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Digital Public Money Infrastructures project
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A novel Digital Public Money (DPM) scheme:

segregating money creation and credit distribution

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1 Introduction of the DPM scheme

1.1 Summary of the DPM scheme

Digital public money (DPM) is a digital form of central bank money, accessible to the public for general use. DPM bears important distinctions from a Central Bank Digital Currency (CBDC). We present a novel DPM scheme in which central bank issues DPM accessible to firms and households, with commercial banks as DPM distributors. Unlike the existing banking model, in which commercial banks take up both roles of money creator and credit distributor, this DPM scheme segregates the two roles specifically, with central bank as the sole money creator and commercial banks as credit distributors. Money creation takes place on, and only on, the central bank balance sheet. As money creator, central bank issues DPM by extending central bank loans (CB loans) to banks based on capital adequacy rule. As credit distributors, banks extend loans and dishoard DPM to customers based on their knowledge of customers. Banks are funded by termed CB loans, instead of demand deposits, which takes away a considerable portion of liquidity risk. The central bank is in turn funded by DPM, as long as firms and households are holding DPM, a claim on the central bank. As liquidity transformation takes place on the central bank balance sheet, and DPM is the most liquid monetary claim, bank run is eliminated by design.

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1.2 Definition of DPM

What does the term digital public money (DPM) mean? A good exposition of the term digital public money may start with the following quote from an executive summary of BIS, which is titled, not coincidentally, “Central bank digital currencies” (BIS 2023):

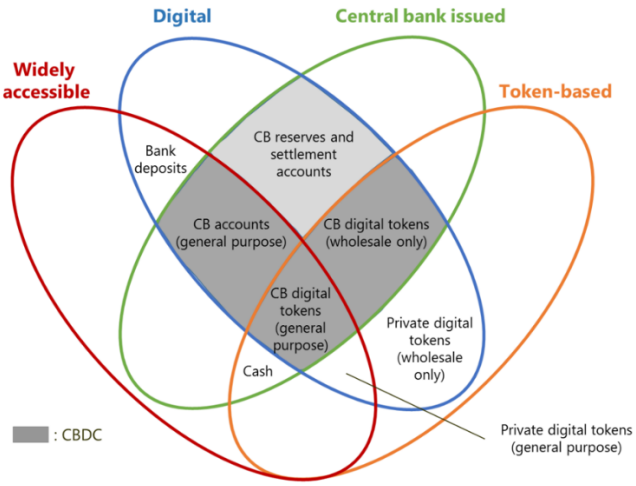
> *Today, money exists in two forms. Public money is issued by a central bank via banknotes and central bank reserves, while private money is issued by commercial banks in the form of deposits and non-bank financial institutions in the form of electronic money (e-money). Banknotes are the only form of public money available to the general public. Banks, in contrast, also have access to public money in electronic form, via central bank reserves.*

Although quite self-explanatory, the first half of the definition of DPM - “a digital form of central bank money - does not carry the connotation of the use of blockchain or distributed ledger technology (DLT). It simply means “electronic form” as opposed to paper form, which may be on any type of database, centralized or distributed, or even do without the need of a database at all and transfer like tokens, which is perhaps beyond usual expectation.

The second half of the definition of DPM - “accessible to the public for general use” - means that DPM not only circulates among firms and households as means of payment, but also among financial institutions (FIs), banks and non-bank FIs, as well as between central bank and banks, as means of money supply and funding liquidity. In a sense, DPM is both retail and wholesale.

In terms of the money flower (BIS 2018), DPM takes up both the dark grey area, of CBDC, and the light grey area, of CB reserves.

The money flower: a taxonomy of money Graph 1



Notes: The Venn-diagram illustrates the four key properties of money: *issuer* (central bank or not); *form* (digital or physical); *accessibility* (widely or restricted) and *technology* (account-based or token-based). *CB* = central bank, *CBDC* = central bank digital currency (excluding digital central bank money already available to monetary counterparties and some non-monetary counterparties). *Private digital tokens (general purpose)* include crypto-assets and currencies, such as bitcoin and ethereum. *Bank deposits* are not widely accessible in all jurisdictions. For examples of how other forms of money may fit in the diagram, please refer to the source.

Source: Based on Bech and Garratt (2017).

Figure 1 The money flower by BIS

1.3 DPM or CBDC

What is the rationale behind choosing the term digital public money (DPM) over central bank digital currency (CBDC)?

The first set of reasons of opting for DPM are due to the heterogeneity in the meanings of CBDC, as summarized in (Bindseil 2024).[1] At the inception of the term CBDC, the "digital currency" part carries specific technology connotation with blockchain or DLT. We intend DPM to be technology neutral from the very beginning. As illustrated in the money flower, DPM potentially covers more ground than CBDC, also including the central bank money that is account-based. Moreover, the dichotomy of retail vs. wholesale CBDC is not necessary in the DPM scheme, as DPM is applicable both in money creation/credit allocation and in payment for goods and services. This distinction is important in that while most CBDC schemes focus on innovations in payment capabilities, the DPM scheme's emphasis is on changing the landscape of money creation/credit allocation. (Bindseil 2024) suggest using the term central bank electronic money (CBEM) as a proper replacement for CBDC. I personally am indifferent between DPM and CBEM, only opting for DPM perhaps for shorter length.

[1] If, however, the heterogeneity can be resolved, as a solution suggested in (Bindseil, 2024), to define CBDC as simply "central bank money in electronic form", DPM would then be equivalent to CBDC in definition. I would personally have no problem using either term.

From a different perspective, there are grounds for using DPM instead of CBDC due to a priori perceptions of the latter. Specifically, the perceptions of CBDC schemes nowadays raise concerns in below three key topics, among many others:

1. Will CBDC lead to disintermediation of banks, higher financing cost or bank stress?
2. Will CBDC enable "state banking", giving central bank direct control over credit supply?
3. Will CBDC become a threat to individual privacy?

The choice of DPM over CBDC circumvents the influence from prevalent presumptions of CBDC, which may hamper our analysis and judgement. As a matter of fact, the DPM scheme serves as means to achieve goals that address above concerns. Therefore, concrete answers to the above questions entails examination of 1) the scheme design, 2) the chosen goals, 3) the implementation. We will revisit these topics later in the journey. For now, a solid definition of DPM with no a priori perception seems to be a good start.

1.4 Scheme goal: segregation of money creation and credit distribution

This DPM scheme chooses the segregation of money creation and credit distribution as its primary goal, and it upholds technology neutrality for preserving privacy by design.

The scheme stipulates that credit distribution is a private business by licensed banks, such that banks are still intermediary of credit. Banks cover credit risk of the customer loans with bank capital, with no need of public backstop for bank failures. In a sense, banks are allowed to fail—a failed credit distributor would not have contagious effect on other credit distributors, and its customers are shielded from loss as they are holding DPM rather than bank deposit. Banks are not only essential intermediary for credit distribution, but they also carry out the role with lighter regulatory burden thanks to relieved obligations for financial stability. Lower regulatory cost also implies lower entry barrier for prospective credit distributors, which encourages more inclusive financing and more vibrant financial innovation.

With public mandates of price stability and financial stability, central banks in the DPM scheme set interest rate rules for inflation targeting and capital adequacy rules for prudential objectives. Central banks, however, do not decide how much money they intend to create, nor where the newly created money goes. The banks decide the amount of DPM to hoard from central bank loans for distribution, taking into consideration the demand of customer loans and the interest rate differential between central bank loans and customer loans. In this sense, DPM is endogenous with respect to banks' credit distribution. Customers keep a direct relationship with their banks, not with the central bank. It can be said that the DPM scheme is a system of one money and two tiers.

Section 2 discusses the current banking model with focus on trust relationships. Section 3 presents the DPM scheme in full detail with functional descriptions for central banks and commercial banks, specifying core functions of bank and monetary/prudential policy toolkit of central banks. Section 4 expands on the implications to all three types of stakeholders in this scheme: the banks, central banks, and public customers. The banks will be relieved of significant

financial stability burden and allowed to compete with greater scope. The central bank will gain more effective monetary policy and prudential policy tools and provide the public good of next-generation money. The public will enjoy a safer financial system, competitive financing cost, and a remunerative public money. Section 5 briefly cover a selection of open topics that are worthy of further exploration. Research notes on these topics are to be expected.

2 The current banking model

We start with a highly stylized case that represents the building block of the current banking model: a bank extending a credit loan[2] to its customer, matched with funding from the customer's deposit. This is a swap of two IOUs. The first IOU is the loan, in which the bank is the creditor and the customer the debtor; the second matching IOU is the demand deposit, in which the customer is the creditor and the bank the debtor.

With the first IOU, the bank knows its customer well enough to extend the credit loan and trust that the customer will repay the loan when the term matures. With the second IOU, the customer is willing to hold a bank deposit, with the trust that the bank will redeem or transfer the deposit on par on demand.

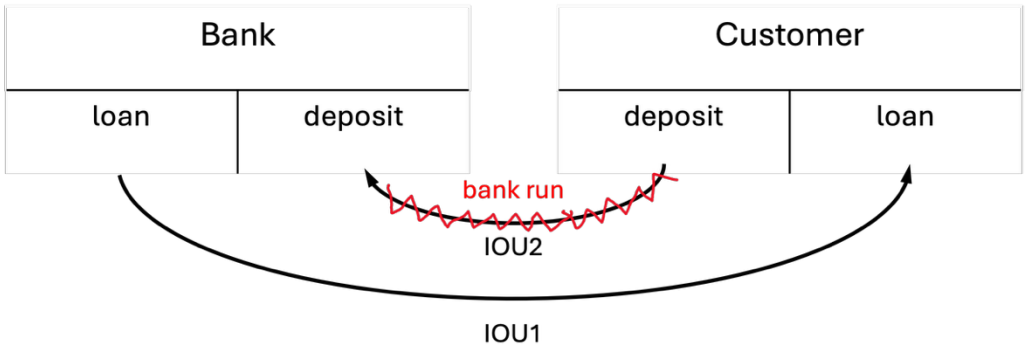


Figure 2 Trust relationship between bank and customer

The bank uses its balance sheet expansion to supply the credit, and at the same time, create money (commercial bank money). The liquidity transformation takes place on the bank's balance sheet, matching long-term loans with short-term demand deposits. It is the second IOU, the demand deposit, that is problematic with insufficient information and trust. A bank is not obliged to disclose asset portfolio, capital level, or debt structure to its customers, whose deposits provide a significant portion of funding for the bank. Bank customers maintain trust of their deposits by

[2] For simplicity and clarity, the discussion is limited to credit loan only, not covering collateralized loans. Collateralized lending will be covered in future extension of the scheme.

façade information such as branch office in operation and timely redemption.[3] Ironically, if bank customers believe that timely redemption is a test of trust for demand deposit, such test is a self-fulfilling prophecy and is doomed to fail—as all customers run to the bank to demand redemption, any bank will be short of funding and the liquidity squeeze will quickly lead to asset value loss and eventual bankruptcy. A banking model with maturity mismatch is inherently prone to bank runs. What's more, bank runs are contagious: one bank in distress would call other banks' trust into question. Panic bank runs causing widespread credit squeeze are common occurrences in monetary history before the introduction of the modern central bank.

Modern central banks are instituted through delegation of power (monetary authority) and responsibility (central bank mandates) by the general public. Central bank's designated mandates[4] necessarily include monetary system stability, which can be expressed in two components[5]:

1. stability in the value of central bank money in terms of goods and services.
2. stability of private-banking system deposit money in terms of central bank money.

Specifically, banks' customers delegate the responsibility of monetary stability to the central bank. Banks' customers are still creditors to banks, as deposit holders, but they entrust the central bank in regulating and oversight of their banks. This institution replaces the previously unreliable trust of demand deposits with two segments of trust relationships: (1) the trust of bank customers in a central bank, and (2) the trust of a central bank in the banks.

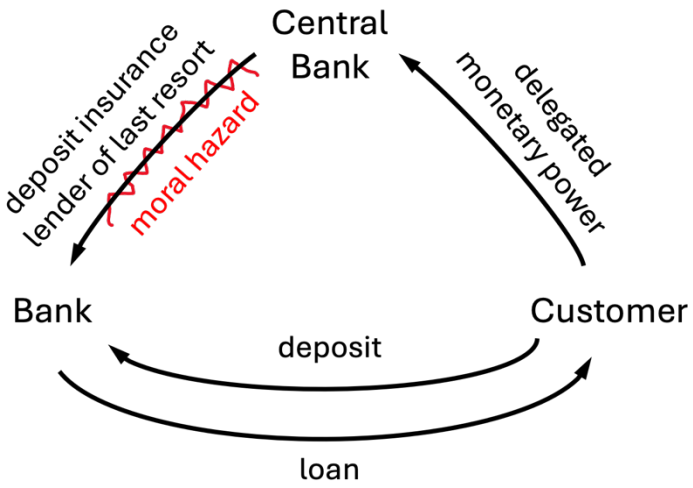


Figure 3 Tri-party relationship of central bank, bank, and customer

Bank customers' trust in the central bank is first and foremost rooted in the governance of the central bank. The core issues of governance for a central bank - including its powers, objectives,

[3] As depicted in the movie, *It's a Wonderful Life* (1946).
[4] A broader spectrum of central bank mandates may include employment, economic growth, financial inclusion, and "support for government economic policies". See (Tombini 2025).
[5] See (Tucker, The political economy of central banking in the digital age 2017).

ownership structure, and most crucially accountability (BIS 2009) - are manifested in its political framework and legal status. Most likely, central banks are formally accountable to the legislative bodies,[6] which represent the public interest for monetary system stability. Central bank obligations to fulfill designated mandates are subject to regular monitoring and inquiries by the legislature. Transparency is another pillar to ensure public trust and accountability with the central bank (Adrian and Khan 2019). Normally, central banks are obliged to disclose balance sheet composition, quantifiable objectives, economic forecasts, policy adjustments (with explanations), and minutes of policy meetings to the public.

Central bank's trust in the banks is rooted in its role in bank licensing and regulation. Central banks play a primary role in banks' supervision and oversight, which are essential instruments for its financial stability mandate. In particular, a central bank bears significant responsibility for setting banks' prudential regulation, in accordance with Basel III. Banks are obliged to disclose asset portfolio, debt structure, and capital adequacy to the regulator. Central banks can also stipulate good governance of banks, as part of banks' license requirement.

Central bank trust in the banks is manifested by the two main functions that modern central banks assume: lender of last resort (LOLR) and deposit insurance (DI). As lender of last resort, the central bank is empowered to lend out reserve to a troubled bank against financial assets that it deems to be "good collateral", which constitutes a collateralized loan relationship from the central bank to the bank. Deposit insurance is the central bank's redemption guarantee of bank customers' deposits below a certain threshold, for which the central bank balance sheet acts as the public backstop explicitly or implicitly.

Bank bailouts remain an unresolved issue, reoccurring almost periodically and costing more and more to the public expense, from the savings and loan crisis in the 1980s to the subprime mortgage crisis of 2007-2010 (Admati and Hellwig 2024), and the most recent Silicon Valley Bank bailout. It is evident that the public backstop has paid for the loss from banks' private profit seeking. As long as there exist information asymmetry between central banks and commercial banks, as central banks cannot perfectly observe banks' risk-taking behavior, moral hazard will not only persist but even grow in scale to capture the benefit of "too big to fail". The DPM scheme proposes a remodeling of the existing banking model, by taking away the excessive liquidity risk from banks' balance sheets while holding them accountable for credit risk with "allowed to fail" as a feature. Perhaps not incidentally, the tri-party trust relationship between the central bank, banks, and customers in the above picture offers the exact tip that leads to the design of the DPM scheme.

[6] For instance, the Federal Reserve is accountable to the Congress, the ECB is to the European Parliament, the Bank of England to Parliament and the Chancellor of the Exchequer. See (BIS 2009).

3 How the DPM scheme works

3.1 Issuance of DPM by CB loans

DPM is created when a central bank approves a CB loan to a bank, which creates a CB loan on the asset side and DPM on the liability side of a central bank balance sheet (Figure 4).

The interest rate of the CB loan is a key policy instrument for a central bank's price stability mandate. For a central bank, the CB loan rate effectively reflects the target interest rate that it aims to achieve in the interbank market. For the banks, the CB loan rate is the wholesale borrowing rate that determines banks' funding cost.

The total quantity of CB loans that an individual bank is entitled to (the CB loan quota) is determined by the bank's capital, based on capital adequacy rule set by the central bank as part of its prudential policy. The CB loan quota may also consider its balance sheet scale, current loan portfolio and other assets performance. The central bank does not need access to banks' customer-level data, which are in safe keeping with the bank as the custodian. It may be preferrable to take a rule-based approach with the CB loan quota in contrast to a standard-based approach, to avoid the burden of discretion and justification. The calculation of CB loan quota will be discussed further in Section 5.1, which harmonizes with the substantial work on capital ratio requirement of current Basel III framework.

Figure 4 Issuance of DPM

Before we go into the distribution of DPM, in this scheme, *DPM is interest-bearing*. This is distinctively different from most existing CBDC schemes. The interest rate of DPM is the other key policy instrument for the price stability mandate, in combination with the CB loan rate. The setting of a DPM interest rate ensures its competitiveness in the market landscape of payment/saving/investment alternatives. The topic of payment innovation and competition will be revisited and expanded on in a later section.

3.2 Distribution of DPM by customer loans

Banks offer loans to firms and households at an interest rate and quantity based on their evaluation of a customer's creditworthiness. Unlike the existing banking model, a bank no longer creates a deposit on the liability side of its balance sheet but instead dishoards the DPM on asset side. After issuing the customer loan, a bank's balance sheet keeps the customer loan and DPM on the asset side, and the CB loan on the liability side. Customers hold DPM on the asset side and bank loans on the liability side.

Central Bank			Bank			Customer	
+CB loan 100	+DPM 100 (Bank)		+DPM 100	+CB loan 100			
	-DPM 100 (Bank) +DPM 100 (Customer)		-DPM 100 +Bank loan 100			+DPM 100	+Bank loan 100
			Reserve 100	Capital 100			

Figure 5 Distribution of DPM

Customers' DPM holdings are registered on the central bank ledger,[7] not on the banks' ledgers. The central bank ledger is where the finality of payment takes place. Central banks do not directly interact with retail customers. It is the banks that provide essential payment service of facilitating payment interaction between customers and the central bank ledger, which does not entail the banks' ledgers. In this capacity, banks are providing wallet service for DPM, very much like digital wallet applications for linked bank checking accounts.

In the exposition of this paper, the central bank provides bookkeeping for DPM held by firms and households. The central bank's access of information is limited to the essential service of bookkeeping, showing only account identifiers, DPM balances, and corresponding changes. More specifically, the account identifiers on central bank ledger are anonymous, and their mappings with the identities of firms and households are known exclusively to their banks. All person-identifiable information is in safekeeping with the banks. The central bank's access to banks' customer information is subject to existing legal requirements and authorization procedures, on par with current compliance practices. Further discussion on privacy, alternative bookkeeping solutions and technology implementations will be covered in a later section as well as in future research notes.

[7] It is implicitly assumed that DPM is registered on a centralized database run by the central bank. The alternative of DPM in bearer form, with no need of ledger, will be covered in Section 4.3.3.

3.3 Core functions of banks in the DPM scheme

Banks in the DPM scheme are expected to offer services to its customers: account maintenance, payment service, customer data custodian, and credit extension.

Banks have a direct relationship with the customers and are responsible for the Know Your Customer (KYC) obligation as part of account maintenance service. Banks assist their customers to open DPM accounts on the central bank ledger, which serves as the single source of truth for all DPM holdings. DPM account identifiers on the central bank ledger are made anonymous by hashing or similarly strong privacy preserving algorithms. Banks safekeep the mappings between DPM account identifiers and customers' identities. Central banks keep the book that tracks DPM balances in the accounts, without knowledge of the identities behind the accounts.

Banks are licensed by the central bank to perform a comprehensive set of payment services on behalf of customers, which include processing payment information, anti-money laundering (AML), countering the financing of terrorism (CFT), and submitting payments to central bank ledger for finality confirmation.

Banks not only serve as intermediaries of payment information, but also custodians of customer data. For the purpose of KYC/AML/CFT, banks collect a comprehensive set of payment data, which is authorized by the customers and authenticated in the process. On mobile devices, payment service providers may also ask permission for collecting additional data from the customers, which include but not limited to device geolocation, user behavior on the device, interaction with other apps, etc. To be explicit, customer data encompasses payment information, payment data (data collected per KYC/AML/CFT requirement), and additional data (data non-essential for payment but valuable for credit evaluation). Banks are designated to be custodians of customer data. The designation requires explicit consent from customers, which should take place when customers establish account relationship with the banks. The capability of customers' data custodian is essential for banks to carry out its function of credit extension.

Credit extension is the profit center of banks' business model, which is the case both in the existing banking model as well as in the DPM scheme. A bank in the DPM scheme extends loans by dishoarding a bank's holding of DPM to the customer. The payment leg of loan extension takes place on the central bank ledger, transferring DPM from the bank to the customer. Put differently, *a bank purchases the customer loan asset by paying DPM to the customer. The cost of DPM funding is the CB loan rate. Bank profits by the interest rate differential between customer loans and CB loan. The interest rate differential reflects the information premium as a result of a bank's role as customer data custodian*. On the flip side, the bank manages credit risks and covers potential loss from customer loans with its capital. The size of a bank's capital should therefore be commensurate with the value assessed on the customer data pool that the bank utilizes for credit extension, which corroborates the rationale that the central bank calculates the CB loan quota based on bank capital. The billion-dollar challenging question is how much bank capital is considered prudentially commensurate to the quality of the customer data pool, under the condition that the central bank does not have access to the customer data pool. Central banks

may resort to the technical solution of privacy-preserving computation (e.g., homomorphic encryption, market solution of third-party credit rating/scoring) or prudential rules based on historical portfolio performance. This topic calls for further dedicated research. The author welcomes enlightenment and proposals with an open mind.

3.4 Monetary policy and prudential policy instruments of central bank

Toward price stability mandate, a central bank sets policy rate band by adjusting the CB loan rate and DPM interest rate. CB loan rate constitutes the upper bound of policy rate band. An increase in the CB loan rate will directly raise the funding cost of banks and discourage credit extension. DPM interest rate acts as the lower bound of policy rate band, a risk-free return that any DPM holder can enjoy. A decrease in DPM interest rate carries a negative wealth effect and makes taking a loan less attractive to a customer.

The setting policy rate band is recommended to link with inflation forecasts. The linkage may be rule-based or be deliberated by a monetary policy committee (my inclination is for the rule-based). The inflation forecasts, from current to short and longer-term, are to be produced by an independent macro committee. It is essential that both the inflation forecasts and the linkage mechanism for setting the policy rate band be transparent with full public disclosure.

Toward financial stability mandate, the key instrument for the central bank is the capital adequacy rule for calculating the CB loan quota. Assuming fixed capital level and asset consisting of 100% customer loans, the CB loan quota can be equivalently translated to leverage ratio of capital to asset portfolio. The capital adequacy rule is to be deliberated by the prudential committee, with full public disclosure. The prudential committee may also consider whether to allow banks to invest in other assets than customer loan, which may include treasury bonds, commercial papers (CP), certificates of deposit (CD) or interbank loans to other banks, asset-backed securities (ABS), equity shares, even crypto and so forth. This topic is related to collaterized loans within the DPM scheme, which will be revisited in Section 5.1 and possibly in a future research note.

Both the monetary policy committee and the prudential committee are under the same umbrella of the central bank. It is anticipated that rule setting by these committees may face tradeoffs – for example, when the capital adequacy rule is set to be stringent, low leverage ratio may translate into insufficient liquidity supply and high financing cost for loan customers; when the capital adequacy rule is relaxed, it may lead to increased occurrences of bank failures with loss absorbed by the central bank. The monetary policy committee may either counteract with offsetting policy or act with synergy. It is the responsibility of the central bank to coordinate policy combination from subordinate committees, as discussed in (Tucker, Unelected Power 2018).

The central bank is capable of, at least in theory, issuing DPM by accepting treasury bonds via banks. On the central bank balance sheet, there will be an addition of treasury bonds on the asset side, and a matching addition of DPM on the liability side. The central bank may, again in theory,

accept treasury bonds directly from the Treasury, and issue DPM to the general account of Treasury. In a deflationary scenario, this might be an effective tool, in coordination with fiscal policies, to achieve the inflation target. In a sense, accepting treasury bonds might be understood as permitting the treasury to act as a DPM distributor, with the treasury bond rate as its funding cost. Treasury may seek to distribute DPM for achieving its public fiscal objectives, which would again require coordination with central bank's public mandates. However, for the sake of central bank independence, there should be strict discipline on the fiscal functions, as argued in (Tucker, Unelected Power 2018).

Conjecture 1: Central bank should set out principle to carve out fiscal functions and strictly restrict public money issuance for fiscal objectives.

Exception to the carve-out principle calls for authorization from legislature and fiscal department and the need for full public disclosure to increase external pressure for transparency and accountability.

Central Bank			Bank			Treasury	
+CB loan 200	+DPM 200 (Bank)		+DPM 200	+CB loan 200			
	-DPM 200 (Bank) +DPM 200 (Treasury)		-DPM 200 +T Bond 200			+DPM 200	+T Bond 200
+T Bond 200	+DPM 200 (Bank)		-T Bond 200 +DPM 200				
-CB loan 200	-DPM 200 (Bank)		-DPM 200	-CB loan 200			
			Reserve 100	Capital 100			

Figure 6 DPM issuance via treasury bond

4 Implication of the DPM scheme to central bank, banks and the public

A concise summary of the DPM scheme is represented by a single illustration in Figure 7. *Firms and households hold DPM, which is a claim on the central bank. Customers are creditors of the central bank; the central bank is the creditor of banks; banks are creditors of customers. The tri-party trust relationship bears a resemblance with Figure 3, with the crucial distinction that customers are holding DPM rather than bank deposits. They are funding central bank, upon which they demand transparency and exert accountability in accordance with the central bank's public mandate. They are not funding the banks, where trust is weaker and more indirect and where public regulation and supervision* are often poorly enforced

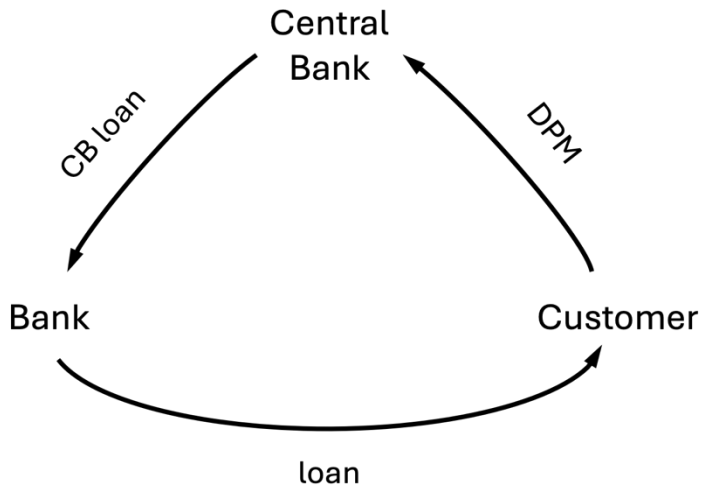


Figure 7 Tri-party relationship in the DPM scheme

In this section, we expand on implications of the DPM scheme to the three types of stakeholders in the public money system: the central bank, banks, and the public. The central bank is more advantageous and preferrable to be the sole money creator, compared to delegating the role to the banks. Banks still play the credit intermediary role, albeit with more freedom for innovation. The public will enjoy a safer financial system, more competitive financing cost, and a public money that renumerates.

4.1 Implications to central bank

By the design of the DPM scheme, central banks should take up the role of maturity transformation and liquidity provision as much as possible, and at the same time shield away from the role of credit allocation.

The central bank balance sheet is more suitable than those of banks for maturity transformation and liquidity provision. As the primary feature of this scheme, maturity transformation takes place on the central bank balance sheet, where termed CB loans are funded by DPM. Unlike the existing banking model where banks carry maturity transformation with inherently unstable funding from demand deposits, in this proposed model, central banks face essentially no liquidity risk. *DPM as a* central bank liability is fiat, as liquid as cash, and therefore run free. With the central bank taking over maturity transformation, banks are almost completely[8] shielded from liquidity risk as long as

[8] An implementation that completely takes away 100% of liquidity risk is suggested by (Grey 2019): banks originate customer loan first and seek funding of CB loan from central bank after each customer loan with matched term. This is in contrast with the sequence of events as in Section 3, where CB loan comes before customer loan origination. In Rohan's implementation, it is clear that central bank is the liquidity provider of first resort, and banks are the credit provider of first resort.

the terms of bank's customer loans are matched with (or shorter than) that of their CB loans.[9] *It can be argued that the DPM scheme is run-free by design.*

It is arguable that there is no maturity transformation for DPM at all, as DPM is a perpetual liability,[10] with an infinite maturity term, and redeemable only to another central bank liability. Not only is the central bank balance sheet free from liquidity risk, it is practically not subject to solvency risk (Bell, et al. 2024), if we limit our discussion in the domain of domestic denomination and exclude foreign denominated liabilities. The central bank carries the responsibility to provide fiat money as the unit of account, as a public good, which allows all economic entities to make contracts and enforce solvency constraints. However, the solvency constraint does not involve the central bank itself, which is the sole exception in the fiat money system. This exception is a special feature of the central bank balance sheet, endowed by its monetary authority. Matching this power, the central bank is held accountable by its public mandates with price stability as the paramount one. The accountability is not only enforceable by the legislature, but also by the threat of an alternative form of "run": if inflation rises out of control, holders of public money may very well "run" to real commodities like rice, to a foreign currency, or to virtual commodities like bitcoin, if possible. As long as the public keeps the trust in the fiat money system, the central bank balance sheet is a better, if not the best, candidate for money issuance.

Central banks provide elasticity and constraint in the lifecycle of public money creation. Regarding elasticity, it is conjectured that any bank with sufficient capital is entitled to liquidity provision from the central bank. Regarding constraint, it is proposed that the central bank should strictly enforce the capital adequacy rule with little room for exception.

Conjecture 2: Central bank should provide universal access to all banks of CB loans and equal treatment of them based on capital adequacy rule.

As long as a bank has sufficient capital according to the capital adequacy rule and prospective customer loans that are profitable given the CB loan rate, the bank will obtain the CB loan and the central bank will comply by issuing the loan in the form of DPM, thus providing elasticity. Money is endogenous in the sense that it is the customers' credit demand that determines how profitable the prospective loans are and how much money is created. Universal access means that the central bank does not ration credit and restrict CB loans to certain groups of banks with adequate capital. Exception of such universal access calls for deliberation by the prudential committee.

A central bank also imposes the constraint when CB loans are due. If a bank's customer loans are performing poorly, not generating enough repayment to cover the CB loans, its capital needs to be written off by the loss. As long as its capital is adequate after the write-off, the bank may still

[9] Banks may nonetheless choose to fund a longer-term customer loan with several shorter-term CB loans or with alternative source of funding. However, it is not advised, as banks are taking on the residual liquidity risk on their own, due to the fact that prospective CB loans or alternative funding will not be 100% guaranteed.
[10] There is alternative view of such perpetual liability is essentially a special kind of social equity to central bank (Kumhof, et al. 2020).

qualify to get new CB loan funding. However, if the stressed bank's capital goes below the capital adequacy rule, no more funding is available from central bank. The bank has to turn around its asset performance, borrow from interbank market or private credit, or raise capital from existing or new shareholders. The lenders/shareholders may have better private information regarding the stressed bank. In contrast, a central bank does not possess detailed information on banks and does not involve in credit allocation, per general principle of segregation. If the bank failed to raise additional funding or capital and the asset loss wipes out all the bank capital, the bank is insolvent and has to declare bankruptcy.

At the occurrence of a bank failure, bank's customers are shielded from the impact, as they hold DPM on the central bank balance sheet. It is the bank's debtors and shareholders that take up the loss on the failed bank's balance sheet, which is the gap between the remaining value of the asset portfolio and outstanding liabilities. If the gap is negative, not only is all the shareholders' capital wiped out, but the central bank, as the leading debtor, also needs to absorb the remaining loss. In this case, the central bank incurs loss from its CB loan in the process of money creation.

To minimize loss absorption, the central bank should strictly enforce capital adequacy rule with equal treatment of all banks and closely monitor bank solvency and allow insolvent bank to fail as early as possible. It is not advisable to provide preferential CB loans beyond the capital adequacy rule to targeted region/industry/entities, as such preferential treatment carries a fiscal mission, which is not part of any central bank mandate. The equal treatment part of Conjecture 2 is in line with Conjecture 1, which sets out the principle to carve out fiscal functions. Exceptions to the equal treatment of the capital adequacy rule need deliberation of the prudential committee and public disclosure, for accountability and transparency. The prudential committee may have tendency to set capital requirement high enough to prevent any bank failure, which may not always reconcile with monetary policy committee's objective. It is up to the central bank to manage the tradeoff between prudential objective of minimal bank failure and the monetary policy objective of sufficient money supply.

4.2 Implications to banks

Banks in the DPM scheme are intermediaries for credit distribution, which is a purely private business with no public responsibility nor public backstop. The DPM design principle necessarily leads to following implications: firstly, all data for credit assessment are entrusted to private custodians with no public access; more importantly, all credit risk exposures are to be managed in the hands of private businesses and covered by private equity holders and private creditors. Private businesses, free from public responsibility of monetary stability, should be encouraged to innovate and compete in privacy protection and credit assessment.

Banks provide DPM account service to customers and are entrusted to act as custodians of customer data. Each identifiable DPM account on the central bank ledger is to be serviced by a

bank, which safeguards customer identity and its mapping with one or more DPM accounts.[12] Privacy protection is part of the service that banks provide, and it is encouraged for banks to compete in offering innovations for better privacy. For example, a bank may provide a shuffling service, assigning a new DPM account to an existing customer to prevent the DPM account being personally identified to the customer by alternative data sources. Customers may also have the choice to migrate the existing account(s) to a new service provider, for better privacy or other better service offerings. Banks are responsible for customer data safekeeping and limiting data access only with explicit consent from the customer (e.g., for credit assessment). The private nature of customer data precludes involvement of public authorities, like the central bank, in credit allocation. A central bank only has access to banks' portfolio level data, which is used for capital adequacy calculation, but not customer level data.

Banks are expected to rely on their own capital to cover credit risk exposure to customer loans. A well-performing bank, either because it possesses valuable data on their profitable customers or because its capability in modelling data for credit assessment, should attract shareholders' investment in its capital, which supports its expansion of asset portfolio in a healthy way. It can be argued that a bank's capital is commensurate with the value of its customer data and its credit assessment capability. On the other hand, as mentioned in the previous section, the impact of a bank stress falls first and foremost on bank's shareholders. The shareholders not only have the more complete and internal information regarding the bank's performance, but they also have aligned incentives to monitor its performance for their equity value. In accordance with the design principle of the DPM scheme, it is strongly recommended for banks to seek equity funding from shareholders. Any restriction in bank's capital expansion is coequal to credit rationing.[13]

Conjecture 3: There should be no restriction of scale on a bank's expansion of capital from existing or new shareholders.

There may very well be an interbank lending market to facilitate banks borrow from private lenders other than the central bank. For example, bank D (debtor bank) may borrow DPM from bank C (creditor bank) if bank D has profitable customer loan opportunities, but has already consumed all of its CB loan quota. Given the capital adequacy rule, the central bank shall refuse to extend a CB loan to bank D, but bank C may very well have some private information regarding the portfolio performance of bank D, which supports bank C's decision of interbank loan extension to bank D.[14] The interest rate premium between bank C's interbank loan rate and the prevailing CB loan rate reflects bank C's private information premium. A bank may also raise funding by issuing financial bonds, with bond prospectus as information disclosure to qualified investors. Under this

[12] Non-identifiable DPM accounts may also be allowable, providing total anonymity just as cash, which will be further discussed in the later section.
[13] Nonetheless, it may be necessary to require that bank's equity investors do not have affiliated interests in bank's customers.
[14] With additional funding from private creditors, it is possible for bank D's capital to fall below the central bank's capital adequacy rule. This departure may be permissible as private creditors have their private information and are allowed to fail as private business. Because of the departure, before bank D's asset performance recovers, bank D should only expect funding from private investors, not funding from the central bank.

circumstance, a bank is funded by 1) capital from shareholders, 2) interbank loans and financial bonds, and 3) CB loans from the central bank. The order of funding sequence is in their capacities to access private information on the bank: the shareholders have access to the most private information regarding the performance of bank, followed by the FIs on the interbank market, and finally the central bank, which is supposed to be a pure liquidity provider.

Conjecture 4: To encourage private provision of credit allocation, there should be no restriction of scale on a bank's funding from the interbank market or bond market, provided that disclosures are truthful and investors are qualified.

There is no funding from customers, which reflects the fact that retail customers normally have very limited information on their banks, and are therefore discouraged from providing funding for banks.

Among all funding sources for banks, the central bank turns out to be the one with the lowest funding cost, as CB loans are supposed to provide liquidity with little or no credit risk exposure. This should make the central bank the liquidity provider of first resort in the DPM scheme. Moreover, as long as the central bank strictly enforces the capital adequacy rule without exception, it effectively disposes of its traditional role as lender of last resort (LOLR) and may therefore declare a principle of "allowed to fail". Letting an insolvent bank fail does not carry contagious effect that spills over to asset valuations of other banks. Bank failures can be treated not as a threat to monetary system stability, but simply a resolution of private business.

As banks in the DPM scheme are no longer funded by customer deposit, the traditional function of deposit insurance can also be discarded. It can be argued that prudential capital requirements on approving CB loans is more effective than deposit insurance in terms of containing public impact of bank failure. Deposit insurance responds to a bank failure *ex post*, by which time the bank is most likely deeply insolvent, with all the capital already wiped out. In comparison, the central bank in the DPM scheme puts in place prudential constraint *ex ante*, in the form of a CB loan quota based on the capital adequacy rule. The ex-ante constraint creates a prudential buffer as prevention to potential bank failure, whereas deposit insurance always acts too late after an actual bank failure, as alleviation to the public impact *ex post*. The prudential constraint of the DPM scheme is also more transparent, as a majority of bank's liabilities (CB loans) and part of a bank's asset (DPM) are on central bank balance sheet, which consequently leads to saving in oversight cost.

The DPM scheme may be brought to comparison with a banking model in which commercial bank money is 100% covered by deposit insurance. The previous exposition has shown that, even with 100% deposit insurance, allowing for money creation by commercial banks is less preferable than the public money scheme that carries prudential buffer. Nonetheless, the comparison inspires a transition mechanism from a bank funded with demand deposits to one funded with CB loans: the central bank offers matching CB loans to the bank, with the same amounts, terms and rates of all current demand deposits; the customers are offered to swap their bank deposits on par with DPM holding, which is more liquid and pays the same rate; if all deposit holders accept the swap, the

bank has transitioned to one funded by 100% CB loans. With the central bank as the liquidity provider, banks enjoy more stable funding and are liberated from liquidity risk due to retail customers' run.

4.3 Implications to the public

Individuals enjoy three distinctive types of rights in money: (1) popular monetary sovereignty, which concerns the right of issuance; (2) property in monetary value, which confers derivative rights to the unfettered use and enjoyment of money's value; and (3) monetary privacy, which protects an individual's right to enjoy privacy from the State in one's lawful financial transactions.[17] The implications of this DPM scheme may be presented according to this framework of rights.

4.3.1 Right of issuance

This public money scheme does not exclude the right of private money issuances. The DPM scheme can be carried out in parallel to the existing banking model with co-existence of other money instruments in the financial market. This feature makes it viable to roll out DPM in controlled scope and in phases, with room for experimentation and evaluation. Central bank can therefore manage banks' transition from deposit funding to CB loan funding, as described in the previous section, in a controlled manner.

An individual or corporation may choose among:

1) bank deposit, with partial public backstop and generally low yield rate;
2) money market fund (MMF), with no public backstop and interbank yield rate;
3) stable coins, with no public backstop, variable yield, little regulatory constraint and lots of programmable features; and
4) DPM, with full public backstop, interbank yield rate, fully regulatory compliant and lots of programmable features.

In comparison with bank deposit and MMF, DPM as a public money instrument is competitive in aspects of liquidity, safety, ubiquitous use, as well as yield. Most current designs of CBDCs do not include remuneration, with the exception of (Bank of Israel 2025). The design choice of non-remuneration may reflect the intention to emulate cash in the form of banknote. Due to the inconvenience of attaching coupons of interest payments, paper currencies rarely offer renumeration, but this physical constraint is no longer applicable with digital money.[19] Not only can the central bank set a renumeration rate for DPM, but it may as well run a zero margin

[17] See (Skinner 2024).
[19] Interest-bearing notes were issued by both the North and the Confederate in the 1860s but did not circulate for long (Burdekin and Weidenmier 2002).

between the average of CB loan rate and the DPM interest rate, which effectively makes the DPM interest rate on par with the interbank yield rate. With DPM's competitiveness, it is not necessary to stipulate monopoly of public money by limiting private issuance of money. The central bank strives to offer a better experience and functionalities of DPM, while private issuers do the same, and all compete openly in the arena of money instruments to the public, which is all the more promising that right of issuance corroborates financial innovation.

DPM offers the infrastructure for innovation and at the same time retains regulatory compliance. *On innovation, practically all programmable features of stable coins can be realized with matching or better efficiency on the platform of DPM. The difference lies in the back end, on whether the ledger validator(s) is centralized or are distributed/permissionless*. In the realm of a fiat currency, implementing distributed ledger adds no trust more than that of public accountability of the central bank, but the substantial cost of efficiency loss from consensus process. In addition, the gap of regulatory requirements of KYC/AML for stable coins, while considered by many applications to be a feature, is a major issue that is bound to be fixed as long as they are partaking in the monetary system. DPM, on the other hand, can readily re-use the setting of all the current regulatory compliance mechanisms that banks already have in place.

4.3.2 Property Right

Holders of DPM have a right to its unfettered use, at least as wide as the use of cash. There should be no restriction regarding the scope of consumption or investment with DPM. Customers can use DPM for payment of goods and services, covering liabilities, or exchange for other assets. There is no ground, in my view, to develop DPM into a special-purpose payment instrument or conditional money that the value may change or expire, which would not only complicate the scheme implementation but, more importantly, distort public perception regarding whether DPM is "a policy instrument or an individual property right" (Skinner 2024). Programmability of DPM, such as conditional payment, are optional choice by the holders of DPM, to be set up by and for the purpose of the owners. This is in contrast with the constraints and conditionalities, if any, built in by the issuer or the distributor of digital money, which potentially becomes a threat to individual property rights. The DPM scheme should make effort to ensure the public that no such constraint nor conditionality exist, with full transparency.

The stability of value of DPM is inherently implied in the central bank mandate for price stability, which covers all forms of money, public and private, that share the singleness of money.

The central bank, on its own, has no authority to stop payment or freeze accounts, but it bears obligation to comply with court orders of freezing or blocking instructions. Such obligation of compliance is consistent and on par with current compliance requirement of retail financial market infrastructures.

4.3.3 Privacy

DPM undoubtedly raises public concern, as much as retail CBDC, that the central bank, or the State, may have access to broader and more detailed information on individuals. Privacy concerns are seriously addressed with an objective that privacy protection is embedded into the design of the DPM scheme. At the current stage, design features that protect privacy include a segregation principle, privacy-preserving services, and DPM in bearer form.

By the segregation principle, the central bank is insulated from personally identifiable information (PII) by design. Banks serve as payment service providers and data custodians that are responsible for customers' identities and other personal data. The central bank keeps the ledger of DPM on which all account identifiers are pseudonymous, with the mapping of DPM account identifier to customer's identity safeguarded by the customer's bank. The introduction of DPM does not change the custodian of PII. Only in exceptional cases, such as under criminal investigation or court order, will banks comply with the legal authority and provide data access. Such compliance requirements on banks in the DPM scheme are consistent and on par with existing obligations of banks. Similarly, the obligation to report to tax authorities (e.g., submitting forms 1099K of the US), also stays with banks, with no involvement of the central bank. If necessary, even the ledger keeping service of DPM can be segregated from the central bank and designated to an independent agency whose sole responsibility is maintaining the DPM ledger with security. The DPM scheme is completely agnostic as to which party keeps the ledger and to ledger technology implementation (centralized/distributed).

It is recognized that metadata of payments activities (e.g. payment pattern or timing coincidence) can potentially reveal PII. The exposure through metadata may be mitigated by privacy-preserving services that banks compete to excel in as a way of winning privacy-sensitive customers. For instance, a bank may provide shuffling service, assigning a new DPM account identifier to an existing customer's account periodically or by request. A bank may also provide migration services, allowing a customer to port its existing account from the original service provider to the new bank. In defense against metadata risks, a third-party service provider may provide a coin mixer or tumbler as a privacy-preserving service, which pools DPM from difference sources, distributes at random times and obscures the trail of originators. Moreover, the central bank may consider allowing service providers to offer non-identifiable DPM accounts with transaction limits (e.g. with caps on balance or on payment value under certain threshold). Customers of such non-identifiable DPM accounts need not verify their identities and can remain completely anonymous all the time, under the restriction of small-value transactions and limited functions. This practice follows a tiered KYC approach (Liang, Johnson Mary and Adekola 2025) and will provide pathways for marginalized groups as well as non-resident aliens.

The ultimate line of defense for privacy is by introducing DPM in bearer form, which dispenses with the need of ledger or accounts altogether and works just like cash in paper form. A formal model for money presents an implementation of e-cash, aggregating receipt token technology, that enables peer-to-peer payment in distributed and scalable manner with complete privacy of payers (de Jong 2024). The DPM scheme described in this paper is compatible with all DPM issued in

bearer form, or with all DPM on a ledger (centralized/distributed), or with combination of both forms, some in bearer and some on ledger, which makes it technology agnostic.

With ongoing research, privacy protection elements for DPM will be featured in future research notes. The tradeoff between privacy protection and threat of money laundering needs to be debated and determined as a public policy issue.

5 Key issues for discussion

Many key issues remain open, besides the privacy tradeoff mentioned in the previous section. There are possibly multiple approaches depending on varied perspective and objective. Each of these issues warrants a series of future research notes.

1. How shall central bank calculate a CB loan quota based on a capital adequacy rule?
2. Shall bank license in the DPM scheme be granted to a wider scope of FIs?
3. How is the DPM scheme compared with the Chicago plan (100% money)?
4. Is it viable for DPM to support cross-border use and currency internationalization?

5.1 CB loan quota based on capital adequacy rule

A CB loan quota is consequential to an entity's survival constraint. If a bank's CB loan quota were unbounded or could be relaxed constantly, the bank could always borrow more DPM to meet its current liabilities, which meant the bank would never fail. As discussed in Section 4.1, the central bank should strictly enforce a capital adequacy rule with equal treatment of all banks.

The calculation of a CB loan quota takes the following two factors as inputs: the current asset portfolio and the current level of bank capital. The capital adequacy rule begins with a calculation of the risk-based capital requirements for the current asset portfolio and compares the required risk capital with the current level of bank capital. If the former has exceeded the later, the available CB loan quota is zero and the constraint is binding; if the current level of bank capital is sufficient to cover the required risk capital, the amount of the CB loan quota can be extrapolated from the current asset portfolio, with the assumption that the available CB loan quota will turn into assets with a similar risk profile.

The CB loan quota calculation involves only bank's portfolio disclosure and needs no access to customer data, which conforms with the segregation principle for privacy protection. The non-access to customer data also relieves the central bank from being responsible for retail credit risk.

To apply the methodology of Basel III's treatment of risk weighted assets (RWA) as a benchmark, the calculation of the capital adequacy rule for the CB loan quota should resort to the standardized approach (SA) and forgo the internal ratings-based (IRB) approach, as IRB carries inherent conflict of interest with the survival constraint.

According to the standardized approach for credit risk CRE20.68 (BCBS 2025):

> *The risk weights that apply to exposures in the retail asset class are as follows:*
> *(1) Regulatory retail exposures that do not arise from exposures to transactors will be risk weighted at 75%.*
> *(2) Regulatory retail exposures that arise from exposures to transactors will be risk weighted at 45%.*
> *(3) Other retail exposures will be risk weighted at 100%.*
> *"Transactors" are obligors in relation to facilities such as credit cards and charge cards where the balance has been repaid in full at each scheduled repayment date for the previous 12 months.*

The 45/75/100 rule may serve as starting point for a stylized capital adequacy rule of the CB loan quota. Basel III proposes minimum total capital ratio of 8% (total capital/RWA) along with additional capital buffer requirements and leverage and liquidity requirements. Mandatory capital requirements of 20-30% for banks may mitigate moral hazard (Admati and Hellwig 2024). In the context of CB loans to banks with no need for collateral, the more significance the value of customer data carries in banks' credit assessment, the higher a capital adequacy requirement. As long as the central bank has no access to private customer data, it will require a high capital buffer commensurate to the information asymmetry. This again brings back Conjecture 3, which suggests that there should be no restriction on a bank's expansion of capital from existing or new shareholders.

Throughout this paper, it has been assumed, in a highly stylized manner, that CB loans are uncollateralized lending to banks, and that banks only hold customer loans in their asset portfolios. In future research, it would be interesting to extend the discussion to allowing banks to hold diverse assets (e.g., bond/CP/MBS/ABS/equity/crypto) as part of their portfolios. Furthermore, if the central bank is to consider collateralized lending to banks in the form of DPM, which types of assets would the central bank accept as eligible collateral? Again, existing collateral frameworks for central bank lending facilities serve as a good benchmark for DPM collateralized lending as well. For instance, the Bank of England's Level C Collateral Securities include bond/CP/MBS/ABS along with disclosure of haircuts (Bank of England 2025). The implication of collateralized lending of DPM is that the central bank acts as a liquidity provider not only to bank loan lending, but also to capital market lending. In addition, it has the potential to induce some of the shadow banks that used to rely on money market funding for capital market lending into ones that count on central bank funding, with appropriate capital buffers and haircuts.

Since DPM is expected to co-exist with private monetary instruments (Section 4.3.1), setting a conservative capital adequacy rule or liquidity provision scope will not pose any problem, as the remaining demands are to be covered by private market providers.

5.2 Scope of bank license in the DPM scheme

It is helpful to differentiate between a bank, which provides full service as DPM distributor, and a payment service provider (PSP), which provides limited service only for DPM payment. Both banks and PSPs provide account service, payment service for DPM, and custodian service of customer data. However, only banks have access to CB loan funding, while PSPs have no access to CB loans and do not provide lending service. Are PSPs allowed to extend customer loans, even without CB loan funding? Although it is indeed feasible for a PSP to raise private market funding by bond, securitization, and syndicated loans, as showcased by Ant Financial, to avoid ambiguity in definition, a PSP is distinguished from a bank by not having access to CB loan and not offering customer loans.[21]

Conjecture 5: In the DPM scheme, bank license should be substantially more open and accessible than in the existing banking model.

Opponents to more accessible bank licenses have foremost concern in financial stability. This used to be the case in the existing banking model, but the DPM scheme very much relieves the threat to financial stability. In the existing banking model, a bank failure endangers trust on banks with similar background, which leads to withdrawals and liquidity squeeze, causing threat to banking system stability. Furthermore, a failed bank not only stops its customers from making payment, but also the counterparties of the customers and with ripple effects onward, causing threat to payment system stability. The DPM scheme dissipates these threats by design. With the central bank as liquidity provider in the DPM scheme, a bank failure will not cause a liquidity squeeze, and all customers' holdings of DPM are intact and ready for payment, as presented in Section 4.1. The impact of a bank failure is confined to lenders and equity holders of the bank, which is no cause for systemic risk.

A central bank may allow more accessible bank licenses in the DPM scheme to encourage financial inclusion and financial innovation without compromising financial stability. Some PSPs may be among the first batch of candidates for bank licenses, who are in possession of high-quality customer data for credit assessment. PSPs are in a natural position to build a repository of customer data regarding consumption behavior, and recent trends of making payments on mobile devices has greatly enhanced the dimension and scope of customer data. Moreover, PSPs also manage the whole process of collection and compilation of raw customer data in proprietary ways, which, in combination with their proprietary risk algorithm, gives them an exclusive advantage in assessing credit value of customer data. Before PSPs officially become banks, they need to build up adequate capital to cover credit risk as much as any bank does. Access to CB

[21] In the years prior to 2020 "rectification", Ant Financial, holding licenses of PSP, small loans, and online-only bank, resorted to funding from most noticeably ABS and syndicated loans, due to credit rationing that strongly constrains the scope and scale of privately-owned banks in China. *"As of June 30, 2020, total consumer credit balance enabled through our platform was RMB1,732 billion, 98% of which was underwritten by our partner financial institutions or securitized"*, as disclosed in the Prospectus (Ant Group 2020). *"Ant Financial's gross issuance of exchange-traded asset-backed securities (ABS) accounted for almost one third of the total securitisation in China in 2017"*, as documented in (BIS 2019) and (Chui 2021). A whole book could be written on this topic.

loan funding is arguably a more stable and possibly cheaper funding source than wholesale funding or securitization. Along with more accessible bank licenses, central bank should also strive to set out standards to enforce customers' right to data portability and encourage competition among novel banks. As custodian of customer data, PSPs and banks may be requested by customers to export its data to other custodians for purposes such as credit assessment. However, the lack of standardized structure of vast and varied dimensions of customer data makes it a huge challenge to effectively re-utilize the customer data by any entity other than the original custodian.

After PSPs are under consideration for bank licenses in the DPM scheme, more candidates emerge as well. Rather than full-blown analysis, I wish to briefly comment on some interesting questions as appetizer for future research.

Shall social media platforms, e-commerce platforms, or any platform with data advantage be considered candidates for bank licenses? In line with reasoning for PSP eligibility, it is fitting that these platforms are also eligible for bank licenses as long as they fulfil capital and other regulatory requirements. This line of reasoning may take one step further and imply that these platforms offer lending services without having to offer payment service, as they have gathered customer data from sources other than payment. In other words, they effectively provide limited service for DPM distribution only. Furthermore, it may be inferred that any entity can participate in DPM distribution, as long as it can establish information advantage for credit and set aside commensurate capital to cover the credit risk. All the above are derived from the feature that DPM distributors are allowed to fail without externalities.

Shall a treasury affiliate to a conglomerate group be eligible for a bank license? In particular, it may be assumed for simplicity that treasury affiliates provide lending services only to subsidiaries of the conglomerate and serve no external client. Although a treasury affiliate does possess internal information on other subsidiaries, I suppose it is not a suitable candidate for a bank license, due to the reason that a treasury affiliate is under influence or control of the conglomerate and cannot make independent decision. Otherwise, a conglomerate may set up an affiliated bank that keeps an infinite game of borrowing from CB loans, lending to the conglomerate, using the fund for capital injection of the bank, and enabling more borrowing from CB loans, which can circulate indefinitely without constraint. By this reasoning, it may be necessary to require that all banks shall not serve clients that have any affiliation of interest with bank's shareholders. Only by ensuring independence of bank's shareholders from bank's client can a bank make responsible lending decisions with its own capital for exposure coverage.

Shall stable coin issuer be allowed to participate in the DPM scheme? I don't see any ground for them to get bank license, as they are not in the business of credit allocation. However, it would be interesting to consider allowing stable coin issuers to be holders of DPM, which serve as a backing asset for the coins that they issue. Compared with treasury bills, DPM is more liquid, as secure, and renumerates at interbank rate. In effect, stable coin issuers are agents for their customers who are either not eligible, or not willing, to be direct holders of DPM. However, stable coin issuers shall also be responsible for KYC/AML obligations arising from their customers'

payments. Otherwise, it is straightforward to foresee compliance arbitrage via stable coin issuers that are exempt from some of their obligations.

5.3 Comparison with the Chicago plan

The Chicago plan and its later variations (Awrey 2022) are characterized by stipulating demand deposit be backed 100% by central bank money, which takes the name “100% money” (Fisher 1936). Money creation takes place both on the central bank balance sheet (for creation of bank reserves) and on commercial banks’ balance sheets (for creation of demand deposits). As my first critique and first impression of the Plan, it seems unnecessarily duplicative to create one unit of money twice on two balance sheets. Central bank reserves can be created in at least 2 ways: 1) government extends treasury credit to the banks, and 2) government purchases goods and services from households and firms with payments in reserves and reserve-backed deposits.

In the Chicago plan, money creation still involves commercial banks’ balance sheets, and bank customers need to hold and trust demand deposits, which are private liabilities of banks. This arrangement retains banks’ current business setup, account relationship and demand deposits. However, it also retains reliance and uncertainty associated with commercial banks’ balance sheets. At the occurrence of bank failure, the Chicago plan will need special treatment in bankruptcy resolution to ensure the failed bank’s holding of reserves are ringfenced to pay off demand deposits. As long as the backing reserves sit on the asset side of commercial banks’ balance sheets, it requires constant monitoring in good days to ensure 100% matching, and there is uncertainty for its 100% control on a bad day. In comparison, the DPM scheme relieves commercial banks from money creation, and leaves credit allocation on commercial banks’ balance sheets.

My final critique of the Plan regards the necessity of excluding all money-like instruments without full backing of central bank money. It surely creates great burden on banking supervision and resistance from financial institutions. Such restrictions also clash with popular monetary sovereign that argues for the right of issuance in Section 4.3.1. In comparison, the DPM scheme is expected to co-exist with all money instruments in the financial market, as infrastructure for innovation rather than monopoly of issuance.

5.4 DPM in cross-border use and currency internationalization

Although the DPM scheme started out to sort out money creation domestically, it becomes essential to consider its international usage as part of its integral role.

Initially, licensed domestic banks can open DPM accounts and provide payment service to foreign clients, which extends to foreign FIs that subscribe to the domestic bank as their correspondent bank for DPM services. Domestic banks provide liquidity in both DPM and demand deposit models, swapping the two on par for their customers. As a next step, domestic banks can also

extend customer loans to foreign clients, with funding of DPM from CB loans. Overseas branches of domestic banks are expected to play important roles in supplying DPM liquidity internationally. As a general-purpose money instrument, DPM can naturally be used for settlement in all international trades invoiced in its currency as well as in payment segments of all financial transactions. Some countries may even choose to hold DPM as part of their official reserves. Finally, international financial institutions, such as the World Bank and regional development banks, are able to use DPM in their financial operations.

The central bank may as well establish currency swaps in the form of DPM with foreign central banks, with which the foreign central banks act as official DPM distributors in their home countries. The currency swaps may be regarded as CB loans to foreign central banks with foreign currency as collateral. These foreign central banks will subsequently provide DPM liquidity in offshore markets by lending them to banks and for money market operations. As in the domestic market, DPM is expected to co-exist, compliment and compete with Eurodollars, which also provide funding liquidity in offshore markets.

On the wholesale level, foreign FIs may treat DPM not so different from central bank reserves. The distinctive feature of DPM most likely impacts foreign customers on the retail level, who are holding public money rather than liabilities of offshore bank. It is promising that DPM will improve efficiency of cross-border payment by short-circuiting the correspondent relationship path, as all DPM payment are executed on a central bank ledger once and for all rather than on several ledgers of correspondent banks in succession. Remaining challenges in cross-border payments reside mostly in the information flow, of KYC/AML information exchange and in designating compliance responsibilities.

6 Concluding remarks

Writing in 1985, economist and Nobel Laureate James Tobin observed (Tobin 1985):

> *The basic dilemma is this: Our monetary and banking institutions have evolved in a way that entangles competition among financial intermediary firms with the provision of transactions media. The entanglement is the source of risks of default and breakdown. Protection against those risks has brought the government interventions now seen to have inefficient by-products: bureaucratic surveillance, deposit insurance, lender-of-last-resort guarantees by central banks. There is no possible complete resolution of this dilemma, but we may hope to limit its scope.*

There is hope on the horizon, to make public money great again.

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