Liquidity risk management

Charles GOODHART
Professor of Banking and Finance
London School of Economics

Liquidity and solvency are the heavenly twins of banking, frequently indistinguishable. An illiquid bank can rapidly become insolvent, and an insolvent bank illiquid. As Tim Congdon noted, (FT, September 2007), in the 1950s liquid assets were typically 30 percent of British clearing banks' total assets, and these largely consisted of Treasury Bills and short dated government debt. Currently, such cash holdings are about ½ percent and traditional liquid assets about 1 percent of total liabilities.

Nor have prior standards relating to maturity transformation been maintained. Increasing proportions of long-dated assets have been financed by relatively short-dated borrowing in wholesale markets. Bank conduits financing tranches of securitised mortgages on the basis of three month asset-backed commercial paper is but an extreme example of this. Northern Rock is another.

Such time inconsistency issues are hard to resolve, especially in the middle of a (foreseen) crisis; it is worth noting that many, though not all, of the aspects of this present crisis were *foreseen by financial regulators. They just did not have the instruments, or perhaps the will, to do anything about it. If, when trouble strikes, the lifeboats are manned immediately, with extra liquidity being provided on easy terms, then there is encouragement to the banks to build even more densely on the flood plain. Why should the banks bother with liquidity management when the Central Bank will do all that for them? The banks have been taking out a liquidity 'put' on the Central Bank; they are in effect putting the downside of liquidity risk to the Central Bank. What is surely needed now is a calm and comprehensive review of what the principles of bank liquidity management should be.*

Liquidity and solvency are the heavenly twins of banking, frequently indistinguishable. An illiquid bank can rapidly become insolvent, and an insolvent bank illiquid. When the Basel Committee on Banking Supervision was first established in 1975, its Chairman, George Blunden, at its initial meeting vowed to try to underpin the capital and liquidity adequacy performance of the main international commercial banks. Indeed, the prior downwards trend in banks' capital ratios was halted and then reversed by Basel I. The advantages of having done so are clearly revealed by the stronger capital positions of most banks in the current context.

What is not so well known is that in the 1980s, at the same time as the Basel Committee was wrestling with capital adequacy issues, it was also attempting to reach agreement on liquidity risk management. For reasons that I have yet to discover, it failed. So while the downwards trend in capital adequacy was reversed, that in liquidity adequacy was not. As Tim Congdon noted, (FT, September 2007), in the 1950s liquid assets were typically 30 percent of British clearing banks' total assets, and these largely consisted of Treasury Bills and short dated government debt. Currently, such cash holdings are about ½ percent and traditional liquid assets about 1 percent of total liabilities.

Nor have prior standards relating to maturity transformation been maintained. Increasing proportions of long-dated assets have been financed by relatively short-dated borrowing in wholesale markets. Bank conduits financing tranches of securitised mortgages on the basis of three month asset backed commercial paper is but an extreme example of this. Northern Rock is another.

The standard example of a time inconsistency dilemma relates to people building homes in a flood plain. When a flood comes, do you rescue them, or not? In recent years the banks have been erecting their strategic dispositions in the middle of such a flood plain, though their problem was not too much, but too little liquidity.

Such time inconsistency issues are hard to resolve, especially in the middle of a (foreseen) crisis; it is worth noting that many, though not all, of the aspects of this present crisis *were* foreseen by financial regulators and Central Banks more widely. They just did not have the instruments, or perhaps the will, to do anything about it. If, when trouble strikes, the lifeboats are manned immediately, with extra liquidity being provided on easy terms, then there is encouragement to the banks to build even more densely on the flood plain. Why should the banks bother with liquidity management when the Central Bank will do all that for them? The banks have been taking out a liquidity 'put' on the Central Bank; they are in effect putting the downside of liquidity risk to the Central Bank.

On the other hand, if the opportunity of a liquidity crisis is taken to penalise those misguided brethren who were insufficiently careful of their own liquidity management, and you do not man the lifeboats so enthusiastically, then there is a danger of mass drownings, in the form of bankruptcies and bank runs. These events are not politically popular, to say the least. Whether, or not, an earlier or more enthusiastic launch of a lifeboat would have prevented such fatalities, there will be many, particularly amongst those penalised, who will swear blind that it would have done so; and one cannot disprove a counter-factual. Sticking to proper principles in a crisis may be admirable, but it can be a dangerous game to play.

What is surely needed now is a calm and comprehensive review of what the principles of bank liquidity management should be. In a global financial system, this should be done multi-laterally in the Basel Committee of Banking Supervision. It is not an easy exercise; the Committee has already tried and failed once before; it must try again.

What exactly is the right distribution of responsibility for liquidity management between commercial banks and a Central Bank? There are some who believe that that responsibility should be almost entirely shouldered by the Central Bank, but yet others call for a return to more traditional banking practices. As for maturity transformation, for how long should a bank be in a position to continue to meet its commitments if the wholesale markets on which it has relied before should suddenly dry up, as we now graphically realise can happen; one day, one week, one month, one quarter, longer yet? I do not know of any good way to resolve that question, nor of any persuasive academic research on the topic.

What I do know is that the exercise ought to be done in terms of general principles, rather than by setting

required ratios or minimums. The most salient metaphor and fable in prudential regulation is of the weary traveller who arrives at the railway station late at night, and, to his delight, sees a taxi there who could take him to his distant destination. He hails the taxi, but the taxi driver replies that he cannot take him, since local bylaws require that there must always be one taxi standing ready at the station. Required liquidity is not true, usable liquidity. Nor might I add, is required minimum capital fully usable capital from the point of view of a bank.

Principles of liquidity management, (and in my view of capital adequacy also), ought to be applied in a much more discretionary manner, pillar 2 rather than pillar 1. But that sets my own position far apart from that of most American academics, who believe that a regulator simply cannot be trusted to behave well. In their view, rules and regulations are needed to constrain the regulator, as much or more so than to constrain the regulated. If that should be so, then the *essential* accompaniment to any set of rules, or of required ratios, is a ladder of ever toughening sanctions as the best practice rule is increasingly transgressed. Setting minimum levels without establishing an associated ladder of sanctions invites both forbearance and the occurrence of credit crunches. One of the, in some respects problematical, characteristics of the Basel Committee has been that it is just an ad hoc advisory committee without any international legal powers. As such, it has felt almost entirely unable to address the issue of what, if any, *sanctions* should be applied if banks or banking systems fail to maintain the Committee's proposals and principles for good banking behaviour.

Let me, however, put the question of sanctions to one side for the time being, though noting that their considered formulation is an integral and essential element in any well-designed regulation system, and return to the question of the principles of liquidity management. Unfortunately the word 'liquidity' has so many facets that it is often counter-productive to use it without further and closer definition. I want to concentrate on two amongst several of these facets; the first involves maturity transformation, the relative maturity of a bank's liabilities and assets; and the second involves the inherent liquidity of a bank's assets, that is the degree to which such assets can be sold without significant loss of value under any market conditions. These are, I hope you will agree, key elements in any bank's liquidity position.

Moreover, these two elements of a bank's liquidity management are themselves inter-twined. The more liquid, and instantly saleable at a steady price, are a bank's assets, the less the bank needs to worry about its maturity transformation, since it can pay off withdrawn liabilities with the proceeds of asset sales. One feature of the Northern Rock debacle was apparently that it had planned to securitize a sizeable proportion of its mortgage book in September. When that became impossible in the market conditions, that bank's exposure to funding problems in wholesale markets became significantly worse. *Per contra*, the less the maturity transformation, the less does a bank need to worry about the interim interest rate and market risk on its assets, since it can hold the asset until maturity, and ride out any intervening market squalls. Thus one lesson is surely that *both* sides of a bank's book have to be taken into account at the same time in order to assess its overall liquidity.

One of the underlying problems of economics is that a strategic decision by any important set of agents, *e.g.* the monetary and regulatory authorities, affects the behaviour of all the other agents, according to the Lucas critique. In this respect the willingness of Central Banks to lend against, *i.e.* to accept as collateral, certain classes of assets will in turn affect the liquidity of such assets. One of the unhappy developments in the latest crisis was an apparent disarray amongst the major Central Banks about what assets should, and should not, be used by themselves as collateral for repos. Since this issue may well depend in large part on history and the differing structures of banking systems in different currency areas, it may be that uniformity of practice amongst Central Banks is neither to be expected, nor desired. Even so it would be good to know on what grounds the Central Banks had adopted different procedures. Perhaps the relevant Central Banks could convene a (private) Conference amongst themselves to sort this out.

On matters such as this, one tends to go back to the principles laid down by Bagehot[1], to lend freely, but at a high rate, against good collateral. There were two reasons for emphasizing the quality of the collateral, first to protect the lender, *i.e.* the Central Bank, from credit default risk, and second to encourage the banks to undertake safer, less risky and speculative, lending, *i.e.* to lend on trade-related, that is 'real' bills, rather than on finance, that is speculative, bills. In Bagehot's time the first, and to some extent, the second objective were achieved by lending on the

1 *Bagehot (W.) (1873): "Lombard Street"*

basis of two-name commercial paper, where the bill had to be counter-signed by another bank, an accepting house, (for a small fee); the accepting house endorsement then left it at risk to pay the face value of the bill at maturity, should the original writer of the bill fail to do so.

One of the current issues relating to the market, and lender of last resort, operations of a Central Bank is how far it should widen the range of assets, which it will buy or against which it will lend, to include private sector credits, such as residential mortgages and marketable claims on high quality firms, in addition to claims against governments and public sector bodies. There is surely no question that such credits, when they are of sufficient quality, are appropriate, traditional bank assets. Moreover, since the Central Bank can rely on its outstanding currency liabilities to remain almost in perpetuity, it can absorb market and liquidity risk. What it cannot accept is credit risk, and, owing to asymmetric information, it is likely to be offered the worst such risk assets within the acceptable class held by the borrowing commercial bank, allowing that bank to access the market with its better risk paper.

Perhaps the time has come to revert to the concept of two-name paper, *i.e.* that a bank selling assets to a Central Bank has to endorse that paper, so that any credit default by the originator still has to be paid by the borrowing bank, with that liquidity taking precedence over all other creditors (except insured depositors). That would widen the acceptable range of collateral, protect the Central Bank, and throw the risks of illiquidity back on to the junior creditors of the commercial bank, the subordinated debt and equity holders where it belongs. That would also lessen, but not remove, the question of the extent of discount, or 'hair-cut', that the Central Bank should still require to protect itself against interest rate and market risk.

Most liquidity injections are, however, done by repos, rather than outright purchases. In this case the borrowing bank is already the first name and the collateral provided is the second. In such, normal, circumstances problems can still arise when the creditworthiness (solvency) of the borrower becomes correlated with the price of the asset, which could easily be possible when the repo is collateralised on private sector assets.[2]

The next question for the monetary authorities is the tenor, or maturity, of their operations. The last crisis was unusual in that it was not related to an insufficiency of cash, but rather to a concern about the availability of funding to meet prospective future commitments, *e.g.* when ABCP were not rolled over, at a time when the solvency status of other banks was under some question. Accordingly three month wholesale (interbank) markets dried up, as banks sought to squirrel away funds internally and in Treasury Bills, at a time when overnight cash was, usually, in ample supply. The demand from commercial banks was for the Central Bank to loan funds for three months. But to keep overnight rates near to the policy rate, the extra loans at the longer maturity would have had to be offset by reverse repos, or open market sales at the shorter end. Would such an 'Operation Twist' have much effect? Research on this is clearly needed.

The Central Bank can establish its preferred short term policy rate with a comparatively minuscule volume of open market operations, because the effective cash reserve base, *i.e.* the buffer above the required minimum ratio, is so small. Trying to twist the yield curve *might* need to involve massive gross purchases at the longer end almost offset by almost as large reverse transactions at the shorter end. That is not to say that it would not be worth trying; what would be the cost?

My own preference would have been to have operated on the bottom side of the interest rate corridor by allowing, or encouraging commercial banks to hold longer term (*e.g.* three month) deposits at the Central Bank, at little cost relative to policy rates. If the commercial banks will not lend to each other, they will lend to the Central Bank, and the Central Bank can always ensure, by expansionary open market operations, that the commercial banks have sufficient certain access to cash, not only day by day, but also at somewhat longer maturities to defuse pure liquidity issues.[3]

2 *I am grateful to Julian Wiseman for his comments on this.*

3 *Operating on the lower (deposit) side of the interest rate corridor is not a hare-brained idea. No less an authority than Woodford: "*Globalization and monetary Control*", NBER Working Paper, No. 13329, August 2007, pp. 43 and footnote 38, describe the variation of interest rates on base money as a 'crucial element in monetary policy implementation in countries with "channel systems". Also see Berentsen and Monnet: "*Monetary policy in a channel system*", paper presented at joint Bank of England/ECB Conference on 'Payments and monetary and financial stability', Frankfurt, November 12, 2007.*

But this takes us back to our starting point, how far should a Central Bank allow the commercial banks to put liquidity management onto Central Banks. Clearly if commercial banks can always rely on the Central Bank, they will undertake maximum maturity transformation, *i.e.* hold 20 year advances against overnight wholesale funds, in order to take advantage of all liquidity premia and the normally upwards sloping yield curve. One essential requirement is to ensure that the Central Bank and the taxpayer do not take the downside, and the commercial bank the upside, of such a liquidity risk play, and the 'two-name' paper proposal above goes in that direction. Even so, it is surely undesirable for Central Banks to face the prospect of holding billions of assets for quite long periods of time as the Bank of England has had to do with Northern Rock. By October 24, the total had reached GBP 20 billion and was still rising; not a satisfactory state of affairs.

But this raises the question of how one should decide on what might be an appropriate extent of maturity transformation? What are the principles involved? Moreover that question is inter-related with the issues raised earlier on the quality of the assets. If the bank holds a stock of very high quality liquid assets, then the maturity transformation can be greater, since the funding risk can be met by selling or pledging the high-quality assets. There is a trade-off between stock liquidity and maturity transformation. What, perhaps, we need is a menu of relationships between stock liquidity and maturity transformation, such as if maturity transformation is measured from 0 (no transformation) to infinite, and stock liquidity is measured as a percentage of assets, then

Actual maturity transformation	0	30	60	100	Infinite
Appropriate stock liquidity	0	5	10	30	100

An immediate problem is that this assumes that there is a single accepted scale of measurement, whether cardinal or ordinal, for both maturity transformation and stock liquidity, and this is not so. A bank will have a wide set of assets and liabilities with a variety of conditions, (*e.g.* early withdrawal penalties, interest rate roll-over dates, etc.). How can one, or should one, compare the maturity transformation positions of two banks? In the past regulators thought about maturity ladders, so that one looked at the net position of banks over differing horizons, *e.g.*

	Up to 1 week	1-4 weeks	Up to 3 months	3-6 months	6 months >
Bank A	+20	-40	-50	+10	+60
Bank B	-30	+20	-10	--	+20

How would one compare the liquidity position of Bank A and Bank B? Moreover what does one do about retail deposits, demandable on sight but normally the most stable and reliable of all liabilities. And how about contingent liabilities? IKB and Sachsen had to be rescued when the market funding of their conduits came under pressure and they were forced to take these back on to their balance sheets in effect, and did not have enough capital to do so.

In his Belfast speech (October 9, 2007), Mervyn King compared the outcomes of the problems of Countrywide in the United States with those of Northern Rock in the United Kingdom. Countrywide had liability insurance; Northern Rock did not. The run on Countrywide was far less extensive, and politically damaging, than that on Northern Rock. Yes, indeed, but the banks writing insurance for Countrywide had by the same token a worse liquidity position. Assume two banks, A and B; A writes insurance on B; B writes insurance on A. Both appear to have insured their liabilities, but in truth there has been no reduction, just a repackaging, of aggregate liquidity risk; perhaps the repackaging relocates risk in a systemically more favourable way, perhaps not.

Before we rush to take normative action to require banks to abide by certain principles of liquidity management, there is a huge task of positive research to be done on the question of how to measure the extent of maturity transformation, with the ultimate objective of reducing it to a single scale (as the VaR measure did for banks' market risk). Can we find an equivalent VaR for maturity transformation? There is a similar problem of measuring stock liquidity. There is no firm barrier on one side of which all assets should count 100% for such stock liquidity and on the other side 0%. Again there is a major measurement exercise to be done.

By the nature of this exercise, we know that any such measurement system will be imperfect, fuzzy and open to gaming (as is VaR). What that, in turn, means that such measurement exercises should be used to set principles, and *not* required ratios or minima. The supervisory authorities should take such principles as the basis for starting dialogues with banks that fall significantly below the appropriate levels. But they should also have the ability, once such dialogue has been undertaken, to require commercial banks to enhance their liquidity position, and to impose sanctions if they fail to do so. And that takes us back to the issue of appropriate sanctions. Since that is beyond the scope of this paper, this is, perhaps, a good point to stop.