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Surveys

100 percent reserve banking: A critical review of green perspectives

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ABSTRACT

100 percent reserve banking (C-PeRB) is an enduring proposal for monetary reform that has been taken up by some ecological economists. This paper identifies three groups of green arguments in favor of C-PeRB, and offers some criticism. First, the proposal could serve to constrain new investments by the availability of savings, thereby checking economic growth. However, this would strongly increase interest rate volatility. Second, it could potentially elevate environmental considerations in decisions about resource allocation by increasing the role of the democratic state as an economic actor. This line of argument faces problems that require further detailed exploration and historical perspective. Third, a transition to C-PeRB would allow debt levels to be drastically cut. This is technically possible, but politically a tall order. Whether the existing system of 'debt-based' bank money generates a significant growth imperative is unclear, and the importance of other driving forces behind perennial economic growth in modern societies – which C-PeRB does not address – remains an issue of contention. In general, the adoption of C-PeRB presupposes a tremendous reconfiguration of power relations between states and finance capital.

1. Introduction

The financial crisis that began in 2007 has underlined the fact that ecological economics does not have much to say about monetary and financial reform. As recently suggested by Daly (2014: 127), "[m]oney and finance have rather naturally been pushed aside by ecological economists' focus on biophysical dimensions", the latter being the great blind spot of conventional economics that the field was born to uncover. Insofar as ecological economists have analyzed market-based policies, these have tended to be narrowly environmental in character, such as payments for ecosystem services or green taxation. A number of proposals for monetary and financial reform have indeed been advocated on environmental grounds (e.g. Douthwaite, 2012; Lawn, 2010; Loehr, 2012), but critical debate has been largely absent. This paper aims to foster such debate by reviewing and making some criticism of green arguments for the long-standing proposal of 100 percent reserve banking (here abbreviated C-PeRB). We begin by explaining the basics of C-PeRB and giving a brief historical overview of the proposal. Sections 2–4 discuss three groups of distinctively green arguments for C-PeRB. Section 5 describes the 'near-money' problem that has accompanied the proposal from its beginnings, and Section 6 concludes.

1.1. Outline and History of Proposals for 100 Percent Reserve Banking

The essence of C-PeRB – or synonymously, full-reserve banking – is that the state gains control over the quantity of money in the economy, i.e. the money supply. In today's capitalist economies, the lion's share of the money supply is bank money, created by commercial banks in the act of lending as a new deposit for the borrower and a new liability of the bank.[1] Conversely, bank money is extinguished as loans are repaid. Under C-PeRB, only the state – via the central bank or some other monetary authority – would have the ability to create (and destroy) money. There would be two basic types of private bank; deposit banks and lending banks (or investment trusts). Deposit banks would be obligated to hold cash, or reserves in their accounts with the central bank, to the full amount of their demand deposit liabilities to their customers.[2]

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[1] The extent to which commercial banks can create money at their discretion remains a matter of debate. Economic orthodoxy holds that banks are constrained by the central bank's provision of reserves via the 'money multiplier'. Post-Keynesian economists, however, argue that any interest-rate targeting central bank must supply banks with whatever reserves they wish to borrow at a given rate of interest. They subscribe to Keynes' view that "there is no limit to the amount of bank-money which the banks can safely create *provided that they move forward in step*" (Keynes, 1965: 26, italics in original), so that each bank can compensate clearing losses of reserves by gains.

[2] This implies that a deposit bank carries its monetary assets and liabilities on its balance sheet, although there must always be a one-to-one relation between them. Some present-day authors reject this design as "backward-looking, actually conserving the obsolete reserve system" with its distinction between commercial bank money and central bank money, and propose instead a system in which deposit banks would only be agents of the central bank, managing people's accounts *held at the central bank* (Huber and Robertson, 2000: 23). Rather than a full-reserve system, this is labeled a 'plain money' or 'sovereign money' system, in which there is "just one integrated quantity of money circulating among banks and non-banks alike" (Jackson, 2013). However, we will here treat the two models as equivalents, coinciding with Wolf's (2014a) judgment that the difference is not "at all important". Indeed, some early full-reservists described their own proposal as a plain money system rather than a two-circuit reserve system, prescribing the "[d]isplacement by notes and deposits of the [Federal] Reserve banks of all other forms of currency in circulation, thus giving us a completely homogeneous national circulating medium" (Simons, 1948: 63).

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Hence, their role would be limited to the payment system, offering transaction and safekeeping services. Typically, deposit banks would finance their activities by charging a fee for managing deposits. Lending banks would be what banks are often wrongly believed to be today, namely pure intermediaries between savers and borrowers. Crucially, a deposit in a lending bank would not be available to the depositor on demand but actually lent out, i.e. it would not be a liquid monetary asset for the depositor. C-PeRB proposals vary in their specifications about lending banks, e.g. regarding reserve and capital requirements and presumed sources of funding (private loans, government loans, or equity investment). The central bank would conduct monetary policy through quantity control of the money stock, rather than (as today primarily) by setting the price (i.e. interest rate) at which it lends reserves to banks through the 'discount window'.

Frederick Soddy (1933: 197–9), a chemistry Nobel laureate, is usually credited with having first raised the C-PeRB idea in the 20th century (but see Bromberg, 1939; and Mints, 1945 on the pre-20th century history of the idea). Soddy aimed to set out a monetary system based on the physical principles that he believed to underlie wealth; the laws of thermodynamics. By requiring banks to hold "pound for pound" of reserves against demand liabilities, a "disinterested bureau of statisticians" could control the money stock to make money an invariable standard analogous to the scales of measurement of the physical world (Soddy, 1934: 211, 169). For Soddy, this "scientific monetary system" was all that was needed to inaugurate the egalitarian age of plenty (Soddy, 1931: 22), characterized by economic *laissez faire* (Soddy, 1934: 3), that the progress of natural science had made possible. Soddy was a "monetary crank" (Clark, 2008), attributing "the whole hell's brew which the scientific civilisation has become" to the "banking tricks" of fractional reserve banking that robbed the nation of its "virtual wealth" (Soddy, 1933: 10; Soddy, 1934: 215, 89).[3] Soddy's original proposal was favorably reviewed by Frank Knight (1927), who in March 1933, together with colleagues at the University of Chicago economics department, would write a memorandum to the US Secretary of Agriculture, known as the first *Chicago plan* for banking reform (Knight, 1933).[4] The essential feature of the Chicago plan is a system of C-PeRB together with a legislated rule for monetary policy (as opposed to central bank discretionary powers). The plan was presented as a free-market alternative to the danger of bank nationalization (Phillips, 1995: 53), in line with Soddy's (1934: 211) advice to "[a]void as the plague schemes for nationalizing banks" (this motive remains in Daly, 2013). Among the few receivers of the memorandum was the eminent economist Irving Fisher, who took up the cause after some hesitation (Allen, 1993), and soon became its most conspicuous advocate.[5] Along similarly *laissez faire* lines, Fisher argued that C-PeRB – by protecting the payment system from the risks involved in bank lending – "would render unnecessary many, if not most, of the present vexatious regulations of banking" (Fisher, 1946, sec. 11; see also Douglas et al., 1939: 31; Simons, 1948: 332–3 n19). The other advantages most commonly claimed by its Depression-era advocates were that it would eliminate runs on deposit banks and eliminate great inflations and deflations, thereby greatly mitigating booms and depressions (Fisher, 1945: 11–4).

Harvard economist Lauchlin Currie (1968 [1934a]: ch. XV) had independently argued for C-PeRB in early 1934. By July, he was employed by the US Treasury *explicitly* to elaborate this proposal (Sandilands, 1990: 57), submitting it in September 1934 to Treasury Secretary Morgenthau (Currie, 1968 [1934b]). As a New Dealer – and unlike the Chicago economists – Currie's intention "was to render activist monetary policy a more useful component of a generally interventionist policy regime" (Laidler, 1993: 1070). Currie went on to draft the administration version of the Banking Act of 1935, which included the legal right of the Federal Reserve Board to raise reserve requirements by anything up to 100% if it so wished.[6] However, by the work of Senator Glass, this right was excluded from the enacted version. Phillips (1995: ch. 10) argues that the exclusion was due to administration blunders affecting Glass and resistance from the banking community based on misconceptions about C-PeRB as a plan to end private banking. Nevertheless, campaigning for C-PeRB went on, especially by Fisher — right until his death in 1947 (Allen, 1993). Various bills prescribing C-PeRB were introduced in the US Congress between 1934 and 1945, but without success. The Banking Act of 1935, which provided permanent federal deposit insurance as the de facto alternative to C-PeRB, would remain the basic banking legislation until the late 20th century. C-PeRB lived on for some time in academia, notably advocated by Milton Friedman (1960: 65–76), but progressively lost attention. In the midst of the US savings and loan crisis of the late 1980s and early 1990s, it enjoyed a revival as 'narrow banking' (Litan, 1987), seen as a solution to the moral hazard problems associated with federal deposit insurance (Phillips, 1995: 180) (narrow banking proposals accept a wider range of assets counting as reserves). C-PeRB has been given yet another lease of life in the aftermath of the financial crisis of the late 2000s; in the policy debate (Benes and Kumhof, 2013; Kotlikoff, 2010; Wolf, 2014b, 2014c) and by the Positive Money movement originating in the UK (Jackson and Dyson, 2013). In September 2011, Dennis Kucinich introduced a bill (HR2990) in the US Congress including C-PeRB, but it failed to pass.

Advocacy of C-PeRB by ecological economists – or more broadly, greens – appears to have begun with Daly's (1980) recovery from oblivion of Soddy's economic thought. Rather than attempting to sketch the historical trajectory of this idea within the international green movement, the following three sections will discuss the distinctively environmentalist case for C-PeRB, as advanced in the English-language literature.[7]

2. Controlling Scale by Limiting Private Investments to the Availability of Savings

Herman Daly is commonly associated with the vision of a steady-state (i.e. physically non-growing) economy (SSE) organized around three basic economic goals: sustainable scale of the macroeconomy within the biosphere; just distribution; and efficient allocation (Daly, 1992). Daly advocates C-PeRB as a policy that could help achieve a sustainable scale, because, "[a]ssuming initially a fixed relationship between GNP and throughput, a steady-state economy requires a constant real money supply" (Daly and Farley, 2011: 335). In Daly's version of C-PeRB, the nominal money supply would also be constant, since the Treasury (not the Fed) would control it so as to maintain a constant price index.[8] This system "would restrict borrowing for new investment to existing savings, greatly reducing speculative growth ventures", so

[3] As Daly (1980: 471) observes, "Soddy is admittedly unconvincing in his frequent attribution of war and all other evils to fractional reserve banking". We may add, conversely, that Soddy never went to great lengths to substantiate his extraordinary claims about C-PeRB. Indeed, it is not for his monetary reform proposal – which is not mentioned – that Martinez-Alier (1987: ch. 9) includes Soddy in the pre-history of ecological economics, but for his discussion of the physical principles underlying wealth, and how these are contradicted by conventional economics.

[4] See Phillips (1995) for an excellent history of Depression-era C-PeRB proposals.

[5] Daly (1980) notes Soddy's apparently magnanimous acknowledgement of Fisher's campaigning in a 1943 pamphlet. However, in the widely forgotten *Economic Forum*, Soddy had previously accused Fisher of having "put forward as his own" the proposal (Soddy cit. in Dimand, 1991: 24). It was pointed out in response that Fisher (1945: 204 n2, 221–3) had in fact already cited Soddy and listed three of his works.

[6] It is therefore not entirely correct to say of the 1930s full-reservists that "their ideas on money were simply classed separately from the rest of their economics, treated as a peccadillo, and were ignored" (Daly and Farley, 2011: 296).

[7] I am unaware of the existence of other major environmentalist arguments for C-PeRB presented in other languages.

[8] Daly allows for some, presumably very limited, GDP growth in an SSE: "Once we have achieved sustainable throughput, technological advance may still allow growth in the real value of market goods and services" (Daly and Farley, 2011: 335).

that "the classical balance between abstinence and investment" would be re-established (Daly, 2013; see also Daly, 1999: 154). Interest rates would be "left to market forces" (Daly, 2013), i.e., vary freely to clear the credit market. Daly would probably agree that interest rates would be more volatile than under the existing system, since banks would no longer be able to satisfy loan demand by creating bank money. Moreover, the average interest rate level would arguably be higher, given that C-PeRB plans generally address the moral hazard problem, making creditors bear a much larger share of the risk of lending by reducing government insurance of savings deposits and allowing lending banks to fail. Indeed, there is reason to believe that the risk of lending will be higher in a climate-changing future, presumably characterized by absolute scarcity.

Daly's thinking about interest rates can be understood in light of his equivalent views on intertemporal discount rates. It is usually argued that a high discount rate is bad for the environment because "[i]t shifts the allocation of capital and labor towards projects that exploit natural resources more intensively" (Daly, 1996: 50). By reducing the present value of future costs and benefits, a high discount rate increases the economic rationality of activities that deplete exhaustible natural resources, and decreases the economic rationality of maintaining slow-growing renewable resources. However, Daly distinguishes this undesirable "allocation effect" of a high discount rate from its benign "scale effect" of restricting the total number of projects undertaken through dissuasive borrowing costs. "Which effect is stronger is hard to say, although one suspects that over the long run the scale effect will dominate" (Daly, 1996: 50). More confidently: "a higher interest rate (discount rate) slows down aggregate growth in GNP and throughput, thus easing pressure on the environment" (Daly and Farley, 2011: 316). Presumably, environmentally adverse credit allocation and other perverse effects of high interest rates such as *adverse selection* and the *incentive effect* (Stiglitz and Weiss, 1981), would be countervailed by means of additional policy instruments.[9] The same applies to the regressive effects of high interest rates on distribution.

Leaving interest rate determination largely to market forces is a corollary of C-PeRB, because of the incompatibility between quantity control of the money stock and price control of credit (but see below on the recent watering down of C-PeRB). It is important to note that this constitutes a radical break with the history of monetary policy. According to Goodhart (1987: 6699, italics in original), "Central Banks have historically been at some pains to assure the banking system that the institutional structure is such that the system as a whole can *always* obtain access to whatever cash the system may require in order to meet its needs, though at a price of the Central Bank's choosing: and there has been a further, implicit corollary that that interest rate will not be varied capriciously". Even under the classical gold standard (ca. 1880–1914), when governments were less concerned than their welfare-state successors about the hardships wrought by interest rate hikes on the lower classes (Eichengreen, 2008: 30), central banks were nevertheless "ironing out swings in interest rates induced by seasonal forces and by the business cycle" (Bordo, 2008: 3). New Keynesian and post-Keynesian economists alike agree that "the dominance of interest rates over monetary aggregates in the conduct of monetary policy is not a recent phenomenon. In the United States, for example, only in the 1979–1982 period did monetary aggregates play a significant role in policy" (Romer, 2000: 155). This refers to the Volcker experiment, which was a *moderate* attempt (because, unlike with C-PeRB, banks still had access to the discount window) by the US Fed to target monetary aggregates by managing banks' holdings of non-borrowed reserves. During this period, the volatility of short-term interest rates rose fourfold as a result (Goodhart, 1987).

The interest rate hikes of the Volcker experiment hurt debtors, including foreign governments that had borrowed dollars at low rates in the 1970s, setting off the Latin American debt crisis. Daly and Farley (2011: 396) imply that this crisis could have been avoided with fixed-rate debt contracts. But this merely shifts the cost of interest rate hikes onto lenders, as illustrated by the US savings banks that also suffered in this period. As Admati and Hellwig (2013: 54) explain, these institutions were carrying many mortgage loans with rates fixed at, say, 6% and a maturity of thirty years. In the early 1980s, while still receiving these low rates from mortgage borrowers, they now had to pay depositors the prevailing market rates of well above 10%. Consequently, about two-thirds of US savings banks had actually become insolvent, although this was mostly hidden. To regain solvency, they began making very risky investments, setting the stage for the savings and loan crisis of the late 1980s, which cost the government some $153 billion. The risk-taking of the savings banks was increased by deposit insurance, an element that C-PeRB proposals would largely dispose of. But the idea of leaving lending institutions to carry the full risk of interest volatility points at a common critique of C-PeRB; that it does not address the impacts on the financial system caused by the failure of institutions other than deposit banks (Admati and Hellwig, 2013: 90, 218–9, 271 n38; Kregel, 2012; Turner, 2010: 22–3). Thus, with reference to more recent times, "we note that both Bear Stearns and Lehman Brothers were non-deposit-taking investment banks, AIG was an insurance company, and LTCM, seen as systemically important in 1998, was a hedge fund. None had depositors, and none was involved with the payment system" (Admati and Hellwig, 2013: 90). The argument here is not that interest rate volatility lay behind the failure of these particular institutions, but that the systemic importance of financial institutions outside the payment system questions the advisability of subjecting them to the risks of volatile interest rates. Historically, full-reservists appear to have shared an optimistic view about the stability of the financial sector outside the payment system, exemplified by Phillips' (1994: 565) remark that "[o]pponents of narrow banking may be underestimating the stability and self-correcting nature of the private credit markets". In recent times, with optimistic views discredited by the financial crisis, some adherents of C-PeRB argue that it should be combined with strongly increased capital requirements for lending banks (Wolf, 2014b). However, a compelling case has yet to be made that this would be enough to countervail the effects of C-PeRB on financial stability through increased interest rate volatility.

Some present-day full-reservists, who do not aim for an SSE, have proposed versions of C-PeRB where the supply of credit is not constrained by savings. Benes and Kumhof (2013: 16) suggest that "[i]f the government wants to maintain low interest rates in the investment trust sector (…), treasury credit can be used to supply additional funds". As they note (Benes and Kumhof, 2013: 29), government accommodation of some of banks' demand for loanable funds was considered by some C-PeRB proponents in the 1930s. Thus, Currie's plan stated:

> "In communities where it can be demonstrated to the satisfaction of the Board of the Reconstruction Finance Corporation that the 100 per cent reserve requirement has resulted in a shortage of funds available for local borrowers and has thereby worked a hardship on such borrowers, the Reconstruction Finance Corporation is empowered to subscribe to the capital of local loaning agencies including banks, or to make secured loans to such agencies, and, in the absence of such agencies, to set up loaning agencies itself." (Currie, 1968 [1934b]: 219–20).

The attitude towards accommodating credit demand is rather more lax in the Benes–Kumhof plan, although only as far as investment credit for productive purposes is concerned. For such loans, "the government is on call to supply funds whenever [financial institutions] want to

[9] Adverse selection refers to the asymmetric information problem that a higher interest rate attracts more risk-loving borrowers, while prudent borrowers are dissuaded by the increased likelihood of debt default with a higher rate. The incentive effect refers to increased risk-taking by any given debtor in order to generate the returns necessary to meet higher interest payments.

lend more" (Kumhof cit. in Huber, 2014: 12). In contrast, "unproductive credit would be discouraged (especially credit for financial and asset transactions, including many real estate transactions)" (Benes and Kumhof, 2013: 20). Positive Money makes a similar argument in response to critique that a savings constraint on lending "would mean a shortage of money, high unemployment and low economic activity — while those with savings would charge high rates and flourish" (Pettifor, 2014). Positive Money responds that the central bank could create additional money and lend it to banks "on the proviso that this was used for on-lending to businesses" (Jackson, 2014). However, this "would be an emergency measure to use when banks are failing to provide sufficient credit themselves, but in most situations, credit to businesses would be provided by savers who are looking for a return". The claim that private money holders' propensity to save in lending banks would normally be sufficient is, however, an assumption that would have to be substantiated. Credit shortfalls may be such that the government must choose between supplying banks with an inflationary amount of newly created funds, and controlling inflation while interest rates go north.[10] To avoid inflation while accommodating banks, Benes and Kumhof (2013: 21 n29) suggest that increases in the government supply of funds be offset by reductions in public spending. The question remains how much public spending would have to be cut to contain the upward pressure on interest rates. Alternatively, Farley et al. (2013: 2815–6) propose that additional taxes be imposed in tandem with the injection of new money. Whether this could be achieved with the requisite political acceptability demands exploration. Why should an increase in the tax pressure be tolerated just because there are eager borrowers who the government finds in its interest to satisfy? The needed agility of tax legislation is also a matter of doubt. Today, the central bank moves demand deposits of the government from itself to the commercial banks to neutralize the reduction in reserves held by the latter caused by tax payments (Lavoie, 2006: 63). In other words, tax payments today are disruptions of the money supply that must be compensated for, not the opposite. Under C-PeRB, government demand deposits, which the central bank can arguably move much faster than the legislature can change the tax rate or pass a new tax, could of course not serve this compensatory function as reserves for bank loans. In sum, full-reservists have yet to make a strong case that, in a private enterprise economy, C-PeRB would not provoke such an increase in the volatility of interest rates that the monetary authority is forced to resume its role of lender of last resort and revert from quantity control to interest rate targeting. The challenges are much greater if C-PeRB is meant to help contain economic growth, rather than merely direct the flow of credit away from unproductive borrowing into real economic activity as proposed by Benes and Kumhof (2013) and Jackson (2014).

3. The Issuer of Money Determines What Gets Done in the Economy

Some green advocates of C-PeRB see it as a way to reduce the dominance of profit maximization over other criteria for allocating the productive resources of society (Farley et al., 2013; Mellor, 2010a, 2010b; Robertson, 2012). In the existing system, the short-term maximization of bank profits can be thought of as the main determinant of who obtains newly created purchasing power, since this power overwhelmingly exists in the form of bank credit. Consequently, "[p]rojects of high long-term value to society as a whole, but of no short-term profit to banks or other commercial businesses, will naturally not be selected as first users of money created as loans by commercial banks" (Robertson, 2012: 106). Environmentally important investments, the benefits of which often arise in the long term, are therefore left unmade. Proposals vary as to how C-PeRB could help to remedy this problem. Perhaps the most common argument is that the prohibition of money creation by banks would allow the government to issue more money without causing inflation; money that would be 'debt-free'[11] since the state would spend it into existence rather than borrow it at interest from the private sector. Although rarely spelled out, this is presumably based on the assumption that a savings-constrained banking sector would lend less than today, freeing up existing productive resources – such as labor-power and natural resources – to be claimed by public spending. Assuming that the government believes this to be its mandate, it would now be in a stronger position "to provide public goods, invest in social and human capital, ensure full employment, rebuild decaying infrastructure, restore the natural systems that sustain us all and otherwise promote the common good" (Farley et al., 2013: 2814; see also Robertson, 2012: 106). It is well-known that market economies under-supply public goods due to the free-rider problem, and this is part of the rationale for giving government the spending powers to make "public good investments in alternative energy, new forms of agriculture and other green technologies [which] will likely play a critical role in reducing throughput" (Farley et al., 2013: 2811). However, in the case of an SSE with near-zero GDP growth, C-PeRB may not significantly increase the fiscal powers of the state, since the opportunities for non-inflationary additions to the money supply would be very limited. Nevertheless, increased scarcity of basic resources characterized by inelastic demand means that "there is no guarantee that physical contraction of the economy will lead to a lower demand for money or a lower level of GDP" (Farley et al., 2013: 2820). The scope for money supply expansion in the future, and consequently the importance of greening the allocation of new money, are very uncertain.

Another proposal, less explored by greens, is that C-PeRB be used to steer commercial bank lending in certain directions. As discussed in Section 2, it has been proposed that the state should supply funds to banks on condition that they are on-lent to the real economy. While shifting the objective away from economic growth, Farley et al. (2013: 2813) similarly argue that "the central bank could make deposits contingent upon banks serving the public interest by loaning to job-creating businesses that protect and provide jobs and public goods and not renewing deposits in banks that loan to speculators" (see also Costanza et al., 2013: 44). Given pervasive market failures, there is a strong case for such 'directed credit policies'. However, this involves important practical difficulties, in particular the specification of eligibility criteria for borrowers. Credit allocation should arguably be based on legislated criteria rather than the discretion of a committee of unelected central bankers.[12] Furthermore, combining directed credit policy with C-PeRB introduces additional difficulties. If the money supply is to be controlled to restrain real economic growth as well as inflation, and in the likely event of excess credit demand, banks could not merely approve all creditworthy loan applications in the eligible categories; they would have to choose among them.[13] This activity may require strong

[10] Friedman's (1972: 201) definitions are useful in this context: "the interest rate is not the price of money. The interest rate is the price of credit. The price level or the inverse of the price level is the price of money".

[11] The expression 'debt-free money' has been criticized as an oxymoron by adherents of credit theories of money, maintaining that money cannot be debt-free because it is always issued as a promise by the issuer to take it back in return for something of value (Wray, 2014). For example, the king issues a coin along with a promise to accept it as payment of taxes. The disagreement arises from different uses of the term 'debt'. For the critics, whether spent or loaned into circulation, money is always a *liability* ('debt') of the issuer. For the advocates, debt-based money only refers to money loaned into existence at interest, so that as long as it remains in circulation, someone keeps paying interest on the loan by which it was created.

[12] Important historical cases of economic development through directed credit policies have been based on the concentration of enormous powers on central bankers, such as the post-war governor of the Bank of Japan Ichimada, known by his contemporaries as 'the Pope' (Werner, 2002). Full-reservists who prescribe an expansion of the policy objectives of the monetary authority – today usually limited to inflation targeting –probably agree with Daly (2013) that this authority should not be exercised by an independent central bank, but placed under a more democratically accountable body such as the treasury. Targeting more than one policy objective involves political trade-offs, not to be decided by technocrats.

[13] This problem may be tempered if the central bank fully accommodates credit demand for productive investment purposes, but then C-PeRB would no longer be a green credit policy tool.

government supervision to correct perverse decision-making. On the other hand, increased government influence over credit allocation gives rise to the danger that the state becomes the arbiter of the fate of firms in financial straits, consequently carrying more of the political costs of business bankruptcies and mass lay-offs. This would create political pressures to return to a policy of easy credit. Broadly, this is the 'soft budget constraint' syndrome, which increases in tandem with the paternalistic role of the state (Kornai, 1986). It was an important cause of the allocative inefficiency of socialist economies, including market-socialist Hungary and Yugoslavia. The soft budget constraint reduces incentives to economize on inputs, since "firms feel that when they cannot pay the bills, someone else will step in and bail them out" (Kornai, 1986: 11). The credit allocation argument for C-PeRB may also be criticized because 100 percent reserves are not necessary for the imposition of credit policies on the private banking sector. This is perhaps a reason why greens have rarely made this argument. As shown in Section 1, C-PeRB has often been justified as a means to achieve the complete opposite.

Resonant with the green credit policy motive is Mellor's (2010a, 2010b) broader vision of a 'public money system' within a steady-state 'sufficiency' economy. In Mellor's proposal, money would be issued through "democratically controlled banks" at national, regional, and local levels, to which firms (for-profit and non-profit) could apply for credit on condition that they meet "democratically identified priorities" (Mellor, 2010b: 86; see also Mellor, 2010a: 172). Second, money would also be issued by the state and distributed as a citizen's income, which "would shift the money circuit from one dominated by anticipatory production in search of profit, to one dominated by consumer demand" (Mellor, 2010b: 85). Third, "[p]ublicly-issued credit could be made available to co-operatives, mutuals or other types of social businesses or to carefully regulated private businesses to deliver public goods" (Mellor, 2010a: 167). The general idea is that all money issuance would give priority to "democratically determined socially relevant expenditure (…) with the capitalist market (to the extent it continued to exist) offering goods and services to attract that money as it circulated" (Mellor, 2010a: 163). In other words, autonomous capitalist firms would have to rely on retained earnings as source of funds.[14] However, "[t]he main source of income for any remaining profit-based companies would be contracts from the public or communal sectors or the provision of goods and services to those sectors" (Mellor, 2010a: 169).

Although Mellor does not discuss what specific institution would control the overall money supply, the proposal raises similar concerns as political credit allocation. It is claimed that "[a]dministration via a public money system would avoid (…) the rigidity of a command and control economy" (Mellor, 2010b: 87), but this is not substantiated. Are 'democratically controlled banks' supposed to extend credit to all eligible firms, or will the steady-state money supply be controlled so that credit must be rationed on some more narrow, as yet unspecified criteria, and by whom? Similarly, by what democratic procedure will publicly issued credit be 'made available' to social businesses? With public contracts becoming the main source of income for profit-based companies, would it not be necessary somehow to coordinate all these procurement contracts into a plan?

The argument that the existing, decentralized system of profit-guided credit creation can be replaced by a workable and more desirable alternative must be presented with rigor and historical perspective to stand a chance against deep-rooted market ideology. Proposals for economic democracy may be checked against the realities of 20th century socialism, an opportunity yet to be seized upon by market-averse C-PeRB advocates. Mellor writes that "[t]he importance of a steady state money system is that money issue would be determined by popular demand in the same way that private demand creates money now" (Mellor, 2010a: 168), and that "[i]t would not be the search for profit that would drive production, but social need and social priorities" (Mellor, 2010a: 169). Like many other references to 'public', 'social', and 'democratic' aspects of the proposal, such statements are perilously reminiscent of the Marxian suggestions about the simplicity and transparency of economic matters under the self-rule of the associated producers, dismissed by Nove (1991: 29 and passim) as evasive sloganeering. This is fine for early sketches (provided they are not subsequently attributed such infallibility as Marx's intimations about communist society), but progress in the development of compelling green visions involving C-PeRB has been decidedly slow since Daly (1980) re-introduced the idea to the environmental movement.

4. Reducing Debt Levels to Counter the Growth Imperative of Interest

Many full-reservists have argued that their plan could help bring about a drastic reduction of total debt. Focus has usually been on the national debt, but some have also referred to private debt. Various motives for reducing debt have been advanced, such as economic equality and growth. However, this section will only discuss the distinctively green argument that debts be reduced to weaken a certain growth imperative attributed to interest payments to the banking sector. But we will first recount some suggestions about how the national debt could be reduced with C-PeRB. The debt could be gradually canceled if the government puts new money into circulation "by buying with it National Debt securities and destroying them. Thus an equivalent of interest-bearing National Debt would be destroyed for the non-interest bearing National Debt that is money" (Soddy, 1934: 69). As noted in Section 3, it is not clear whether there would be significant opportunities for such money supply expansions in a physically non-growing economy. A second argument, made by Fisher in the 1930s, was based on the historical circumstance that the US federal debt was then mainly held by domestic banks. Therefore, the monetary authority would implement the plan by buying this debt from the banks in exchange for the cash reserves that the latter needed in order to operate as deposit banks under the plan (Fisher, 1945: 11, 206–7). "In that way most of the Government debt could be paid almost over night" (Fisher, 1936: 15). Irrespective of the merits and demerits of such a procedure (see Angell, 1935), it has lost relevance (in the US at least) since the share of government securities among banks' assets has shrunk, and these securities have migrated to non-banks. Because of the decline in bank holdings of government bonds (as well as reserves), Milton Friedman had by the mid-1980s – while still an advocate – become "very sceptical indeed that there is any political possibility of achieving one-hundred percent reserves" (Friedman cit. in Phillips, 1995: 174). Defying such assessments, recent proposals stipulate that banks would be required to borrow reserves from the monetary authority until they have all their demand deposit liabilities completely backed. As Benes and Kumhof (2013: 7) explain for the US case, since the total demand deposit liabilities of US banks today are much larger than the debt of the US government, this transaction would leave the latter with a strong net position. However, the introduction of the plan would not eliminate the government's gross debt held outside US banks.

Even if it were possible eventually to eliminate the national debt, there are reasons why this may not be desirable. In particular, other ways would have to be found to provide safe assets for public purposes such as pension funds and insurance funds. Jackson and Dyson (2013: 309) therefore argue that seigniorage revenues would be better used to encourage people to reduce their private debts. The greater size of total private debt, as in the US and UK at present, and the generally higher interest rates charged on private debts, are also seen as reasons to prioritize the reduction of private over public debt (Jackson and

[14] This highlights the prospect that businesses would react to C-PeRB by changing their funding mix. Even today, US corporations finance more than 75% of capital expenditures from retained earnings, not debt nor equity (Berk and DeMarzo, 2014: 570). Assuming a higher average level of interest rates, the rising cost of debt would favour existing large corporations that are able to rely more on retained earnings, to the detriment of new business entries.

Dyson, 2013: 309). Early full-reservists have generally not tended to emphasize the potential for private debt reduction. An exception is Soddy (1934: 97), who was immensely optimistic that his proposal would before long get industry and agriculture out of debt to the banks. In their recent proposal, however, Benes and Kumhof suggest that the government could transfer a part of its credit with the banking sector (resulting from the massive loan of reserves by which their plan is implemented) to the public "by way of a citizens' dividend, whose mandatory first use is the full repayment of any outstanding private debts by the recipient". They therefore foresee "at least some, and potentially a very large, repayment of private debt" (Benes and Kumhof, 2013: 8). Moreover, they claim more generally that "because under the Chicago plan money no longer needs to be created through debt, debt levels throughout the economy would be very much lower" (Benes and Kumhof, 2013: 17). Interest payments to the private banking sector are the focus of the green argument for debt reduction that will now be discussed. For this reason, the reduction of private debts is therefore also the priority of adherents to this theory, to which we now turn.

Green critics of fractional reserve banking often argue that an economy with positive interest rates and a money supply largely consisting of bank money faces a growth imperative. Accordingly, borrowers cannot in the aggregate pay back both loan principal and interest to banks, without causing a deflationary decrease of the money supply, unless others take on ever more debt. This is because the fraction of money that continues to exist after the loan is repaid, namely the interest payment, is not recirculated in full by the bank, but partly withdrawn from circulation as retained profits (Douthwaite, 2006: ch. 1; see also Costanza et al., 2013: 42). As others take on more debt, the total debt grows, and unless creditors are to receive an ever larger share of GDP, or debts are inflated away, the real economy must also grow. Given the complex dynamics involved, such arguments are hard to make compelling by verbal exposition alone. Binswanger (2009) constructs a model of a pure credit economy to test for this growth imperative in capitalist economies. The model is simple yet constitutes an improvement over mainstream macroeconomic models that generally treat the money supply as exogenously determined. The simulation yields that "[a]n economy with high interest rates (…) is subject to a stronger growth imperative than an economy with low interest rates" (Binswanger, 2009: 723). If firms are to make profits in the aggregate, the economy must grow at above 0.45%. However, this model has a premise, "crucial for establishing the growth imperative" (Binswanger, 2009: 713), that is based on a common misunderstanding of bank capital. The simulation uses data for the US and Germany (1979–2003) to specify that 20% of banks' income is *retained* as bank capital, which "does not flow back to the economy and the money supply in the economy is diminished by the same amount" (Binswanger, 2009: 717). But it is incorrect to treat bank capital as a pile of "cash that sits idly in the bank's tills without being put to work in the economy" (Admati and Hellwig, 2013: 6). A bank's capital is merely "the part of its balance sheet that represents unborrowed funds" (Admati and Hellwig, 2013: 98), i.e. "the money that a bank has obtained from its owners if it is a private bank or from its shareholders if it is a corporation, along with any profits it has retained" (Admati and Hellwig, 2013: 6). Part of the confusion arises from the fact that this type of funding is elsewhere called equity; only in banking is it misleadingly called capital. The notion that bank capital is something that banks must 'set aside' to comply with regulations at a cost to the economy is also a fallacy propagated by the banking lobby to confuse the regulatory debate (Admati and Hellwig, 2013: 6). Banks may indeed retain a fraction of interest earnings as *reserves*, and what appears as reserves owned by the bank on the left-hand side of the balance sheet will appear as equity on the right. Higher reserve requirements do affect negatively the ability of banks to make profitable loans. In contrast, "[a]t least for banks that are organized as corporations, bank capital requirements have no automatic effect on bank lending" (Admati and Hellwig, 2013: 7). Consequently, models testing for an interest-based growth imperative should use data on bank reserves rather than bank equity. A further issue requiring clarification is if it matters whether banks 'recirculate' interest payments by making new loans or through spending. Finally, the existence of non-interest-bearing money spent into the economy by the state would have to be taken into account.

5. Can Money Creation Be Monopolized in a Market Economy?

Critical assessments of full-reserve proposals have often emphasized the technical difficulties of maintaining a government monopoly over money creation. Quantitative control of the money supply requires a stable definition of monetary aggregates, but defining what serves as money is notoriously difficult. Checking the creation of new forms of 'near-money' (highly liquid non-cash assets) is "the difficulty that all such schemes meet" (Schumpeter, 1954: 723 n15). For Henry Simons – one of the originators of the Chicago plan – the chief concern soon became "how to keep deposit banking from growing up extensively outside the special banks with the 100% reserves" (Simons cit. in Allen, 1993: 708). Allen (1993) lists the near-money problem as one of the reasons why Fisher's energetic campaigning failed to generate sufficient support. Theoretical arguments about the challenges involved eventually found an empirical counterpart in the monetarist experiments, where attempts were made to define certain monetary aggregates so that they could be made the target of monetary policy. The episode popularized the so-called Goodhart's law: "that any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes" (Goodhart, 1984: 96). More specifically, if the authorities impose controls on the money supply by one definition, these will be evaded with the development of unregulated monetary substitutes, making the definition obsolete. Since monetary policy has reverted to interest rate targeting after the monetarist attempt at quantity control, it may be disputed whether near-moneys really are "as much a problem for the existing system as for the alternative we are suggesting" (Daly, 1999: 156). If the money supply is to be a policy tool for achieving sustainable scale, pressures to innovate money-like instruments in the shadow banking sector may certainly be expected to be higher than in today's growth-based economies. Goodhart's law may not necessarily be read as defeatist prophecy, but as an indication that any important advancement of the government's role in determining the nature of money would be conditioned on a fundamental reconfiguration of power relations between states and finance capital (for general discussion of this point, see Ingham, 2004).

6. Conclusion

C-PeRB has generally been advocated by conventional economists as a corrective of the crisis dynamics of capitalism, usually – but not always – as part of a program for economic *laissez faire*. As such, it influenced the New Deal policy process. However, its enduring appeal for some greens arguably resides in its apparent promise to impose limits on the monetary sphere. Given the physically unbounded character of the pure fiat money system in existence since Nixon broke the link to gold, C-PeRB affirms many ecological economists' inclination for quantity-fixing over price-fixing policies. But the case for C-PeRB is fraught with problems. Daly's proposal for a savings-constrained credit system would strongly increase the volatility – and likely also the average level – of interest rates, with perverse allocation effects and financial fragility as a result. Whether C-PeRB would allow (presumably green) governments more room for determining resource allocation remains a matter of debate, in view of the unclear scope for non-inflationary money supply expansions in an SSE. The existing embryonic arguments for C-PeRB-based green credit policies or a 'public money system' are as yet far from compelling, lacking in detail and historical perspective. Extensive debt reductions in a transition to C-PeRB appear technically possible, but presuppose a massive political weakening of the creditor

classes. The debt-money growth imperative that such a transition would serve to undercut has yet to be rigorously shown to exist. The successful establishment of a government monopoly over money creation would require a greatly empowered state, capable of suppressing financial innovation. Given the elusive nature of money, it is unclear whether the use of near-moneys could be effectively fought if a permissive stance towards community currencies is considered desirable. Another political precondition for control over the supply of money and credit is strong international capital controls. Ultimately, the notion that the existing capitalist monetary system is in itself a major driver of perennial growth that can be neutralized while maintaining the capitalist institutions of private property in the means of production and competitive markets, has not been sufficiently substantiated (see e.g. Blauwhof, 2012). Insofar as C-PeRB addresses the objective of sustainable scale, it should be evaluated in relation to the broader debate about why exponential monetary and physical growth of economic systems have been the main theme of the modern era.

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