

Maturity Mismatch Stretching: Banking Has Taken a Wrong Turn

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Abstract

This note reviews the evolution of maturity transformation in banking and discusses the financial stability implications of its current level, particularly in relation to the expansion of mortgage lending. We discuss simple proposals to remedy the extreme degree of mismatch accumulated in bank balance sheets.

A Potted History

Banks were not always as mismatched as today.

Till the 19th century, bank lending to the private sector was meant to be primarily for short-term, self-liquidating, trade-related working capital, especially in the guise of 'real bills', bills of exchange financing trade. This was true since the emergence of banks in the XV century, supporting merchants in their long distance trade. This approach persisted in the Anglo-American tradition, where banks discounted promissory notes and held the rest of the portfolio in easily saleable securities, especially Consols. This enabled a credible promise to depositors, as banks' assets were either short-term, or easily sold, with little maturity mismatch. Of course, not all banks lived up to this ideal, and there were always concerns about 'finance bills' being issued, not based on trade, but raised to finance other, perhaps speculative, activities.

A partial exception to this rule was represented by the emergence of the German banking model, celebrated in Gerschenkron (1962). While the English banks had expanded gradually with the growth in trade and the gradual expansion of manufacturing, in Germany, France and Italy (and somewhat later in Japan) there was a need to catch up with productive investment which had reached the phase of large scale production. Accordingly, new banks were set up to transfer funds to longer term capital investment, to complement the traditional role of equityholders. However, the key source of long term funding from industry came from bond issuance, managed in these countries by the banks themselves, or used by them to create a maturity matched structure. This massive expansion of long term savings through banks was facilitated by the high concentration of wealth and the long period of monetary stability until WW1. Until then corporate and bank bond markets were in fact very well developed in France, Germany, Belgium and Japan (Rajan and Zingales, 2003). In other words, the bank business model outside the Anglo-Saxon world did not require a radically different degree of maturity transformation as often believed.

Even in the context of limited maturity transformation there were serious issues of stability, as most bank assets remained less liquid than their liabilities. The banking system remained subject to runs. The core of bank regulation (see e.g. Calomiris and Watson, 2014) was, indeed, not capital requirements, that required a difficult assessment of asset value, but reserve requirements, easily verifiable. The Bank of England, being a competitor to other commercial banks as well as the central bank in the 19th century, had then no direct supervisory oversight, and could not inspect their books. While it had some information on those banks that held balances with itself, and had access to market information/gossip on the reputations of others, it had no way of directly assessing who might be solvent or insolvent. So the supposed Bagehotian distinction between lending only to solvent, but illiquid, borrowers is largely mythical. What, instead, the Bank did try to oversee and to control was the quality of assets that it would discount, and more broadly the quality of bills being accepted and discounted in the market.

The main problem with the 'real bills' doctrine was that it was pro-cyclical. Money was created as a by-product of the finance of trade. As business and trade ex-

panded (declined), the private sector issued and discounted more (fewer) bills. In so far as the private sector creates money for its own purposes through the medium of the banking sector, such procyclicality is inevitable. Such procyclicality can, however, be amplified by the behaviour of the banks, were they to ease lending criteria in a boom and tightening them in a bust.

The procyclicality of this system in the USA was worsened in the Great Depression by the weakness of the unit banks, the failure of the Fed to undertake countercyclical measures, and (as argued at the time) excessive competition driving down bank margins and hence leading to more risk-taking. World War II led to banks becoming stuffed with government debt, with loans to the private sector limited to large, mostly manufacturing companies, and with competition in this banking industry strictly restricted. Banks lived in a government-managed cosy cartel with limited interest rate risk. No wonder there were so few bank failures between 1935 and 1970.

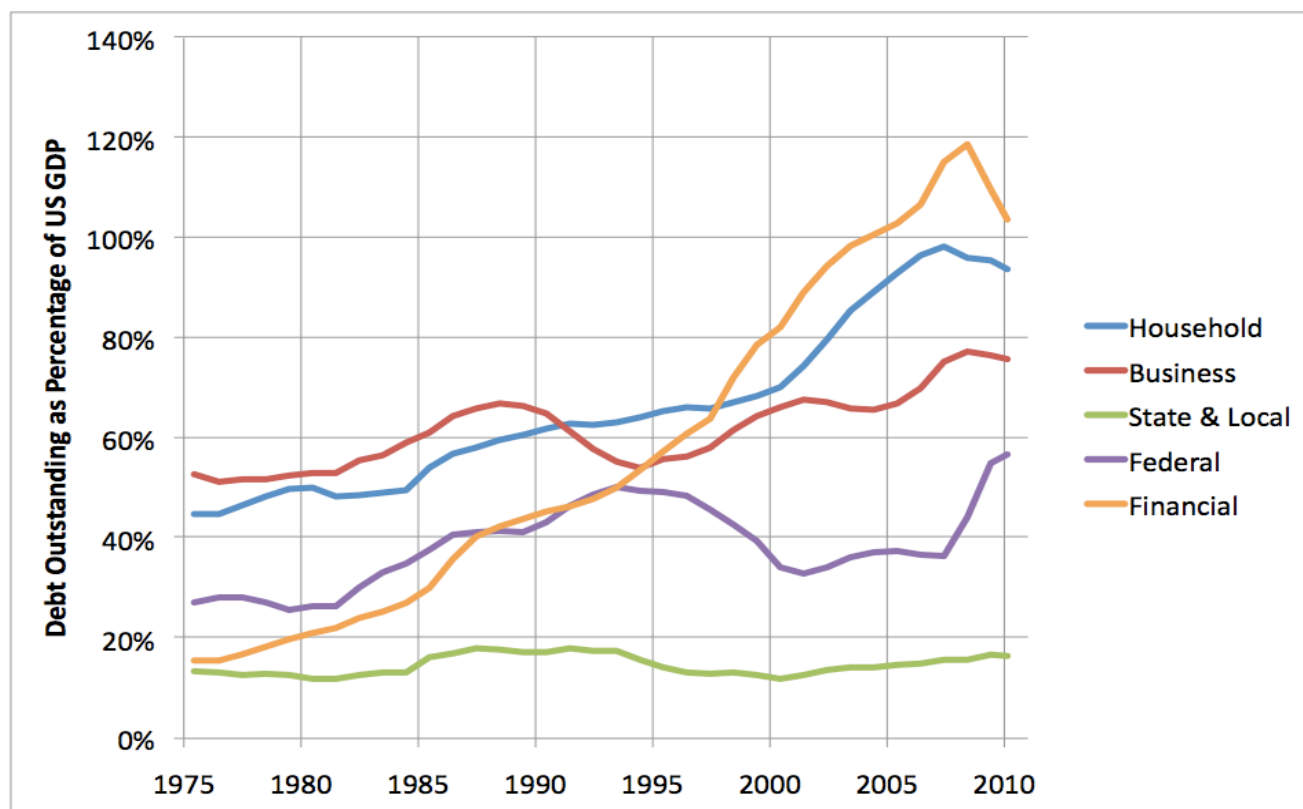
During the postwar boom, capital investment remained largely funded by bond and equity issuance in the AngloSaxon world, while in many devastated European countries, which had suffered severe inflation, the banking system played a larger role by expanding maturity transformation. However, the major change in bank balance sheets came from the evolution of real estate finance.

The early history of funding for private housing suggests banks were not the major source of capital. In the US it was even illegal to issue loans collateralized by real estate, considered very speculative (Calomiris and Watson, 2014). Typically, house purchases were funded by family wealth, and to the extent that some amount was lent, the maturity of these loans was rarely very long term, and certainly below 3 to five years. In the US these loans were often made as “character loans”, meaning that they were secured on the base of the reputation and earning capacity of the borrower. In other words, even when real estate was used as collateral, only a small fraction of the purchase price would be financed.

A major financial innovation took place after WW1, when the US government supported the creation of long term mortgages for returning veterans, developing an unprecedentedly long maturity mortgage loans, up to 30 year. This standard pro-

gressively expanded, though loan to value ratios remained moderate. Insurers and other long term investors played a significant role by investing in bank issuance of long term notes to maintain some maturity matching. Yet the size of these loans was nowhere as large on the balance sheet of banks as it became subsequently.

In the course of the 1970s and 1980s, the structure of banking began to change radically, and not necessarily for the better. Wholesale funding markets, boosted by the emerging euro-dollar market, exploded onto the financial scene. Funding liquidity, i.e. relying on borrowing on such wholesale markets, began increasingly to replace asset liquidity, i.e. saleable assets held on banks' books. The Basel Committee on Banking Supervision tried to reach an Accord on banking liquidity requirements to accompany the Capital Accord (1988), but they were exhausted by the struggle to agree on Basel I. Liquidity regulation thus was dropped, leaving no international benchmarks (see Goodhart, 2011, Chapter 9). Accordingly through the next four decades, 1970 to 2007, banks' holdings of liquid assets, especially public sector debt, became progressively pared back. To give a quantitative example, at the end of the 1960s British banks held about 30% of their asset portfolio in UK government debt. By 2007 such holdings had been entirely run off. Around the same time, the growth of bank lending to the private sector began to expand much faster than the growth of bank deposits (Schularick and Taylor (2009)). The increasing reliance on wholesale funding, mostly short-dated and uninsured, created a novel version of bank fragility, as informed market investors are more liable to flee at the first sign of trouble than insured and uninformed bank depositors. This risk became magnified by the progressive expansion of long term lending backed by illiquid collateral. By far the largest component of this was due to a massive surge of bank mortgage lending for house buying, (Jorda, Schularick and Taylor, 2014). As a result, bank lending to household grew larger than their corporate lending, their natural function (see Figure 1).



The mortgage business ensured banks a steady cash flow, funded largely at the short term rate. But it also represented a dramatic increase in maturity mismatch. This construction was at the heart of the Savings and Loan crisis in the 1980s, caused by a sharp rise in interest rates. Its format was also replicated in the massive expansion in shadow bank operations during the credit boom. In many countries banks managed to set such lending outside their balance sheet, on the pretence that these entities were bankruptcy remote. Investment banks also pursued a related form of shadow banking, with massive holdings of securities based on long term mortgages funded mostly by short-term repos, at the extreme overnight.

The surge in bank lending to individuals for house purchase transformed the banks. Whereas they had once transferred funds from households to business borrowers (and government), they now intermediated between one set of households (savers) and another (house buyers), Turner (2013). An increasing share of their portfolio became property related, including lending on commercial real estate and to property developers, much of it at a long tenor and generally even riskier than housing mortgages. Even when the banks were able to hedge the interest rate risk

on their own books, e.g. by variable rate mortgages, that risk simply got passed onto the borrowers, maintaining most of the banks' credit risk exposure.

Prior to the 1980s mortgage loans for home purchase had been in many countries the province of specialist intermediaries, S&Ls in the USA, building societies in the UK. But the S&Ls died from exposure to interest rate risk in the 1980s, and the building societies in the UK mostly transformed themselves into banks in much the same period, seeking a more aggressive business model.

As the traditional model of banking, with considerable liquidity and relatively little maturity mismatch, was abandoned, it was replaced by a market funded universal banking model with massive maturity mismatch. Its sustainability was, with hindsight, a gamble on aggregate liquidity, relying on the continuing smooth functioning of wholesale funding markets.

So long as housing prices remained stable or rose in nominal terms, the fragility of this banking model remained obscured. Meanwhile the politicians cheered on any stratagem for making house purchase easier, cheaper and available to a wider, and poorer, segment of the population, (Wallison, 2015). But the growing leverage and liquidity risk implied that even quite small declines in housing prices became dangerous.

One reason why Central Bankers, especially in the USA, were so slow to spot the danger was that the area of weakness, e.g. sub-prime, especially in the Sun States, seemed small relative to the overall size of housing markets and banking profitability. Certainly the downturn was greatly exacerbated by the miniscule buffer of loss-absorbing capital, particularly given the very high loan to value ratios chosen during the boom. Yet the financial losses in the crisis clearly dwarfed the direct credit risk in subprime lending. It was the extreme maturity mismatch which financial intermediaries had built up that led to a much larger spillover effect, via its effect on runs, fire sales and flight to safety.

Regulatory authorities shared the blind spot on the liquidity risk of intermediaries. By 2007 they were fully fixated on capital ratios, seeking a Basel II framework that effectively ignored mismatch and liquidity issues (and thus endogenous correlation risk). The regulatory reform since the crisis has targeted a much higher equity (or

loss-absorbing) ratio. Yet even if leverage ratios have fallen, liquidity regulation is essential to ensure a proper composition and in particular the maturity of the remaining 95-97% of funding.

The crisis of 2007-09 was triggered by recognition of some bad credit on real estate. Housing and commercial real estate loans proved more leveraged and correlated than expected. Yet these losses were propagated and reinforced across markets and economies by the massive mismatch of bank funding. Lehman Brothers represented an extreme case. Its balance sheet represented a massive gamble on mortgage backed securities, thus very illiquid assets with long maturities. Lehmann funded these long duration assets with short-term, ultimately overnight, money. One could hardly imagine a larger maturity mismatch than 30 year loans whose funding is rolled over every 24 hours.

Liquidity risk arises from unstable funding including uninsured, wholesale short term funding, and contingent liabilities such as derivative margins. Creating exposure to liquidity risk is profitable in good times, as short term funding is much cheaper, and contingent liabilities earn risk premia. However, it also creates massive losses in liquidity crises. Critically, it represents a powerful risk externality (Perotti and Suarez, 2012). Unfortunately, the regulatory response has been insufficient. Aside from the more marginal tool represented by LCRs, the implementation of more structural NSFR rules has been delayed. The commitment to complete the regulatory framework looks unclear at this stage. This is a major source of concern. While it may not be binding at present, the issue of liquidity risk will re-emerge once central banks start reducing their expansionary role.

What Should be Done?

Most (though not all) financial crises in recent decades have been caused by losses related to property lending. Lending to the real estate sector enables rapid loan expansion with the appearance of tangible collateral.

Real estate lending is not just riskier than previously believed (due to its significant systemic component). It is also the prime cause of the maturity mismatch and excessive leverage that has made the banking system so fragile. We believe that

to reverse this transformation of banks, it is necessary to consider novel channels of long term funding, to move related long term assets away from bank funding, and to re-establish a separate category of specialist property financial intermediaries.

Land is scarce and its availability is fixed. In other words, real estate value has a large pure rent component. Thus in any expansion, real estate prices generally rise faster than consumer prices, and become prone to bubbles and busts. To avoid socializing risk taking, what is needed is an intermediation process where the financing comes from investors that assume the bulk of such risk.

We call for solutions that ensure such risk bearing by focusing on two principles: much greater maturity matching and no insured deposit funding. These goals may be achieved by various means. One avenue is to securitize mortgages with little maturity transformation, such as those funded by bond or pension funds. Another is to create new intermediaries providing mortgage loans where the lender shares in the appreciation, while assuming some risk against the occasional bust. This may be seen as a shift towards the principles of Islamic banking, but it is also a return to tradition as in the early days of banking.

The shared responsibility mortgage (SRM) of Mian and Sufi (2014, Chapter 12) goes in the right direction, but would need regulatory underpinning. First, during a long upswing in prices, borrowers may become unwilling to share in the appreciation with a lender. Thus we need some regulatory requirement that all mortgage related lending have a loan to value ratio of less than 70%, while more funding may be raised by property lenders via equity participation of up to 25%. This would still enable the minimum first time deposit to be as low as 5% of the value of the property. Property should be revalued at regular intervals, with the house owner having the right to buy back (some of) the equity share of the lender at the new valuation, until the equity participation of the lender was exhausted.

An objection to the SRM is that such loans would vanish during a property price collapse. This would probably require public intervention, as in the case of the UK government's 'Help to Buy' scheme. This could ensure access to finance during a crisis, while shifting state aid from Wall Street to Main Street.

Additionally mortgages could be provided by property finance companies (PFCs), designed to differ from banks. PFCs would not offer demand deposits, nor payment services. A PFC would have to back all its equity participation in SRMs with equity of its own or other allowable Loss Absorbing (bail-inable) Capital. A PFC could borrow only modestly in the interbank market, or other wholesale source of funds, and should hold a minimum ratio of liquid assets, supported by increasing fines as its reserves declined. A PFC would be allowed to deal in derivatives, but only so far as it could be shown to hedge its various risks. Besides its equity participation, PFCs could offer all the current varieties of mortgage, except foreign currency mortgages which would be banned, except for those domiciled abroad. PFCs could raise the bulk of their remaining funds by the issue of term deposits, with a tenor of 90 days, or more, and a charge for early withdrawal, and from bonds, preferably covered bonds of the Danish kind. For an account of how this already works in Denmark, see Berg and Bentzen (2014). Securitisation of the fixed interest segment of such property mortgages would be encouraged, but they would be admissible investment only for specialized bond funds or pension funds. Neither banks nor PFCs would be allowed to hold such CMOs.

Banks should be discouraged to make any (mortgage) loans collateralised on property by severe restriction on their maturity. Furthermore, in order to restrict mismatch, required stable funding ratios should be rising steadily as the maturity of loans increased.

With banks removed from the mortgage business, they would/should revert primarily to the short-term finance of business, plus short-term consumer credit. With their mortgage business removed most banks would become instantaneously much smaller and thus more manageable. In support of their corporate clients, banks would make markets and deal in derivatives. Banks would be allowed to hold equity in corporates, and make long term loans to them, but only if they were backed one-for-one by their own equity, or T-LAC, above their other regulatory requirements.

There should be no need to provide deposit insurance for PFCs. The outstanding mortgages of a failing PFC would be transferred to another asset management company. If there was a run on PFCs as a group, the Central Bank could decide

which were worthy of support. Critically, this construction would allow PFCs to fail with no effect on the payment system, transactions balances or credit provision to business.

Under this new system, the provision of deposit insurance and the process of resolving a failing bank could proceed as before, having lessened a critical component of liquidity risk and scaled down average bank size considerably.

In conclusion, our argument is that a most critical structural divide is between long-term mortgage, property-related, financial intermediation and short-term traditional banking. The Basel committee has also recognized the need to contain the excesses of maturity transformation by publicly insured banks. The issuance of its final recommendations on the adoption of stable funding norms commensurate to the maturity and liquidity of bank assets completes the essential architecture of regulatory reform since the crisis. We hope that politicians will have the courage to complete the task, at a time of visible reform fatigue. But let us recall also that NSFR norms have been rewritten extensively, until the point where most banks already satisfy them, and will be vulnerable to regulatory arbitrage as any fixed ratio. We are convinced that a more structural approach is justified to contain this structural issue. Banking prospered for centuries without stretching its maturity transformation mandate.

References

Berg, J., and C.S. Bentzen, (2014), 'Mirror, Mirror, Who is the Fairest of them all? Reflections on the Design of and Risk Distribution in the Mortgage Systems of Denmark and the UK', *National Institute Economic Review*, No. 230, November.

Calomiris, Charles and Mark Watson, (2014) "Corporate Governance and Risk Management at Unprotected Banks: National Banks in the 1890s", NBER discussion paper No. 19806, January

Franks, Julian & Colin Mayer & Hannes Wagner, 2006. "The Origins of the German Corporation - Finance, Ownership and Control", *Review of Finance*, European Finance Association, vol. 10(4), pages 537-585, December.

Gerschenkron, A., (1962), *Economic Backwardness in Historical Perspective*, Harvard University Press.

Jorda, O., Schularick, M., and A.M. Taylor, (2014), 'Betting the House', Hong Kong Institute for Monetary Research, HKIMR Working Paper No. 31/2014, December.

Mian, K., and A. Sufi, (2014), 'House of Debt', University of Chicago Press.

Rajan, R., and L. Zingales, (2003), 'The Great Reversals: The Politics of Financial Development in the Twentieth Century', *Journal of Financial Economics* 69, pp 5-50.

Schularick, M., and A.M. Taylor, (2009), 'Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008', National Bureau of Economic Research Working Paper 15512, November.

Turner, A., (2013), 'Credit, Money and Leverage: What Wicksell, Hayek and Fisher Knew and Modern Macroeconomics Forgot', Stockholm School of Economics Conference, 12 September.

Wallison, P.J., (2015), *Hidden in Plain Sight: What Really Caused the World's Worst Financial Crisis and Why it Could Happen Again*, Encounter Books, USA.