Could the crisis at Northern Rock have been predicted?:
An Evolutionary Approach

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Introduction

In earlier articles (1986, 1993a), I have shown the relationship between the evolution of banking behaviour, the theory of banking and the scope for monetary policy. Then I was challenged (Chick 1993b) to think about how banking, and its macroeconomic implications, might evolve in the future. There I wrote: 'Sometimes it helps, when trying to see around corners, to look at the way a system has developed in the past' (p. 79). And so it might have done in the case of Northern Rock, but I took my eye off the ball for a long time, so this paper is not an extended version of 'I told you so'. It is an exploration of the causes and consequences of developments in the behaviour of financial institutions and how we all might have foreseen the dangers that these developments present – as indeed many did.

What is the nature of the crisis at Northern Rock?

Northern Rock came to the public's attention as a result of a loan – a rather massive loan (£25b.) – from the Bank of England when it was clear it was illiquid – that is, it could not meet its immediate cash flow obligations. Apart from the size of the loan, this looked like a classic lender-of-last-resort operation according to Bagehot rules: lend for illiquidity but not insolvency. The very fact of making the loan, made public by the press, was enough to spark off a run on Northern Rock, the first run on a UK bank for over 100 years. That was the public face of the crisis.

For those who, like me, had not followed Northern Rock's aggressive marketing in the last few years,[1] the idea that there might be more to the situation came from an early statement by the Governor of the Bank of England[2] that the Bank should not lend when a bank was in a pickle of its own making, illiquid because of unwise past decisions. That would put the Bank in the position of supporting the risky behaviour that had caused the problem in the first place. Rather, the lender-of-last-resort facility was designed to provide liquidity when the shortage was something over which the bank had little or no control and which they could not reasonably have foreseen.

What was the nature of Northern Rock's liquidity crisis? Why did they not have sufficient cash for everyday requests for cash withdrawals and other commitments? (Liquidity is a cash flow problem.) Let us look at the balance sheet at the end of 2006, long before this crisis began. (See Figure 1.) There are several ways to safeguard liquidty. One is to hold assets which are 'more certainly realisable at short notice without loss'[3]; these can be sold quickly to meet commitments. Liquid assets amount to only 13 per cent of Northern Rock assets, and the rest of the assets are, in traditional terms (the reason for this qualification will become apparent later), illiquid – mostly mortgage loans. On the other side one wants a stable funding profile. Retail

[1] Northern Rock's mortgage loans in the first half of 2007 alone were up 47 per cent from the same time the previous year. It has emerged that some of these were very risky indeed.
[2] to the House of Commons Treasury Select Committee, 12 September 2007.
[3] Keynes 1930, v. II, p. 67.

deposits account for only 22 per cent of liabilities. Wholesale deposits are the same scale, and the bulk of liabilities are securitised bonds.

At first blush might think that it is a good thing that deposits, the source of demand for cash at sight, should be such a small fraction of liabilities, but actually a deposit base is, these days, usually quite stable and predictable. The very rarity of runs testifies to this. That is why the banks have for so long relied on them as their main source of funding, and why we might view their small contribution here with some alarm. Furthermore, in the text commenting on the balance sheet figures, retail deposits are described as 'on- and off-shore'. Off-shore deposits are more likely to be interest-sensitive and volatile. So also are wholesale deposits. The bonds, the bulk of liabilities, arise from re-packaging mortgage obligations and using these as collateral for the bonds to support their sale.[4] This has been done through Northern Rock's off-shore subsidiary Granite: the data in Figure 1 come from the consolidated balance sheet, which includes Granite. Clearly Northern Rock has relied for a steady stream of cash on the marketability of these securities and on the continued attraction of its deposits to the wholesale market and off-shore depositors, as well as the (normally more reliable) on-shore retail depositors. This is a fair-weather balance sheet, extremely vulnerable to a change in market sentiment.

Northern Rock is not alone in its bizarre balance sheet – not at all. Banks everywhere are following a similar strategy[5] if perhaps in a less extreme form. The traditional banking model, in which a loan stays on the bank's books until repaid and the banker shoulders both the liquidity and the solvency risks attached to the business, while making a profit on the spread between the rates of interest on loans and deposits, has been replaced by an 'initiate and distribute' model, in which the risk attached to loans is passed on through the financial markets to other investors and the fees associated with initiating and servicing the loan are a major source of income.

This model leaves banks vulnerable to the willingness of the market to continue to buy its securitised bonds and to lend to it. When the market began, first in the USA, to mistrust the quality of the mortgages that serve as collateral for these securities, Northern Rock's source of funding, and its cash flow, dried up.

There may also be a problem with solvency – in fact there almost certainly is – but this has yet to surface in full. This will be explored later. We turn to the question at the core of the paper, namely how we got to this point. Because Northern Rock shares the history of both banks and building societies we look for clues in the history of both, and in their interaction.

A feature of early bank evolution, to illustrate a basic principle

The origins of banking are contentious, but one strand emphasises the role of goldsmiths, who accepted 'deposits' of coin for safe keeping, as they had the appropriate facilities. Receipts for these 'deposits' began to be acceptable in some transactions. The goldsmiths soon realised that they could lend some of this money, and charge interest. Thus the same amount of gold supports more transactions. In neo-classical thought this is an improvement in efficiency. But there is now the risk of not

[4] Kregel (2008) gives a detailed explanation of this mechanism.
[5] Again, Kregel (ibid.) is a useful reference.

being able to redeem a receipt in gold when presented (convertibility risk). The limits to this lending had to be determined by experience, by testing the risk that accompanied expansion. Substituting 'deposits' for 'receipts' and 'cash' for 'gold', we have the main liquidity risk facing 19th to late-20th century banking. The goldsmiths had to feel their way, to know how far they could extend loans beyond their actual holdings. Gradually, as experience built up, credit could be extended further. Once receipts began to circulate to third parties in lieu of 'money', we are on our way to the use of bank liabilities as money and fractional-reserve banking.

As the business of banking matured and the banking habit became more widespread, the expectation was established that demands for cash would be small in comparison to total deposits and that the probability of these demands was reasonably well known and stable. These expectations in turn are based on both predictable behaviour and the law of large numbers (there are many depositors, not all of whom, in normal times, will want their cash at the same time). Banks expect to meet most of these demands normally out of a steady cash flow from performing loans and keep enough liquidity to meet exceptional demands. But finding the appropriate level of liquidity was not a smooth and easy process, as the history of bank failures in England attests. Failures were particularly numerous after the long period of suspension of convertibility during the Napoleonic Wars: without the discipline of convertibility, bankers over-extended their lending and under-estimated the liquidity they would eventually need.

The substitution of receipts for gold or deposits for cash introduces a time factor: how *long* will the receipts (deposits) 'stay out there' without their owners demanding their cash. The willingness to hold deposits, and their acceptability in exchange, depends on the banks being able to fulfil their promise of cash on demand, but since claims exceed the thing claimed, the promise can never be fulfilled in aggregate: the system depends on continued willingness to hold the claims. The balloon has gone up, and it had jolly well better stay up. This is the foundation of all banking, and bankers continue to invent new balloons.

The 'traditional' bank of our textbooks

Consider the balance sheet of the traditional 19th-20th century bank: their assets are 'cash' (including deposits at the central bank), liquid assets, advances and investments (mainly longer-term government securities (gilts)). These are balanced by liabilities (almost entirely deposits) and a small amount of.net worth (equity shares), though the latter was considered minor – which is quantitative terms it was. A fair proportion of the assets are liquid: either cash or short-term, highly marketable assets. Even gilts, though their market prices fluctuate much more, are fairly liquid in advanced countries. Advances were considered completely illiquid until the due date, i.e. banks held their loans to maturity. Therefore it was traditional to make 'self-liquidating'[6] loans, e.g. bridging loans between production or wholesale purchase and final sale. These loans had a short time to maturity, so banks could continually reassess their loan book, the performance of their borrowers, and the balance between loans and 'investments' – holdings mainly of gilts. Despite these safeguards, there was a marked maturity mismatch between assets and liabilities, known as lending long and borrowing short, technically 'at sight'.

[6] This term came to be ridiculed, but it captures the important points: that the term of the loan is predictable and the market for the product tried and tested, if not perfectly certain.

Cash and short-term liquid assets were known as 'reserves' against liquidity risk, though this purpose was subverted when holdings were made a legal or conventional requirement and thus could only be used to provide liquidity between reporting dates. Required deposits at the Bank of England were eventually recognised as a tax rather than a reserve and were much reduced, supplemented by 'operational deposits' of a scale to be negotiated between the Bank and individual banks. Left to their own devices, banks squeezed their liquidity cushion more and more, until it became very thin indeed.[7] Liquid assets are not very profitable, so there is every incentive to do this. Confidence in the lender of last resort and the development of interbank lending would have contributed significantly to this trend.

Building societies

Northern Rock shares its history, as do other building-societies-turned-banks, with the building society movement. These institutions fulfilled a role once forbidden to banks on the grounds that mortgage lending entailed to excessive risk due to the degree of maturity mis-match. To match, at least partly, the long-term mortgage loan commitments, the share-holders in building societies were expected to build up their participation before taking out a loan with the same society. Although technically the members of the societies owned shares, these had many of the attributes of bank deposits, though they were thought of as long-term savings. They were attractive because they prepared for a future mortgage and they paid interest.

Notice that the building societies held their reserves in the form of bank deposits, thus creating a pyramid of credit on the monetary base. Building society deposits were a further substitution, just as deposits were a substitute for 'money proper'.

In the late 1960s, the banks complained that they were subject to compulsory ratios of liquid assets to deposits while the building societies were exempt. The ratios were lowered and extended equally to the building societies in Competition and Credit Control (CCC) (1971)[8]. Banks and building societies were now on an equal footing, which perhaps the banks lived to regret. Building society shares were (quite intentionally) imperfect substitutes for bank deposits: they were not designed to be part of the payments mechanism, and as holders, beginning in about the late 1960s, tried to use them for this purpose, they found them awkward compared to bank deposits. Building societies were not banks and so could not grant overdraft facilities. For this reason there were no cheques (the holder had to obtain a draft from the society made out to the third party), and cash points were not permitted. These inconveniences were offset by interest. The restrictions on building society shares were gradually relaxed, and with each relaxation, the banks faced stiffer competition while the ethos of stable saving with the building societies was eroded.

The banks' response

Eventually most banks offered interest on current accounts. CCC had abolished the cartel which fixed bank lending rates and deposit rates in relation to Bank Rate. Banks now used interest rates to compete for deposits, depending on the extent to which they wished to expand their activities: that is, they engaged in liability management. But

[7] The fall in liquid asset holdings has been going on in all western countries for at least four decades but is perhaps most extreme in the UK.

[8] 'Competition and credit control', Bank of England *Quarterly Bulletin*, December 1971.

the interest payments squeezed profits, and that fact and the push for market share presented incentives to take further risks, including moving into mortgages and other longer-term lending, and running down liquid assets whenever they could. (In 1981 the required non-operational balances at the Bank were lowered again.[9])

There was really only one source of liquidity left: the banks' 'illiquid' assets, their loans. Following a technique developed in the USA in the 1970s, UK banks began to securitise their assets. In the Berlin conference in 1990 I characterised this as the 'sixth stage of banking' (Chick 1993). Banks repackage assets and sell securities for which the packages are collateral through a 'special purpose vehicle' (SPV). Securitisation gets the illiquid assets off the bank's balance sheet – or at least it appears to do[10] - and restores liquidity, but it shifts the burden of liquidity provision from the market for short-period, very safe securities like Treasury bills to a more lucrative but uncertain market. (The fact that the supply of Treasury bills and gilts was also drying up one might argue forced the banks' hand.)

The removal of risky assets from the balance sheet became even more important after the first Basel Agreement (1988), establishing capital adequacy controls by means of required capital, itself differentiated into two 'tiers' as ratios to risk-weighted assets. (It cannot be an accident that the first rules attempting to regulate capital adequacy were agreed just as the liquidity cushion had lost almost all its stuffing. Once there is no liquidity provision, solvency is the next thing to worry about, though paradoxically the framers of Basel appear to have thought that the liquidity question had been solved and was not a cause for concern.) The Basel Agreement and its successor, Basel II, illustrate the law of unintended consequences: regulations which were intended to strengthen the balance sheets of banks by weighting assets by risk, thus rewarding the holding of safe assets, actually drove risky assets off the balance sheet. As a result of Basel, securitisation was undertaken not just a small part of bank operations when banks needed liquidity, but on such a scale as to change the whole way banks operate.

The old model in which banks held assets to maturity has been superseded by the 'initiate and distribute' model. Banking can no longer be modelled in terms of a simple balance sheet, for a great deal of activity now takes place off the balance sheet. The proportion of income earned from the interest spread has declined as that from fees and commissions has become more important. Selling on loans may be a source of liquidity provision and convenient for the avoidance of Basel regulations, but it also means that (a) banks no longer have an on-going interest in, or the capacity to monitor, the loans they make and (b) with re-packaging, it is very difficult to evaluate the risk of claims on these loans. The ratings agencies claim to do this, but it is generally agreed that they underestimated risk. It may also be the case that their ratings were misinterpreted as having a wider application than purely the risk of default.

Demutualisation

[9] 'Monetary control – provisions', Bank of England *Quarterly Bulletin,* September 1981.
[10] In the case of Northern Rock, the assets and liabilities of their SPV, Granite, appear in its consolidated balance sheet, as we have seen, even though the company is not actually owned by Northern Rock – a curious state of affairs.

While the banks were extending their risks and learning new tricks, the members of most building societies voted to turn their institutions into public limited companies. This move provided a new source of capital and further intensified competition between mortgage lenders and the old banks. Building societies became banks, but banks with a difference: their loan book consisted almost entirely of mortgages, once forbidden territory for banks. By the time of demutualisation their deposits had become indistinguishable from bank deposits. This degree of maturity mismatch is unprecedented – or at least it would be if it were not for two features which did not figure in old building society mortgages: securitisation and the short mortgage contract. The first has already been discussed. The second was a device to attract borrowers, at a time when variable-rate mortgages were the norm, by offering very good terms on a fixed-rate mortgage with a limited time to run. At the end of this period the mortgage would have to be refinanced. By old banking standards these are still longish loans but nothing like the commitments which put mortgage lending beyond the pale of the traditional banks.

Repackaging of assets for re-sale – which may involve mixing good and less good assets together – means that the resulting securities are very difficult, perhaps impossible, to evaluate. In fact, the repackaging means that no-one can easily understand the nature of the collateral, and the ratings agencies certainly did no detailed exploration of that kind. Although both the Governor of the Bank of England and the Chancellor of the Exchequer aver that Northern Rock is solvent, it is doubtful that they actually know whether that is true or not. I would say that no-one can possibly know.

Solvency

An institution or person is solvent, even when not liquid, if the value of assets exceeds the value of liabilities. There are (at least) two interrelated ambiguities here: the length of time given to realise assets and the appropriate asset valuation: assets sold quickly realise little compared to the proceeds of assets in an on-going concern. a firm forced to sell quickly might be insolvent when it would be solvent in another time frame. The valuation problem may be dealt with according to some appropriate accounting rules. Then insolvency is defined with respect to those accounting rules. These rules make assumptions about the realisation of assets, given the underlying questions such as: If the assets include receivables, such as outstanding bank loans or mortgages, are the borrowers likely to repay? (What is the probability? how is that probability to be assessed?) Will the loans have to be refinanced? (Now the time frame is indefinite.) Is there enough capital to write off expected bad loans (what is a reasonable value of such loans?) and still remain in positive equity?

In the case of Northern Rock, whatever the evaluation of accountants, we know that in their recent extraordinary push for expansion and market dominance, some very questionable loans were made: 125 per cent mortgages, for example. In fact, it must be the case that to effect very rapid expansion, the quality of lending will suffer.

Good risk assessment on both sides of the balance sheet leads to banks being both solvent and liquid, despite the maturity mismatch. The capital adequacy controls were instituted in an attempt to ensure solvency as well as the ability to write off bad debts. as we have explained earlier, their institution resulted in the change to an entirely new banking model – a model which can now be seen to have some new problems

attached to it. The Basel II provisions were developed ostensibly as an improvement on the simple rule-of-thumb approach to risk modelling. It allows individual institutions to follow their own risk modelling to substitute for the older approach. This opens up another possibility for avoidance of restraint on the buccaneering spirit of modern banking and is to my mind a worrying development.

Summary and conclusion

Looking at banking and mortgage lending over a very long period we see several long-term trends: successive substitutions of credit for 'money proper' and one kind of credit instrument for another (a pyramid of credit), an increasing mismatch of maturities in financial institutions, the provision of liquidity in markets rather than on the balance sheet, and finally the transformation of banks which made a specialised range of loans and held them to maturity to the 'originate and distribute' model brought about by securitisation, in which the banks at least believed they had no long-term responsibility for a loan's performance. Banks used to rate the risk of their own assets; now ratings agencies, who bear no costs if their ratings are wrong, evaluate (or claim to evaluate) mixed packages of these assets, and investors, who have no way of knowing how the ratings were derived, have nothing else to go on.

Almost all financial institutions have followed this pattern to some extent. The problem with Northern Rock is only a matter of degree.

Could its problems have been foreseen? They *were* foreseen – Northern Rock specifically by the Bank of England, and the financial sector in general by the Bank for International Settlements. In a Radio 4 interview with Robert Peston, Mervyn King complained that while they knew of the danger of the rapid expansion of Northern Rock on the basis of its 'business plan', the Bank no longer has the power to have its concerns acted upon. Most early commentators thought it had not been foreseen by the Financial Services Authority, that their approach was not attuned to systemic risk. But even they now claim to have predicted the crisis but been unable to persuade Northern Rock to rein back. At a recent conference on bank regulation, a participant said this was 'the best-predicted crisis in history'. History tells us that banks expand by taking risks, gradually if they are prudent, and that this is always an experiment. There are failures along the way. From this evolutionary point of view, Northern Rock is just a bank that expanded far too fast, heedless of the risks to which it was exposed. The inherent fragility of its balance sheet could not withstand the market's shift away from lending to or buying from mortgage lenders after the revelation of difficulties in the American sub-prime mortgage market.

The 'originate and distribute' model is a logical response to evolutionary and regulatory pressures. From the evolutionary perspective of this paper it is a comparatively new balloon. It remains to be seen whether or not it will stay up, despite the failure of one of its practitioners and the stress that others such as Citibank are now reporting. It is extremely unlikely that the system as a whole will suffer long-term damage, any more than it did during the bank failures of the early nineteenth century.

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Figure 1. Northern Rock consolidated balance sheet at 31 December 2006
per cent of total

Assets		Liabilities and Net Worth	
Liquid assets	13	Retail deposits	22
Residential mortgages	77	Wholesale deposits	24
Other advances	9	Securitised bonds	40
Other	1	Covered bonds	6
		Capital	4
		Other	4
Total	100	Total	100

Source: Northern Rock Annual Report and Accounts, 2006, p. 38.
http://companyinfo.northernrock.co.uk/downloads/results/res2006PR_AnnualReportAndAccounts.pdf, accessed 5 March 2008.