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Register, Issue, Cap and Trade: A Proposal for Ending Current and Future Financial Crises

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Abstract A fundamental cause of the global financial crisis was excessive creation of short-term money-like liabilities ('quasi-money'), notably in shadow banking holdings of sub-prime MBS and other US dollar structured credit instruments and in cross-border flow of capital to the uncompetitive Euro area periphery. This paper proposes a registration system for: (i) controlling quasi-money and resulting economic externalities and systemic risks; and (ii) supporting public sector monetary issue to counter collapse of private sector credit in the aftermath of crises. This policy would trigger a profound but also economically beneficial change in the business models of both banks and long-term investors.

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1. Introduction

This paper proposes the creation of national (currency specific) registers of short term monetary and money-like liabilities, and the use of these registers to prevent both unsustainable expansion and subsequent damaging collapse of money and credit.

This proposal goes beyond the many steps already taken by the global authorities to contain the crisis and prevent a recurrence.³ Registration, together with the accompanying system of 'cap and trade', will require fundamental changes in the business operations of virtually all financial market participants. We are already implementing a huge amount of reform to the financial system overcoming intense objections from financial market participants. Why consider a yet more radical measure with such a major business impact?

The main reason is that the regulatory and policy measures taken in the aftermath of the crisis, while they might have done much to prevent the build up global systemic risk had they been in place a decade ago, cannot deal fully with the aftermath, the necessary deleveraging of the private sector. We have postponed this adjustment through large scale fiscal deficits, i.e. public borrowing has been used to prevent a collapse of private sector money and credit. But eventually, to avoid a loss of confidence in public sector solvency, fiscal deficits must be reduced and the threat of a collapse of money and credit will return.

Monetary policy, as presently conducted, appears to be in the same position as fiscal policy – powerless to prevent a looming collapse of private sector money, credit and output. Conventional monetary policy easing (i.e. money market interventions), and more recent 'unorthodox' monetary policy operations (purchasing long term instruments such as government bonds using central bank reserves), work by lowering interest rates and increasing private sector borrowing. Thus, these monetary operations are only effective in delaying a private sector deleveraging, they cannot prevent it. Deleveraging and accompanying decline of private sector borrowing and spending must eventually take place and will then, without a different policy approach, lead to a cumulative process of falling prices and falling output, i.e. a 'debt deflation' as conceived by Fisher (1933). This vicious cycle is already emerging in periphery Europe and may before long affect other countries, such as the US and the UK, that have grown their economies on the basis of unsustainable expansion of money and credit. Policy makers need to rethink.

³ The list of these measures is long and includes the major expansion of the balance sheets of the Federal Reserve, the ECB and the Bank of England; emergency provision of central bank liquidity against a range of collateral; US dollar swaps provided by the Federal Reserve to other central banks; orthodox and unorthodox monetary stimulus; aggressive fiscal stimulus; the capital and liquidity requirements of Basel III; additional oversight and requirements on systemically important financial institutions; central registration and clearing of OTC derivative markets; new strict rules on remuneration; enhanced regulation of credit rating agencies; introduction of additional contingent capital instruments, the imposition of resolution plans to avoid future tax-payer bail-out of failing financial institutions; the US Volcker rule limiting commercial bank activities; the UK ring fencing of retail banking; and the creation of macroprudential policy making bodies such as the US Systemic Risk Council, the UK Financial Stability Committee, and the European Systemic Risk Board.

This paper offers such a rethink. It is organised as follows. Section 2 sets out the proposal – the establishment of a short-term liability register and its use to avoid damaging debt deflation and contain future unsustainable money and credit expansion – and also discusses practical implementation. The proposal has three elements. The first is the register itself. Compliance is ensured by requiring that liabilities that are not recorded in this register are like gambling debts, they can be postponed rather than repaid if the borrower does not wish to do so. The second element is a system of ‘cap and trade’ of registered short term liabilities, the government issues licenses for holding these liabilities. A penalty is imposed on financial institutions issuing registered short term liabilities not matched by the possession of a license. Licenses are tradable to ensure that short term liabilities are allocated to uses which earn the greatest return. The third element is issuance, using the liability register as a tool for implementing what is sometimes referred (in the phrase of Milton Friedman) as the helicopter money drop. The government is able to adjust the stock of registered money and quasi-money at its choosing, by an across the board percentage increase. These are private sector liabilities so they must be matched by a corresponding distribution of non-interest bearing government bonds, convertible on demand into central bank reserves or notes.

Section 3 discusses the rationale for this proposal. The creation of a short-term liability register is something that will likely be needed anyway, in order to fulfil the commitment of policy makers and regulatory authorities to ensure that financial institutions issuing short-term liabilities can be resolved without tax-payer support. But the case for creating such a register goes well beyond its contribution to such ‘resolution plans’. This section discusses further the claims made in this introduction, that registration allows the authorities to prevent cumulative collapse of money and credit and can also support the use of cap and trade so ensuring that individual institutions take account of the implications of their funding decisions for the risk of breakdown to the financial system as a whole, hence preventing future unsustainable money and credit expansions.

Section 4 discusses some practical concerns and consequences of introducing registration and licensing of short term liabilities. Can the register be avoided? It turns out that avoidance is difficult. Does it not require fundamental change the business models of both banks and long term investors? Yes but this change is desirable in itself with a shift from focus on short term to longer term returns. Will there not be losers as well as gainers? Yes, because deleveraging of the private sector through registration and issuance of monetary liabilities will result in a sustained period of negative real interest rates, with inevitably large redistributive impact, primarily from foreign investors to domestic citizens and from domestic and typically older savers holding nominal assets such as savings accounts to domestic borrowers. Section 5 – the longest of the paper – discusses how registration, issue, cap and trade relates to some other policy proposals. Section 6 offers some concluding remarks.

2. The proposed mechanism.

The proposal consists of three elements.

Registration

- A central register of financial assets and liabilities is established, and updated in real time. The detail on asset holdings can be sketchy (the main reason for including them is to ensure complete coverage of liabilities through the balance sheet identity) but full details must be provided on maturity and promised cash flows on each liability.
- There must be incentives for accurate registration. One incentive is a requirement that, in order for a liability to be legally enforceable, it must be contained in the register. Another is through the systems for payments and securities clearing and settlement: when any financial institution processes a payment instruction for crediting or debiting an account, then for the payment to be approved the corresponding asset and liability must be registered.

Issuance

- The central bank, as the monetary authority, can use the register to directly increase the money supply, increasing the value of all registered liabilities by a chosen percentage.
- Since these are private sector liabilities they must be matched by a corresponding increase in private sector assets, achieved by simultaneously giving the issuers of the registered liabilities the equivalent value in permanent non-interest paying government bonds. These are exchangeable for reserves with the central bank or for notes. Because they are non-interest bearing they do not count as part of the government stock of debt.

Cap and trade

- The systemic risk regulator (for example the Financial Policy Committee of the Bank of England in the case of the UK) determines on a quarterly basis an amount, say £100bn, as the upper limit on short term liabilities of financial intermediaries in the relevant currency. Licenses for this amount are distributed to financial institutions (an appropriate basic criteria for allocation is usage over a previous 3 month period, but a degree of re-allocation may appropriate in order to achieve further goals such as promoting new entry into lending markets).
- The short term liabilities of non-financial companies (trade credits, corporate paper, drawn down lines of credit from banks etc.) are included in the register but

- are not subject to licensing control or to helicopter drop issuance. All short term liabilities used to finance financial investments, both loans and securities.
- In advance of each quarterly period licenses are auctioned. One way this can be done is by requiring financial institutions to submit schedules for purchase or sale of licenses (relative to their initial allocation), stating how much they are willing to pay for acquiring licenses or what they would be willing to sell them for. Then a cut-off price can be established at which the supply of licenses sold equals the demand for licenses purchased, and schedules are exercised at prices up to and including this cut-off.
 - During the subsequent quarterly period short term liabilities are measured and monitored on an end of working day basis; and, if at any time they exceed what is allowed by the licence, then a fine is due (the level of the fine should be large enough to provide a strong discouragement, but not preclude emergency borrowing; this might be perhaps 4 basis points per day, equivalent to an annual rate of interest of around 10 per cent.) These controls apply to all financial institutions – commercial banks, investment bank trading, market making and brokerage, hedge funds, and also investment institutions such as insurance companies and pension funds (although normally these will not borrow short term). They cover unsecured borrowing but also secured contracts such as repo. Intra-quarter (daily) trading of licenses is permitted to allow efficient use of liquidity.
 - To allow for control of ‘near-money’ liabilities of relatively short maturity, the quantity of short term liabilities subject to licensing can be calculated on a “ $(365-t)/365$ ” basis where t is the residual maturity. An overnight liability ($t=0$) would have a full 100% weighting; and three month liability ($t=91$) would have a 75% weighting etc. All liabilities would however have to be included in the register, so that when the residual maturity of longer term liabilities falls to less than one year, they fall within the ambit of the licensing system.
 - The control over the stock of licenses is used to then to limit the amount of maturity mismatch in the entire financial system. An appropriate target is to limit total short term financial sector liabilities to a given ratio of nominal GDP. The exact ratio is not so important; it can be based for example on the average ratio of short term liabilities to GDP in the recent past. The ratio can also be adjusted gradually over a period of years, in response to structural changes in both technology and institutions, increasing or decreasing the demand for short term financial assets. What is important is that the licensing prevents rapid increase in the ratio of short term liabilities to nominal GDP, and hence prevents the unsustainable build up of maturity mismatch in the system as a whole.

3. The rationale

The most obvious application of a liability register of this kind is to assist in the practical execution of the 'resolution plans' regulators are now requiring of all major financial firms. Rapid identification of claimants is an essential requirement for orderly resolution, i.e. allocation of losses and continuity of services, when a bank or trading firm is in financial distress and this identification needs a complete register of liabilities. The mechanics of dealing with a bank resolution are well understood, at least for the case of small institutions with relatively simple structure.⁴ It is necessary, if immediate liquidation is to be avoided, to have a special resolution regime distinct to that applied to non-financial corporations.⁵ For large complex institutions, especially those active across borders, resolution is more complex. However, even in this difficult case, an asset liability register would be of great value, for example quickly allowing the authorities to determine the extent which other institutions are exposed to the institution in trouble.

But the central argument of this paper is that liability registers have other even more important policy uses. They can provide a mechanism for both avoiding unsustainable expansion (through 'cap and trade') and preventing cumulative collapse of private sector money and credit (through 'helicopter issuance').

These additional measures are needed because conventional monetary arrangements do not give the authorities effective control over private sector money and credit. The central bank has a considerable influence over interest rates, both short and long term, from its power to create monetary liabilities (via open market operations, repo and reverse repo lending, and purchase of long term assets). But aggregate money and credit is determined by the credit decisions of commercial banks and other financial institutions and these decisions depend on many other factors, besides the monetary liabilities of the central bank and current and expected interest rates.

The consequence is that credit and money aggregates bear no stable relationship to either the monetary based controlled by the central bank or to market rates of interest. Rather money and credit expands or contracts, depending upon the confidence of banks in the prospects for repayment of their loans and on the confidence of borrowers in being able to service debts at current and prospective rates of interest. This expansion of money and credit happens together, because of the balance sheet linkage between them: in periods when confidence justifies the extension of a bank loan, the loan creates a corresponding deposit; whereas loan payment extinguishes a deposit. A 'cap and trade' constraint on the creation of deposits then provides an immediate brake on the volume of lending.

⁴ The research and publications of the International Association of Deposit Insurers <http://www.iasi.org/> contain much standard information.

⁵ In contrast to a non-financial corporation, it is not possible to impose a stay on creditors; the usual route for maintaining a troubled company as an active concern. Doing this would require a freeze on all deposits, effectively putting a bank out of business.

The lack of control of central banks over monetary and credit aggregates – while not well explained in most money and banking textbooks – has been long understood by monetary economists.⁶ The consequence is systemic financial risk. The decision in good times by individual banks and other lenders to increase credit and money exposes the financial system as a whole to disruption when market participants lose confidence in the value of underlying assets. This disruption is especially pronounced when this lending is financed using short term liabilities (maturity mismatch);⁷ and in particular when maturity mismatch is created by borrowing using short term wholesale funding instruments, such as repo or interbank borrowing rather than retail funding (short term retail funding is relatively sticky and only “runs” when severely provoked).⁸ If market funding is secured, then the amount available depends on the market valuation of the collateral pledged. If it is unsecured then it depends on market confidence in the credit standing of the borrower. Loss of confidence in the value of structured credit securities, and in the solvency of many unsecured bank borrowers, were the key factors undermining interbank, repo and money markets during the 2007 to 2009 crisis.⁹

This systemic risk can be understood as an economic externality. The returns demanded on short term liabilities, insured or uninsured, do not fully reflect the risk that underlying assets may not fully repay these liabilities. This understatement of risk is especially pronounced in credit booms and underpins the growth of shadow banking that contributed substantially to the build of risk prior to 2007.¹⁰ The externality is accentuated by ‘firesales’, the pressure on illiquid institutions especially those with relatively high leverage and maturity mismatch to sell assets in order repay short term liabilities, leading to substantial credit losses and sharp declines in mark to market valuations, so further undermining confidence.¹¹

By analogy with environmental externalities such as acid rain and greenhouse gases, this systemic risk can be controlled by setting aggregate emission limits (the license cap) and allowing exchange between institutions (the trade of licenses) to determine the most efficient allocation between institutions. The analogy is not exact. Not every single dollar of short term liabilities can be expected to make exactly the same contribution to systemic financial risk, this contribution will vary with the liquidity of underlying assets and with the

⁶ The autonomous creation of bank money and credit is the essential mechanism in Von Mises theory of the business cycle (Von Mises (2012)); the inability of the central bank to control the money supply is also a key element the criticism of monetarism of Kaldor (1970); for more extended recent discussion see Ryan-Collins et. al. (2011).

⁷ See Besar et. al. (2012) for a detailed and extended analysis of the sources of systemic financial risk, including maturity mismatch.

⁸ A good illustration is the run on UK bank Northern Rock in September 2007, which was essentially a wholesale not a retail run (for a full description see Milne and Wood (2008) and Shin (2009)).

⁹ See for example Brunnermeier (2009) and Milne (2009).

¹⁰ Tarullo (2012), page 3, describes the role of shadow banking well: “Shadow banking also refers to the creation of assets that are thought to be safe, short-term, and liquid, and as such, —cash equivalents similar to insured deposits in the commercial banking system. Of course, as many financial market actors learned to their dismay, in periods of stress these assets are not the same as insured deposits.”

¹¹ For further discussion of this firesale externality see Stein (2010) and Kashyap and Stein (2011).

stability as well as the maturity of liabilities. But this system of cap and trade will limit the use of wholesale short term funding to finance holdings of financial assets. It also does so much more effectively than the Basel III liquidity requirements, because it allows individual institutions to choose for themselves an appropriate balance of short- and long-term funding and to cope relatively easily with short term difficulties in issuing of long-term debt.¹² Furthermore, unlike Basel III, cap and trade automatically applies to non-bank 'shadow' banks.

There are well known criticisms of cap and trade of environmental emissions. Some accuse environmental emissions cap and trade of creating excessive profits for financial institutions; but cap and trade of systemic financial risk will instead reduce their profits. Environmental emissions cap and trade is only a partial response to global warming, it does not for example limit consumption of automobile or aviation fuels. But as set out in Section 2, cap and trade can be applied on a comprehensive basis to cover all contributions of maturity mismatch to systemic financial risk. Some are concerned that the 'caps' in environmental cap and trade are insufficiently restrictive, allowing too high a level of continued emissions. Maybe so, but this reflects scientific uncertainties and the response of policy makers to the relatively high costs of altering production technologies; it is not a criticism of the effectiveness of cap and trade at achieving a given reduction of emissions.

The liability register also provides a mechanism for stimulating private sector output and expenditure, when currently available monetary and fiscal policies are ineffective, in particular when a debt-deflation of the kind described by Fisher (1933) is threatened, with unsustainable levels of private sector debt, leading to reduced borrowing and spending, falling prices of both assets and goods, a rise in the real burden of debt, and further price falls. This destructive and cumulative contraction of money and credit can be prevented through the conduct of a monetary helicopter drop.¹³ This is simple enough in principle, distribute enough government backed money, for example Bank of England notes, to maintain nominal wealth and spending. The practical problem is undertaking the distribution in a reasonably fair way, ensuring that all citizens benefit from the largesse. This problem can be addressed by using the liability register as the basis of distribution.

There are variations. It would be possible to include a unique identifier for each citizen and this combination, together with the liability register, could be used to conduct a helicopter drop on a level per-capita basis, making the policy more redistributive. There are other possibilities. The government could simply create money on its own accounts, and use this for financing general spending; but this is problematic because it does not separate sufficiently fiscal policy from the helicopter monetary issue. The use of the liability register

¹² For more detailed assessment of the liquidity and capital requirements in Basel III, see Allen, Chan, Milne and Thomas (2012).

¹³ For a lively debate on this policy see the following exchanges from 2008 on the Financial Times Economist's Forum <http://blogs.ft.com/economistsforum/2008/12/central-banks-need-a-helicopter/>

keeps the helicopter drop distinct from the operation of fiscal policy (and therefore for example under the control of a macroprudential or monetary authority).

4. Practical concerns and business impact

This section addresses concerns about the practical implementation and business impact of the liability register and in particular of its use for cap and trade (its use to support a 'helicopter issue' of money is relatively straightforward and is not discussed further). Will cap and trade encourage a 'black market' where firms obtain short and long term debt in order to avoid licensing restrictions? Will clever financial engineers not move assets and liabilities 'off balance sheet' so that they escape the discipline of the licenses? Or will banking and other activities not move overseas to other jurisdictions (if the licensing is not applied on a global basis)? Does this in turn not imply that 'cap and trade' must be introduced on a simultaneous global basis for it to be effective?

Other objections are that cap and trade could in effect operating like a system of capital controls, preventing the free international flow of capital and hence reduce the available funds for productive investment opportunities. It could also undermine bank business models that have been developed over more than three centuries, and this too might damage the supply of investment funds. It could also create barriers to entry and so reduce competition in the financial system, with some firms could end up unfairly benefiting, at the expense of others, from the distribution of licenses. Finally it might be objected that 'cap and trade', far from promoting financial stability, could result in large fluctuations in the cost of funding and might even trigger instability if it triggered a withdrawal of deposits from institutions close to exhausting their licensing capacity.

As this section shows, these concerns can be handled without great difficulty. There are only three real drawbacks. The first are the costs to establishing the scheme. It requires a shift of records from haphazardly maintained private systems, to a robust and complete public debt register, updated in something close to real time, and incorporating all private and public financial liabilities. The informational requirements are fairly large but still perfectly manageable; in essence all the back office systems of today's financial institutions would have to be mirrored in a central platform. A second drawback is that the change in bank business models will sharply reduce profitability of some firms. But it appears that this impact will overall be very positive, limiting profits and remuneration in comparatively unproductive security and financial market related activities, and helping financial market prices more closely reflect fundamentals. The third valid objection is that the use of the 'helicopter drop' to inflate away the burden of private sector debt is inconsistent with the use of monetary policy to achieve an inflation target and will have a substantial distributional impact with losers (savers) and gainers (borrowers). This is why it is desirable to accompany the use of the helicopter drop with the introduction of 'cap and trade', both to limit renewed borrowing to take advantage of anticipated negative real interest rates and

as a means of persuading investors that this is a one-time policy and there will be no repeated future uncontrolled monetary and credit expansions, followed by further inflationary reduction of debt.

Registration

The discussion of impact distinguishes the three elements of the proposal, registration, issuance, and 'cap and trade'. Registration of asset and liabilities is something that the industry will, eventually, have to accept in order to fulfill the authorities objective of ensuring that all firms are resolvable.¹⁴ Such standardisation and registration is already well advanced in relation to over the counter derivative markets. It is only a matter of time before similar developments occur for short term funding and other markets.

There will be costs to industry, but these will be mostly associated with developing and introducing industry wide standards for the common reporting of assets and liabilities. This is a substantial practical challenge and it could take some time to agree on such standards and get the asset and liability register up and running.¹⁵ There would have to be extensive testing to ensure that system is operationally sound. But there is considerable industry expertise in developing and implementing such projects. A central authority, most likely the central bank, would have to bear the costs of the core infrastructure, which would be where the major investment cost would lie. While the project would take time, comparison with similar large IT banking projects suggests the total cost would be perfectly manageable.

Issuance

The objection to issuance is not so much practical (once a liability register is established, then using it to distribute government issued money is straightforward) but intellectual. The past twenty years have seen a revolution in thinking about monetary policy, which has seen resulted in a consensus amongst academics and policy makers on two main points. First that money stocks and financial institution assets and liabilities do not matter much in the operation of monetary policy in a modern liberalised financial system: the central issues is instead the control exerted by the central bank over market rates of interest and the policy rules followed by the central bank for determining these rates of interest.¹⁶ Second that the principal objective of monetary policy should be to maintain control over inflation, either through following a operational rule for interest rates such as that proposed by Taylor (1993) in which it responds to deviations of inflation from a target level by increasing the

¹⁴ The latest statement of this from the global authorities is Financial Stability Board (2012).

¹⁵ One comparison is with the European Central Bank's 'Target 2 securities' (T2S) system for pan-European settlement of securities trades. This is a central register, that mirrors the positions of individual national depositories, through overnight uploading of liability (security account) data. Getting T2S up and running has been a multi-year project. But T2S is a greater challenge than the asset liability register, because of the need to implement real time delivery against payment (DVP).

¹⁶ As exemplified for example in the exposition of Woodford (2003); this view of monetary policy is sometimes referred to as Wicksellian after the Swedish economist Wicksell who emphasises the importance of market interest rates as a tool of monetary policy.

level of short term interest rates; or through discretionary alteration of interest rates in pursuit of an inflation target.

The use of a short term liability register as a mechanism for distributing government backed money runs directly counter to this relatively recently established consensus on how monetary policy works. So, in order for the liability register to be used to support the issue of government backed money and hence counter a cumulative decline of private sector money and credit, a relatively newly established consensus amongst academics and central banks on how monetary policy operates must be overturned.

This now conventional view of monetary policy asserts that policy makers can use available instruments (the central bank balance sheet) to control market rates of interest, and they can prevent a debt deflation (a cumulative fall in private sector money and credit) provided that this is accompanied by a credible commitment to a relatively high target rate of inflation.¹⁷ Announce a sufficiently high inflation target and this high target will then generate a self-reinforcing expectation of higher future inflation and so prevent a debt-deflation occurring. This works because, with high expected future inflation and low nominal interest rates, real rates of interest become extremely low. As a result demand and economic activity are boosted to above the capacity of the economy and so actual inflation must rise until it reaches the new higher target level.

The key word here is 'credible'. Without a direct mechanism for the creation of government backed money, other than relying on using interest rates as a monetary policy instrument, a new higher inflation target may not be credible. And if the new higher inflation target is not believed, then however low are nominal interest rates, expected real interest rate can remain very high. In this case private sector money and credit can be expected to contract in real terms, and so expectations of inflation will fall permanently and increasingly far below the announced target.

The key argument in favour of issuance is then follows. While there will certainly be considerable scepticism from those holding senior positions in the major central banks and from academic experts on monetary policy about the need to the use of the liability register to issue government backed money, the liability register must be prepared now in order to support this additional policy option. Then in three to four years time, if it turns out as argued here that policy measures based on lowering market rates of interest are unable to prevent a cumulative collapse of money and credit, the necessary alternative policy instrument will be available.

The more cogent criticism to the use of the liability register to support government backed money issue is that doing so will conflict with the pursuit of inflation targets, such as those currently adopted by the Bank of England, the ECB and in many other countries, and that

¹⁷ This view of how to counter a deflation was urged strongly by Paul Krugman on Japan in the late 1990s, see the various papers on <http://web.mit.edu/krugman/www/jpage.html>

the consequent increase of inflation and fall of real interest rates will result in substantial redistribution of wealth, especially from savers holding nominal assets such as bank deposits or government bonds to borrowers. This objection is well founded, and it would be better if there could be an orderly process of reducing private sector debt obligations, with careful attention to ability to pay and forgiveness only for those who were really unable to fully service their debts. But the legal and other costs of fully investigating and establishing ability to pay are extremely high and, if this could ever be done in a reasonably objective way at reasonable cost, would still take a very long time, possibly many years, during which firms and households would face severe constraints in access to finance and output and economic activity will be severely reduced. Therefore there seems little alternative but to accept that, if the threat of cumulative collapse of money and credit is to be avoided, we must be ready for a substantial money issue even despite the considerable redistributive costs of such a policy.

There will also be a major impact on financial and asset markets. Amongst the losers will be exporting countries that have enjoyed large export surpluses and invested in nominal assets such as government bonds or other securities in importing countries in the developed world. If money issuance via liability registers is widely adopted in developed countries, the cumulative trade surplus of China, Germany, Russia, Saudi Arabia and other countries will be substantially reduced, until these investments are moved out of nominal assets such as government bonds and into real assets such as property. There will therefore be substantial declines in bond prices (with corresponding increases in long term rates of interest) and substantial increases in the price of real assets such as prime property. Alert market participants who anticipate these movements will be able to profit considerably from borrowing in order to purchase real assets before their prices move. As a result issuance via the liability register could have the undesired result of triggering renewed growth of private sector money and credit and substantial capital gains for a fortunate few who are in a position to take advantage of higher inflation and changing asset prices. The resulting redistribution of wealth will be unpredictable and possibly extreme.

This indicates that the issuance of new government backed money via the liability register must be undertaken cautiously, only taken as far as is necessary to avoid a cumulative collapse of private sector money and credit, and must be accompanied by the simultaneous introduction of 'cap and trade' in order to limit future speculative gains on short term borrowing and investment.

Cap and Trade

The greatest practical challenges surround 'cap and trade'. The problem of a 'black market' or of clever financial engineering that replicates short term funding, outside of the register, cannot arise within the domestic jurisdiction, provided unregistered claims are not legally enforceable. Such claims might be created but they cannot create a destabilising run because a borrower can always refuse immediate repayment.

Another potential weakness is 'offshoring'. Will the response not be the same for example as to the imposition of 'Regulation Q' constraints on US dollar rates of interest in the 1960s, with business migrating to other financial centres where there is no requirement for licensing? Yes of course this is possible, but the objective, of limiting maturity mismatch in domestic markets, can still be attained by preventing any linkage to domestic institutions. All this requires is the simple additional expedient of requiring that domestic currency payments transactions by domestic institutions, or their customers, can only be made between accounts that are part of the asset and liability registration.

It will still be possible for a domestic (for example UK) financial institution to go to an offshore financial centre, to raise short term sterling funds, from non-UK residents and entities. On occasion, such cheap short term sterling funding may be plentiful, provided non-residents wishing to hold offshore UK sterling deposits for speculative reasons (to benefit from high sterling interest rates or an anticipated appreciation of sterling). But these pose no systemic risk, provided once again there is no direct link to domestic balance sheets. If there is a loss of confidence and a run on these off-shore deposits, then these short term depositors will have to pursue their claims in an overseas court (these are not domestically valid claims). If the assets are also overseas then there is no domestic impact. If the assets are held domestically, then they cannot be accessed via the overseas court.

What about the extension of domestic trade credit, e.g. when a large customer borrows from a supplier by making payment after delivery of a goods and services, or a large supplier borrows from a customer, by insisting on payment before delivery of a goods and services? In principal these short term liabilities could also be brought within the scope of the licensing scheme. As a practical matter it seems easier if they are excluded, but that large firm trade credit should still be recorded in the asset liability register, so that if the firm begins to engage in financial intermediation the licensing requirements can then be applied to its activities. Similarly the short-term liabilities of companies to financial institutions are probably best recorded but not subject to license.

It might be thought that derivative or off-balance sheet contracts could replicate short term funding and undermine the system. For example, derivative contracts which are economically similar to short term deposit claims, such as an 'in the money' call option for purchase at a fixed exercise price of low risk assets such as short term government bonds. The existence of such derivative contracts does not undermine 'cap and trade' because, without registration, they are not legally enforceable short term obligations.

A natural concern is that such 'cap and trade' could end up operating like a system of exchange controls, preventing the free international flow of capital and hence reduce the available funds for productive investment opportunities. This is not the case. While under cap and trade UK based subsidiaries could not lend to or borrow from non-UK institutions, except at maturities of well over 12 months, such business can be conducted by non-UK subsidiaries and UK institutions can freely make outright purchases or sales of foreign

currency, with any entity worldwide. Moreover non-UK institutions can still establish subsidiaries in the UK to conduct short-term sterling transactions, so there is free entry of overseas institutions into short term money markets.

Another concern is that could create barriers to entry and so reduce competition in the financial sector, especially in deposit markets. This is a key issue and it depends on the allocation of licenses. If licenses are given only to existing incumbents, then competition is indeed reduced. But the distribution of licenses can also be used, for example, to encourage new entry in customer deposit markets. It may be appropriate to involve the competition authorities in the process for allocation of licenses.

Finally it might be objected that 'cap and trade', far from promoting financial stability, could result in large fluctuations in the cost of funding and might even trigger instability if it triggered a withdrawal of deposits from institutions close to exhausting their licensing capacity. But this depends on the volume of available licenses. It could induce such instability if the stock of available licenses were contracted sharply during periods of financial vulnerability. But if used appropriately, to constrain excessive build up of maturity mismatch (excessive that is relative to the level of nominal GDP) when credit and financial institution balance sheets are growing strongly, then it will reduce exposure to systemic liquidity risk; and in the event of an episode of financial instability the volume of licenses can be increased to increase access to short term funding.

'Cap and trade' would have a dramatic impact on financial institution business models, especially for those banks, hedge funds and other institutions that use short term funding to take positions in security and foreign exchange markets. Financial firms have come to rely on their access short term and low cost funding, in order to take advantage of fleeting profit opportunities. A shift to using long term debt and equity to finance their holdings would substantially increase costs of position taking and greatly limit the activity of market makers and dealers as well as of proprietary traders.

A foreign exchange dealer, for example, who wished to borrow in sterling in order to exchange spot for dollars, would require a liquidity license. If 'cap and trade' was introduced unilaterally by the UK, this would raise the cost of short term funding and thus (via covered interest parity) affect the relationship between spot and future exchange rates. Holding long positions in securities would similarly become more expensive. And so too would holding short positions, since the borrowing of securities, in order to hold a short position, is always matched by a counterparty on the other side of the trade who borrows money and providing the security as collateral. The borrowing of the counterparty would be subject to cap and trade licensing and thus security borrowing would become relatively expensive.

Financial market participants are ever inventive and will no doubt find ways to continue taking positions, despite cap and trade on short term borrowing. For example it should be possible to borrow securities using other securities rather than cash as collateral. The

secondary trading of licenses can be expected to become highly sophisticated, with the market price of licenses fluctuating substantially day to day, hour to hour and minute to minute. So there will continue to be short term position taking.

But ‘cap and trade’ will still bite. Aggregate short term inflows into security markets no longer be automatically financed by collateralised short term credit; instead investors will have to compete with traditional banks for a limited pool of available short term funds from retail and corporate customers.¹⁸ With investment flows between money and security markets damped, that security and foreign exchange prices will become less volatile and less cyclical.¹⁹ This in itself seems a desirable outcome, helping prices match more closely to economic fundamentals and more than offsetting the somewhat higher costs of transactions for final investors (such as insurance companies and pension funds).

There is a parallel with the widely discussed proposal by Tobin (1978) for a tax on foreign exchange transactions, a proposal that has since been frequently revived for a range of financial markets as a means of discouraging trading that aims only at achieving short term returns. The current proposals by the European Commission for a financial transactions tax are motivated by a desire to both discourage short term trading and to force the financial sector to make an increased contribution to public sector revenues.

‘Cap and trade’ will have a similar impact on short term position taking as a Tobin tax, but appears to do so in a more cost efficient manner, since it imposes no direct cost on long investors such as pension, insurance or sovereign wealth funds that seek to alter their portfolios. There will of course be an indirect impact. Less short term financing of trading positions will lead to some reduction in price discovery, with current market prices reflecting the views of rather fewer market participants. But market participants will be limited in their ability to use short term funds to make profitable trades based on anticipating short term price movements (a desire to borrow money to go long, or go short and deposit money, will be largely reflected in an increase in the prices of licenses for short term funding, rather than in fluctuations in the market price of securities). So market prices will approximately more closely to expected long-run fundamentals.

There will be a similarly major impact on asset management firms who will no longer be able to easily move client portfolios out of securities into cash, or from cash into securities. Portfolio decisions will have to be based much more clearly on their assessment of long-run returns. These are major change of business model for both trading and investment firms, but the resulting focus on long term investment returns appear to be a substantial additional benefit from cap and trade (especially if this shifts market equilibrium from an impatient to patient outcome as described by Haldane (2009)).

¹⁸ Adrian and Shin (2009) document of the large cyclical variation in repo by New York broker dealers.

¹⁹ See Adrian et. al. (2010) for evidence that fluctuations in repo borrowing in New York markets are associated with fluctuations of exchange rates, implying that ‘cap and trade’ would reduce exchange rate volatility.

5. Related ideas and policy initiatives

This section, the longest of the paper, reviews some related ideas – under five broad headings (i) measures to increase transparency and availability of data for the financial sector; (ii) new approaches to regulation emphasising containment of systemic financial risk; (iii) the imposition of Pigovian taxes to contain systemic risk externalities; (iv) structural reforms and intervention in the financial sector; and (v) monetary policy and the liquidity trap.

Measures to increase transparency and data availability

One of the most notable regulatory developments since the global financial crisis has been steps taken by the regulatory authorities in both the US and Europe to ensure much greater transparency and availability of data, especially in over the counter (OTC) derivative markets. Both the Dodd-Frank act and also forthcoming European regulation are requiring trades in OTC markets to be recorded in central trade repositories, both in order to provide regulators with up-to-date information on market developments and also to allow market participants to better assess the financial condition of their market counterparties.

A central component of these new requirements will be the establishment of a global system for unique legal entity identification (or LEI) system, which allows unambiguous identification of every participant in a contract between financial firms.²⁰ While the global system is still under discussion, the Commodity and Futures Trading Commission in the US derivatives regulator is pioneering a system of interim compliant identifiers, in order to fulfil its obligation under the Dodd-Frank act to begin tracking swap transactions in 2012. Eventually all OTC derivatives transactions should be fully recorded in trade repositories and where possible cleared through central counterparties.

While the initial efforts of regulators have been focussed on derivatives, especially on interest rate swaps and credit default swaps, a similar shift to recording and monitoring of transactions can be expected in short term money markets, including repo, in order to allow the regulators to monitor risks to the system as a whole and also to track exposures when a firm has to be resolved. The liabilities register similar to that proposed in this paper will be a necessary step to provide such transparency in short term money markets.

New regulations to contain systemic financial risk

The failure of regulators to anticipate and respond to systemic financial risk is now widely acknowledged.²¹ Efforts are now being devoted to modelling and measuring such systemic risk externalities;²² and policy makers have been introducing regulatory measures intended

²⁰ See Financial Stability Board (2012)

²¹ Turner (2009), Brunnermeier et. al. (2009)

²² For example Adrian and Brunnermeier (2010)

to address them, including the likely introduction of ‘cyclically varying’ bank capital charges and other macroprudential tools.²³

One initiative has been a new emphasis on monitoring and regulating liquidity, with the Basel Committee on Banking Supervision asking internationally active banks to comply with two new liquidity requirements as part of the ‘Basel III’ requirements: a liquidity coverage ratio LCR (requiring banks to hold sufficient liquid assets to cope with a breakdown of funding markets for a prescribed period of one month) and a net stable funding ratio NSFR (limiting the use of short term wholesale funding).²⁴

While Basel III attempts to address the problem of ‘procyclicality’ in its predecessor Basel II, which encouraged relaxation of capital requirements during periods of rapid growth of asset prices and credit, it is far from clear that the procyclicality of regulation has been fully removed.²⁵ There are particular problems with the Basel committee liquidity proposals.²⁶ There has been no quantitative economic justification for the chosen ratios: are these the right levels to prevent future systemic liquidity problems, or are they too high or too low? The LCR as currently announced creates (unintended) liquidity risks by restricting banks to holding a very narrowly specified group of assets. The NSFR requires banks in many jurisdictions to issue very large amounts of long term debt, by the final implementation date of end-2018. The need to do this appears likely to put considerable strain on bank balance sheets and this could result in a renewed global recession.

Using cap and trade to address systemic risk from maturity mismatch can avoid these problems. If cap and trade focuses on preventing further increase in maturity mismatch, rather than the total amount of maturity mismatch, then there is no need to determine a correct level of short term financing, either for the industry as a whole or for individual firms. This in turn reduces the pressure on the banking sector to issue large amounts of long term debt within a short time period. With cap and trade controlling aggregate maturity mismatch, there is no obvious need to control the asset holdings of individual firms. Cap and trade thus provides an appropriate macroprudential control of liquidity risk, without the many severe disadvantages of the current Basel measures.²⁷

²³ Many of these measures are being developed under the auspices of the Basel Committee on Banking Supervision (BCBS (2010c) , see section 2 below for more detailed discussion).

²⁴ For details see BCBS (2010a, 2010b). Final rules are due for publication by end 2010.

²⁵ Academic discussion has been fiercely critical of Basel II, pointing out well before the recent global financial crisis, that it could create severe problems, most notably by encouraging pro-cyclical movements in bank credit. See for example Danielson et. al. (2001), Milne (2003) and Brealey (2006).

²⁶ These problems are discussed in more detail by Allen et. (2012).

²⁷ Regulatory authorities are currently considering the use of a variety of possible macroprudential policy tools, such as limits on loan to value ratios and countercyclical variation in capital, to limit systemic financial risk. See Drehman et. al. (2010) for one analysis of how such countercyclical variation might work. Milne (2010) provides a critical review of what might be achieved from using such macroprudential policy tools.

This does not prevent the authorities, if they wish, using cap and trade to put gradual pressure on the system as a whole to refinance at longer maturities, by steadily reducing the stock of available licenses. But this can be done gradually and adjustment can be made most by those firms that have the credibility with investors that allows them to raise long term funding at low cost (other firms will instead pay the additional costs of obtaining licenses that allow them to continue to using short term funding.) Thus, unlike the measures being introduced by the Basel committee, cap and trade avoids dangerously rapid balance sheet adjustments.

A different approach to the containment of systemic financial risk is motivated by a view of the financial system as a ‘complex adaptive system’ in which, in a stressed situation, shocks can cascade and amplify through the network of connections between firms.²⁸ This is one motivation for the creation of new macroprudential policy making bodies that can both respond to increasing financial systemic risks and ensure that financial systems are resilient and do not break down when these risks materialise. But there is concern that the actions of these new macroprudential policy making bodies will create uncertainty for both financial institutions and non-financial businesses about the cost and availability of credit and hence interfere with economic activity.²⁹ There is therefore a strong case for arguing that macroprudential tools should be used within a strict rule based framework, in which the impact on the cost and availability of credit can be readily predicted. Cap and trade provides an example of how such a rule based macroprudential policy instrument can work, with the aggregate maturity mismatch constrained to grow no faster than a target level established by the authorities. Similar rule based aggregate rules could well be developed for containing aggregate financial sector capitalisation or other primary causes of systemic financial risk.

Pigovian taxes

Another widely canvassed idea for making banking safer and limit state subsidy of risk taking is to impose ‘Pigouvian’ taxes, designed so that individual firms end up paying for the additional ‘externality’ created when their decisions impose risks on other firms and the financial system as a whole. This idea has been taken up in several recent contributions to the debate on regulatory policy.³⁰ ‘Cap and trade’ can be seen as one way of implementing such a Pigouvian tax.

The contributions closest to the ‘cap and trade’ licensing of this paper are those of Perotti and Suarez (2009a, 2009b) and Stein (2010). Perotti and Suarez also focus on the systemic risk posed by maturity mismatch, and propose addressing this using a Pigouvian tax on short

²⁸ See Haldane (2009) for an overview.

²⁹ See Clark and Large (2011) for a discussion of the many challenges to faced in establishing an effective macroprudential policy function.

³⁰ Including Brunnermier et. al. (2009), Acharya et. al. (2010), Adrian and Brunnermeier (2010), Doluca et. al. (2010), Kocharlakota (2010), Jeanne and Korinek (2010) and Shin (2010). Note that amongst these papers there are considerable differences of view about what constitutes a contribution to systemic risk.

term whole sale funding, aimed at preventing build up of systemic risk from maturity mismatch. 'Cap and trade' offers one clear advantages over the direct imposition of a Pigouvian tax, it is no longer necessary to quantify the external costs of maturity mismatch, in order to determine the level of the tax. Rather instead aggregate maturity mismatch is directly controlled. Still the distinction between the two policies is not a sharp one: provided that system wide maturity mismatch is measured, then this can be controlled either directly using cap and trade or indirectly by setting an appropriate level of Pigouvian tax.

Perotti and Suarez (2010) consider a related issue whether such build up is best addressed using taxation or quantity controls, showing that when firms face differing investment opportunities a Pigouvian tax is superior to a control of individual short term liabilities (this is because it is more flexible, it does not prevent firms creating value from using short term funding). This same flexibility benefit applies to 'cap and trade'.

The most closely related proposal to the cap and trade suggested in this paper is that of Stein (2010), building on ideas put forward earlier by Kashyap and Stein (2004). Stein provides a theoretical argument in favour of such 'cap and trade', developing a model of money creation, in which short term funding creates systemic risk externalities, because of potential liquidity problems. In this context 'cap and trade' is the most effective way of incentivising banks to pursue socially desirable combination of investment levels and maturity composition of funding. However, Stein offers little discussion of practical implementation or any comparison with other policies for containing systemic risk.

Kashyap and Stein (2012) consider how such a 'cap and trade' system might be put into practice, arguing that the systemic risk externality associated with short term borrowing could be addressed using the relatively old fashioned tool of setting binding low interest rate reserve requirements on all short term liabilities (one feature of their proposals is that they allow the authorities to independently alter both the level and interest paid on these reserves). Is this not equivalent to 'cap and trade'? There are parallels and differences. The parallel is that both the 'cap and trade' of licenses and of required reserves would penalises the use of short term funding relative to long term funding and hence attenuate the systemic risk externality of maturity mismatch.

However the proposal of Kashyap and Stein (2012) for 'cap and trade', based on reserve requirements, would weaken the ability of the central bank to control short term market rates of interest. Kashyap and Stein (2012) argue that the central bank can assert control over both the quantity and the price of reserves by altering the remuneration paid on reserves. This appears to be true in their theoretical model, but in practice banks experience substantial day to day fluctuations in reserves (for example as a consequence of movements of funds in foreign exchanges markets or large tax payments to government) and central banks have to respond by withdrawing or supply reserves in large quantities (typically using repo to lend reserves or reverse repo to withdraw reserves) so as to correct any imbalances

in the market. If they do not do so the consequences are massive fluctuations of overnight money market interest rates such as the Fed Funds rate.³¹ This means that, even if reserves are remunerated, it is impossible for the central bank to simultaneously control both their quantity and their price (an exception is when as now central banks expand reserves massively in excess of reserve requirements, then they can control both price and quantity, but this means they cannot use reserves as a constraint on bank decision making). Having, as proposed in this paper, separate traded licences for maturity mismatch allows the authorities to control both interest rates and maturity mismatch.

Structural reform of the banking sector

The cap and trade proposals of this paper seek to limit the extent to which risky credit expansion is financed using short term liabilities. There have been a number of proposals for radical structural reform of the banking industry over the years with similar aims. The literature on so-called 'narrow banking' in which banks would be forced to back deposits only by extremely safe assets such as central bank reserves or short-term government bonds, and deposits could not be used to finance lending, is long standing.³² The difference is that 'cap and trade' focuses on increases in the stock of money and credit, and does not attempt to change the funding of existing bank loans and other credit assets.

There has been a related recent debate on structural reform in the UK, beginning with Kay (2009) who argues that there should be a clear separation of safe utility banks that take retail deposits from other financial institutions (though a banking group might contain a utility banking subsidiary alongside other riskier activities). Thus retail depositors are not exposed to the riskier aspects of banking and tax-payer protection of deposits, through explicit or implicit deposit insurance, does not subsidise risk-taking. Kay also argues that the ring-fencing of UK banking will help overcome problems of business culture, in which UK retail banks have been influenced by the aggressive nature of wholesale and investment banking and become excessively focussed on short term revenue growth at the expense of customer service and customer satisfaction.

In the UK the independent commission on banking chaired by Sir John Vickers has recommended, in its final report of September 2011, a similar ring-fencing of UK retail banks, in which all customer deposit taking and short term customer lending must take place in separately capitalised ring-fenced subsidiaries.³³ The UK government has accepted these proposals and is due to put them into law by early 2013 with implementation by 2018.

³¹ As occurred during the period 1979-1982 during the brief experiment by the Federal Reserve with monetary base control.

³² The concept of narrow banking originated with Irving Fisher's proposal for 100% Money (Fisher (1935)), in which bank deposits are fully backed by central bank reserves, an idea subsequently endorsed by many influential economists including Maurice Allais (1948), Henry Simons (1960) and Milton Friedman (1960). These proposals for narrow banking were revived in a slightly different form, following the US S&L crisis, by Litan (1987), Tobin (1987), Spong (1989), and Burnham (1991). Phillips (1991) provides a useful review.

³³ The final report has been published at <http://bankingcommission.independent.gov.uk/bankingcommission/>.

However, while the separation of retail deposits and short-term lending into separate 'ring-fenced' subsidiaries is straightforward, the determination of their other activities has proved problematic, with a complex set of rules about what other exposure are legitimate for ring-fenced banks emerging.

UK developments are, to a degree, paralleled in the US, where the proposals of former Federal Reserve Governor Paul Volcker for limiting the engagement of licensed deposit taking banks in relatively risky activities of proprietary trading or participation in hedge funds and private equity funds have been incorporated as part of the 2010 US Dodd-Frank Act). Again however these are proving difficult to implement in practice, with lengthy rule books required in order to distinguish legitimate activities that can be conducted by commercial banks from those that cannot.

A weakness of the Kay version of narrow banking, and its implementation as proposed by the UK Independent Commission on Banking, is that it places no constraints on the use of maturity mismatch by other financial institutions, those that do not take retail deposits. Other institutions (those whose funding comes from wholesale markets rather than retail deposits) could still use short term funding to expand their balance sheets, without being subject to the normal disciplines imposed when firms raise long term debt or equity finance. The combination of maturity mismatch and uncontrolled balance sheet expansion could then still pose a potentially large systemic risk, with a loss of confidence and withdrawal of funds leading to major declines in asset valuations and a significant loss of net worth across much of the financial sector. Some form of 'cap and trade' therefore still seems to be needed to contain the growth of such 'shadow banking'.

Kotlikoff (2010) offers an even more ambitious structural reform that he labels 'limited purpose banking', in which all bank liabilities would have to take the form of mutual fund claims on underlying assets. Transaction services could only be offered by cash mutuals, holding government issued money (central bank liabilities such as notes, but also central bank reserves). These cash mutuals are thus very much like the 100% money banks originally proposed by Fisher (1935), but such 'narrow' banking is only part of the reformed system. Safe investments, offering similar balance of risk and return as the savings or time deposits offered by today's banks, can be provided by mutual funds as long as they invest only in safe short and medium term bonds, such as government and good quality corporate issuers. Higher returns could be offered by funds investing in longer term and riskier bonds or in equities. Limited purpose banking would eliminate all forms of maturity mismatch, rather than as in 'cap and trade' limiting its growth.

There is also a link between structural reform of banking and the other main proposals of this paper, for government backed money issuance via the liability register. All these structural interventions will have significant transition costs, making it difficult for firms to

refinance their current asset portfolios. Thus it is even more likely than would otherwise be the case, that issuance of government backed money using a liability register will be needed to prevent a cumulative collapse of money and credit.

The liability register and the zero lower bound

The construction of a liability register, and its use to conduct a ‘helicopter’ issuance of government backed money, can be viewed as overcoming a key constraint in the operation of expansionary monetary policy, the zero lower bound on nominal interest rates. It is therefore worth commenting, briefly, on why there is a zero lower bound and on what alternative mechanisms there might be for overcoming it.

Prior to the global financial crisis central banks controlled short term (overnight) rates of interest by limiting the amount of reserves and supplying only the amount consistent with their desired target level of overnight rates of interest. In theory this approach could be used to reduce overnight interest rates as far below zero as the authorities desire, provided that there was a penalty charge imposed on banks for holding of central bank reserves, and indeed on occasion central banks have indeed pushed overnight money market rates of interest into negative territory.³⁴ However since the crisis central banks, notably the Federal Reserve and the Bank of England, have turned instead to ‘unorthodox’ policies including quantitative easing in which they seek to control the long term market rates of interest as well as short term interest rates. Why have they not pushed short term nominal interest rates well below zero?

Buiter (2009) argues that the constraint that prevents central banks setting nominal short term market rates of interest is the substitution of central bank notes for central bank reserves, but that this constraint can be overcome either (crudely) by abolishing notes or (less crudely) by imposing a tax on bank notes, so for example insisting that they are exchanged every twelve months for new notes worth perhaps only 95% of their previous nominal value. This 5% per year deflation in the nominal value of paper money would allow the authorities to push nominal interests also down to minus 5% without causing a flight out of central bank reserves. Hence the authorities should not be constrained by the zero lower bound.

There are some serious practical objections to the Buiter proposal of taxing currency. One is that in an open economy, is that while the authorities could easily use currency taxation to prevent a flight from central bank reserves to domestic currency, they would have little power to prevent a flight into overseas assets currency without imposing currency controls. Another is that private sector financial systems have not been designed to cope with negative rates of interest, so just as the year 2K (2000) threatened to cause major disruption to bank computer systems, there could be serious disruption from negative rates of interest.

³⁴ See Ward and Oakley (2009)

Similarly legal problems might arise with some contracts if they offered a negative nominal rate of return.

A deeper objection is the one raised already in the introduction to this paper: a policy of reducing short term overnight market rate of interest well below zero seeks to maintain output and demand by creating substantially negative rates of interest and hence encouraging firms and households to borrow and increase expenditure on both consumption and investment today, thus increasing demand relative to the supply capacity of the economy. But this is counterproductive, at least to the extent that this higher demand requires them to increase their borrowing. Reducing interest rates to negative levels, well below the rate of inflation, will reduce the burden of debt for some borrowers, paying nominal rates of interest who can enjoy paying substantially negative real rates of interest. These borrowers will be able to increase expenditure without increasing their borrowing. But using the liability register to support direct issuance provides a much more direct means for increasing private sector expenditure without increasing private sector debt: for every Euro thus put into the hands of citizens, some fraction will be spent and the rest can be used to reduced indebtedness. To conclude, it is possible, with appropriate institutional arrangements such as a taxation on currency, to push nominal interest rates well below zero and thus erode the burden of private sector debt. But this burden can be reduced, much more directly, by using a liability register to issue government backed money.

6. Concluding remarks

Conventional fiscal and monetary policies appear incapable of maintaining economic output and activity in the wake of the global financial crisis. This paper offers, in Section 2, a new policy proposal to avoid this outcome, with a liability register used to both prevent unsustainable expansions of money and credit (where the register is used to support 'cap and trade') and to prevent subsequent cumulative collapse (by a 'helicopter drop' issue of money implemented through the register).

A register of this kind will be needed for authorities to pursue their current policy objective of making every financial institutional resolvable following major losses without tax payer support. But a short term liability register is also a basis for other even more critical policy tool. It can provide a basis for "helicopter monetary issue", with monetary and quasi-monetary private sector liabilities increased as necessary by the public authorities (and financed in private sector balance sheets by the distribution of non-interest paying government bonds exchangeable into central bank reserves or currency). It appears that this policy option will be needed to prevent a cumulative collapse of money and credit, now that current fiscal and monetary policies have reached their effective limits.

This proposal runs directly counter to the widely held consensus, established in the past twenty years amongst both senior officials in central banks and academic monetary economists, that monetary policy need not be concerned with the quantity of money, and that it can be based instead entirely on the use of market rates of interest as the instrument of monetary policy, operated so as to keep inflation close to some desired 'target' level.

It represents a break from this consensus in two respects:

- It is a rebuttal of so called 'unorthodox' monetary policy, in which central banks seek to control long term interest rates as well as short term rates. These so called 'unorthodox' but actually very orthodox policies seek to maintain output and economic activity by increasing private sector money and credit. This cannot work because the fundamental problem is that private sector money and credit have already increased well beyond sustainable levels and must in future fall in real terms, not increase.
- It is a rebuttal of inflation targeting, because the only means of reducing private sector money and credit, without an severe accompanying fall in output and economic activity, is for unexpectedly high inflation and consequent negative real interest rates to reduce the burden of private sector debt.

Issuance proposed here is costly. The resulting rise of inflation and fall of real interest rates will have substantial distributional impact, both between countries (from surplus mostly emerging nations to deficit mostly developed nations) and within countries (with losses to savers and an across the board subsidy to debtors). But there appears to be no other realistic and reasonably rapid way of reducing the burden of private sector debt, in those countries that experienced large increases in the private sector money and credit during the years 2002-2007 prior to the global financial crisis.

As long as banks and 'shadow banks' remain free to create money and credit, then issuance will provide them with strong incentives to engage in further unsustainable expansion of money and credit so as to take advantage of low real interest rates. Issuance must therefore be accompanied by cap and trade, to control aggregate short term borrowing and ensure a permanent fall in private sector debt and money without a renewed expansion of private sector money and credit. This will also help maintain credibility in the commitment of the authorities to limiting the money issue to the extent necessary to prevent a cumulative collapse of money and credit.

Cap and trade will have a further benefit, discouraging short term position taking in financial markets. Any desire by short term traders to increase (or reduce) aggregate positions will raise (or lower) price of traded licenses, rather than change of market price. This should lower market volatility and move prices closer to fundamental levels. Overall the benefits of the proposals made here, while needing further assessment, appear considerable.

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