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Abstract

Proposals for full reserve banking have been put forward as a radical way of preventing further financial crises. They rest on the argument that crises are caused by excessive money supply growth brought about by inadequately controlled bank credit creation. Our aim is to provide a critique of the theoretical assumptions underlying the plans for full reserve banking. In particular some of the plans rely on the view that the money supply is a key causal variable and that it is feasible for central banks to identify and enforce an optimal quantity. Second, the plans all rely on an unsupported confidence in the efficiency of financial markets outside the centrally controlled banking system. Third, by removing profit-making opportunities from banks, the proposals may unduly tip the balance further in favour of shadow banking. Finally, as the case of 95% liquidity requirements on Kaupthing, Singer and Friedlander in the wake of the Great Financial Crash shows that modern financial engineering makes such policy-making difficult to execute. A Minskyan analysis rather emphasises the inherent instability of the financial system such that it is subject to systemic crises and the indeterminacy of demand for liquidity, while also emphasising the contribution prudent banking can make to financing economic activity and providing a safe money asset. While a return to a traditional separation of retail banking (regulated and supported by the central bank) from investment banking (regulated differently but not supported) would contribute to financial stability, it is argued that the full reserve banking proposals go too far.

Key words: bank regulation, full reserve banking

JEL codes: E5, G21, G28

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1. Introduction

The last financial cycle has been characterised by a large credit expansion and excessive leverage which drove the asset price bubble and the following asset price collapse. The economic consequences were so dramatic that in many countries the economic recession which followed was the most severe since the Great Depression. The financial regulation and conventional macroeconomic policy framework in place seems to have done very little, if anything, to prevent or moderate the financial cycle. Unprecedented in modern times, banks had been able to expand their balance sheets and pursue high returns without expecting to incur large costs; in the event, in many cases the losses which transpired have been nationalised. The resulting public expenditure combined with restrictive fiscal rules (notably in the euro-zone) sparked off a reversal of the initial expansionary fiscal response to the crisis, exacerbating the real economic crisis which followed.

This series of events has opened a wide debate into which form of financial regulation should be put into place to prevent a new ‘Minsky moment’.² The aim has been to limit the risks that banks might face at the same time as reducing the exposure of governments to large bail-out costs. The financial literature has proposed a range of solutions in the form of macroprudential regulation: leverage ratios; the introduction of bank capital requirements which are countercyclical and related to the rate of change of bank lending and asset prices in the relevant sectors (Goodhart and Persaud 2008a, 2008b); restrictions on proprietary trading; restrictions on mortgage lending; bank stress tests; living wills for banks; and forcing banks to fund a higher proportion of their asset with equity (Admati and Hellwig 2013). Structural reform proposals have also been put forward to limit further the activities of banks, by separating off retail banking from the types of financial market activity which had both fuelled the asset price bubble and exposed banks to heightened risks (see e.g. Vickers 2011); these proposals are presaged by an older literature on ‘core banking’ (see e.g. Bryan 1990, and Bossone 2002 for a review). Many of this range of proposals have been adopted or are being looked into seriously for implementation and banks are accordingly reining in their activities and thus their balance sheets.

How far these measures will prevent a further banking crisis depends on what is regarded as the source and nature of the crisis. For many commentators, market forces had failed to maintain financial stability because incentives were distorted by the continuation of central bank support for banks; this encouraged a dramatic expansion of their exposure to market risk (‘moral hazard’).³ It follows that the optimal solution appears to lie in some combination of eliminating lender-of-last-resort support for banks to ensure that they take the consequences of their risk exposure. The presumption for many is that market forces will then be free to promote financial stability along the lines of the Efficient Market Hypothesis (Selgin 2010).

For other commentators financial markets are inherently unstable because asset pricing proceeds within a fundamentally uncertain environment such that independent objective risk

² A *Minsky moment* refers to a sudden collapse in asset prices following a prolonged period of speculative financial investment. It takes its name from Hyman Minsky who showed how a period of financial stability normally generates financial fragility, which can culminate in a financial crisis.

³ According to this view, central banks are considered the source of, rather than part of the solution to, financial instability. The Scottish experience during the 18th and early 19th centuries is frequently taken as an example of the absence of moral hazard by the free-banking proponents. They, however, seem to ignore that a central banking system evolved among the private sector banks (Dow and Smithin 1992) and that Scottish banks were always able to turn to the Bank of England as a lender of last resort (Goodhart 1988).

measures are not available. Rather markets operate on conventional judgments which tend to operate cyclically and are open to discrete shifts of sentiment. Cycles in asset valuations, and confidence in these valuations, encourage a cycle in portfolio leveraging. Thus the period prior to the crisis was one of ever-increasing leverage fuelled by bank lending to finance productive and unproductive investment, because of a high level of confidence that asset prices would continue to rise. But the apparent financial stability was in fact breeding a fragile financial structure which was ripe for collapse (Borio and Lowe 2002). The resulting pattern of financial instability is exacerbated by a counter-cyclical pattern of liquidity preference, such that a crisis encourages a rush to liquidity just when it is least available; liquidity preference too reflects the uncertainty of expectations and differing degrees of confidence in them. No two cycles are alike, particularly because of the dynamic nature of financial innovation, and only the degree of fragility can be predicted, not the timing of the onset of crisis. The purpose of regulation according to this Minskyan analysis is therefore to constrain the growth of credit in the cyclical upturn in order to moderate the downturn. This approach supports much of the type of macroprudential and structural regulation outlined above, but with the proviso that it should be part of a dynamic process involving alertness to financial innovation and changes in market sentiment (Kregel 2014). The focus is on evolution rather than equilibrium and on the interdependence of the state and markets. The capacity of the banks to create credit to finance new investment is welcome, but efforts are required to constrain the creation of credit to finance speculation.

But for some the crisis calls for a much more radical cure: the elimination of fractional reserve banking altogether. The argument is that financial instability is inherent in the current system and is directly caused by the capacity of banks to create credit and thus money beyond the direct control of the central bank, and the effect of the lender-of-last-resort facility in protecting banks from the ensuing risks. Priority is placed on ensuring the provision of a safe money asset without the need for costly bank bail-outs. A sharp distinction is drawn between safe money assets (issued, or completely backed by, the state) and all other assets. We will explore the (monetarist) view among proponents of full reserve banking that the role of central banks is to control the money supply,⁴ and their apparent confidence market forces can then be relied upon to ensure that the rest of the financial sector will promote financial stability.

Among the range of full-reserve-banking umbrella we focus here on four different sets of plans: the 1930s Chicago Plan (CP) recently revived by Benes and Kumhof (2013), the Positive Money and NEF (PM/NEF) plans for monetary reform (Jackson and Dyson 2012), Kay's (2009) Narrow Banking (NB) plan, and Kotlikoff's (2010) Limited Purpose Banking (LPB) plan and more recently the 100% equity-funded banks as proposed by Cochrane (2014).⁵ There are important differences among the various plans in terms of the transition to the new regime, how banks are then allowed to operate and the form of state involvement in the setting of the money supply level. What they all have in common is the fundamental point that banks will no longer be able to *create money* through credit and not face the associated risks; in order to achieve this, the focus of all the plans is on the supply of money and ensuring that imprudent banks fail without threatening the rest of the banking system or the public purse.

⁴ This is a narrow perspective when seen against the roles taken on by central banks over history (see e.g. Cobham 2014).

⁵ Table 1A in the Appendix sets out a detailed summary account of the four main proposals, taken from Dixhoorn (2013: 30).

In the current monetary system almost all money is created by commercial banks via the creation of loans, thus the key question is whether money should continue to be a prerogative of the (mainly) private banking system. For these plans the simple answer is no. What these reforms propose is to remove the ability of banks to create money by separating money and credit, thereby creating a public money system distinct from the private, market allocation of savings and loans.⁶ In brief, a bank's reserve ratio (i.e. public money over current accounts) must be 100%. Alternatively, current accounts are removed from banks and placed at a public institution or in a separate special bank. Central independent institutions (set up by a central bank or the government) would then directly control the quantity of money in circulation. In these systems banks have to borrow from creditors before being able to lend it out and would not enjoy special public sector support in the event of failure.

Clearly the crisis called for a policy response with respect to the structure of the financial system. Further, as Haldane (2012) has argued, the complexity of the sector and its capacity to innovate in response to regulation indicate that broad-brush macro-level reform is called for rather than adding to that complexity. But here we argue that, for all their good intentions, full-reserve banking plans have serious shortcomings which derive from their assumptions about money and about the financial sector. Even if it were feasible for the state to establish control of the money supply, there would be little scope for credit intermediation or maturity transformation. Were banks to find it profitable to continue to trade, they would come to resemble investment trusts and fund managers or even money shops. More importantly, the impact of these proposals on the financial system and on the overall economy might result either in a stagnant economy or in the growth of the unregulated provision of money in the private sector; full reserve banking might not in fact prevent a resurgence of financial instability. To further support our argument that full-reserve banking would not make the financial system less prone to bank runs and financial crises, we look at the case of a British bank, Kaupthing, Singer and Friedlander (KSF), where a 95% liquidity requirements did not prevent the bank collapse, but rather it pulled the trigger on a subsequent failure of its parent company, the Icelandic Bank, Kaupthing.

The paper is organized as follows: we first proceed by briefly considering how banking currently operates; in section three we provide a critique of the full-reserve banking proposals; in section four we look at the behaviour of Icelandic bankers responding to the full reserve requirement constraint in 2008; section five concludes.

2. The current banking system

In this section we provide a brief explanation of what banks do, how they operate and the problems which now call for some kind of banking reform. In the current economic system money is created by commercial banks in the process of credit creation and money is destroyed when a loan is repaid. Using the accounting rule of double-entry bookkeeping, every time a bank grants a loan the amount immediately becomes both an asset and a liability for the bank itself. These items are both in the name of the borrower (the bank's customer). The current account entry, although it is not legal tender money, is used by the customer for payment and is universally accepted within a certain monetary space.⁷ Against this credit-

⁶As we will see later, separating money and credit is a contradiction in terms since money is always a credit (debt).

⁷ The monetary space usually coincides with national borders, i.e. with the legal space within which the government has the power to impose taxation.

money banks only hold a small fraction of notes and coin and balances with the central bank to face sudden large withdrawals of funds.⁸ While these reserves consist of state-issued money, by far the bulk of the stock of money consists of deposits with banks which have mostly arisen through the granting of loans to, or the purchase of securities from, the non-bank private sector.

Traditional retail bank services can be distinguished into asset and liability services. The former services provided to borrowers include evaluating, granting, and monitoring loans. The latter, provided to depositors, includes holding deposits, clearing transactions, and service flows arising from conventions that certain liabilities are acceptable as payments for goods. As Diamond and Dybvig (1986: 58) state, ‘transformation services require no explicit service provision to borrowers or depositors but instead involve providing the depositors with a pattern of returns that is different from (and preferable to) what depositors could obtain by holding the assets directly and trading them in a competitive exchange market. Explicitly, this means the conversion of illiquid loans into liquid deposits or, more generally, the creation of liquidity’. Banks first grant a loan and only in the second place look for the necessary funding and any required reserves. For any one bank there is no guarantee that deposits issued with loans, once spent, will remain in accounts with that bank, although the expectation of a high redeposit ratio is more reasonable for large banks.⁹

But from the 1970s banks extended their activities beyond these traditional boundaries as a result of lobbying for financial deregulation to allow them to address the growing competitive threat from non-bank financial intermediaries. On the liabilities side, banks have therefore been relying increasingly on the interbank market for funding, not just for smoothing purposes. As observed by Diamond and Dybvig (1986), usually small banks have more cash funds available than demanded by their customers; these excess reserves are usually lent out via the money market, usually to large banks short of deposits. The large banks then transform the liquid funds borrowed in the money market, via the lending operation, into illiquid assets. On the assets side, facing regulatory requirements to fund risk-weighted assets to a larger degree with unborrowed money, i.e. capital, banks developed the practice of securitising loans, weakening the link between bank credit default risk assessment and bank profitability. Competitive pressures also encouraged banks to expand their activities beyond traditional lending, in search of profit, such that by the early 1990s lending only accounted for around half of profits in the US and two-thirds in Europe. It would seem that diversifying sources of funding, reducing the reliance on illiquid debt contracts and diversifying activities would have made the banking system more sound. But it was in fact in all these new areas that banks fuelled the crisis and in turn were threatened by the prospect of their own default.

Although in most circumstances historically the system has worked successfully, the fractional-reserve character of banking means that it is inherently fragile and vulnerable to financial instability. In fact, the whole system is based on trust, based on experience: trust about the borrowers’ ability to repay the lender; trust that commercial banks will be able to provide liquidity on demand; trust that the central bank will provide all the liquidity necessary to the commercial banks once it has set the interest rate. When the system is

⁸ The term ‘credit-money’ might be a bit misleading since all money is credit by creation, but it serves to distinguish it from notes, coin and reserves created by the central bank.

⁹ For instance the market share based on the number of active accounts in the UK in 2013 was about 30% for Lloyds Banking Group, about 16% for the Barclays and RBS, 12% for the HSBC and 10% for the Santander group. (https://assets.digital.cabinet-office.gov.uk/media/53c834c640f0b610aa000009/140717_-_PCA_Review_Full_Report.pdf)

subject to shocks (such as a collapse in asset markets) which undermine these economic relations, a deep failure of trust (such as trust in financial institutions or trust in political/regulatory institutions) can be a powerful determinant of Knightian uncertainty and have a non-negligible impact on society's level of risk, stress and ultimately individuals' wellbeing, see Montagnoli and Moro (2014).

There are two main reasons why trust is important to prevent financial instability. Firstly banks are at risk of bank runs. To mitigate the possibility of these occurring, deposit insurance protection schemes (which are normally, but not necessarily, publicly funded), have been introduced. But the recent banking crisis dramatically increased awareness of these schemes, an awareness which had previously been obviated by non-calculative trust.¹⁰ The advantage of such trust is the stability of the payments system and the safety of savings and credit. Nevertheless, the deposit insurance guarantee can exacerbate moral hazard in the system; deposits being the banks' principal liability, depositors are less inclined to focus on the state of their banks' balance sheets, allowing banks to take on higher risk. Second, the central bank does not have any direct control over the money supply; this is almost entirely determined by the ability and willingness of banks to lend and by individuals and firms to borrow. If we accept that the supply of credit money the banks are able to create is not limited by the central bank, the money supply is highly dependent on the credit risk and profitability analyses by banks, and, where there is significant recourse to securitisation, of markets. Moreover, from a macroeconomic perspective in the current system, the supply of credit money is tied to the value of the assets used as collateral. This implies that, in an economy dominated by a rise in risk aversion among banks and customers, the amount of credit-money shrinks during economic recessions; in other words, credit-money is procyclical, enhancing business cycle fluctuations.¹¹

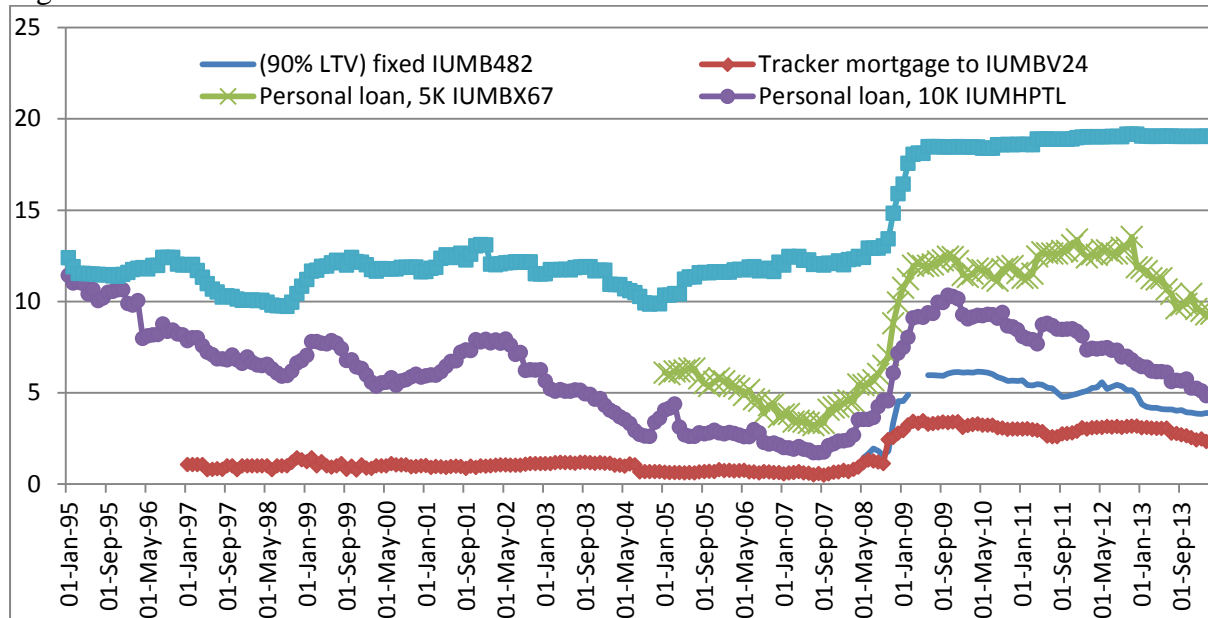
In a scenario of increased uncertainty with a consequent decrease in economic activity and limited control over the money supply by the central bank, there is very little that monetary policy can do to stimulate economic growth. Within this banking architecture the central bank has an *indirect* role, in setting the short term risk-free interest rate that affects the credit supply and demand decisions of economic agents. The financial crash illustrates how limited and uncertain is the impact of monetary policy. Central banks tried to fend off the crisis by sharply cutting the level of interest rates and by injecting the system with a large amount of liquidity to prevent bank defaults. However these policies did not result in a lower cost of capital for firms and households or higher credit availability. The increased level of uncertainty faced by banks about the future, combined with a lower and more uncertain value of collateral available, prevented these policy actions from feeding through into the real economy. The regulatory response to the crisis further reduced the banks' appetite for risk.

¹⁰ Calculative trust is in fact simply a form of rational expectation and relies on the same assumptions as the Efficient Market Hypothesis. Non-calculative trust is a social convention more in tune with the Minsky analysis based on the pervasiveness of fundamental uncertainty.

¹¹ The importance of collateral is well recognised in the academic literature. On the topic Geanakoplos (1997: 286) writes: '...the main business of Wall Street is to help people make and keep promises. Over time, as more people have been included in the process, punishment and reputation have been replaced by collateral. This enabled a proliferation of promises, but has led to a scarcity of collateral. The ensuing efforts of Wall Street, in conjunction, of course, with the government and in particular the courts and the tax code, to stretch the available collateral has significant and surprising effects on the working of the economy, including the cyclical or volatile behaviour of prices...'

This scenario is depicted in Figure 1. The (lowest) blue line shows the central bank interest rate.¹² What we clearly see is that, as a result of the financial crisis, the cost of capital (which is the cost that households and firms face to finance their investment and consumption) did not follow the drastic reduction in the level of the official rate during 2008.

Figure 1: Selective interest rates



Notes: Data are from the Bank of England database. The official rate is the Bank of England base rate (code IUMABEDR); “Tracker mortgage” is the average interest rate charged by banks on tracker mortgages (code IUMB24); “90%LTV” is the interest rate in mortgages with 90% loan to value ratio (code IUMB482); “Personal loan 5K” and “Personal Loan 10K” are average interest rates on loans of £5000 and £10000, respectively (codes, IUMBX67 and IUMHPTL). “Overdraft” is the interest rate on overdrafts (code IUMODTL).

Clearly the current system of bank regulation and monetary policy has worked badly, inviting some kind of alternative. The proposals to change to a system of 100% reserve banking aim to make the system less prone to instability by bringing the money supply into the public sector domain. Credit would be supplied by other institutions than the suppliers or administrators of money; these institutions would be pure financial intermediaries, without lender-of-last-resort facility support or publicly-funded deposit insurance. All the proposals therefore are addressed to preventing bank runs and reducing moral hazard by requiring holders of all non-money assets to accept market risk. A strict divide is to exist between non-interest bearing, risk-free money and all other assets. The stock of money is to be controlled indirectly through the cost of borrowed reserves or directly by the state and the volume of credit is to be market determined, given that money stock.

In the next section we will present a critique of these plans. Inevitably designing a new institutional structure for a highly complex sector throws up challenging logistical problems, but we do not explore these here, other than in general terms. Our aim here is rather to focus the critique on theoretical foundations.

¹² Under the current system for the central bank to keep this rate at the desired level it has to be ready to supply an unlimited level of reserves.

3. Full reserve banking: a critique

Our critique of full-reserve banking develops along two lines. Firstly, we focus on the meaning and the role of money in an historical context and in modern economies. Second, we look at the link between credit, money supply and the economy.

3.1. Money and Banking critique

Embedded in all the full reserve banking proposals is the idea that it is socially unacceptable to have a money supply which is almost entirely determined by the private sector. Society requires a safe asset as a unit of account, means of payment and store of value and the conclusion is drawn from the crisis that the banking sector cannot be relied upon to produce a safe asset. Bank deposits are currently inside money in the sense that they are assets of depositors but liabilities of the banks, and there is a risk that these liabilities will not be honoured.¹³ Historically payments were made with commodity money (outside money) which is a pure asset and therefore carries no risk.¹⁴ However the supply of these commodities (notably precious metals) proved to be too restrictive relative to society's needs and inside money increasingly overtook outside money; the banking system evolved in such a way as to make these deposits also safe assets. For long periods the banking system operated on a reasonable level of trust in the prudence of banks' credit policies¹⁵, but increasingly in the central banks' actions designed to promote that prudence. Certainly crises destroy much of that trust, which then has to be restored, but the 100% reserve banking plans assume that this time trust cannot be restored. In fact, because of state backing of deposit insurance, public trust in bank deposits as a store of value has been maintained in spite of the crisis – it is trust in the system as a macro phenomenon which has been eroded.

The proposed alternative is to go back to a completely outside-money system, where money is the asset of, or is completely backed by, the public sector, where the public sector liability is not regarded as involving any risk. This is a bold idea. Aside from a small and ever-declining proportion of outside money provided by the state, money in practice has always been created by private sector institutions and has involved a token of credit extended by some and received by others (see e.g. Wray 2004). While banks settle net payments between themselves using state money in the form of their balances with the central bank, non-bank payments are settled primarily through bank deposits. Bank deposits thus perform the money function of means of payment. In addition they act as a store of value, as long as there is public trust in bank deposits.¹⁶ The full reserve banking plans envisage renewed trust in bank deposits, whose value the state would ensure. But, since the aim (as we shall discuss below) is to constrain the expansion of bank deposits, the availability of safe assets would be reduced - for all other financial assets, some risk would be attached (because of the absence of state support) so that they could not be regarded as a good store of value. Savings accounts would now carry risk about which the general population would need to take an informed position. But even financial experts in the run-up to the crisis failed to price in risk adequately – the effect of unreasonable conventional judgements arrived at under uncertainty. It is totally

¹³ Deposit insurance has in practice succeeded in protecting bank deposits during and after the crisis, but only in some cases when combined with massive state support including nationalisation.

¹⁴ In essence money was fully collateralised and the only risk was linked to the type (e.g.) of good used and the demand for that particular good.

¹⁵ The term 'credit' comes from the Latin word 'credo' - 'I trust'.

¹⁶ A government guarantee on deposits acts as a transfer of trust from the banking system to the government.

unreasonable to expect the general public to undertake this kind of assessment and bear the consequences of a financial failure without deposit insurance. Yet the only alternative on offer is zero-risk deposits earning zero return and in fact, if banks are to be induced to manage them, probably attracting bank fees.

It seems to be assumed that the new fully-backed bank accounts are held for transactions purposes only (for both real and financial activity), something which is reasonably stable. But the demand for money arises also from increases in liquidity preference at times when price volatility is high and expectations are unclear (precautionary demand) or when volatility in asset prices declines and markets are more confident in upward or downward trends in asset prices (speculative demand). The authorities would need to be sensitive to these fluctuating sources of money demand when setting their target. Demand for money other than for transactions purposes reflects a reasonable response to fundamental uncertainty. But the build-up to the crisis demonstrated the widespread capacity for conventional expectations to be unreasonable and, in particular, to underestimate risk. As a result high expected returns on market assets could entice society into treating assets as safe which are in fact much less safe than current bank assets. The demand for liquidity could be satisfied by assets other than the fully-backed stock of bank deposits. It is therefore conceivable that 100% reserve requirements on depository institutions would ‘just drive even more finance into shadow banking, and make the system even riskier’ (Krugman (2014)).¹⁷ Goodhart (2008) explores the ways in which regulation affects institutions inside and outside the regulatory net as the ‘boundary problem’. In the case of full reserve banking, the problem of low profit opportunities in retail banking may be so severe that the end of fractional reserve banking would mean the end of banking, leaving financial activity to institutions outside both the regulation and protection of the authorities.

While the full reserve banking proposals envisage enforced (endogenous or exogenous) limitations on the supply of money, monetary history demonstrates that societies develop money assets according to need, making that enforcement very difficult. This phenomenon is encapsulated in Goodhart’s Law. For example, the Scottish banking system arose from a shortage of coinage. The need was met by paper money (IOUs) issued by trustworthy partneries against the security of their loan assets and the partners’ capital. There was no state-sponsored central bank.¹⁸ Rather the banks organised themselves in such a way as to promote prudent behaviour which maintained confidence in their liabilities. As the UK banking system evolved, institutions and practices were developed which allowed banking to expand while (normally) maintaining stability (Checkland, 1975). This expansion financed economic development through the provision of credit by banks with growing expertise in

¹⁷ <http://krugman.blogs.nytimes.com/2014/04/26/is-a-banking-ban-the-answer/>

¹⁸ Aside from a small and ever-declining proportion of outside money, money in practice has always involved a token of credit extended by some and received by others. Even the state has traditionally engaged in debt monetisation through currency issue which yields monetary seignorage. What advocates of full reserve banking regard as ‘money’ is only a small part, alongside bills of exchange and other forms of IOU, of ‘credit’ which keeps the wheels of industry turning in modern market economies. Whenever an individual or business issues an IOU to another individual or business, the issuer is a non-bank that starts to create a liability that looks like and functions as money within a confined monetary space. For instance, a supplier grants a credit in the form of goods or services whose purchase is financed with an IOU in the form of a bill of exchange. The important lesson here is that IOUs issued by a creditworthy individual or business not only have the characteristics of (‘look like’) money, but also may perform the functions of money; this is in fact how transactions have been conducted over thousands of years before the introduction of modern money (see e.g. Wray 2004). The emergence of cryptocurrency testifies that virtually anyone can issue money, as long a functioning clearing system, credible income stream and returns are in place to back up each issue.

risk assessment, while at the same time providing an endogenous expansion of money in the form of bank deposits (Cameron, 1992). But from the 1970s, endogenous credit creation was fuelled by competition within the financial sector rather than the needs of the real economy (Chick 1986). More recent experience of banking indicates the ever-increasing scope for much more damaging endogenous financial developments; we consider below how that played out in extreme form in the case of the Icelandic bank subsidiary, KSF, located in the UK when attempts were made to exert control on the money supply.

The development of mechanisms to meet demand for credit is a matter of many centuries of historical experience, predating market exchange and thus the need for a means of payment. Yet, as endogenous money theory shows, money was a by-product of the provision of credit by trusted suppliers. Not only is the supply of credit relevant to the development process, but it is relevant too to the income multiplier process, whereby bank credit allows investment to precede the generation of the saving to finance it. It is clearly critical to the plans for full reserve banking how the money supply will be determined relative to demand and how far the demand for credit will be met.

3.2. Controls on the supply of money and credit.

The proponents of the 100% reserve banking system advocate decisions on money creation to be taken by a monetary committee independent of the government. The aim to control rather than influence the money supply heightens issues already raised by the current policy framework, but which are not adequately addressed by the full reserve banking proposals. The first issue is the relationship between the central bank and government. The nature and effects of central bank independence are in fact controversial. The crisis has required a new relationship between governments and central banks which acknowledged their interdependencies, Dow (2014a). Starting from the work of Alesina (1993), the economic literature has provided some evidence suggesting that the higher is the degree of independence of the central bank, the lower will be inflation expectation and consequently the level of inflation. Moreover the literature has suggested possible measures by which the central banker can be credibly forced to act in a *non-partisan* manner.¹⁹ This can be reasonably implemented, for instance when the objective of the central banker is clear and easily understood as is the case of an inflation target strategy. But even if these judgements about the feasibility and merits of central bank independence are accepted,²⁰ it is much more problematic to judge the work of a central banker or a committee whose job would be to inject *money* into the banking system and to place a limit on the amount. The performance would have to be based on a counterfactual, but it is difficult to envisage how this would be chosen and estimated.

These issues are particularly important for the PM/NEF plan which, unlike the others, is for the state literally to create all money for payments purposes, rather than indirectly through the supply of bank reserves issued on demand. The mechanisms by which money would get into the economy would be primarily through government spending and debt repayment. Any shortfall in the supply of money would be met by directly financing bank credit, where its supply was thought to be inadequate, but credit only for productive purposes. But there are clear interdependencies between fiscal policy, the supply of credit for productive purposes

¹⁹ It is beyond the scope of this text to see whether these policies are actually effective, and whether these advances in monetary economics are the real cause of the “conquest of inflation”.

²⁰ There is in fact substantive evidence challenging its merits (see e.g. Daunfeldt and de Luna 2008).

and the state of the economy. Such interdependencies require an institutional structure which promoted coordination between the government and the monetary committee. The challenge for the committee to identify productive uses of credit is also not insignificant; even if successful, there would no doubt be diversion from other sources of credit which could be devoted to more speculative purposes. Moreover, partisan behaviour would enter into consideration; consider for instance two similar projects deemed as equally viable and of a productive nature. The question is whether both projects would receive the necessary financing or whether only the one which is closely linked to the government in power at that time would be executed.

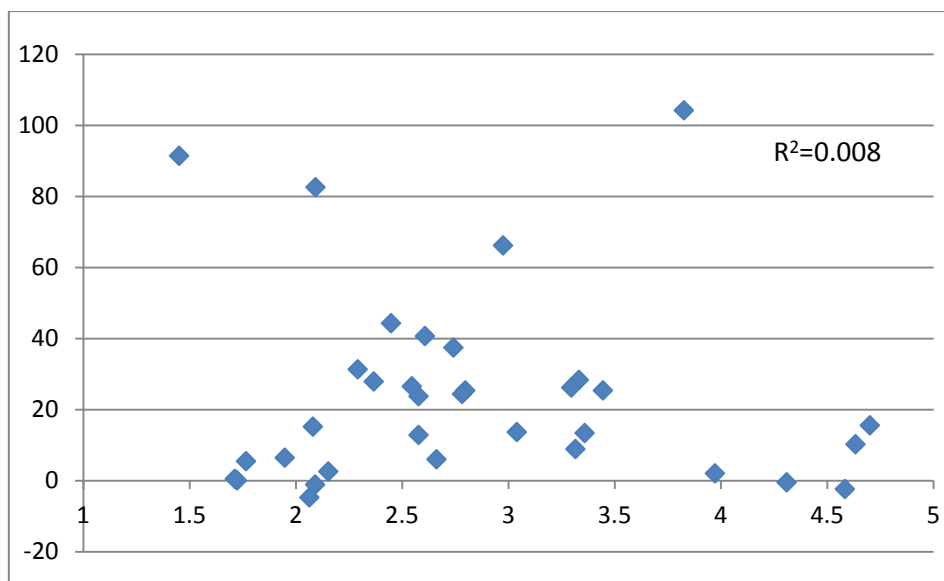
Even if we accept that it was possible (and desirable) to completely isolate the monetary authorities from political pressure via some form of strict legislation (as in the case of the ECB, for instance), the next big problem would be which model and forecast the committee would have to follow to inject credit into the economy. Supporting the 100% reserve proposals, Martin Wolf (2014) writes ‘the central bank would create new money as needed to promote non-inflationary growth’.²¹ This assertion assumes that the central bank has a *correct* model of the economy and this can be used to make *correct* decisions about the level of money injected in the economy. However, from a Keynesian perspective there cannot be a ‘correct’ model or ‘true’ risk measures because of fundamental uncertainty (see Dow 2014), hence macroeconomic models which generate monetary policy recommendations can only be seen as a guide rather than a rule. As highlighted in Dow (2014) ‘central banks have become explicit about the various forms of uncertainty they face. The most fundamental of these is model uncertainty: uncertainty as to the best model to use as the basis for policy-making. [...] The theoretical literature generally presumes that there is such a thing as a correct model, but that policy-makers face stochastic errors in identifying it (see for example Hansen and Sargent 2004). This follows from the mainstream literature’s inattention to fundamental uncertainty (unquantifiable risk) as opposed to quantifiable risk’ (see further Dow 2004, Lawson 2009). Finally, the central bank’s task is complicated further by the fact that real-time data on GDP are subject to heavy revision. Orphanides and van Norden (2002) find that the revisions of US GDP are quite sizable and are of the same order of magnitude as the estimated output gap. In the same spirit, Edge and Meisenzahl (2011) find similar results for the debt-to-GDP ratio, casting doubts on this indicator and its ability to be used as a key indicator for macroprudential policy.

Unsurprisingly therefore the central banks’ record on producing accurate forecasts of the economy is rather poor, supporting indeed the view that a true model, good to understand the economy and forecast future events, does not exist. As a result there is a range of models with differing policy implications, but these also need to be considered in light of the institutional framework of monetary policy. Thus Taylor (2008), for instance, has put forward the thesis that one of the causes of the financial bubble which preceded the great financial crash, was

²¹ Some critics have observed that this statement suffers from the fallacy that reserves are at the beginning of the process, rather than the end of the monetary process. This critique, however would no longer be valid since banks, in a newly created monetary system, would be just financial intermediaries without any power to create money. Hence, the current process where policymakers set the rate of interest at which they supply liquidity to the banking system and supply reserves on demand to maintain that rate of interest, would not be in operation any longer. The central bankers would have to use their monopoly power of liquidity supplier to set the quantity rather than the price. In order to do so, they will have to leave the interest rate free to fluctuate. This, however, would exacerbate some of the problems that the full reserve banking proposal tries to solve. It is likely that during an economic expansions firms and households would increase the competition for liquid resources; in turn this would push up the price (interest rates) of this resources. The result would be that the adverse selection and moral hazard problem would worsen.

the FED's inability and slowness to act. According to his calculation, the interest rate set by the central bank was about 3% lower in 2003 than implied by his model.

Figure 2: Bank of England Assets and Inflation (2006Q1-2014Q3)



Notes: annual CPI inflation on the horizontal axis, annual growth rate of the Bank of England on the vertical axis.

To focus on the money supply rather than an interest rate is a departure from central banking practice (other than the troubled experiments with money-supply targeting in the 1980s), posing particular challenges for the committee. Not only are there logistical difficulties with controlling an aggregate rather than a price, but the economic effects of controlling the money supply are in any case highly controversial. The discussion so far begs the prior question as to the purpose of controlling the money supply. The Chicago Plan is explicitly based on the Monetarist premise that economic instability is due to instability in the supply of money rather than credit. Previous efforts at direct control failed because of the endogeneity of bank reserves, to which the full reserve banking proposals are addressed. But, as we have already suggested, society might well find alternative assets to perform money functions, such that the supply of money assets remained endogenous. But in any case previous efforts at monetary control were predicated on the Monetarist proposition that expenditure and thus inflation were caused by monetary growth. Recent experience of substantial growth of monetary aggregates as a result of quantitative easing when the interest rate has reached the zero lower bound has if anything been associated with fear of *deflation* (see e.g. Williamson 2013). This seems to provide support for the hypothesis that monetary growth in normal times is a symptom rather than a cause of inflation.²² In Figure 2 we plot the annual growth

²² It is also worth noting that, although beyond the scope of this paper, the experience so far is that QE does little to offset a contractionary fiscal policy and has had little effect on the behaviour of individuals and businesses when this is driven by panic and uncertainty. Moreover, the extra liquidity injected by the central banks via the quantitative easing programmes has encouraged a hoarding of safe assets. A shortage of these has had a double effect; first it has pushed their values beyond their fundamental values and, more importantly, has encouraged investors into riskier and alternative assets. From here, for instance, significant capital flows went to emerging economies, and China. For instance stock market prices appear to have stopped collapsing when the central banks decided to inject liquidity into the financial system. Figure 1A in the Appendix shows a graph of the FTSE All-shares; a similar analysis is provided by Farmer (2012).

in the Bank of England total assets and inflation rate for the period 2006Q1-2014Q3. It is quite clear from the scatter diagram that the correlation between the two series is zero.

Even if the state could control the quantity of money, and even if there were a clear correlation with the rate of inflation, it is not clear what would be the basis for settling on any particular cap on the money supply. It is highly uncertain how the committee would be able to create the amount of reserves required by the economy in order to remain on a certain economic trajectory. The particular PM/NEF proposals for countercyclical money creation are designed to promote financial and economic stability by leaning against the wind on credit creation. But success would hinge on being able to orchestrate the extension of credit on the basis of that money supply, which requires that money would indeed consist only of state money and that the path of credit growth would follow that of money growth. If the restrictions on what performed money functions and on credit expansion were indeed successful, the danger would be an end result of an inelastic economic system which would be slow to react to domestic and international economic shocks, hence exacerbating rather than dampening the negative consequences of any shocks.

In the run-up to the crisis, the risk posed to bank deposits and therefore to the public purse arose from banks engaging in non-traditional activities, fuelling a much wider dysfunctional expansion in financial asset markets. Arguably the banks played a crucial role in expanding credit as rapidly as they did, financing the escalating levels of financial churning which drove up asset prices, in a vicious circle. However an increasing proportion of total credit was being provided by shadow banking. If we think of the financial sector as an inverted pyramid, shadow banking at the top expanded on a base of commercial bank deposits which expanded on a base of reserves. In each case the general overconfidence with respect to default risk encouraged a significant increase in balance sheets as a multiple of the respective bases. As far as shadow banking is concerned with respect to their bank deposits, this would carry over even where the amount of bank deposits was restricted by 100% reserve requirements. Now even shadow banks are being overtaken in the credit market by technology groups; of particular relevance to the full reserve banking proposals is the emergence of new payments systems.

If it is in fact the volume of credit, rather than money, which should be of concern for effective demand and thus the rate of inflation (as well as the rate of unemployment), then the focus of the new system should be on credit rather than money. The implication of the full reserve banking proposals is that the requirement on investors to accept risk would improve the allocation of credit. What is critical to how the current situation is regarded is the view taken of market efficiency. All the proposals are remarkably sanguine about the capacity of the financial sector to ensure its own stability and the stability of asset markets (with the help, in the case of the LPB plan, of a central agency overseeing security issues). If lender-of-last-resort protection no longer applied to any element of the financial system, it is argued that there would no longer be an incentive to take on excessive risk.²³ Market discipline would ensure that excessive risk taking was punished by withdrawal of savings. But the requirements of such a system are prohibitive. First there must exist objective measures of risk attached to all assets and second the general public must be able to have access to these measures. The first is the more demanding in that it requires the future to be knowable within a probability distribution, while the second requires a general level of financial sophistication.

²³ In the extreme form of Free Banking or New Monetary Economics, the state would not even be involved in supplying money (see e.g. Dowd 2009).

In any case the crisis arguably was not the result of moral hazard – the wilful and cynical taking on of excessive risk – but rather a completely unrealistic set of expectations about asset prices. The financial sector has shown itself capable of generating massive instability.

Yet the full reserve banking proposals seem to reflect confidence in market efficiency, most explicitly in the case of the LPB plan for financial institutions structured around mutual funds. State-controlled money would be a safe asset, but earn no return. In order to earn a return, households would need to invest in assets of variable value, i.e. non-money assets. Since these would not enjoy state protection, households, along with large financial companies, would lose out in the event that a bail-in was required. Further it is an important feature of the free banking view that bank failures in a truly free market system would be isolated events; an adverse assessment of risk attached to one bank would simply lead to a transfer of accounts to another bank. But this belies the possibility of systemic bank failure; we are back to the issue of the significant difference between confidence in free market forces on the one hand and a Minskyan analysis of inherent financial instability on the other. If systemic failure of financial institutions is a real possibility, then market discipline of individual institutions will not protect asset holders. Indeed, as Goodhart (2009) points out, the big failures in the crisis fell outside the conventional retail banking system.

Banks certainly fuelled asset markets with credit, but the ultimate problem was asset markets themselves.²⁴ Nevertheless it could be argued that full reserve banking, by constraining credit growth, would constrain the capacity for markets to become so fragile that they collapse, causing a financial crisis. But the international financial system has shown itself capable of massive expansion outside national regulatory restrictions which in turn has impacted on asset markets, and particularly markets in speculative assets. The credit restrictions therefore might be felt more by SMEs rather than financial markets. Macroprudential regulation would still be required for the entire financial system, based on close attention to the way in which it was evolving and to trends in asset markets.

4. A case in point: Kaupthing, Singer and Friedlander (KSF)

The most severe banking collapse during the Great Financial Crisis undoubtedly occurred in Iceland, as 97% of the country's banking sector failed over only three days. The Icelandic case offers a myriad of lessons and insights (which otherwise would have gone largely unnoticed), due to a thorough and unique official inquiry by Parliamentary Special Investigation Commission, and exceptional data privileges granted to the Commission. The Commission's report published in Icelandic in April 2010 describes in detail the build-up of risk within the banking sector and following policy responses or lack thereof. One of these valuable insights shows practitioners' response to a *de facto* 95% reserve requirement imposed on one of the subsidiaries of the Icelandic bank Kaupthing, in the UK, called Kaupthing, Singer and Friedlander (KSF).

As a response to a wholesale run on the Icelandic bank in 2006 and 2007, the three Icelandic banks started diversifying their funding base by collecting deposits abroad. Kaupthing

²⁴ As discussed above there is no ultimate and infallible way to assess asset prices. Imperfections of the asset market also stem from human traits and psychological biases that keep market participants from forming their opinions of asset values in a rational manner, as contributions by behavioural finance scholars testify, Kahneman & Tversky (1979), Shiller (2002), Shefrin & Statman (1985) and Barber & Odean (2008)

established an on-line deposit account called Kaupthing Edge, through branches and subsidiaries, including KSF in the UK. After the collapse of Northern Rock, the British regulator, the FSA, stepped up its oversight and imposed a 95% liquidity requirement on the ballooning on-line deposit accounts, demanding that the bank hold 95% of all deposits in the form of liquid and relatively risk free securities on a 24 hour cycle (SIC 2008, Vol. 7: 120). According to the regulator, KSF was to use hardly any of its incoming deposits for regular lending activity, recognising the inherent risk involved in rapid deposit collection.²⁵

In March 2008, KSF sought to lower the liquidity requirement. While the FSA reviewed the bank's request, KSF made a liquidity swap, such that it lent 1.1 billion pounds to its parent company, Kaupthing, on a rolling overnight basis, subsequently categorising the loan as 'liquid funds'. However, the parent company in turn lent the money back to the subsidiary KSF, on a rolling three month basis. Now, the subsidiary could allocate the money in whichever way it wanted, including lending it back to the parent company, which was in dire straits due to the lack of Forex funding. It was only under severe stress, six months later, when the regulator noticed that these liquid funds were indeed not liquid and KSF had been in breach of liquidity requirement all this time.

As it turned out, the fate of Kaupthing lay in this missing liquidity. A run on Kaupthing Edge escalated after the fall of Lehman Brothers in September 2008 and the FSA started to call for the missing 1.6 billion pounds (additional credit lines of 500 million pounds had been drawn on by the parent company) to have readily available as the depositors asked for their money back. KSF could not meet those requirements, nor even raise the 300 million pound minimum liquidity to cover the bleeding on-line account (SIC 2008, Vol. 7: pp. 160-1). After having waited for KSF management to deliver the missing funds for 10 days, the regulator assessed that KSF was no longer a safe place for depositing the public's savings. Under the authority of the Banking Special Provisions Act of 2008, the FSA revoked KSF's license to receive deposits, took over the Kaupthing Edge accounts and put the entire KSF operation into receivership. On July 10th 2009 the High Court of Justice, the Queen's Bench, ruled that the legal requirement for the drastic administrative measures had been met by the regulators, in a case brought by the Kaupthing Resolution Committee against her Majesty's Treasury for unlawful administrative enforcement. The court was of the opinion that the Treasury had indeed been safeguarding the system's financial stability as the regulator foresaw panic in the UK banking sector. If 170,000 depositors in Kaupthing Edge were to wait to get compensated after the bank panic, it would make other domestic depositors uneasy with their deposits in different banks in the UK (SIC 2008, Vol. 7, p. 161).

This case clearly shows how easy it is to circumvent financial regulation (by intention or by ignorance), yet how effective quality financial supervision can be in safeguarding the public's interests. Little has been heard of KSF's depositors having difficulty accessing their deposited funds. The same cannot be said about Icesave depositors at Landsbanki's branch in the UK, which was under the financial supervision of the Icelandic authorities in the run up to

²⁵ Rapid credit growth and rapid deposit collection are similarly risky. Deposits are attracted by high interest rate, whereas credit is rather extended rapidly, at the initial stages, due to low interest rates. Bargain hunting depositors are however a volatile funding base, as experienced by the Icelandic banks abroad. Landsbanki attracted 16 billion Euros through its online-account Icesave over a year and a half. Icesave experienced a run twice during the course of the two years it was running. A crude regression analysis, performed by the SIC, showed that as Icesave stayed at the top of deposit rate lists in the UK, it attracted 18 million pounds on average per week, but as the accounts dropped to fifth place on those same lists over best deposit rates, an outflow occurred of 16 million pounds on average per week.

the crisis. That story is covered in detail in Johnsen's book *Bringing Down the Banking System: Lessons from Iceland* (2014).

5. Conclusion

Full reserve banking plans arose out of the perception that the crisis resulted from excessive bank credit, which was the counterpart to uncontrolled money creation. The plans seek to exert central bank control over money; the aim is that a quantity of a safe asset would be supplied in line with an inflation target. Credit would be provided by pure financial intermediaries and would therefore be kept within limits. But the risk attached to credit, and indeed to all other financial assets, would be borne by the savers.

We have argued here that this type of plan is unlikely to work, given the long history of financial innovation in the face of new regulatory restrictions. Not only would new forms of money evolve outside the net, but so also would new sources of credit. In any case, even if the money supply could be controlled, recent experience has amply demonstrated the weakness of the causal link between money and inflation (and indeed real economic activity). Further, demand for money for precautionary purposes, in the face of low confidence in expectations as at present, is subject to discrete shifts and would be difficult to address with the kind of conventional modelling that would be used to establish the money supply cap.

If in fact it is credit that should be the target, different types of issue arise with state involvement and the inevitable interdependencies with government policy. When considering steering the allocation of credit to productive purposes, some public-private mix is likely to be the most effective. But if money is capped and banks can no longer create credit, the problem could be more one of insufficient credit than credit excess.

Finally all the plans envisage a sharp split between heavily controlled money on the one hand and the provision of savings vehicles and credit on the other. We have raised issues with the basis for setting the money supply target. But further all the plans show a remarkable degree of confidence that financial institutions without special regulation or public support would promote financial stability in their intermediation role. They also assume that savers will be happy to accept bail-in risk on any savings which earn a return.

The authors of the full-reserve banking plans are to be congratulated for seeking a radical solution to the undoubted problems with the current banking system. No possibility is without problems. But we have identified some serious problems with these plans which stem, we believe, from a misunderstanding of the nature and role of money and the history of the development of money and banking. We are not aware of any experience with such a system, so what is proposed is an experiment. The closest experience is the crisis-induced 95% reserve requirement on Iceland's Kaupthing, Singer and Friedlander, which only illustrates the capacity of banks to subvert controls.

What we would favour would be an attempt to recapture the socially-useful form of banking which prevailed until the mid-twentieth century – itself a tall order given the way in which financial development has occurred since then. We therefore suggest a more moderate change in financial structure, whereby public support is provided to traditionally-regulated banks performing traditional functions, offering chequing and savings deposits, as well as loans

designed to be held to maturity. But close attention would need to be paid to behaviour in the rest of the financial sector, and the way in which it was evolving, in order to curb excesses where possible and to discourage the build-up of asset bubbles. This is easier said than done, but the lesson of financial history is that there are no simple solutions and that the search for solutions needs to take account of the evolution of the financial sector. In our view the solution to the banking crisis is not to eliminate banking.

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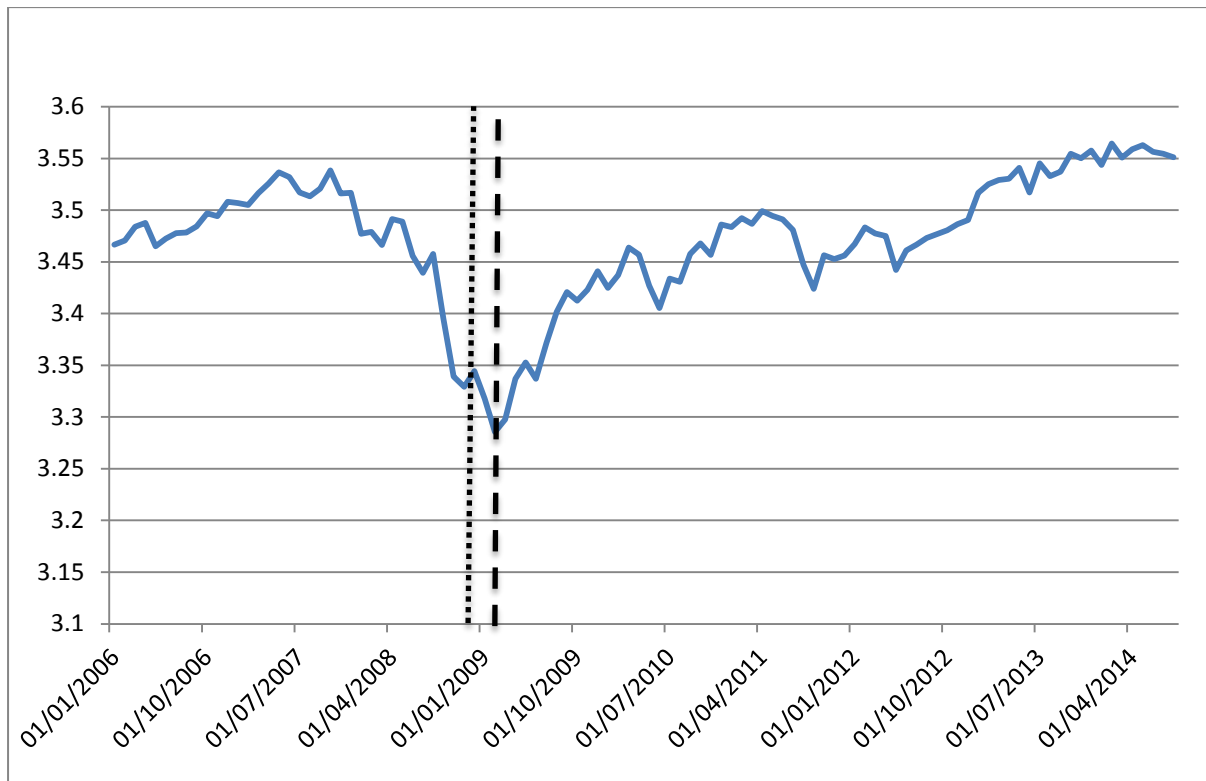
Appendix

Table 1A: A Comparison of the four main proposals for full reserve banking

Interpretation of Full Reserve Banking		Definition of money	Control and creation of the money supply	Control and creation of credit	Transition	Unique benefits	Unique problems
Chicago Plan	Two separate private organizations: money banks (100% reserve backed deposits) and credit investment trusts (funded by treasury credit or savings).	Very broad but strict definition as the money in Money Banks, explicit referral to the need to avoid the creation of 'near monies'.	Public, independent institution.	Market determined and by public, independent institution through provision of Treasury Credit.	Requires a debt jubilee.	Reduction of private and public debt. No need for new monetary structure. Simplified central bank & government accounts.	Distributional and mentality effects of a debt jubilee. Money creation may still be possible. Simulated with DSGE model.
Positive Money/NEF Plan	Private commercial banks who can fund loans only by attracting savings or with own capital. All money accounts in a new system at the central bank.	Defined as the sum of all accounts at the central bank. Transfer of ownership of investment accounts not possible. Near-monies/other currencies not guaranteed by government.	Public, independent institution (MCC) determines quantity of money. Spent into the economy by government (lower taxes/debt, or more spending).	Mainly market determined but addition possible through direct lending to commercial banks by MCC and/or Δ money supply (alters amount available for investment).	Gradual pay down of conversion liability by banks (loan from central bank).	New monetary system at the central bank: effective and efficient, ensures money creation by banks impossible. Claimed social, environmental effects.	No market pressure towards innovation in payments system. Transfer risk of 'bad' loans from deposit holders to taxpayers via conversion liability.
Narrow Banking	Commercial banks obliged to hold 'safe' assets equal to amount of deposits.	Not explicitly defined.	Public, independent institution through creation of 'safe' assets.	Market determined but will be altered by a change in the money supply (alters amount available for investment).	Gradual attainment of 'safe' assets by banks.	Simple transition. Flexible interpretation.	What is a 'safe asset'? Are there enough? Easy to lobby to extend this definition. Deposit insurance remains for narrow banks.
Limited Purpose Banking	All financial institutions become mutual funds – either cash (money always there, payments function), insurance or for investment (credit function).	Cash mutual funds are the basic form of money. Any other means of payment are not guaranteed.	Public, independent institution through increase or decrease of cash mutual funds by buying/selling government bonds.	Market determined but intervention by the public, independent institution is possible by buying a stake in particular investment mutual funds.	Gradual change of status to mutual funds.	Banks run no risks – individuals do. Increased transparency as everything sold by mutual funds has to be evaluated and disclosed.	Fewer incentives for banks to monitor lending. FSA capacity to evaluate all securities.

Source: Dixhoorn (2013: 30)

Figure 1A: Stock market, Asset Purchase Facility and Quantitative Easing.



Notes: Data are FTSE All Share index. The dotted and the dashed lines corresponds to 29 Jan 2009 – the government and Bank of England set up the Asset Purchase Facility (APF), and 5 Mar 2009 – the announcement of £200bn of asset purchases (QE), respectively.