#### THE NORTHERN ROCK AFFAIR: AN ANALYSIS OF THE 'TEASER RATE' STRATEGY

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### 1. Introduction: Northern Rock's 'teaser rate' strategy

Northern Rock's rapid expansion from its de-mutualisation in 1997 to the summer of 2007 owed much to marketing, particularly the so-called 'teaser rate' strategy. According to *The Daily Telegraph* in an analysis in November 2007, the strategy was devised by Mr. Adam Applegarth in its early years as a quoted PLC. Mr. Applegarth later became Northern Rock's chief executive and was still in this position when the bank's growth plans hit their nemesis in September 2007. The essence of the strategy was to offer mortgages at rates that appeared to be little different from banks' cost of funds in order to take business from rival organizations, while charging fees and a number of other add-ons which gave Northern Rock a reasonable profit. It should be said that – even allowing for the fees and add-ons – Northern Rock's loan margins were low compared with most of the competition.

One of the issues raised by the Northern Rock affair is therefore 'How are banks' loan margins determined?' The purpose of the current paper is to set out a framework which answers this question, but also relates it to the long-run evolution of banking systems. Specifically, a formula is derived to relate the average return on banks' assets to the ratios of cash and capital to assets, and a brief historical survey then shows that these well-known measures of liquidity and solvency are much lower in banking today than in the past. The discussion recognises the separate roles of 'liquidity' and 'solvency' in two types of decision analysis. These are, first, the thinking of banks' managements with their goal of profit-maximisation and, secondly, the agenda of financial regulation, as the regulators do their best to ensure that deposits always remain convertible into cash at par.

A fair generalisation is that the lower are cash-to-deposit and capital-to-asset ratios, the riskier are the banks' operations and the greater should be regulatory concern about their ability to meet claims. On the other hand, an implication of the formula is that, for any given rate of return on capital in the banking industry, the lower are the ratios, the lower also is the cost of bank finance to non-banks. Banking therefore suffers from an inevitable tension. The competitive, low-margin and customer-oriented banking practiced by Northern Rock, while admirable in some respects, may be difficult to reconcile with the emphasis on depositor safety demanded by the media in the immediate aftermath of a crisis.

### 2. How are banks' loan margins determined?

Bank loans are risky and costly to organize, and they are financed by deposits on at least part of which interest is payable. It is clear that revenues (i.e., net interest margin, fees and other income) must be sufficient at least to cover the following list of items,

- An allowance for likely loan losses,
- The costs of organizing the loans and maintaining the money transmission infrastructure which enables banks to collect deposits, and
- The cost of funds to the lending bank, in terms of the interest rate paid on deposits or other finance.

Loan losses might not unreasonably be expected to be close to zero for a specialist mortgage bank, like Northern Rock, maintaining low loan-to-value ratios and requiring borrowers to buy mortgage indemnity cover<sup>1</sup>. For simplicity, the rate of loan loss is ignored in the rest of this paper. In the real world the costs of organizing loans are substantial, but they are largely met or exceeded by arrangement fees. For banks with extensive branch networks and a major role in the payments mechanism, the costs of collecting and managing deposits are also substantial, but they are assumed here to be zero to ease the exposition. With the assumptions of nil loan losses and zero running costs, the average return on banks' assets would still not be identical to the loan margin if assets included bonds and securities. Nevertheless, the concepts must be closely related in a world – such as that of today – in which banks' assets are dominated by their loan portfolios. In the rest of this paper the phrases 'return on bank assets' and 'loan margin' are used interchangeably in order to facilitate the discussion, even though they are not the same in practice. Obviously, loan margins need to be adjusted upwards to deliver a particular 'return on assets' if allowance has to be made for loan losses and bank running costs.

The list of costs set out in the last paragraph applies to all types of credit institution. But many such institutions – including, for example, hire purchase companies and specialist leasing businesses – are not banks. Without entering too deeply into the vexed question 'What is a bank?', the distinctive

<sup>&</sup>lt;sup>1</sup> A plethora of newspaper reports appeared in late 2007 about the irresponsibility of Northern Rock's lending practices. The write-off rate on Northern Rock's loan assets in the first half of 2007 was in fact 0.01 per cent, although a larger charge (of almost 0.12 per cent of mean advances to customers) was made. See the section on 'Loan loss impairment' in Northern Rock's *Interim Results*, published on 25<sup>th</sup> July 2007.

characteristics of banks may be understood to include the ability to take and repay cash deposits over the counter, and an obligation to maintain a cushion of capital against possible loan losses which further protects depositors' interests. Historically cash reserves, both in the form of 'vault cash' and in a balance at the central bank, have not paid interest, but they are essential for retail deposittaking<sup>2</sup>. It follows that, for any given loan margin (which may be measured as a percentage of loan assets), the rate of return on assets is a positive function of the ratio of non-cash, earning assets to total assets. Plainly the rate of return on capital depends on both the rate of return on assets and the ratio of ratio of capital to assets. The argument is easily statement in algebraic terms. Let a bank's assets be split between cash, C, with c representing the ratio of cash to assets, and earning assets or loans, L. Then total assets A = C + L or A =c.A +L. So L = (1 - c).A. Profits (P) are equal to the loan margin or profit 'spread' on assets, s, multiplied by the earning assets, L, or

$$P = s.L = s.(1 - c).A$$

while the rate of return on capital (K) is P/K, which is

P/K = s.(1 - c).A/K.

So

s = P/K. (1/[1 - c]). K/A.

It is clear that, if the loan margin is given, the rate of return on capital is inversely related to the cash/assets ratio (or indeed almost certainly the more conventional cash/deposits ratio) and the capital/assets ratio. As Phillips remarked in his 1921 classic on *Bank Credit*, 'the essence' of banking 'consists in the practice of extending loans far in excess of either the capital or the cash holding of the bank in question'<sup>3</sup>.

By implication, bankers are likely to support any developments, in institutions or technology, which enable them to lower their cash/deposits ratio (i.e., their 'liquidity') and their capital/assets ratio (i.e., their 'solvency'). The next two sections discuss the long-run trends in banks' liquidity and solvency, with a particular emphasis on the UK as background to the Northern Rock affair.

<sup>&</sup>lt;sup>2</sup> Following a precedent set by the European Central Bank, the Bank of England started to pay interest on reserve balances in 2006. While a system of remunerated reserves would require a radical restatement of the argument in this paper, in the UK's case it was made so recently as not to affect the paper's key points.

<sup>&</sup>lt;sup>3</sup> W. Phillips, Bank Credit (New York: Macmillan, 1921), p. 13.

# 3. Long-run trends in bank liquidity: an historical perspective

Banking evolved from the safekeeping of money. In the familiar accounts people left deposits of a widely-recognised monetary commodity (usually precious metals like gold) with a specialist in safekeeping, such as a goldsmith. Initially the deposit was backed 100 per cent by the assumedly safe 'hard' monetary asset. Over time the notes which acknowledged the deposits were used in transactions instead of gold, while bankers found that they could make loans in their note liabilities instead of gold. By issuing note liabilities without gold backing, the ratio of gold to total liabilities fell from 100 per cent or more to markedly lower levels. Nowadays the safe monetary asset – the so-called 'monetary base' – is no longer a precious metal, but the legal-tender notes issued by the central bank. But, like gold, legal-tender notes do not pay interest. Because notes are not earning assets, modern banks want to reduce the ratio of cash to their earning assets, in the same way as goldsmiths in embryonic banking.

Early banks often had cash/asset ratios of over 50 per cent. (One example is provided by Scottish banking in the middle of the 18<sup>th</sup> century, which is a favourite topic of the advocates of 'free banking').<sup>4</sup> By the start of the 20<sup>th</sup> century the UK's so-called 'joint-stock banks', with their limited liability to shareholders and a sophisticated system of cheque-clearing, had cut the ratio to 11 per cent and continued to retain their customers' confidence. This fall had been facilitated by two insights, first, that the convertibility of deposits into cash could be protected by holding interest-bearing assets which could be readily sold for cash as well as by the holding of cash itself, and, secondly, that a distinct institution with the prerogative to issue notes (i.e., a central bank, which was the Bank of England in the UK's case) could lend to commercial banks if they ran out of cash.<sup>5</sup> Indeed, the key to maintaining

<sup>&</sup>lt;sup>4</sup> Charles W. Munn, 'The origins of the Scottish note exchange', *Three Banks Review* (1975), no. 107, pp. 45–60. In February 1768 the Aberdeen Banking Co.'s ratio of specie to demand liabilities was 61.2 per cent. (See p. 51.)

<sup>&</sup>lt;sup>5</sup> A classic discussion of the factors influencing banks' cash/asset ratios was provided by Francis Edgeworth in his 1888 paper in the *Journal of the Royal Statistical Society* (vol. LI, pp. 113–27) on 'The mathematical theory of banking'. But Edgeworth concentrated on the scale benefits of a large bank, because of 'the law of large numbers' acting on deposit withdrawals, and the advantages of establishing a clearing-house. He did not discuss the ability of a central bank to create cash at zero cost and the implications of its ability to lend such cash (i.e., the ability to make lender-of-last-resort loans) for banks' own cash management practices.

deposit convertibility was not to have a large holding of idle vault cash, but to nurture a good relationship with the Bank of England and keep holdings of an assortment of 'liquid assets'. It was understood that such assets could either be sold to the Bank (possibly on repurchase terms) or would serve as collateral for a loan.

During the 20th century the Bank of England therefore paid close attention to both the cash ratio and 'the liquidity ratio' (i.e., ratio of explicitly defined liquid assets to a large balance sheet category, such as deposits held by non-banks) observed by the banks. In the first few years after the Second World War the cash ratio dropped to 8 per cent, while the liquidity ratio was 40 per cent and banks' assets were dominated by claims on government. In such circumstances it was virtually inconceivable that a run would exhaust banks' cash holdings. Over time both ratios fell dramatically. By the late 1950s the Bank of England has allowed the liquidity ratio to go down to about 30 per cent, although the institutions specifically charged to respect this ratio - the clearing banks resented the competition they faced from other credit-granting organizations not subject to ratio control. In the Competition and Credit Control reforms of 1971 the discrimination against the clearers was largely remedied by the setting of a 'reserve assets ratio', applicable to all banks, at 12 1/2 per cent of sterling deposits. The clearers had to keep a non-interest-bearing balance at the Bank of England, equal to 1 <sup>1</sup>/<sub>2</sub> per cent of deposits, on top of their required reserve assets, but this had an obvious functional rationale in their clearing activities and was not objectionable to them.

By now competition and risk-taking were intensifying, but British banking seemed to be working smoothly. In 1981 both the clearers' 1  $\frac{1}{2}$  per cent ratio and the 12  $\frac{1}{2}$  per cent reserve assets ratio were scrapped. Instead all banks – whether involved in clearing or not – were to lodge a deposit in 'special non-operational, non-interest-bearing accounts' at the Bank of England equal to  $\frac{1}{2}$  per cent of so-called 'eligible liabilities' (i.e., non-equity liabilities to agents other than banks and the government). These accounts were seen as serving no purpose in either monetary control or financial supervision and regulation. Instead they existed to give the Bank of England funds which it re-invested in interest-bearing securities, generating an income sufficient to cover its costs. The clearers kept a separate balance, over and above the  $\frac{1}{2}$  per cent, to settle debit and credit balances at the end of each daily clearing, but it was now a very low ratio of their balance sheet totals.

The Bank of England was still concerned about the degree of maturity transformation that the banks were undertaking. The liquidity ratio was history and the reserve asset ratio had been abolished, but in July 1982 the Bank published a paper on 'The measurement of liquidity', showing how individual banks were to calculate (among other things) a 'net cumulative mismatched position'. Bank officials continued to supervise all banks' liquidity until 1998, when the job was transferred to the newly-created Financial Services Authority as part of an institutional upheaval at the start of the Blair government. This institutional upheaval led to the transfer of many officials from the Bank of England, with its decades of experience and a fund of central banking know-how, to the FSA which had yet to find its feet. Some officials at the FSA undoubtedly did appreciate that the structure of assets, and in particular the ratio of liquidity to total assets, was relevant to the integrity of the banking businesses under its supervision. But a fair comment is that official interest in UK banks' ability to withstand a run was sharply less than had been the norm during the 20<sup>th</sup> century.

### 4. Trends in bank liquidity: the run-up to the Northern Rock crisis

The *insouciance* towards banks' vulnerability in a run was reflected in several developments in the decade leading up to the Northern Rock crisis. The traditional understanding had been that banks' cash reserve with the Bank of England had a definite functional rationale for the depositing banks themselves. Their cash reserves were both the accounts in which the clearing banks themselves settled their end-of-day imbalances and a backstop for their vault cash, if their vault cash came under attack from a loss of confidence and a retail run. Further, by opening an account at the Bank of England a bank started a relationship with the UK's central bank, which included the possibility of borrowing from it in the appropriate circumstances. Indeed, historically, building societies had not maintained accounts at the Bank of England. Instead they 'banked' via the clearing banks, while they had been regulated not by the Bank of England, but by the Registrar of Friendly Societies.

But officialdom seems increasingly to have forgotten that banks' cash reserves at the Bank of England had a functional purpose. Under the terms of the 1998 Bank of England Act and the 2000 Financial Services and Markets Act, UK banks were required to maintain a non-interest-bearing balance at the Bank of England of only 0.15 per cent of eligible liabilities. The Treasury subsequently published two consultative papers on what it come to term 'the cash ratio deposit scheme', in which the sole purpose of the scheme was seen as providing the Bank of England with non-interest-bearing balances.<sup>6</sup> These balances could be re-invested in interest-bearing securities to generate a profit, and so to cover its staff and other costs. The scheme was discussed solely and entirely as a mechanism for covering the Bank of England's costs, and as having no wider value for the British banking system. The two documents seemed to be oblivious of the operational rationale of a cash reserve at the central bank from the commercial banks' own point of view.

<sup>&</sup>lt;sup>6</sup> The Treasury published the two documents – both called *Review of the Cash Ratio Deposit* Scheme: Consultation on proposed changes – in August 2003 and August 2007. In qualification to the statement in the text, the Bank of England was fully aware of the significance of the cash ratio deposit scheme for bank's liquidity management. See *The Framework for the Bank of England's Operations in the Sterling Money Markets* ('the Red Book') (London: Bank of England, March 2008), p. 6.

Before its demutualisation in October 1997 Northern Rock had been a mutually-owned building society and its direct contacts with the Bank of England were negligible. Since 1998, like other quoted British banks, it has kept a non-interest-bearing deposit at the Bank of England. In May 2006 the Bank of England changed the structure of its relationship with the UK's commercial banks in wide-ranging reforms, notably by starting to pay interest on cash reserves separate from the 0.15 per cent cash ratio deposit scheme. The new terms of the Bank of England's relationship with its customer banks were contained in a Red Book, which - in its own words - was 'designed to provide flexible access to central bank money, including in unlimited size against eligible collateral at a penalty rate through' the so-called 'standing lending facility'.<sup>7</sup> In the summer of 2007 Northern Rock was a participant in the Bank of England's reserve schemes and a member of the list of banks to which a standing facility might be granted. The phrases contained in the Red Book were apparently comforting, implying that - as a long as Northern Rock or any other British bank had good collateral - it could always meet a run by selling assets (probably on a repo basis) to the Bank of England. The events of August and September 2007 were to show that, in practice, no one in Northern Rock's management or the Bank of England knew precisely what was supposed to happen if Northern Rock lost the confidence of its retail depositors.

Nevertheless, for most of Northern Rock's existence as a PLC the resilience of its defences against a retail run was not a big topic in its corporate strategy. Its regional roots and smallness handicapped it in the market for UK retail deposits. Here the clearers - with their national branch networks and the scale that allowed them to enjoy huge 'network economy' advantages in settlement business - were entrenched. Instead Northern Rock, like two other former building societies (Bradford & Bingley, and Alliance & Leicester), decided to fund their expansion in the wholesale markets, including the international markets in asset-backed securities (ABS) and collateralised mortgage obligations (CMO) which had started to grow rapidly in the 1990s. At demutualisation Northern Rock's liabilities were dominated by its retail deposits, mostly in the north-east of England; by the end of June 2007 its retail liabilities of £24.5bn were exceeded by wholesale money amounting to £26.7bn, securitisations of £45.7bn and covered bonds of £8.1bn<sup>8</sup> A fair comment is that by this stage Northern Rock's management hoped to meet any funding problem by the issue of further securities. After all, in early 2007

<sup>&</sup>lt;sup>7</sup> The Framework for the Bank of England's Operations in the Sterling Money Markets (London: Bank of England, March 2008), p. 7.

<sup>&</sup>lt;sup>8</sup> See Northern Rock's Interim Results, published on 25<sup>th</sup> July 2007, p. 19 and p. 36.

it had been accorded a higher credit rating by the rating agencies and a large securitisation issue had been oversubscribed.

With hindsight, Northern Rock's business model and particularly its reliance on wholesale funding have been deemed imprudent or even irresponsible.<sup>9</sup> But in truth by the early 21<sup>st</sup> century the whole of the British banking system had economised on cash to a remarkable extent and, in this respect, taken a cavalier attitude towards funding risk. Cash as a fraction of total sterling liabilities, and even of sight sterling liabilities, had become nugatory by 2005. In January 2006 UK banks' cash ratio deposits were £1,953m. and other balances at the Bank of England (i.e., the balances actively used in settlement of payments business) were £839m., and their vault cash was £5,417m. Their total cash resources were therefore £8,209m. At the same time their sight liabilities to UK non-banks were £629,892m and their total sterling liabilities £2,534,494m. So the ratio of cash to sight liabilities held 'by the British public' was 1.3 per cent and the ratio of cash to all sterling liabilities was 0.3 per cent.<sup>10</sup> In other words, the cash ratio of British banks had dropped to about a thirtieth of what it had been 80 years earlier! Perhaps it is unnecessary to add that the situation in summer 2007 - which had changed again because of the introduction of interest-earning reserves in May 2006 - remained a far cry from the 100 per cent cash reserve ratio found when the idea of banking had been conceived in the late middle ages.

How would UK banks' managements have reacted if critics pointed out the apparently perilous degree of maturity transformation in their balance sheets? The answer might have had two parts. First, they might have mentioned that they kept deposits at other banks plus a cushion of ready-for-sale securities, often enjoying a triple-A credit rating and hence similar in quality to those that would have qualified as 'liquid' in the eyes of the Bank of England in the mid- $20^{th}$  century, on top of cash itself. In fact, at the end of June 2007 Northern Rock had deposits with other banks of £6,812m and ready-for-sale securities of £8,000m., against a balance sheet total of £113,506m.<sup>11</sup> So its 'liquid assets', taken altogether, were more than 13 per cent of liabilities (and much more than 13 per cent of retail deposits), not out of line with the norms

<sup>&</sup>lt;sup>9</sup> See, for example, the evidence of Mervyn King and Professor Willem Buiter to the Treasury Committee of the House of Commons, as summarized on p. 18 of volume one of the Treasury Committee's *The run on the Rock: 5<sup>th</sup> report of the session 2007/8* (London: The Stationery Office, 2008).

<sup>&</sup>lt;sup>10</sup> The apparently extreme vulnerability of the British banking system to a system-wide retail run was discussed by the author in Tim Congdon 'Short of cash', p. 41, in the July/August 2008 issue of *Financial World* (London: IFS School of Finance in association with the Centre for the Study of Financial Innovation).

<sup>&</sup>lt;sup>11</sup> Again see Northern Rock's Interim Results, published on 25th July 2007, p. 19.

of the late  $20^{th}$  century. Secondly, banks' executives might have noted that they had inter-bank 'lines' (i.e., borrowing facilities), which could be used if – for any reason – they could not find buyers for their supposedly 'ready-for-sale' securities.



Chart 1: The Changing Composition of the UK Banking System's Assets

The trouble here was that, while any individual bank could regard an inter-bank line from other banks as enabling it quickly to add to its cash, for all banks together the inter-bank lines cancelled out. If the banks either ceased to trust each other or found that they needed cash for their own businesses, the likelihood was that banks would cut their lines to each other. Inter-bank finance would prove illusory as a source of liquidity. Further, if the market in allegedly 'ready-for-sale' securities became constipated by excess supply (of, for example, the ABSs and CMOs which had been issued in vast quantities in 2005 and 2006), the only ultimate source of cash was the central bank, which in the UK context of course meant the Bank of England. As is well-known, the international wholesale banking markets became paralysed in August 2007 as

a by-product of a crisis in sub-prime mortgage lending in the USA. When a number of British banks approached the Bank of England for an easing of its collateral requirements for central bank credit, they received a dusty answer. For many years they had cut back drastically on their cash holdings, taking for granted that the Bank of England would always help them out as long as they had adequate capital and good-quality assets. This assumption was shattered by the insistence of Mervyn King, the Bank's Governor, that only government securities constituted the right kind of collateral for central bank loans. In mid-2007 the British banking system had extremely low cash relative to deposit liabilities by past standards, while the availability of new cash from its ultimate source (i.e., the Bank of England) was thrown into doubt.<sup>12</sup> For reasons not discussed here, British banks' net claims on government were also tiny by the early 21<sup>st</sup> century. (See Chart 1 above.)

<sup>&</sup>lt;sup>12</sup> A growing problem from mid-2007 was that many of the securities believed to be 'readyfor-sale' had been conceived in the structured finance boom of the previous few years. Despite having triple-A credit ratings, they became illiquid and for several quarters could be sold only at prices well beneath their par value. In the past – including the quite recent past – British banks' transactions with the Bank of England had been conducted largely in 'eligible' commercial bills, with eligibility for sale to the Bank being established by the acceptance of the default risk by two good banking names. The arrangements were brought to an end in 2003, largely at the instigation of Mr. Paul Tucker, one of the Bank's executive directors. One of the virtues of the eligibility system was that it dispensed with the need for outside credit ratings, since the credit assessment has to be done by the banks 'accepting' the default risk.

### 5. Long-run trends in bank solvency

For many decades writers on monetary theory – and particularly writers on the theory of monetary policy-making – paid considerable attention to the ratios of cash and liquidity to banks' overall balance sheet size. By contrast, the ratio of capital to assets was neglected until the 1980s. One reason is that central banks did not always publicise their views on the desirable level of banks' cash/assets ratio. In the first edition of *The British Financial System*, published in 1973, Revell noted that building societies were subject to regulations on their capital reserves set by the Registrar of Friendly Societies, but for the banks matters were somewhat different. To quote,

The Bank of England keeps a close watch on the reserve ratios of the bodies under its direct surveillance in the banking system – deposit banks, accepting houses, other secondary banks and discount houses. In all cases it works to certain minimum ratios, although nobody outside the Bank knows what these ratios are.<sup>13</sup>

Of course banks' management were cognisant of their capital ratios from internal records and they had to keep shareholders informed in their audited accounts. So – despite the apparent regulatory neglect of the capital side of banks' balance sheets until the last 25 years – researchers have been able to compile data on the long-run behaviour of capital ratios. As with the cash and liquidity ratios, the trend is clear. Whereas in the embryonic phase of banking capital/asset ratios put heavy emphasis on safety and were often over 30 per cent, in the 20<sup>th</sup> century and the opening years of the 21<sup>st</sup> century the ratios fell substantially and with only occasional interruptions to the long-run pattern.<sup>14</sup>

This is not the place for a systematic treatment, but some generalisations can be offered. (See Table 1 for some relevant data.)<sup>15</sup> In the late 19<sup>th</sup> century a capital/assets ratio of over 15 per cent was normal even in the UK, the

<sup>&</sup>lt;sup>13</sup> Jack Revell *The British Financial System* (London and Basingstoke: Macmillan Press, 1973), p. 105.

<sup>&</sup>lt;sup>14</sup> The subject is of course vast, but – for example – see p. 124 of Howard Bodenhorn *A History of Banking in Antebellum America* (Cambridge: Cambridge University Press, 2000.) At end-June 1840 the Bank of Charleston had an equity-to-assets ratio of 60.6 per cent and a contingency fund of over 5 per cent of assets as well! It nevertheless earned a return on equity of about 10 per cent.

<sup>&</sup>lt;sup>15</sup> The data used in the table come from p. 149 of M. K. Lewis and K. T. Davis *Domestic and International Banking* (Oxford: Phillip Allan, 1987).

most advanced financial power of the time. By contrast, in the first half of the 20<sup>th</sup> century the leading British banks regarded an appropriate capital/ asset ratio as between 7 per cent to 10 per cent. In the second half of the 20<sup>th</sup> century the figure had fallen to 5 to 6 per cent. By the end of the century banks in the USA and Europe - which had historically operated on higher capital/asset ratios than their British counterparts – increasingly had the same attitude towards capital adequacy, but bank managements and regulators in these areas were dismayed by the very low capital/asset ratios in Japanese banking. Indeed, the view that Japanese banks' skimpiness on capital allowed them to undercut their rivals in the offshore banking markets provoked the Anglo-American 'convergence accord' on bank capital in January 1987. The accord developed into the Basle capital rules which were enforced in all the participating countries, including Japan, to establish a 'level playing field'. As is well-known, the central principle of the first set of Basle guidelines was that capital should be not less than 8 per cent of assets, with equity capital equal to at least half of total capital. The similarity of this principle to British banks' own preferred capital/assets ratio of about 5 per cent is striking. Given the pattern of the preceding international negotiations in which UK officials had been so active, the setting of a 4 per cent minimum may not have been entirely accidental.

	UK Banks*	US Banks <sup>+</sup>
1880	16.8	n.a.
1900	12	n.a.
1914	8.7	18.3
1930	7.2	14.2
1940	5.2	9.1
1950	2.7	6.7
1966	5.3	7.8
1980	5.9	6.8
1985	4.6	6.9

Table 1: Equity capital to total assets of UK and US banks, 1880–1985

<sup>\*</sup> UK deposit banks 1880–1966, UK clearing bank groups 1980 and 1985

<sup>+</sup> All member banks of the Federal Reserve system

The low value of the UK ratio in 1950 reflected the high ratio of low-risk government paper in banks' assets after the Second World War.

Source: Jack Revell, *The British Financial System* (London and Basingstoke: Macmillan Press, 1973), p. 105.

Northern Rock became subject to the Basle rules at its de-mutualisation. Indeed, references to compliance with the latest developments in the Basle regulatory framework were included in its last published accounts as a quoted PLC.<sup>16</sup> Perhaps it is premature to pass judgement on international banks' manipulation of asset and liability structures over the last decade or so, as they attempted to bypass the Basle constraints. Nevertheless, even a cursory examination of banks' annual reports shows that in the last few years actual ratios of equity capital to assets have often been under 3 per cent for a very large number of institutions. They nevertheless met the Basle rules because those rules allow a zero weight (in terms of capital usage) for inter-bank exposures and claims on government, as well as other technical exemptions. Not the least of the adjustment problems created by the paralysis in the wholesale banking markets from August 2007 was that, whatever the Basle rules said, responsible banks decided in their own interests to allocate capital against the risk that other banks might fail. Contrary to the intention of international bank regulation since the late 1980s, banks ceased to trust each other in the crisis of 2007. Equilibrium capital/asset ratios rose sharply across the whole international system. The risks of defaults on claims on other banks were given new urgency by the collapse of Northern Rock, even though - in strict legal terms – by the end of the year it continued to have positive capital and had met all its obligations.

To conclude this section, in the early phase of modern industrialism banks typically had capital/asset ratios of over 30 per cent, but in the middle years of the present decade the effective ratio was little more than 3 per cent. A significant rise in the ratio, probably to about 5 per cent, and a fall in the ratio of inter-bank claims to total assets are likely to be two medium-term responses to the current crisis.

<sup>&</sup>lt;sup>16</sup> See Northern Rock's Interim Results, published on 25th July 2007, p. 13.

# 6. What do the trends in liquidity and solvency imply for loan margins?

It is now time to bring together the strands of the argument by setting out a matrix which shows how, with a particular return on equity targeted, the average return on bank assets varies with different ratios of cash and capital to assets. The matrix – set out in Table 2 below – uses the formula developed earlier for the determination of banks' average return on assets. A reminder may usefully be inserted that the implicit assumptions in preparing the matrix are the same as they have been throughout this paper. They are that banks have no loan losses, and that banks' fee revenues cover the costs of organizing the loans and running any deposit collection and money transmission infrastructure.<sup>17</sup>

<sup>&</sup>lt;sup>17</sup> Also neglected – as mentioned in the text – are the complications arising from banks' issue of bonds and preference capital. Liabilities are deemed, for simplicity, to consist solely of equity capital and deposits. The text assumptions may seem unrealistic, but in the case of Northern Rock they are far from silly. In the five years leading up to the crisis of mid-2007 its loan losses were negligible, while its wholesale funding model minimised the costs of collecting deposits and arrangements fees covered the costs of organizing loans. Could Northern Rock have been 'reckless' in its asset selection, if its loan losses had been negligible over such a sustained period? In the years to 31st December of 2003, 2004, 2005 and 2006, pre-tax profits were £390m., £435m.,  $\pm$  494m. and  $\pm$  627m. respectively, compared with shareholder funds at 31<sup>st</sup> December of 2002, 2003, 2004 and 2005 of £1,210m., £1,388m., £1,538m. and £1,576m. respectively. The implied rates of return on shareholder funds (on a preceding year basis) were therefore 32.2 per cent, 31.3 per cent, 32.1 per cent and 39.8 per cent. (Data taken from August 2007 issue of Company Refs: Fully Listed Companies [London: HS Financial Publishing].) No doubt Northern Rock's management and auditors made mistakes, as do those of any commercial organization. But - given the record of consistent profitability and the relative simplicity of Northern Rock's business - the claim that its operations were systematically 'reckless' seems implausible, to say the least. On 12th May 2008, under new management, Northern Rock issued a trading statement which included a change in its policy towards arrears accounting. To quote from the next sentence, 'the change...does not reflect any change in the underlying quality of Northern Rock's mortgage portfolio, as demonstrated by the low level of realised losses which the company has experienced on its mortgage portfolio over many years'.

<i>P/K</i>	С	K/A	r <sub>b</sub>
Rate of return on capital	Cash ratio	Capital/assets ratio	"Loan margin"
14	80	45	31.5
14	40	20	4.7
14	12	15	2.4
14	5	8	2.2
14	1	5	0.8
14	1	3	0.5

Table 2: How banks' loan margins vary with their cash and solvency ratios

Table 2 shows, with a given target rate of return on capital, how a reduction in banks' average return on assets (i.e., their 'loan margin', more or less) becomes possible as their cash/asset and capital/asset ratios decline.

A target rate of return on capital of 14 per cent has been chosen, as this sort of number would be regarded as modest by contemporary UK banks in their internal strategy documents and serves as a reasonable benchmark for discussion.<sup>18</sup> In the very early days of banking – when banking was indeed little different from risky and avaricious money-lending, and the cash ratio was perhaps 80 per cent and the capital/assets ratio 45 per cent - the loan margin had to exceed 30 per cent. In the opening decades of the industrial revolution, in such countries as England, Scotland and the USA, a cash ratio of 40 per cent and a capital/asset ratio of 20 per cent would have been commonplace in the banking industry. A loan margin of almost 5 per cent (i.e., 500 basis points) would achieve a return on capital of 14 per cent. In the early decades of the post-war world, with a cash ratio of 5 per cent and a capital/assets ratio of 8 per cent, a loan margin of about 200 basis points would have been consistent with that return on capital. But in the low-ratio banking of the last 15 years or so, loan margins of 100 basis points or less were compatible – assuming all went well with asset selection and cost control - with high bank profitability. Admittedly, the teaser rates offered by Northern Rock may have taken the logic of these developments to an unsustainable extreme. But that does not necessarily mean that the Northern Rock management was irresponsible and foolish. Northern Rock's activities

<sup>&</sup>lt;sup>18</sup> As demonstrated by the previous footnote, Northern Rock exceeded the 14 per cent figure by a wide margin, until its funding – and so the business itself – collapsed in late 2007. The chief economic commentator of the *Financial Times*, Martin Wolf, protested about the high profitability of banking in a column on 28<sup>th</sup> November 2007, attributing it to 'sundry explicit and implicit guarantees' from the state. Later in his column he endorsed 'higher capital requirements'. The argument of this paper is that the likely result of imposing higher capital requirements is that banks will widen their margins. A widening of banks' loan margins has indeed occurred in early 2008. See Chart 2 and footnote 20 below.

certainly intensified competition within the UK housing finance industry and, to that extent, benefited the British public.

Chart 2: The rise and Fall of "The Teaser Rate"



Chart refers to monthly data. Note that the scale has been inverted, so that the lowest values of the mortgage margin (in 1999) appear to be the highest

The regulatory sequel to the Northern Rock crisis has included a drive towards the raising of capital/asset ratios in UK banking as part of a wider campaign to improve the safety of deposits. Since the *contretemps* of August 2007 the Bank of England has continued to equivocate about the type of assets it would readily purchase from the banks, even if it has to some degree relented on King's initial insistence that only government paper constituted valid collateral.<sup>19</sup> Meanwhile banks have cut back on inter-bank exposures and tried to improve the quality of the securities in their portfolios. So the long-run pattern for banks to economise on cash and low-yielding liquid assets, and to increase their leverage, have been reversed. This reversal may

<sup>&</sup>lt;sup>19</sup> A Special Liquidity Scheme was introduced in April 2008, to enable banks to swap mortgage debt into gilt-edged securities (on a repo basis for as long as a year, if desired), so that the gilts could be used as collateral in the inter-bank market. King's insistence on government paper as collateral for a loan from the Bank of England, or as the assets purchased by the Bank in open market operations, is remarkable by historical standards. For most of the 19<sup>th</sup> century the Bank's assets were dominated by commercial bills, not government securities. As recently as the 1980s the Bank's holdings of commercial bills were several times larger than its holding of claims on the government. Indeed, in 1984 and 1985 a veritable 'bill mountain' resulted from the Bank's operations in the gilt-edged and money markets, and – according to the Prime Minister of the day – the Bank's excessively large holdings of commercial bills (i.e., claims on the private sector) constituted a policy problem. (Margaret Thatcher *The Downing Street Years* [London: HarperCollins, 1993], pp. 695–6.)

be merely cyclical, but sooner or later the secular trend towards low-ratio banking had to end. The Northern Rock crisis demonstrated yet again that, in banking, 'convulsion' can follow all too quickly after 'overtrading'.<sup>20</sup> At any rate, for Northern Rock's customers, and the many other British households servicing mortgages or considering house purchase, the effect of the reversal in the long-run trend towards low-ratio banking has been a rise in the cost of mortgage finance.<sup>21</sup> (See Chart 2 above).

<sup>&</sup>lt;sup>20</sup> This is of course a reference to Overstone's account of the 19<sup>th</sup> century trade cycle which, in his view, consisted of successive states of 'quiescence, improvement, growing confidence, prosperity, excitement, overtrading, convulsion, pressure, stagnation and distress', before starting up again with 'quiescence'. For a discussion, see Joseph A. Schumpeter *History of Economic Analysis* (London: George Allen &Unwin, 12<sup>th</sup> printing of 1954 edition, 1981), p. 744.

 $<sup>^{21}</sup>$  'The death knell was sounded for the cheap fixed mortgage last night as Britain's biggest lender raised rates by up to 0.5 per cent. Halifax – which provides one in five new mortgages – pushed up the cost of more than half of its fixed-rate deals.' The quotation is from a story headlined 'End of the cheap fixed mortgage', which was the front-page main lead in *The Daily Mail* of 21<sup>st</sup> June 2008.