Central banks should stick to central banking. In the Bank of England's current asset-purchase operations, that is reflected in our remit from the government focusing on high-quality securities, and in the maximum prices (minimum spreads) we set.

These considerations need to be weighed very carefully in deciding whether, or how, to operationalise any MMLR policy. We absolutely must keep a clear line around central banking.²⁶

Which brings me to the third "instrument" I want to say something about today.

Capital of Last Resort

However much the authorities do to forestall or alleviate a crisis by providing liquidity, I fear that we cannot rule out that very rarely the banking system will end up needing to be supported by some ultimate source of capital. We absolutely must be prepared to let banks fail when, in systemic terms, it is safe to do so. Such decisions call for technocratic judgment. But, as we have seen, sometimes disorderly bank insolvencies would bring systemic distress.

For that reason, at least three things follow. First, each country needs a Special Resolution Regime for distressed banks, and probably more widely; we cannot rely on general insolvency law to help control threats to system stability. Thank goodness, the UK now has such a regime for banks, and the Bank will draw lessons about whether it needs refinement over time. Second, given the prevalence of internationally active banks in a globalised economy, national authorities just must be able to work together – in reality; when it matters – to control the resolution of banks whose activities cross borders.²⁷ And third, as by now

²⁶ This was re-affirmed recently in a joint statement by the US Federal Reserve and the Department of the Treasury (www.federalreserve.gov/newsevents/press/monetary/20090323b.htm).

²⁷ Work is underway under the auspices of the Financial Stability Board, which published Principles endorsed by G20 heads of government in April; and in the Basel Committee of Banking Supervisors. These issues were also discussed recently by Eric Rosengren, President of the Federal Reserve Bank of Boston in a speech at the Institute of Regulation and Risk, Hong Kong, 5 May 2009 "Challenges in Resolving Systemically Important Financial Institutions".

many others have said,²⁸ we need to find a solution to Too-Big-To-Fail, or too interconnected, too complex – however one wants to think about it. That might involve requiring banks to have credible resolution plans for themselves, with higher regulatory capital and liquidity charges entailed if they do not.

As we have seen across many countries during the current crisis, governments can otherwise end up having to provide capital support in order to prevent the financial system unravelling, with unfathomable costs for the real economy and so for households. The long lesson of history is that we must build a resilient system; but that we and our successors would be foolhardy to imagine that governments will never again need to provide capital to save the day.

If that is right, then society needs principles and policies for what might be called “Capital of Last Resort”, to sit alongside the Lender of Last Resort (LOLR) principles developed by and for central banks since the 19th century. Clear and timeless principles in this area barely exist. There are just 30 or so mentions of COLR on the web.

One possible starting point is how we have learned to think about bespoke liquidity-support operations. After explicitly recognising that occasionally liquidity support operations can end up providing de facto risk capital if the recipient deteriorates, the late Eddie George offered some thoughts on this in 1993;²⁹ “central banks are not in the business of providing public subsidy to private shareholders. If we do provide support, we will try to structure it so that any losses fall first on the shareholders and any benefits come first to us. And any support we provide will be on terms that are as penal as we can make them, without precipitating the collapse we are trying to avoid We look for a clean exit. The company may be required to run down or restructure its operations, under our surveillance, to the point where it can do without our support. We aim to protect the system, not to keep in being unviable banking capacity” And, paraphrasing Mervyn King in 2007: “if the [authorities] underwrite any [risk] that threatens to damage the economy as a whole, it encourages the view that as long as a bank takes the same sort of risks that other banks are taking then it is more likely that their problems will be insured ex post.”

Extrapolating, common principles for LOLR, MMLR and COLR might include that the terms must help prevent and contain crises; not incentivise imprudent behaviour; be time-consistent, which is to say that they must be credible; and lead to an exit strategy.

Elsewhere in the repertoire, we are clear, for example, that the costs of LOLR should fall to shareholders; and that the costs of deposit insurance should be recovered by levies on the banking sector as a whole. Building on that, one possible way through the COLR maze might conceivably be to establish, over the medium term, a regime where the eventual cost of any COLR would in some way be allocated back to the banking system itself rather than to the general taxpayer. If it is unavoidable that, instead of allowing banks to fail, the banking system occasionally needs to be rescued through injections of equity capital, “insurance” is in effect being extended to ordinary creditors generally and not just to retail depositors. The funding of that insurance would, perhaps, be extended in a similar fashion. If the authorities determined that a public equity injection was necessary in order to preserve stability, government could be authorised to provide the support, but with a right to claim back the eventual cost, if any, from an increased “insurance” levy on the banking system over a period of years beginning after the crisis had clearly passed. Under that kind of regime, more of the cost of banking system failures could fall on the shareholders of banks generally rather than

²⁸ For example, Philipp Hildebrand (Vice-Chairman of the Governing Board of the Swiss National Bank) on 5 May 2009, in an interview with *Handelsblatt*, a German daily newspaper.

²⁹ “The pursuit of financial stability”, LSE lecture by Governor George, *Bank of England Quarterly Bulletin*; and Mervyn King’s September 2007 letter to the Treasury Select Committee, “Turmoil in financial markets: what can central banks do?”.

on the public purse. Banking sector shareholders collectively would benefit ex ante from the provision of the insurance to the system as a whole; and ex post from support given to any particular firms. The authorities would, in effect, loan their capacity to fund and absorb risk to the banking system for a temporary period during the height of the crisis, but would eventually be repaid by the system. Banks could take that into account in planning their businesses; and might, arguably, have an incentive during peacetime to monitor the threats which their peers posed to stability.

Unlike regular deposit insurance, where the Bank has favoured the UK moving to a degree of pre-funding of the system, it is less clear that such a regime could or should be pre-funded. But, as with regular deposit insurance, the question of whether or not any ex post allocation of costs should somehow be risk based would need to be considered. Indeed, more generally, including perhaps even for liquidity insurance, we need over time to be clearer about the principles that drive whether insurance premiums are risk based and collected up front.

This is obviously difficult territory. There are arguments against any approach along those lines. I air it not so much a proposal but in the hope of stimulating serious thinking about what a COLR regime might look like.

If a COLR regime could be devised, it would be very important that it was not overused. Private sector backstops should be used first; and they could be better designed. One such approach would be to require banks to take out private capital insurance. This could take a variety of forms. One idea would be straight capital insurance: ie a commitment from investment institutions to subscribe when called upon to do so by a bank. As with possible public sector capital-insurance schemes to be activated only during a systemic crisis, such private insurance could be linked to maintaining a required minimum capital ratio. A private scheme of that kind would not work, however, if the insurer could not afford to subscribe when the call came; or if investment institutions were unwilling to enter into such commitments on a sufficient scale for the insurance to make a difference to the system's resilience. Another idea circulating currently³⁰ is that banks would be required by the authorities to issue hybrid-debt-capital instruments that could be converted when needed into loss-absorbing equity. In one variant, the option to require conversion would lie in the hands of regulators provided a systemic-severity test were passed.

Summary and conclusions

During the current crisis, the normal functioning of the financial system broke down, with profound effects on credit conditions and on the appropriate monetary policy response. Although I have ranged widely today, I have in fact deliberately not covered the operations employed in some countries to lend directly to firms, effectively by-passing the financial system; or the actions by some central banks, including the Bank of England, to expand the money supply in an environment of near-zero policy rates. Instead, I have focused on the repertoire of instruments directed to supporting, and ideally reviving, the financial system itself: funding liquidity, market liquidity, and solvency.

In terms of funding liquidity, following innovations over the past year the Bank of England now offers six permanent facilities through which liquidity can pass between us and the banking system – intra-day repos to oil the wholesale payments system; variations in banks' reserves balances, which comprise a prime liquid asset for banks; Open Market Operation (OMOs) against government securities; use of overnight Operational Standing Facilities to absorb day-to-day frictional payments shocks; longer-term repos through which the Bank

³⁰ For example, "An Expedited Resolution Mechanism for Distressed Financial Firms: Regulatory Hybrid Securities", Squam Lake Working Group on Financial Regulation, April 2009, Council on Foreign Relations.

lends cash against wider collateral; and a Discount Window Facility, through which banks without fundamental problems of solvency or viability can exchange a very wide range of collateral for UK government bonds.

In designing those facilities the Bank has been clear about its goals. On the financial stability front, we frame them as follows:

“To reduce the cost of disruptions to the liquidity and payments services supplied by commercial banks. The Bank does this by balancing the provision of liquidity insurance against the costs of creating incentives for banks to take greater risks, and subject to the need to avoid taking risk onto its balance sheet.”

In that area, central banks are able to draw on more than a century of experience and analysis. But this crisis has exposed a gap in thinking about what principles should guide any Market Maker of Last Resort or Capital of Last Resort interventions by the authorities. I will not remotely have solved that problem today, but I hope I can prompt others to help clarify thinking and practice in those areas in the years to come. Doing so will be important to developing new “rules of the game” for what must in the future be a more resilient global financial system.