THE LENDER OF LAST RESORT: A COMPARATIVE ANALYSIS OF CENTRAL BANKING AND FRACTIONAL-RESERVE FREE BANKING

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THE PRESENT PAPER EXAMINES THE ROLE OF CENTRAL BANKS as "lenders of last resort." This function has been one of the primary justifications for the existence of a central banking system, and has played a major role in central banking operations during the all-too-frequent periods of economic crisis that have occurred under the present economic system. We will critically examine the nature of a central banking system in its operation as a lender of last resort, and contrast this operation with lending mechanisms that would be likely to exist under a free-market system allowing fractional-reserve banking but without a central bank.

In order to conduct our analysis we will first examine some preliminary material on the nature of free-banking and the operations of private banks under this system. To do this, we will examine the purposes of banking services and consider how banks attempt to achieve them and also manage the risks involved. We examine the requirements for bank lending in a banking crisis and critically examine the central banking and FRFB systems with respect to these requirements. We also examine the actual practice of the

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US Federal Reserve system in the recent US financial crisis, and use it as an illustration of the previous theoretical points.

The present paper will argue that the operations of a central bank cannot be expected to adhere to the prudent lending principles set forth for a "lender of last resort." The actual lending practices and other financial dealings that occur under a central banking system will be markedly different from what is needed to resolve a banking crisis. The paper also argues that a free-market banking system is less likely to lead to bank runs and other crises, and is more capable of dealing with these crises prudently when they do arise.

1. The Idea of Fractional-Reserve Free Banking (FRFB)

The issuing of money is usually monopolised by governments, with legal restrictions being imposed to compel the acceptance of government money and prevent money being issued by private parties. The essence of free banking consists of the de-monopolisation of this market, removing these legal restrictions and allowing private banks to issue their own currencies and to compete for currency-holders on the market.

The idea of a free banking system was discussed in Hayek (1990) and was elaborated in detail by White (1984) and Selgin (1988). There is now a large literature on the justification for and functioning of such a banking system, including works by Friedman (1969), Klein (1974), Smith (1990) Dowd (1992), Sechrest (1993) and Rozeff (2010).

Under a free banking arrangement, private banks would be free to issue their own bank notes without restriction and control the supply of these notes and their reserves, subject only to their contractual obligations to their customers (Hayek, 1990, pp. 46-51). Banks would each issue their own notes which would need to be distinguishable from those of other money issuers. Replication of the notes of other money issuers without their permission would constitute forgery, and would remain prohibited, meaning that there would be clearly distinguishable competing currencies. Money creation would be transformed from a government monopoly to a competitive market activity.

The kind of banking arrangements that would be allowable and/or desirable under free banking has been an area of contention among free-market economists supportive of de-monopolisation. In particular, there has been ongoing debate over whether fractional-reserve free banking (FRFB) would be allowable within the property-rights framework of a free market

economy, and whether or not this form of banking would have desirable economic consequences.

Broadly speaking, juridical objections to allowing FRFB have been made on the basis that it involves inconsistent ownership claims that cannot be satisfactorily resolved, leading to the contention that the practice is inherently fraudulent. Objections to the economic desirability of FRFB have also been made on the basis of allegations that it causes adverse economic consequences such as business cycles and the misallocation of resources. (Only the juridical objection is fatal to allowing FRFB under free-market conditions, though the economic problems are obviously relevant to the prudence of establishing such a system.) Arguments against FRFB are found in Rothbard (1962), Hülsmann (1996, 2000, 2008), Huerta de Soto (1995, 1998), Hoppe, Hülsmann, and Block (1998), Barnett and Block (2005, 2009), Bagus and Howden (2010), Block and Davidson (2010), Mahoney (2011a, 2011b), and Davidson (2012).

Supporters of FRFB argue that the juridical objection to fractional-reserve banking is invalid, and that the adverse economic consequences alleged are actually due to monopolisation rather than fractional-reserve banking. In the present paper we take the view of Selgin and White (1996) that there is no inherent juridical problem with fractional-reserve banking. In particular, we hold that the alleged contradictions in the deposit contract for fractional-reserve banking are not insoluble. We accept that fractional-reserve arrangements may involve inconsistent ownership claims, or fraud in particular cases, but take the view that there is nothing inherent in the nature of such a transaction which prevents it from being properly implemented and understood by all parties within a private property rights framework, without any contradictory ownership claims. That is, we take the view that FRFB could be established on a legitimate and non-fraudulent basis. Further arguments in defence of FRFB can be found in White (1989, 2003), Selgin (1988; 1994; 2000, 2012), Sechrest (1993), Selgin and White (1996), Callahan (2003) and Rozeff (2010). We also note that, in the absence of fractional-reserves there is really very little to discuss on the present topic. Redemption runs on banks are innocuous in the context of full-reserve banking and so there is clearly no need for lenders to stem liquidity risk.

Since our focus here is on the behaviour of central banks, a full discussion of the merits of FRFB relative to full-reserve banking is beyond the scope of the present paper. In any case, both camps have been supportive of the de-monopolisation of money and abolition of central banking, although each with a different view of how private banks should function.

Under FRFB private banks would be responsible for maintaining their own solvency and liquidity. There would be no government "insurance" of bank deposits, nor any government central bank acting as a "lender of last resort" (Hayek, 1990, pp. 105-106). Competition between different issuers would mean that any bank that inflates its currency will lose currency-holders, and persistent inflation will threaten its business. In a typically pithy but powerful summary of the issue, Hayek observed that "[m]oney is the one thing competition would not make cheap, because its attractiveness rests on preserving its 'dearness'" (1990, p. 94). He stressed that special regulation of these private banks would not be needed, since it would already be in their interest to maintain the stability of their currency, and refrain from inflating for short-term profit (1990, pp. 110-111).[1]

2. Warehousing and Credit-granting: the Twin Functions of Banking

To assess the desirability of a government central bank acting as a lender of last resort we need to consider the purpose of banking and the credit-granting function that leads to fractional-reserve banking. Banks perform several distinct services for their depositors. Their primary function, from which all their other functions derive, is the storage (bailment) of deposited goods, meaning that the bank takes possession of these goods and stores them securely for the depositor. The contract for storage of goods is subject to other functions (which we will discuss presently) but these other functions are made possible only because the bank has possession of the deposited goods through the initial storage function. If the deposited goods are fungible then the bank may allow the depositor to access copies of those

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[1] This issue has been examined by several economists supportive of free banking. Selgin and White (1994) point out that "[a] profit maximizing fiat-type issuer could choose to hyperinflate its own brand of money, and would do so if staying in business promised less than the one-shot profit available from an unanticipated hyperinflation" (pp. 1735). They also note that this issue arises as a special case of a wider "customer-assurance problem" in the supply of any copyright-protected good sold at a price higher than its marginal production cost (see also Coase, 1972). In fact, the existence of many goods of the latter type (e.g., memorabilia, collectibles, etc.) supplied in competitive markets without excessive production threatening their value suggests that this may also be viable in money. Klein (1974) has formulated sufficient conditions under which long-term profits from stable money exceed the short-term gain from inflation of the supply, so that banks would not be tempted to inflate (see pp. 436-437; see also Selgin and White 1994, pp. 1735-1736).

goods at different locations, giving depositors convenient access to substitutes of the deposited good when and where they are needed. Since banks mostly store money, this allows depositors easy access to their money at a range of locations.[2]

If a bank were to perform only this warehousing service then it would hold the deposited goods, or fungible copies, so as to allow access to depositors at any time. The most reliable way to do this is to hold all of the deposited goods *in situ* so that the bank can satisfy full withdrawal demands from all its depositors simultaneously if need be.[3] If all depositors seek to withdraw their money at the same time, then a bank holding full reserves will be able to satisfy this demand, whereas a bank that does not have full reserves cannot. Depositors operating under this arrangement would have to pay a fee for storage, and could not obtain any payment of interest on their deposit, since the bank would have no other means to earn money on deposits (Huerta de Soto, 2006, pp. 15-16).

This arrangement has the form of a pure deposit contract, which is a bailment of goods. A deposit contract may be a *commodatum* contract (also called a regular deposit), where the bank acts as a bailor of non-fungible goods which are returned on demand to the depositor. The contract may also be a *mutuum* contract (also called an irregular deposit), where the bank acts as a bailor of fungible goods and is obliged to return an equal quantity of goods of the same type and quality (Huerta de Soto, 2006, pp. 1-4). The latter is likely to be operative in the context of banking, since money is a fungible good. There would be minimal risk to the depositors in this arrangement— the remaining risks would consist of the possibility that deposited property may be lost, stolen, or destroyed while at the bank, and with good security procedures and/or insurance on deposited property, these will generally be small risks.

In the ordinary course of business, a bank which is the bailor of goods from large numbers of depositors will expect that it is unlikely to experience large demands for withdrawal relative to the total deposits at any one time. In

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[2] Access will depend on branch-banking and banking networks. It is worth noting that modern banks allow their depositors to access money at a large range of locations.

[3] In the case where banks offer access at different locations it would be impossible to offer full immediate withdrawal at every location. Instead the bank would offer withdrawal subject to delays in moving the stored goods from one location to another. This would not detract much from immediate deposit access, though it might give rise to a "continuum problem" of the kind discussed in Bagus and Howden (2012).

such a case individual withdrawal demands are usually only for a portion of the deposited amount and withdrawal demands from different depositors are only weakly correlated. This means that the volatility of the proportion of total withdrawals needed at a given time is smaller than the weighted volatilities of the individual proportions withdrawn from each individual account. O'Neill (2013) shows that the reduction in volatility is affected by the correlation between individual withdrawals, though there is some reduction in volatility in any case of less than perfect positive correlation.

In practice, the number of depositors in a bank is generally large and the correlation between withdrawals is positive but weak under ordinary conditions (strong positive correlation can occur during a bank-run or other crisis). This means that the total withdrawal proportion will be substantially less volatile than the individual proportions in the ordinary course of business, but the volatility of total withdrawals will increase during a crisis. Hence, in the ordinary course of business, a bank undertaking pure deposit contracts will have a large amount of "idle" deposited goods under normal conditions—these are idle in the sense that they are not being accessed, but they can also be regarded as being active as a hedge against the liquidity risk from the demands of depositors.

If the bank holding the deposit perceives that only a fraction of these funds are required to hedge their withdrawal risk then it is natural to offer their depositors the opportunity to loan out these funds to obtain interest payments. The interest on these loans is shared between the bank and the depositors; the depositor gains an interest payment less than the amount charged on the loan, and the bank keeps the residual profits after this and other costs have been deducted. The result of this arrangement is that the bank holds only part of the deposit (i.e., fractional-reserves) and lends the remainder, thereby giving rise to bank accounts which exceed the total amount of money held as backing. The additional deposits created by the existence of these fractional-reserve accounts can still be regarded as backed by the initial deposits, but only fractionally. Under this system, the bank's capacity to satisfy demands for withdrawal is now subject to an additional source of risk. In return, the depositor gains interest on the deposit and this also pays for the storage cost that would ordinarily apply in a system of full reserves. In short, the depositor takes on additional risk, but now gains money from interest instead of losing it due to storage costs.

If a bank performs both of these functions together its "depositors" are no longer pure depositors in the bailment sense. Rather, they are now somewhere between a pure deposit arrangement and a pure loan arrangement (for the essential differences of these contracts see Huerta de Soto, 1998,

Table 1, p. 41). Under the mixed arrangement the bank is still obliged to return the deposited money on demand if it can, but it is not regarded as acting criminally or fraudulently if it is unable to do so due to its outstanding loans (it is still liable for the debt).[4] We have already noted that this form of mixed contract is objected to by some opponents of fractional-reserve banking.

In practice, modern banks use fractional-reserves to lend out money paid to them by depositors. The depositors gain money on their deposit (i.e., the interest payment outweighs the storage and administration costs), but they also bear additional risk, owing to the fact that they have a partial-deposit-partial-loan arrangement with the bank rather than a pure bailment of goods. The present monetary system utilizes a government monopoly money unbacked by any commodity. This means that bank depositors have a legal claim against the bank to regain their deposit in terms of the initial fiat currency deposited. However, they have no guarantee of convertibility into any kind of valuable commodity.

3. Fractional-reserves and Redemption Runs

The fractional-reserve arrangement is an implication of the fact that banks lend out part of the deposits given to them by their depositors. However, this practice introduces an additional source of risk in that it is possible that banks will be unable to repay their depositors on demand. Though this risk exists in any loan contract, it is particularly acute in banking, since bank deposits are usually subject to payment on demand. The risk is also accentuated by the fact that depositors and other observers are aware of this danger, and if a payment is not made in one case, this can lead to demands from other depositors, causing a redemption run—i.e., depositors attempt *en masse* to convert their deposits into high-powered money. (In the case of commodity money, this would include conversion to the original commodity deposit, or to some central fiat-issue currency in the case of fiat money.) In such cases the bank experiences a large short-term liquidity shock and is unable to meet the withdrawal demands of its depositors.

Since a redemption run is usually precipitated by some unsatisfied withdrawal demand, it is useful to analyse the management of liquidity risk.

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[4] Here we follow the common practice of referring to people with a bank account as "depositors," even though the exact legal status of the contract may be a mix of a pure deposit and pure loan.

The magnitude of the risk depends on many factors, but two factors dominate. The first is the number of different depositors that the bank has and the dispersion of funds between them (the more depositors, and the more equal the dispersion of funds, the more stable the aggregate demand) and the second is the proportion of reserves the bank holds against the total claims depositors can make (the greater the fraction of reserves, the greater the capacity to pay unusually high demands). Other relevant factors include competition from other banks and the extent of transactions between a bank's own customers and the customers of its competitors.

Banks make calculations on the reserves they should hold using actuarial methods which measure the risks of large demands for funds.[5] In cases where they receive unanticipated high demands for funds, they may not have sufficient reserves to pay the demands of their depositors. This means that banks may require immediate liquidity to pay on demand, with catastrophic results if they cannot do so. This can occur even when the bank is solvent, since demand is based on liquidity, not solvency. For this reason, banks using fractional-reserves will want to have access to some means of meeting liquidity demands so as to head off the risk of a redemption run.

If the affected bank is part of a larger banking network it may seek assistance from its different branches or the other banks of its parent firm. If it has exhausted these sources of funds (or if the larger network is itself subject to the redemption run) then it may seek a loan facility from outside banks. These options can be used at the time of liquidity problems, but several other opportunities are available with sufficient preparation. The bank may plan ahead for liquidity risk by purchasing deposit insurance, establishing a pre-existing loan facility with another lending agency, or structuring some or all of its deposits to be subject to contractual options to delay or suspend withdrawals. This last could include options to delay withdrawal demands or delay the conversion of notes into commodity (see Selgin and White 1996, p. 91). All of these mechanisms involve the arrangement of immediate incoming payment to the bank in exchange for some later outgoing payment or loss of assets.[6]

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[5] In a government regulated system, minimum reserves are set by regulations that define minimum "statutory reserves." This may be a set proportion of reserves or it may be a variable proportion calculated by actuarial methods.

[6] In the case of a pre-existing loan facility the bank gains immediate funds at the expense of later repayment with interest. In the case of delay options, the bank essentially obtains a loan from the depositor equal to the demanded funds. In the case of deposit

4. Risk management under free banking

Outside loan and insurance facilities are, of course, available in the private banking and insurance markets. Just as banks make loans to borrowers, they can also obtain loans from other banks on mutually agreeable terms. In the case of a redemption run, the bank at risk will want to obtain large amounts of funds quickly, in order to reassure its depositors that it can meet withdrawal demands, and thereby induce them to re-deposit money and return to their ordinary pattern of withdrawals (subject to any changes resulting from whatever caused the initial change). The bank is likely to be willing to pay a high rate of interest since it does not anticipate needing the loaned funds for very long, and since the alternative to obtaining the loaned funds is potentially catastrophic. In order to find a willing lender on the private market a bank will need to convince the lender that it is solvent. If the problem is an immediate liquidity problem, but the long-run solvency of the bank is sound, then it is likely to be able to obtain funding. Contrarily, if the problem is a long-run solvency problem, it is unlikely to obtain a loan.

In cases where a redemption run goes beyond a single bank and spreads to the banking system as a whole this can lead to widespread failure of all banks in the financial system. This more general and problematic condition is known as a "panic," and is a more dangerous problem than an isolated bank run. In a panic, each bank is unable to meet withdrawal demands unless it has established a very large fraction of its deposits as reserves (e.g., full reserves or close to this). In such a situation it is unlikely that banks will grant loans to other banks, since they must themselves be highly liquid. This means that an avenue for dealing with redemption runs is closed. Nevertheless, even bank panics that affect the "whole" banking system tend to be isolated to a single country or closely-linked group of countries, and this means that there will still be private lenders in other banking systems able to grant loans on mutually beneficial terms. Indeed, to the knowledge of the present author, there has never in history been a bank panic that has caused simultaneously runs on every bank in the entire world. Such an event is only ever likely to arise under a system of centralized government control of world banking.

Banking panics have been used as an argument for a government lender of last resort, since large-scale panics may be beyond the loaning capacity of a

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insurance the bank pays an initial premium for the right to make a later insurance claim. Merton (1977) argues that deposit insurance can be regarded as a put option purchased by the bank from an outside insurer.

single private bank. However, it is important to note that in a free banking regime banks are not likely to suffer from widespread panic. There are two main reasons for this, one having to do with the absence of information externalities in free banking, and the other having to do with the greater independence of different banks.

Since banking panics are redemption runs which do not discriminate between individual banks in the system, these panics tend to occur due to "information externalities" that prevent the public from assessing the liquidity and solvency of individual banks. Selgin (1988) notes that "...panics occur when liability holders feel a need to test the safety of their balances" (p. 137). Such tests consist of efforts to withdraw deposits, and when this is done indiscriminately (i.e., without differential treatment for different banks) on a wide scale, this puts massive strain on the liquidity of the banking system, leading to a panic. However, the indiscriminate nature of this panic rests entirely on the fact that the monetary unit as well as fractional-reserves themselves are under centralised control. This prevents depositors from assessing their own bank relative to the banking system as a whole. So long as bank liabilities are bought and sold freely (i.e., there are no restrictions on their trade), there is no reason for an information externality of this kind to arise, and prevailing market prices should adequately reflect the risks of individual banks (Gorton, 1985). Under the free banking arrangement, a redemption run on an individual bank will have an impact on the market prices of different private currencies, and the risk will be built into this price, which in turn can be easily seen and interpreted by depositors.

Moreover, even apart from individual risk-pricing, it is also the case that banks are more connected to one another under a centralised banking system of government monopoly than under a free banking system. In the former system all banks are reliant on the government for their underlying monetary unit, since there is a single monopoly money. It is also usual for the central bank (or a related government agency) to engage in regulation of the banking industry, imposing uniform rules and practices on banks under their supervision. This imposes stronger connections between individual banks, due to the fact that they are more affected by a common cause. As a result, this imposes stronger dependence between the liquidity and solvency of different banks. This greater dependence manifests in a greater correlation in the liquidity of banks, and this means there is less distinction to be drawn between different banks by their customers—i.e., greater likelihood of a system-wide panic rather than an individual redemption run.

These considerations mean that widespread panics are far more likely under a centralised banking system than under free banking. In cases where it

has been practiced, free banking has indeed been subject to individual banking runs, but these have not given rise to banking panics affecting the entire system (Selgin, 1988, pp. 138). Rather, total panics are a direct consequence of the central banking system and the government monetary monopoly.

5. Recourse to the "Lender of Last Resort"

Notwithstanding the greater resilience to panics under free banking, it is nonetheless useful to consider the borrowing needs of banks at risk under individual redemption runs and panics.[7] It is clear that free banking already provides several avenues for dealing with these situations through private loans and other arrangements. Advocates for a government lender argue that the government central bank should also provide loans in these events, allegedly as a "last resort" when private banks are unable or unwilling to lend to affected banks.

The classical statement on the proper function of a government lender of last resort is found in Thornton (1802), though it was later popularised in Bagehot (1837) and has come to be known (perhaps unfairly) as "Bagehot's dictum." This dictum holds that during a panic, the lender of last resort should lend freely to banks at a "very high" rate of interest, on the basis of any collateral that is marketable in the ordinary course of business (ibid, Bagehot, Ch XII, paras. 57-58; for discussion of the dictum, see Goodhart, 1999).

The key in understanding this dictum lies in the idea that the lender of last resort should treat the panic as a temporary shock which will subside once banks are provided with sufficient liquidity (Fisher, 1999). The lender of

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[7] The lender of last resort has also been used in cases of a currency run, where depositors seek to convert their deposits into bank-notes. In fact, this was the original purpose of the lender of last resort. This cannot arise under free banking since there are no restrictions on note-issue in such a system; demand can be accommodated by printing notes against the deposits. Currency runs arise in regulated banking systems when there are restrictions on note-issue. In such cases a bank may be drained of its reserve of notes—issued by some central bank—and this can itself cause a redemption run on the bank. Many historical banking crises have been caused by this kind of restriction (see Selgin, 1988, pp. 119-124). Hence, even if a government lender of last resort is adequate to address this problem, the problem is caused by government regulation, and this fact must still be regarded as a deficiency in a regulated system vis-à-vis free-banking.

last resort effectively ignores the change in market conditions during the panic. Both the collateral and interest rate requirements for loans are based on the pre-panic situation. The rate of interest is conceived to be a rate which is high relative to the pre-panic market level, but is not necessarily above the market rate during the panic (ibid Goodhart, pp. 341-342; Repullo 2000; Xavier, Parigi and Rochet 2000).[8]

The idea behind this dictum is that if a bank subject to a redemption run can convert all its marketable collateral into liquid form, then, assuming it is solvent, the run should subside, such that withdrawal demands should fall to their normal level. This restores the "ordinary course of business" which then ensures that the lender holds good collateral against the loan. Some of the collateral may be good regardless, but the lender is not picky in choosing which instruments to use. The high rate of interest on the loan encourages the bank at risk to repay the loan quickly, and imposes a penalty on the bank for its failure to correctly anticipate its liquidity needs.

6. Private Lenders versus Government Lenders

Private banks already have an incentive to lend to other banks in accordance with Bagehot's dictum. Because the dictum requires a high rate of interest, this produces a profit incentive for potential lenders. If a lender expects that its lending can stem the bank run, then it will expect to be repaid and earn profit due to the high rate of interest. Alternatively, if the lender is worried about default on the loan, but believes that they have good collateral against the loan, they may still expect to profit, regardless of whether or not

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[8] Actually, in the proper sense of the term, the rate of interest charged by the lender of last resort cannot possibly be above the "market rate." If the "market rate" is determined by reference to what loans are actually offered to the would-be borrower in its present circumstances (and what else can a "market rate" really mean other than this), then the idea of a genuine market rate in the absence of any loan offers is a rather constructive idea. If the lender of last resort lends only in the absence of forthcoming private loans from other banks, this means that there is no market rate for that particular loan, and hence there can be no genuine calculation of a penalty rate relative to a non-existent market rate. To consider the matter another way, the absence of a forthcoming private loan at any stipulated interest rate means that the "market rate" of interest is infinity, and certainly the rate charged by the lender of last resort cannot possibly be higher than this!

the loan is repaid.[9] This means that private banks lending according to the dictum may have reason to believe that they can profit from their lending transactions.

Private banks each have an incentive to secure the liquidity of other banks (since bank runs can spread) as well as to profit from loans when the underlying solvency of the borrower is sound. There are large risks in such lending, but there are also large potential rewards. Moreover, under a system of free banking each bank is responsible for its own liquidity risk and there is an incentive for banks to plan ahead to manage this risk.

Whether to lend to a bank at risk in time of crisis will depend largely on an assessment of the underlying solvency of the bank under normal non-crisis circumstances, which is a difficult task. There is no reason to expect that a government institution will be better able to assess the underlying solvency of a bank than private sector lenders. In regard to the mandate of the lender of last resort, Repullo notes that:

> There may be... a contradiction between the aim of "staying the panic" and the requirement to lend on "good banking securities." If a security is known to be good, then presumably the bank would be able to sell it to other banks or to borrow from them posting the security as collateral, in which case the [lender of last resort] would not be needed. So it must be the case that the securities that the bank in trouble is able to offer are not publicly known to be good, which implies that either the central bank has more information than private banks or it is willing to lend on the basis of collateral of uncertain value (or both). (2000, p. 581)

In fact, there is no reason to think that governments have any special source of information or expertise that is not available to private institutions under co-operative terms. Some economists have argued that government agencies have an advantage over private-sector lenders, since they collect information about banks by means of their various regulatory powers (see e.g., Mishkin, 2000). Nevertheless, whatever information is collected by government agencies can just as easily be given voluntarily to would-be lenders by a bank at risk, in advance of a crisis if necessary.

Moreover, the incentive structure of a government central bank is entirely different for a private bank that must earn profits to survive. Central

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[9] In this case there may be enforcement costs involved in taking control of the collateral in the event of default, and these would need to be taken into account when considering the risk and reward of the loan.

banks are "big players" in the market in the sense that their actions greatly affect market outcomes, but they are also insensitive to the economic consequences of their actions (on the economics of "big players" see Koppl and Yeager, 1996; Koppl, 2002, pp. 120-140, 184-194). It is the private sector which has an advantage in making profitable loan decisions. Since private banks prosper or fail according to their profitability, their incentives are aligned with prudent lending, and so they naturally tend to pursue this goal. Unlike private sector agencies, government agencies do not prosper or fail according to profits from their activities; instead they have an incentive to pursue political goals that are inconsistent with prudent lending. In the context of a crisis, political pressure is almost a certainty, since "[b]anking crises are often associated with periods of significant political turmoil and weak institutions, which makes any sort of commitment by government agencies difficult to achieve" (Ennis and Keister, 2008, p. 1604). This was one of Hayek's primary concerns in formulating his theory of free banking (see Hayek, 1990, pp. 23-25).

By its very nature, recourse to a government loan, when there is no loan forthcoming on the private market, usually means the loan is made with no genuine expectation of profit. A government lender has no special advantage over a private lender, and in fact has every incentive to let its actions be guided by political considerations. Its lending must always involve a subsidy to the debtor since it is granting credit on terms not available on a voluntary market basis.

One additional difficulty for a government lender of last resort is that it must augment its lending activities with extensive regulatory interventions to try to ameliorate the moral hazard generated by its own lending activities. This has led economists supportive of a lender of last resort to recommend a range of accompanying interventions including regulation of the bank's asset portfolio, external imposition of changes in management, and the imposition of costs on equity-holders (Fischer, 1999, pp. 92-94). None of this is necessary under free banking, since the bank will naturally be penalised by the costs of market loans, which are not subsidised to begin with. Penalisation of equity-holders is a natural effect of these costs, and any flow-on effects such as changes to management are left up to shareholders, who have an incentive to hold managers to account for poor performance. All of this merely demonstrates the fact that markets tend to regulate themselves through proper incentives, whereas intervention by government involves adverse consequences that lead to further calls for intervention to ameliorate the effects of the original policies; secondary interventions in turn cause other adverse effects, and so on.

7. The "Lender of Last Resort" in Practice

We have so far considered a central bank making a *bona fide* attempt to act according to Bagehot's dictum. However, there is no real incentive for a government agency to act in this way, since its prosperity depends on political considerations rather than profit. In fact, we will see that the idea that the central bank acts in the last resort as a prudent lender on bank collateral is extremely far-fetched, historically speaking.

In actual practice, central banks act in concert with other government agencies to give direct subsidies and low-interest loans and purchases to banks suffering liquidity problems. Often central banks will lend with a view toward stimulating further lending by banks—a political imperative which has nothing to do with stability of the banking industry and everything to do with giving the appearance of a healthy economy. Indeed, this form of central bank action has been directly pursued under the implementation of the "quantitative easing" practices which have become common in the US in the wake of the recent financial crisis.

Quantitative easing refers to efforts by central banks to stimulate the economy by purchasing financial assets from the banking sector. This practice arises in cases when the central bank has already succeeded in lowering short-term interest rates nearly to zero through its ordinary monetary operations. In such cases central banks have purchased financial assets with longer maturity from private banks. According to Bullard (2010), "...quantitative easing most often is defined as a policy strategy of seeking to reduce long-term interest rates by buying large quantities of financial assets when the overnight rate is zero." Another common aspect of quantitative easing policies is the practice of providing low-interest loans to private banks, with a view to stimulating further lending.

In the context of this paper, what is most interesting about quantitative easing is that it is a practice of purchasing assets from private banks for purposes that are wholly distinct from those of the lender of last resort. This means that central banks pursuing this policy have been guided by different considerations than those of Bagehot's dictum. Their attempts to "stimulate" the economy have required central banks to purchase assets at prices higher than market rates and also to lend at rates of interest lower than the market rate, since otherwise banks would gain no profit from further lending. This is totally in defiance of Bagehot's dictum and must necessarily involve a loss in real terms. This puts central banks in a situation where political demands for "stimulated" lending are entirely contrary to prudent lending practices, and the incentives of the central bank oblige it to pursue the former.

During the recent "global financial crisis," the US Government and US Federal Reserve system pursued exactly this type of policy. Several government agencies gave direct payments, indirect subsidies, and low-interest loans to US banks, amounting to the largest banking bailout in history. Financial instruments of dubious worth held by banks were purchased by government agencies under the Troubled Asset Relief Program (TARP) and the mortgage-backed securities (MBS) program, among others. These assets were purchased in cases where there was no purchaser on the private market and no available market prices. The purchase price was therefore highly speculative and led to a wide range of subsidisation of banks through purchases above actual value. According to the Chairman of the Federal Reserve, assets were purchased at a "hold-to-maturity price" (see Bajaj, 2008). However, the operations of the central bank were conducted entirely in secret and the assets purchased were usually not subject to any market test to determine what investors would be willing to pay.[10] In addition to buying assets that had not been valued on the market, the central bank system made low-interest loans to banks, amounting to a further subsidy. These loans were made at rates below pre-panic levels, and in many cases, at zero interest.

The lending activities of the central bank were truly massive. Between December 2007 and June 2010 the central bank supplied total loans of $16.1 trillion to various banks (USGAO 2011, p. 131, Table 8). To give a sense of the enormity of that figure, nominal US GDP over the same two-and-a-half-year period was approximately $37.7 trillion, meaning that total loans to banks were approximately 43% of GDP for the period (these calculations are based on figures from Johnston and Williamson, 2013).

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[10] With respect to secrecy of central banking operations, it is worth noting that in a free banking system private banks would not be under any requirement to publicly disclose their lending activities. They would, however, have disclosure obligations to their shareholders and would also have contractual obligations to their depositors. Historically, loans by banks operating under free banking have also been kept secret from the public; see the discussion in Gorton and Huang (2003, pp. 181-219). However, there is a difference between the actions of a private institution and the actions of a government agency: for the latter, the funding for loan activities comes from direct expropriation of the public. As a result, there has been a general desire for transparency in government operations that is not applicable to the operations of private institutions that operate without public money. This desire is based on the view that disclosure should be open to those funding the institution.

Contrary to Bagehot's dictum, these loans were at very low interest rates (consistently below market rates), and in some cases required essentially zero interest (Ivry, Keoun, and Kuntz, 2011). The loans were made with a view to stimulating bank lending in the wider economy, a goal that directly contradicts the requirements of Bagehot's dictum, but pursues the political goals of quantitative easing. This meant that the loans amounted to a substantial subsidy to banks, equivalent to a direct corporate welfare payment.[11]

These loans by the central bank were made in secret, with public disclosure of the program only occurring due to outside investigations into the activities of the banking system (Ivry, Keoun, and Kuntz, 2011). Though the US Government claimed that its loans and asset purchases were required to avert bank collapses and stimulate lending, actual investor presentations by bankers at the time suggested that "...few cited lending as a priority. An overwhelming majority saw the bailout program as a no-strings-attached windfall that could be used to pay down debt, acquire other businesses or invest for the future" (McIntire, 2009).

Despite the fact that government loans and payments cannot be expected to generate profit, and must involve subsidisation relative to market loans, it is in the interests of government to obscure these subsidies. Since modern governments are unwilling to give the appearance of subsidising wealthy banking interests, it is common for government loans to be highly clandestine. Though implausible on its face, the US Government made strong efforts to convince the public that their intervention in the banking system was profitable to taxpayers. The government repeatedly claimed that banks had paid back money from the TARP bailout with interest, and that the program had been profitable for taxpayers (Barr, 2009).

The claim of profitable lending was false in several respects. First, since the loans were made at subsidised interest rates, even with genuine repayment they constituted a loss to taxpayers in real terms. Secondly, many repayments of TARP money were made using other government payments including payments made under the secret MBS program conducted by the central bank (Khimm, 2012). The complexity and covert nature of the government's

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[11] Based on revelations about the loan program, one source estimated that banks obtained $13 billion in income due to loan subsidies between August 2007 and April 2010 (Ivry, Keoun, and Kuntz, 2011). This estimate was based on a lower figure for total central bank lending than is now known, and so it is likely to have underestimated the true subsidy amount.

bailout activities, coupled with large subsidies in its interest rates, allowed the US Government to "muddy the waters" to claim that its bailout program had been a profitable exercise. According to Barr (2009), the discovery of the MBS program used to fund TARP "repayments" revealed that "...honesty was one of the earliest casualties of the 2008 financial crisis."

Examples of this kind of arrangement abound. As just one concrete example of the kind of deal touted as profitable investment, consider the case of US Government bailouts to the investment bank Goldman Sachs, discussed in Fry (2010). In October 2008, the bank accessed a $10 billion low-interest government loan under the TARP facility which was "repaid" in June of 2009. There was much fanfare made about the repayment, with both the bank and US Government officials publicising it as evidence of successful policy (Barr, 2009). Unknown to the public was the fact that six weeks before the repayment the US Federal Reserve system had paid Goldman Sachs $11 billion to purchase some of its illiquid assets—an amount sufficient to cover its TARP debt. In the year following the "repayment" the central bank system purchased more than $100 billion of illiquid assets from Goldman Sachs without any open tender to establish their actual value. All of these transactions were done in secret, and were only discovered later due to unrelated investigations into the activities of the central bank. Moreover, while the case was touted as a successful, profitable venture for the government, there was no mention of the fact that the loans were made at a subsidised rate of interest, so that even with genuine repayment they constituted a loss in real terms. This example was typical of many "profitable" loans from the government to banks under the pretext of the government acing as "lender of last resort."

At the time of this writing, there have been three rounds of "quantitative easing" by the Federal Reserve System, each involving lending and asset-purchase practices that run contrary to Bagehot's dictum. The present round of purchases, dubbed QE-3, is open-ended in nature, leading it to be referred to as "QE-infinity" by some commentators (see e.g., Mackintosh, 2013; Suderman, 2013). Recent announcements from the chairman of the Federal Reserve suggest that the end of the program is likely to be contingent on the achievement of macroeconomic targets such as reaching particular unemployment rates (see Harding and Politi, 2013). This demonstrates that the approach of the central bank has not been guided by considerations of prudent lending standards, but has instead been focused on the attainment of other macroeconomic goals which are of value to the political establishment.

8. Conclusion

Though this kind of activity is certainly a perversion of Bagehot's doctrine, it is one that is an entirely predictable and natural consequence of government lending operations. Hayek warns us specifically of the inclination of a government central planning agency of this kind to pursue political goals. Any assurances about desirable rules for lending have no power in the face of incentives that operate on government agencies such as the central bank. Government agencies are funded through taxation and have no imperative to profit from loans to banks. Their incentives are political in nature—to secure the support of influential special interest groups while at the same time obscuring their welfare payments to banks from the public.

All of this is exactly what Hayek (1990) warns of, and it is his chief motivation for proposing free banking as an alternative to national central banking. In considering the doctrine of the lender of last resort, one must ask a fundamental question: if these loans are really profitable and prudent, why are they not made by private enterprise?

If we examine this question in light of actual banking practice by reserve banks, as we have above, we see that government lending is not directed toward profit, but political considerations (though the *appearance* of profit is one such consideration). In the US financial crisis it was the *appearance* of government profit that was important to those in charge of the banking apparatus; however, the actual financial outcome of lending (and asset buying) was a substantial subsidy to connected interest groups.

Hayek and other free-banking advocates have argued against the monopolisation of the money supply by government, favouring instead a free banking system where private banks may issue their own bank-notes without restriction. Competition would be healthy for the monetary system and would tend to produce currencies with properties that are desirable for money-holders.

The claim that a central bank is needed to act as a "lender of last resort" for this system is incorrect, since bank runs can be managed through a host of prudent market mechanisms, each functioning based on the profit motive. In practice, the lender of last resort has not been used as a last resort at all, since private alternatives to a government lender have been prohibited or pre-empted by low-interest government loans. Indeed, based on the actual actions of central banks, it is not an exaggeration to say that the government lender is almost never used as a last resort, and the term has been used effectively as a propaganda tool, to falsely imply that all other options have been exhausted.

The present analysis suggests that a government central banking system increases the risk of redemption runs and other banking crises, and is less effective at dealing with these crises than an unhampered free-market banking system. This implies that the proper approach to reform is to wind back government intervention through the central bank and allow the market to manage the monetary system.

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