

9. CENTRAL BANK DIGITAL CURRENCY: WHAT DIFFERENCE DOES IT MAKE?¹

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I offer a macroeconomic perspective on the “Reserves for All” (RFA) proposal to let the general public use electronic central bank money. I argue that a marginal substitution of outside for inside money does not affect macroeconomic outcomes if conditions on bank and government (central bank) incentives are met; and that these conditions likely are violated. I relate my analysis to common arguments in the discussion about RFA and point to inconsistencies and open questions.



9.1. INTRODUCTION

Far into the twentieth century central banks commonly offered accounts not only to a select group of financial institutions but also to non-banks. This liberal approach has given way to a monetary arrangement where the general public typically uses only one form of central bank issued money, namely cash. Access to electronic central bank money – “reserves” – generally is restricted to financial institutions whom the central bank interacts with to implement monetary policy. When households or non-financial firms pay electronically they use privately issued money (e.g., bank deposits), not central bank money.

The advantages and disadvantages of this monetary arrangement are the subject of an intensifying debate which takes place against the background of fundamental changes in the financial system (including technological innovations, the entrance of new players [“fintech” and “bigtech”], new payment systems) as well as questions about the future of cash and interest in private digital tokens like Bitcoin. At the same time, the debate testifies to a loss of trust in traditional banks after the recent financial crisis and an increasingly critical attitude towards their role in money and credit creation. While this attitude has only recently gained prominence in the political arena – most notably in the Swiss constitutional referendum on “Vollgeld” (sovereign money) – it is much older and precedes the recent changes in technology and market structure.

¹ This text is an abbreviated version of CEPR Discussion Paper 13065 (see www.niepelt.ch/research/reserves-for-all-central-bank-digital-currency-deposits-and-their-non-equivalence-cepr-2018/). For more detailed discussions, references, and the bibliography, please refer to the discussion paper.

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In this note, I offer a macroeconomic perspective on the implications of letting the general public access central bank money in electronic form – “Reserves for All” (RFA). I do not emphasize technological aspects. Instead, I focus on the key macroeconomic question of interest, namely the difference between bank issued “inside” and central bank issued “outside” money, e.g., RFA.

After distinguishing the RFA proposal from related, but conceptually different proposals to introduce narrow banks or restrict the use of cash, I lay out an equivalence result according to which a substitution of outside for inside money is neutral: When a fiscal-monetary policy implements an “initial” equilibrium with inside money then an alternative fiscal-monetary policy with more outside money and with transfers implements a “new” equilibrium with the same allocation and prices and less inside money. This suggests negligible macroeconomic effects of RFA.

But as I also discuss, the neutrality proposition relies on conditions relating to bank and government (central bank) incentives which are likely violated. Against this background I assess the plausibility of various suggested implications of RFA, including effects on financial stability, national saving and investment, and the conduct of monetary policy. I conclude that some suggested implications are at odds with my analysis and that the policy discussion so far has been missing important elements.

9.2. RESERVES FOR ALL

I adopt a broad perspective. Rather than restricting attention to central bank monies based on cryptocurrencies or other specific technologies I consider arbitrary forms of centrally managed, electronic central bank money. The key aspect I am interested in is universal access that is, the possibility for the general public to use electronic central bank money. The system I consider, then, is a system where reserves serve as unit of account, store of value, and means of payment not only for institutions in the financial sector, as they do today, but also for households and firms outside of that sector.

With this focus on universal access in mind I do not take a stance on technical aspects such as whether payments would be made using a traditional payment system or a distributed ledger; and whether RFA would be held in a central bank account; an off-balance-sheet account managed by a service provider on the basis of a public-private partnership; or on a prepaid card. From a macroeconomic perspective these considerations are of second or third order even if they are of first-order importance for many operational, legal, and technical questions.

The proposal to make central bank issued digital money accessible to the general public in order to provide a partial substitute for cash on the one hand and bank deposits on the other dates back a long time. Most notably, Tobin (1985, 1987) promotes the idea. Recent discussions include Groff (2013), Koning (2014), and Niepelt (2015). Many additional contributions discuss RFA against the background of proposals to relax the effective lower bound on interest rates, see the discussion below.

9.3. RELATED DEBATES

Proposals to introduce RFA often are combined with suggestions to introduce narrow banking or restrict cash use. These three proposals are logically distinct.

9.3.1. Narrow Banking Proposals

Many economists, central bankers, and practitioners voice concerns that the ability of commercial banks to “transform maturity” and create money causes fragility and instability.

The “Chicago plan” from the 1930s proposes to end fractional reserve banking and thus, to separate credit from money creation. Similarly, the Swiss “Vollgeld” initiative proposes a complete ban on private money creation.

Kay (2009) argues that financial regulation and supervision in the run-up to the recent financial crisis has failed and that complex regulatory frameworks should make way for simple structural rules and a “firewall between retail deposits and other liabilities of banks.” Kotlikoff and Goodman (2009) and Kotlikoff (2010) go further and propose a system of “Limited Purpose Banking,” in which financial intermediaries are reduced to managers of equity financed mutual funds invested in financial assets. Melaschenko and Reynolds (2013) propose a resolution mechanism that shares features of equity financing.

King (2016) proposes that all short-term bank liabilities should be covered by liquid assets and a central bank credit line that depends on the quantity and quality of assets lodged at the central bank to serve as collateral when needed.

McMillan (2014) emphasizes that many proposals to implement narrow banking restrictions pose the problem that they require regulators to distinguish between financial and non-financial companies, which could be difficult in practice; as a consequence, banks might circumvent the restrictions. As a solution to this problem, McMillan (2014) proposes a rule according to which the market value of *any* company’s real assets always must exceed the value of its liabilities that is, financial assets always are financed by equity.

These proposed arrangements differ from RFA because RFA does not directly constrain the business model of banks or their ability to create inside money. RFA simply provides the public with an electronic means of payment that serves as an alternative to deposits and other forms of private money.

9.3.2. Proposals to Abolish Cash

Proposals to abolish cash or eliminate large denomination typically derive from two motivations. First, to increase the cost of criminal, black market, or money laundering activities as well as tax evasion (see for example Rogoff, 2016). And second, to enlarge the set of monetary policy options.

How convincing the first motivation is, is a matter of debate. The extent to which cash use fosters crime and illegal activities is unclear, as is the trade-off between the benefit of crime reduction and the cost that cash restrictions create for legitimate activities. (Abolishing cash could also negatively impact financial literacy.) Moreover, restricting cash use would (further) undermine privacy – and privacy has both private and social value (Kahn, McAndrews and Roberds, 2005). In any case, abolishing cash would be difficult because in a free society, any government-led reform of the monetary system is constrained by the requirement that government money must remain attractive for its users.

The second motivation has deficiencies as well. Its starting point is the observation that banks issuing deposits cannot lower the deposit rate significantly below zero without risking large scale cash withdrawals and thus, the stability of the institution. The effective lower bound on the deposit rate implies, in turn, an effective lower bound on the central bank's policy rate unless the central bank is willing to accept a compression of the interest rate spread earned by financial institutions, with negative consequences for bank profitability and potentially, financial stability.³ An abolishment or taxation of cash, or restrictions on its use would limit the outside options for depositors and this would open the way for more aggressive monetary policy interventions.

But a more aggressive monetary policy stance is possible, in principle, even without legal restrictions on cash use. Goodfriend (2000) proposes a carry tax on monetary liabilities – effectively a negative interest rate on cash – to relax the lower bound on deposit rates. Buiter (2009) identifies the bearer security nature of currency (i.e., the fact that the owner of cash remains anonymous) as the fundamental cause of the lower bound on nominal interest rates. He proposes two alternative strategies in addition to taxing currency (which poses incentive

³ The compression is moderated when the central bank only charges negative interest on balances that exceed exemption thresholds, as is current practice in Switzerland.

problems), to relax the bound. First, to abolish currency. And second, to float the exchange rate between cash and reserves. In the process, the medium of exchange and unit of account functions of money would be unbundled. Monetary policy would be conducted as usual by setting interest rates on reserves but positive (negative) interest rates on reserves would be associated with an appreciation (depreciation) of cash.

In conclusion, the RFA proposal is fundamentally unrelated to the question of whether cash should be abolished or its use discouraged. Even if RFA were motivated by the aim to empower monetary policy this could be achieved without abolishing cash or restricting its use.

9.4. EQUIVALENCE

To organize the discussion of possible consequences of RFA, I propose a neutrality result according to which inside money is irrelevant from a macroeconomic point of view. An implication of the result is that the introduction of RFA and its substitution for inside money does not have macroeconomic consequences. After laying out the logic of the argument in this section I subsequently turn to a discussion of key assumptions underlying its validity. Thereafter, I confront the findings with arguments commonly made in discussions about RFA.

The neutrality result is in the spirit of Modigliani and Miller (1958), Barro (1974), Wallace (1981), or Chamley and Polemarchakis (1984). Its purpose is to provide a benchmark, not the most realistic description, in order to identify key conditions for neutrality and thus, potential sources of *non*-neutrality. The macroeconomic perspective I adopt leads me to emphasize the economy's aggregate balance sheet (or consolidated intertemporal budget constraint). This contrasts with partial equilibrium intuitions inspired by models in the tradition of Diamond and Dybvig (1983) which underlie many arguments in the debate.

The basic intuition for the result is as follows: Inside money serves various functions in the non-bank sector. RFA, possibly accompanied by fiscal interventions, can also serve these functions. Inside and outside money thus can be substituted against each other, subject to appropriate fiscal interventions, without macroeconomic consequences.

Money serves as a unit of account; a means of payment to mitigate the double coincidence of wants problem; and thus, also as a store of value. Since central bank money – cash or reserves at the central bank – serve as the unit of account a substitution of outside for inside money does not affect the first of the mentioned functions. I therefore focus on the role of money as a store of value or means of payment. Moreover, I restrict attention to inside money – bank deposits

– that are not “backed” by outside money in the banks’ balance sheets (that is, I focus on the deposits that drive the money multiplier above one). The share of inside money that is “backed” by outside money could be taken off the banks’ balance sheets and thus, replaced by outside money without macroeconomic consequences.

9.4.1. Store of Value

Money serves as a store of value because it is a financial claim. But this claim does not affect aggregate wealth. An economy’s wealth comprises the assets in the consolidated balance sheet, representing the economy’s productive capacity, endowments, and net external assets. The liability side of the consolidated balance sheet determines how this wealth is apportioned and distributed among the various sectors and agents in the economy, but it does not affect its size (*cf.* also Modigliani and Miller, 1958). Whether the central bank issues outside money or the banking sector inside money thus is irrelevant for aggregate wealth.

The composition of the stock of money might, however, be relevant from a distributional point of view, for example because inside and outside money have different payment characteristics, or because their tax treatments differ. These distributive implications of a substitution of outside for inside money can be sterilized by appropriate state contingent transfers.

A counterargument to this reasoning emphasizes “crowding out,” namely the fact that for given private sector saving, additional public sector debt issuance (including outside money issuance) reduces the share of private saving that funds physical investment. When inside money (which is an asset and a liability of the private sector) does not increase private sector wealth but outside money (which is an asset of the private sector but a liability of the public sector) does, as the counterargument asserts, then inside money creation is associated with a smaller wealth effect in the private sector than outside money creation and as a consequence, with less aggregate consumption and crowding out.

This counterargument neglects the fact that the economy’s consolidated balance sheet includes the public sector that is, the public sector’s net worth is a component of national wealth. Since the private sector “owns” the public sector as taxpayers ultimately are responsible for covering public sector deficits, public debt (including outside money) does not increase private sector net worth (Barro, 1974), and this implies that inside and outside money do not have differential aggregate wealth effects. Of course, with heterogeneous groups in society (e.g., different cohorts), crowding out does occur to the extent that debt issuance and the associated change in the timing of taxation redistributes the tax burden across groups with different marginal propensities to save (Diamond, 1965; Niepelt,

2004). But this redistribution can be offset by appropriate transfers between the affected groups.

9.4.2. Means of Payment

To assess whether outside money can substitute for inside money as a means of payment consider the extreme case of a complete replacement that is, a requirement that all payments must be conducted using central bank money. Holding velocity constant, this would require that the share of deposits currently used for payments (rather than held for precautionary reasons) was replaced by central bank money, for example by having banks sell a corresponding amount of assets to the central bank in exchange for reserves.

In effect, banks would replace loans or other financial assets on their balance sheet with reserves and as a consequence, the share of deposits currently used for payments would be fully “backed” by these reserves – a situation akin to having non-banks use reserves as means of payment. Equivalently, households would substitute RFA for deposits and the central bank would provide loans to the banks that are secured by bank assets. In either case, the quantity of central bank money would increase relative to the situation before the financial crisis when banks held few reserves in excess of what was needed to settle *net* payments between them. And the degree of “maturity transformation” in the banking sector would be reduced.

The more limited extent of “maturity transformation” would have distributive implications because banks would earn a lower spread on their assets net of liabilities. To offset these implications the central bank would refund to the banks the seignorage profits that banks generate in the current setting but would lose under the new balance sheet structure. Banks’ profit streams thus would remain unchanged. As would be the process of credit extension. Banks would continue to screen and select projects that receive financing before selling the loans on to the central bank or financing them with central bank funding. At no time would the central bank be in the business of directly extending credit to the “real” economy.

The modified balance sheet structure of banks and the compensating transfers from the central bank would render explicit what is implicit in the current monetary system: The implicit lender-of-last-resort (LOLR) guarantee provided by the central bank; and the value of that guarantee.⁴

⁴ Again, there are parallels to public debt whose dominant component in many countries is implicit.

One might argue that the central bank's implicit LOLR guarantee is much smaller than suggested above, because LOLR assistance is granted only occasionally, and in amounts that are much smaller than the share of deposits used for payments. But this is not clear. The current monetary system relies on the strong perception in the non-bank sector that inside money constitutes a secure claim on central bank money. The deposit insurance system and more importantly, actual LOLR assistance in crisis times; bank supervision; and various other types of assurances by government foster this perception of a fixed exchange rate between inside money in the regulated banking sector and outside money.

If the perception indeed was wrong, and the assurances misleading, then the implicit guarantee would indeed be smaller than suggested. A neutral substitution of outside for inside money then would require, not an unconditional sale of assets to the central bank (or secured borrowing from the central bank) but rather a contingent "liquidity line."

9.4.3. Equivalence Proposition

I have argued that both from an aggregate balance sheet point of view and as far as money's means-of-payment function for the non-bank sector is concerned, starting from an equilibrium, a substitution of outside for inside money accompanied by appropriate transfers leaves macroeconomic outcomes unaffected.⁵ I have not argued, however, that this substitution is consistent with optimality on the part of the parties that issue money, namely the central bank and commercial banks (see below). The neutrality proposition suggested by the preceding discussion thus is a conditional one. Related, I have also not argued that arbitrary compositions of money can be implemented as equilibrium outcomes. (See the discussion paper for a formal statement of the proposition.)

Note that an immediate implication of the proposition is that the introduction of RFA is neutral as long as reserves perform the same payment functions for non-banks as deposits do. Note also that the result can be extended to cover stochastic environments.

9.5. NON-EQUIVALENCE

The result proposed above suggests that key conditions related to incentives have to be satisfied for equivalence to prevail and thus, for a partial substitution of outside for inside money to have no macroeconomic consequences.

⁵ The prices of commodities, financial claims, and "liquidity" in the two equilibria are the same as well.

9.5.1. Bank Incentives

A general argument against the irrelevance of a firm's liability structure relates to the fact that this structure affects the incentives of owners or managers. Similarly, changes in the balance sheet structure of banks might undermine, or strengthen incentives and this might affect the equilibrium allocation.

Most importantly, the incentives for banks to exert sufficient screening and monitoring efforts might suffer. A substitution of reserves for loans on the asset side of banks' balance sheets might give rise to an "originate-to-distribute" business model in which banks extend credit to non-banks before selling the loan to the central bank. This might reduce incentives to carefully screen projects and could have important negative medium- and long-term effects on the economy's development. It could also affect the wealth distribution between the public and private sector (central bank vs. commercial banks).

How strong these effects would be, and whether they would indeed result in weaker incentives is unclear as this would depend on the regulatory framework. After all, depositors do not currently play any meaningful monitoring role but rely on the efforts of the central bank, the banking supervisor, the deposit insurance agency, the consumer protection agency, etc. The latter actors would continue to be active in their present roles and in particular, the central bank would have even stronger incentives than today to supervise banks' lending practices as it would acquire (or accept as collateral) more bank loans than in the present system.

In conclusion, there is a case to be made for changed incentives as a consequence of modified bank balance sheet structures, but the exact form and implications are far from clear and certainly strongly dependent on the regulatory environment.

9.5.2. Government Incentives

The neutrality proposition envisions an exogenous new fiscal-monetary policy. It thus abstracts from politico-economic frictions and assumes commitment. Both assumptions are unrealistic.

Consider first the political support for transfers. I have argued above that a neutral change of fiscal-monetary policy would render the implicit LOLR guarantees provided by the central bank as well as their values under the current monetary arrangement explicit. But it is unlikely that the beneficiaries of these guarantees, once made explicit, would continue to be able to muster the same political support. In other words, the equivalent fiscal-monetary policy most likely would not be an equilibrium policy. In politico-economic equilibrium, the

now explicit support by the central bank could rise or fall and as a consequence, payment related services could become cheaper or more expensive.

Which of these two outcomes would be more likely depends, among other factors, on the degree of competition in the banking system. When competition is high bank customers rather than shareholders benefit from the implicit central bank subsidy in the current system, and increased transparency coupled with the political influence of, e.g., small and medium sized enterprises might strengthen the political support for central bank support. When competition is low, in contrast, such that the shareholders of banks are the major beneficiaries of central bank support in the current system, then it seems more likely that increased transparency would weaken the political support for banks and their customers and as a consequence, payment related services would become more expensive. This would be associated with lower distortions, however.

The political support would also change for other reasons. Policy choices under commitment typically are not time consistent because the incentives of a government change over time as macroeconomic outcomes that are endogenous *ex-ante* turn into *bygones ex post* (Kydland and Prescott, 1977). The initial, equilibrium fiscal-monetary policy in the current policy regime with inside money *is* time consistent, by assumption, and reflects the *ex-post* incentive compatibility constraints faced by political decision makers. In a different policy regime with less inside and more outside money, these incentive compatibility constraints would change if the state variables that determine the choice set of political decision makers evolved in different ways.

It seems likely that this would be the case. At the source of the *ex-post* incentive constraints in the current regime is the fact that private money creation puts the central bank at a second mover disadvantage, effectively forcing it to serve as LOLR during liquidity crises to safeguard the payment system, or even as provider of bailout funds in solvency crises.⁶ According to the neutrality result, the equivalent fiscal-monetary policy would be associated with transfers, including from the central bank to banks (or their customers), and according to the discussion above, these transfers would likely become politically unsustainable once made explicit. As a consequence, bank equity and other state variables would evolve differently and the *ex-post* optimal government choices in the new regime with less inside and more outside money would differ from the equivalent fiscal-monetary policy.

⁶ While the incentive constraints in the current arrangement tend to increase liquidity and financial support for banks this need not result in excess profits in the financial sector. Depending on the degree of competition, bank customers may be the main beneficiaries. Nevertheless, such support distorts prices, with negative welfare implications.

A different source of potential non-neutrality concerns the central bank's asset management. Under the assumptions underlying the neutrality result the central bank purchases additional assets from the banking sector but it does not directly intervene in the process of credit allocation. Whether this would be incentive compatible *ex post* is questionable. It is well conceivable that an extension of the central bank balance sheet would lead fiscal policy makers to impose additional constraints on the central bank, for instance to require the bank's investment policy to meet certain "ethical," "social," "ecological," or other standards. In short, credit extension could become more politicized and this might change aggregate investment.

In conclusion, the political support for the equivalent fiscal-monetary policy would likely differ from the support enjoyed by policy in the current regime and as a consequence, the equivalent policy would not be time consistent. While it is impossible to gauge the properties of the new equilibrium policy outside of a formal model it appears likely that increased transparency would give rise to reduced transfers and less distortions.⁷ At the same time, the risk of political interference with the credit allocation process would likely increase.

9.6. OTHER IMPLICATIONS

I review common arguments in the debate on RFA against the background of the previous discussion.

9.6.1. Financial Stability

Many commentators argue that the risk of bank runs – sudden withdrawals of deposits – could increase when bank customers have the option to convert deposits into RFA rather than just into cash. This argument is difficult to make sense of within the analytical framework used so far. After all, the neutrality result starts from the presumption that deposits in the current system are implicitly guaranteed by the central bank, so there is no reason to run in the first place (Diamond and Dybvig, 1983) and even if depositors do run, the macroeconomic consequences are minor as the central bank steps in and implicit guarantees simply are made explicit. The same mechanism would continue to operate in the

⁷ One might argue that distortions are minimized when inside money creation is completely outlawed. But putting a complete stop to inside money creation would likely not be enforceable. Banks and their clients would search for and find, ways to circumvent the legal prohibition and as a result, the central bank might completely lose control over the money supply. The equilibrium policy would become irrelevant. A fundamental problem at the source of non-enforceability is the difficulty to define money and what it means to make a payment.

new regime, on a smaller scale (because some inside money would have been made explicit as a consequence of substituting RFA for deposits).

The discussion abstracted, however, from physical differences between electronic money and cash; and it therefore cannot speak to the fear of differential risk of “running for RFA” as opposed to cash. If such differential run risk exists, is it higher with RFA? One group of commentators suggests that this is the case. The basic idea is that with RFA it becomes easier to shift funds across accounts, and this increases the elasticity of deposit demand. Others are more skeptical. Koning (2018), for instance, retorts that during a confidence crisis bank customers would no longer have to queue to withdraw cash; LOLR support would be provided much more quickly; and large cash holders would continue to shift funds into treasury bills, not into electronic central bank money. As a consequence, the risk of bank runs would decrease rather than increase.

Riksbank (2017) similarly expects the introduction of an e-krona to have limited effects on financial stability as the Riksbank would continue to engage in the usual LOLR policies. It does see the risk, however, that the substitution of outside for inside money could reduce bank profits and thereby affect banks’ stability. This argument assumes that the hidden transfers present in the current system would no longer be present in a system where the central bank’s guarantees are made explicit. As I argued above, this is indeed likely.

9.6.2. Credit

Many commentators also suggest that the substitution of outside for inside money could reduce the volume of credit, with important macroeconomic consequences for investment and growth. According to this argument the fact that many banks rely on deposits to finance their assets suggests that less deposit funding would reduce the flow of credit extended by these banks.

However, this argument disregards both liability substitution and securitization: Deposits may be replaced by other forms of bank debt, and loans might be sold to investors. Under the assumptions underlying the neutrality result banks continue to originate loans even when they have no, or less deposit funding but they sell the loans to the central bank in exchange for reserves or use them as collateral for central bank financing.

As discussed above, the incentive effects of the modified bank balance sheets could lead banks to change their screening and monitoring efforts. But if these efforts indeed weakened and lenders adopted an originate-to-distribute business model then this would likely work in the direction of banks easing credit standards and originating *more* rather than fewer loans. On the other hand, also as mentioned before, political interference with the central bank’s asset

management and thus, the central bank's refinancing of bank loans could distort the credit allocation mechanism.

Another argument suggests that additional outside money creation, and the associated lengthening of the central bank balance sheet, would reduce the amount of assets that the private sector may use as collateral. The validity of this argument depends on whether banks in the current system do not need to provide collateral in exchange for the implicit central bank guarantees and thus, also, on whether they gamble on receiving LOLR resort even without sufficient collateral.

9.6.3. Monetary Policy

According to the neutrality result, an equivalent fiscal-monetary policy *can* in principle be implemented. In line with this argument, Riksbank (2017) expects limited effects on monetary policy (of the basic e-krona version) and Dyson and Meaning (2018) argue that “with careful design choices, a CBDC need not be disruptive to the conduct of monetary policy.”

At the same time, however, as argued earlier, it is questionable whether this equivalent policy would actually be chosen in politico-economic equilibrium. Moreover, a substitution of outside for inside money could change the economic choice set of monetary policy makers, in particular if it were accompanied by restrictions on cash use (a structural change which, as I have argued, is not inherently connected to the RFA issue). As argued by Bordo and Levin (2017), RFA could then “free” the economy from the lower bound and thereby allow monetary policy to focus on price rather than inflation stability (price level targeting) and to implement the Friedman (1969) rule.

9.6.4. Structural Changes

More generally, the introduction of RFA could give rise to many structural changes whose implications far exceed the scope of the equivalence result. For example, RFA could increase competition in the banking sector. On the other hand, RFA could also lead to reduced variety in payment solutions when the greater role played by outside money leads the government to demand more standardization.

RFA might also affect the resiliency of the payment system. In the current regime consolidation and system integration (due to economies of scale) enhance the system's technological fragility. The introduction of a parallel payment system accompanying RFA could counteract that trend and offer significant gains from diversification. It goes without saying that the abolition of cash would be counterproductive from a resilience point of view.

Still other arguments relate to financial inclusion or government oversight over the payment system.

Last but not least, the introduction of RFA would end what appears to be a slightly absurd situation in countries that prohibit citizens from using cash – the only legal tender accessible to the general public – for larger transactions, thereby essentially forcing them to use privately issued money instead. Opening the central bank’s balance sheet to the public would constitute a more liberal approach than restricting access to financial institutions.

9.7. CONCLUSION

The proposal to issue digital central bank money for use by the general public enjoys surprisingly strong support among finance practitioners but equally often faces skepticism, in particular by central bank representatives. A typical line of argument put forward by the skeptics emphasizes that the traditional approach has served the public and the financial system well, and that RFA could have disruptive effects. This argument is not convincing: The “traditional approach” has evolved over the years and will continue to evolve; and in the absence of a clear counterfactual, it is difficult to assess whether it really has worked “well.”

From a macroeconomic point of view, RFA need not have disruptive effects and if it does have such effects, they might well occur in other areas or have different signs than what is typically suggested. For example, RFA could *increase* the incentive to extend credit but might undermine the political support for implicit financial assistance to banks. This suggests that the discussion about digital central bank money could benefit from well-articulated, coherent, formal models that clarify equivalence relations as well as sources of non-equivalence. This paper is a step in that direction. In work in progress (Brunnermeier and Niepelt, 2018) we formalize some of the arguments.