

The Role of Public Money in the Digital Age

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Acknowledgements

This paper was prepared while Alejandro García worked at the Bank of Canada; he now works at the Office of the Superintendent of Financial Institutions.

We are grateful for the insightful and constructive comments from Narayan Bulusu, Paul Chilcott, Darrell Duffie, Chris Henry, Janet Hua, Kim P. Huynh, Charles M. Kahn, Jim MacGee, Katherine Macklem, Darcey McVanel, Bena Lands, Jiaqi Li, Martin Robichaud, Rob Townsend, Warren Weber, Steve Wild and Steve Williamson as well as comments received from members of the Bank of Canada's CBDC Econ Working Group.

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Abstract

A well-functioning monetary system is characterized by public and private forms of money that exchange at par as value flows freely between them. This is essential for efficient transacting and contracting in a market economy. **A relevant retail public money—whether in the form of cash, a central bank digital currency or both—is a necessary component of such a monetary system.** Some of the other necessary components include financial regulation, deposit insurance, **a monetary policy framework and lender of last resort facilities.** A monetary system without retail public money would be prone to fragmentation, where different types of private money do not trade at par, and to market failures arising from the network effects of payment platforms.

Bank topics: Central bank research, Digital currencies and fintech, Payment clearing and settlement systems

JEL codes: E42, E50, E58

Résumé

Un système monétaire qui fonctionne bien est caractérisé par des formes de monnaie publique et de monnaies privées qui s'échangent à parité, la valeur pouvant circuler librement entre ces formes de monnaie. Cette parité est essentielle pour faire des transactions et négocier des contrats de manière efficiente dans une économie de marché. Une monnaie publique de détail adéquate – qu'il s'agisse d'argent comptant ou de monnaie numérique de banque centrale, ou des deux – est un élément fondamental d'un système monétaire efficace, tout comme la réglementation financière, l'assurance-dépôts, un cadre de politique monétaire et les mécanismes de prêt de dernier ressort, notamment. En l'absence d'une monnaie publique de détail, un système monétaire serait sujet à la fragmentation – c'est-à-dire il n'y aurait pas de parité de change entre les diverses monnaies privées dans ce système – et à des défaillances du marché provenant des effets de réseau des plateformes de paiement.

Sujets : Recherches menées par les banques centrales; Monnaies numériques et technologies financières; Systèmes de compensation et de règlement de paiements

Codes JEL : E42, E50, E58

Executive summary

A market economy relies on a well-functioning monetary system for conducting transactions and establishing contracts efficiently. In a well-functioning monetary system of a modern state, the state has monetary and regulatory sovereignty—the capacity to define the official unit of account and to enact policies to regulate the creation of money in its jurisdiction. A well-functioning monetary system displays uniformity of public and regulated forms of private money; that is, public and private money coexist and complement each other while trading at par, allowing money to move back and forth safely and efficiently.

This paper argues that there is now and will continue to be a fundamental need for a relevant retail public money (to be described below) as part of a well-functioning monetary system. **Such a retail public money—whether in the form of cash, a Central Bank Digital Currency (CBDC) or both—is just one pillar supporting the monetary system.** Retail public money complements other policy initiatives, such as updates to regulatory frameworks, that may be needed as part of the government response to future developments in payment markets and the financial sector.

Today, the Canadian monetary system functions relatively well, characterized by:

- the Canadian dollar as the unit of account
- limited use of alternative units of account
- efficient settlement of payments
- exchange of different forms of money at par (cash and bank deposits)
- a relatively stable rate of inflation

This paper, however, takes a long-term outlook, potentially measured in decades. Over that horizon, three interrelated and overlapping trends pose risks to the monetary system. First, the overall digitalization of the economy and financial system is increasing demand for digital payments. Second, due to the first trend and other conditions, **use of cash has been declining at the point of sale for many years.** The third trend is the emergence and proliferation of private cryptocurrencies and digital assets, including foreign CBDCs. These trends pose risks to the monetary system through three mechanisms:

- increased potential that fragmentation of the monetary system could create inefficiencies
- increased ability of issuers of private forms of money to exert market power
- increased difficulty implementing timely and adequate regulation due to the rapid pace of change

These risks could lead to a loss of the uniformity of money, adoption of alternative units of account and exclusion of some segments of the population. When different forms of money (including alternative units of account) compete in a jurisdiction, users need to monitor both risks and exchange rates, and the resulting frictions provide scope for the issuers of these alternative forms of money to exert market power. Ultimately, these frictions and abuse of market power reduce the efficiency of the economy.

Retail public money has two key features. Due to its non-profit motive, **it can be designed to be universally accessible and non-exclusionary.** These features, together with the other regulatory elements of the monetary system, allow public money (including its wholesale form) to *interlink* the different forms of

private money defined in the official unit of account, making them convertible and uniform. Since no private issuer has the same incentives as the public sector, a monetary system without retail public money complementing the regulatory frameworks would be prone to fragmentation and market failures arising from the network effects of payment platforms.

To perform its interlinking function, retail public money needs to be economically relevant in addition to being universally accessible; that is, it must be a viable payment option and a practical mechanism to transfer between private forms of money. **This requires merchants and customers to adopt the retail public money in sufficient amounts so it can be used if needed.** It does not necessarily imply high *use* of the retail public money. Cash today is an example: it is widely adopted but used in only about a fifth of in-person transactions. Historically, cash has served as a viable mechanism for transferring value between issuers of private money (avoiding fragmentation) and has provided an outside option for payments at the point of sale (providing a check on market power).

Cash is likely to decline in relevance going forward and should it ever decline to the point that it is no longer viable as a payment option, **then a properly designed CBDC would help fill the gap and maintain the relevance of a retail public money in the economy. A CBDC would fulfill the role of cash as the economy and money become increasingly digital. This would maintain the current role of retail central bank money in the economy.** Such a CBDC would be offered alongside other complementary regulatory and policy responses to evolving conditions in payment markets.

Synthèse

Une économie de marché a besoin d'un système monétaire efficace pour qu'on puisse y mener des opérations et y nouer des contrats de manière efficiente. Dans un tel système monétaire, l'État moderne a les leviers de la souveraineté monétaire et réglementaire, soit la capacité de définir une unité de compte officielle sur son territoire et de mettre en place les mesures qui lui permettront d'y encadrer la création de monnaie. Dans un système monétaire efficace, les monnaies privées réglementées et la monnaie publique présentent une uniformité : ces deux formes de monnaie coexistent et sont complémentaires. Elles sont également à parité tant et si bien qu'une circulation fluide se fait en toute sûreté de part et d'autre.

Cette étude montre qu'une monnaie publique de détail pertinente est, et restera, un élément indispensable d'un système monétaire efficace. Une telle monnaie publique — qu'il s'agisse d'argent comptant, de monnaie numérique de banque centrale (MNBC), ou des deux — n'est qu'un des piliers sur lequel repose le système monétaire. La monnaie publique de détail complète d'autres initiatives des pouvoirs publics, comme la mise à jour des cadres réglementaires, qui pourraient être nécessaires dans le contexte d'actions gouvernementales déployées pour réagir aux évolutions futures des marchés des paiements et du secteur financier.

Le système monétaire canadien fonctionne aujourd'hui relativement bien. Il est caractérisé par :

- une unité de compte (le dollar canadien)
- l'usage limité d'autres unités de compte

- le règlement efficient des paiements
- la parité de change des différentes formes de monnaie (argent comptant et dépôts bancaires)
- un taux d'inflation assez stable

L'étude adopte une vision à long terme, un horizon éventuellement de plusieurs décennies. Au cours de cette période, trois tendances entremêlées sont porteuses de risques pour le système monétaire. Premièrement, la numérisation générale de l'économie et du système financier nourrit la demande de moyens de paiement numériques. Deuxièmement, sous l'effet de cette tendance et d'autres conditions, l'usage de l'argent comptant est depuis longtemps en baisse dans les commerces. Enfin, la troisième tendance est l'émergence et la prolifération des cryptomonnaies privées et des actifs numériques, dont font partie les MNBC étrangères. Ces tendances sont porteuses de risques pour le système monétaire à travers trois mécanismes :

- le risque accru que la fragmentation du système monétaire puisse créer des inefficiences
- la capacité accrue des émetteurs de formes de monnaie privée de disposer d'un pouvoir de marché
- une difficulté accrue à mettre en place une réglementation adéquate dans un bref délai compte tenu de la rapidité des changements

Ces risques pourraient engendrer une perte d'uniformité de la monnaie, l'adoption d'unités de compte concurrentes et l'exclusion de certains segments de la population. Lorsque plusieurs formes de monnaie (et différentes unités de compte) sont en concurrence sur un même territoire, les utilisateurs doivent alors surveiller à la fois les risques et les taux de change. Les frictions causées offrent aux émetteurs de formes alternatives de monnaie l'occasion d'exercer leur pouvoir de marché. Ces frictions et l'abus par des acteurs de leur position dominante érodent l'efficacité de l'économie.

La monnaie publique de détail a deux grandes caractéristiques. Puisqu'elle est sans but lucratif, elle peut être universelle dans son accès et avoir un usage non exclusif. Ces caractéristiques et d'autres aspects réglementaires du système monétaire permettent à la monnaie publique (y compris celle utilisée pour les transactions de grande valeur, soit les soldes de règlement) de relier entre elles les différentes formes de monnaie privée dont la valeur est exprimée dans l'unité de compte officielle, et de les rendre ainsi convertibles et uniformes. Comme aucun des émetteurs privés n'a les mêmes motivations que les pouvoirs publics, en l'absence d'une monnaie publique de détail qui complète le cadre réglementaire, un système monétaire serait sujet à la fragmentation et à des défaillances du marché provenant des effets de réseau des plateformes de paiement.

Pour permettre de relier entre elles les différentes formes de monnaie privée, la monnaie publique de détail doit être pertinente sur le plan économique tout en étant d'accès universel : elle doit par conséquent être un moyen de paiement viable et un instrument de transfert commode entre les formes privées de monnaie. Son adoption en quantités suffisantes par les commerçants et les consommateurs est donc nécessaire pour répondre aux besoins le cas échéant. La monnaie publique de détail n'a pas forcément besoin d'être largement *utilisée*. Par exemple, l'argent comptant est largement adopté, mais n'est utilisé que dans environ 20 % des transactions directes en personne. Historiquement, l'argent comptant a été un moyen de transfert viable de la valeur entre les émetteurs de monnaie privée (pour éviter la fragmentation) et un moyen de paiement indépendant aux points de vente (pour restreindre le pouvoir de marché).

L'argent comptant est susceptible de perdre en importance à l'avenir. Et si son utilisation devait diminuer au point d'en faire un mode de paiement qui ne soit plus viable, alors une MNBC bien conçue pourrait prendre le relais et aider à préserver la pertinence économique d'une monnaie publique de détail. Une telle MNBC tiendrait le rôle de l'argent comptant dans un contexte où l'économie et la monnaie sont en voie de numérisation. Elle serait offerte parallèlement aux mesures réglementaires et autres actions des pouvoirs publics en réponse aux conditions changeantes des marchés des paiements. La monnaie de banque centrale conserverait ainsi son rôle actuel dans les transactions de détail.

1. Introduction

Monetary systems around the world are at risk of being disrupted by the digitalization of money as new technologies and participants enter the process of money creation. **New technologies such as blockchain can underpin networks where digital representations of value can be transferred securely and easily. These networks are easy to set up, as demonstrated by the proliferation of cryptocurrencies, stablecoins and other forms of digital assets.** It is still unclear how successful these alternative monies could become, but interest in them has not waned even after several dramatic waves of market capitalization, pointing to an unmet demand. At the same time, non-financial firms are considering entering the market for payments and other forms of financial intermediation.¹

The digitalization of money raises this central policy question: What should be the public policy response to the oncoming structural changes in the architecture of the monetary system?² In this paper, we ask a narrower question: What is the role of retail public money?³ **Our answer is that, once the extent of digitalization crosses a certain threshold, retail public money in digital form, henceforth a CBDC, would be essential for maintaining a well-functioning monetary system, particularly if the use of cash for transactional purposes declines to the point that it can no longer be considered a widely available payment method. An economically relevant CBDC should be part of the overall policy response.**⁴

Regulatory action (e.g., regulating banking fees, compelling banks to offer free accounts, actions to improve financial sector competition, extending deposit insurance) is sometimes proposed as an appropriate response to the trends outlined above. We are not suggesting that a CBDC is a substitute for regulatory responses or, alternatively, that regulatory responses alone would suffice to confront the risks to the monetary system. **Rather, we suggest that a CBDC and regulatory responses should work in tandem to safeguard the monetary and regulatory sovereignty of Canada.**

¹ Non-financial firms offer payments using existing financial infrastructure, although this may not be apparent to users.

² Multiple groups in government are tackling this broad question by examining the regulation of digital assets, the use of data in the digital economy and open banking. Some of this work was examined under the digitalization of money initiative announced in the 2022 federal budget.

³ Different aspects of this question have also been discussed in Engert, Fung and Hendry (2018); Armelius, Claussen, and Hendry (2020); Cunliffe (2021, 2023); Brunnermeier and Landau (2022); and Panetta (2022).

⁴ An economically relevant retail public money is one that merchants and customers have adopted in sufficient amounts so that it is a viable payment option and a practical mechanism to transfer value between private forms of money.

The Canadian monetary system is the set of institutional arrangements regulating the creation and use of different forms of money, as is the case in most advanced economies. Today, these arrangements include:

- the legal monopoly of the central bank to issue bank notes
- the regulatory framework for the creation of money by financial institutions
- wholesale and retail payment systems that are operated or regulated by the public sector

In a well-functioning monetary system, the state has monetary and regulatory sovereignty: these represent the capacity to define the official unit of account and to enact effective policies to regulate the creation and use of money in its jurisdiction, respectively.⁵ Today, the monetary system in Canada functions well, making market transactions and contracting more efficient. It provides uniformity, where regulated forms of money trade at par in Canadian dollars, the legislatively defined common unit of account. Furthermore, the system allows the Bank of Canada to support the use of the official unit of account and conduct monetary policy. In a well-functioning system, private firms intending to issue private money should have sufficient incentives to:

- seek to be regulated and comply with existing regulations
- denominate their liabilities in the common unit of account
- seek a high degree of interoperability with other forms of money in the economy⁶

The digitalization of money poses risks to the monetary system. With digital technology, new assets are easier than ever to create and distribute (Brunnermeier and Landau 2022). The explosion in the number of cryptocurrencies and stablecoins, and the numerous experiments being conducted by established financial institutions using distributed ledger technologies, exemplifies this fact. At the same time, big technology companies based on digital platform models are considering entering the payment services business in various ways, often using existing payment methods but sometimes launching payment instruments of their own. The relative importance of cash in the economy is diminishing, driven by demand and supply factors. Consumers seek the convenience of digital payments, and merchants increasingly favour digital payments, either because they are online only or because they are brick and mortar businesses that find processing cash too expensive (Chen et al. 2021; Henry et al. 2022).

The risks to the monetary system from these trends are twofold. First, with a more rapid and diverse process of creating monetary instruments, the monetary system is at a higher risk of becoming fragmented. Various forms of money used for diverse purposes could be priced to reflect their inherent risks or benefits. Second, in an increasingly digital economy without a public form of digital money acting as an outside option for consumers—a role cash plays today—issuers of private forms of digital money would increasingly be able to exercise market power to differentiate their liabilities from one another and *in extremis* from the unit of account. Ultimately, this reduces the efficiency of the economy because users need to monitor both risks and exchange rates when different forms of money (including alternative units of account) compete in a

⁵ In accordance with the *Currency Act*, the Canadian dollar is the official currency or unit of account. This does not preclude the possibility of transactions occurring using other fiat currencies provided the parties involved agree.

⁶ Different types and degrees of interoperability can exist. In general, this refers to the characteristics and degree of the connections supporting exchange between separate monies or systems.

jurisdiction, and the resulting friction strengthens the market power of the issuers of these alternative forms of money. In both cases, the monetary system would be at risk of losing its uniformity and the efficiency that it provides.

The monetary system adapted well to previous waves of financial innovation in money and payments, for example, to daily interest accounts, cheques and card-based electronic payments at the point of sale. During those waves, the wide availability and use of cash, in tandem with the requirement for ultimate settlement in central bank money, maintained the uniformity of money. The monetary system, however, may not adapt as well to a future where cash is less widely used. The increased diversity of forms of money and the strong complementarities between customer data and financial transactions inherent in the business models of digital platforms are market forces that were not at work during previous waves of innovation. The key to our argument is that, in the past, customers exercised a disciplining effect on the issuers of private money through demand for cash, providing issuers with the incentive to stay within the regulatory perimeter and interoperate with other regulated forms of money. In the future, if cash use and demand decline, a redesigned retail public money such as a CBDC could take over as a disciplining device for private sector issuers.

A natural question is whether updates to the regulatory components of the monetary system alone would suffice to manage the risks of the trends outlined above. It is possible that such updates could manage most of the risks but would unlikely be able to fully compensate for them in a timely and efficient manner. The two pillars of the monetary system—good regulation and a relevant retail public money—are complementary and work together to support the system. We believe it would be challenging for regulation alone to support a well-functioning monetary system because regulation evolves in a stepwise manner and does not anticipate future trends.

A relevant retail public money provides an ever-present check on the private sector into (and out of) which people can move their money as desired. **Therefore, to maintain a well-functioning monetary system during the transition to a more digital economy, the safer policy response seems to be to complement regulatory changes with the issuance of a digital equivalent to cash—a CBDC.** In a future without a digital form of retail public money providing the disciplining channel for customers, the capacity of the regulatory framework to adapt would be weakened because all retail money in the economy would be privately issued. Private issuers would then be in a stronger position to shape the regulatory framework to their advantage.

This paper proceeds as follows. Section 2 describes the components of the monetary system in Canada and explains how they interact to provide the benefits of uniformity. Section 3 emphasizes why cash is an essential part of the current monetary architecture. Section 4 describes the trends in payments and technology that are transforming the process of the creation of money and the usage habits of different forms of money. Section 5 explains the mechanism by which these trends pose a risk to the monetary system. Section 6 explains the policy options. Section 7 concludes.

2. The current monetary system in Canada

We define a modern monetary system as the set of institutional arrangements that govern the creation and soundness of different forms of money in a domestic economy. These arrangements work together to produce an environment of monetary and financial stability. In Canada today, these arrangements include:

- the legal monopoly of the central bank to issue paper-based money, as described in the *Constitution Act*⁷
- the requirement in the *Bank of Canada Act* to “make adequate arrangements for the issue of its notes in Canada and the supply of those notes as required for circulation in Canada”
- federal and provincial frameworks for the regulation of financial institutions
- federal and provincial deposit insurance schemes
- the *Canadian Payments Act* and the *Payments Clearing Settlement Act* establishing a framework for the creation and oversight of Lynx, the wholesale payments system, as well as the requirement of certain financial institutions to be members of Payments Canada, the operator of Lynx
- the monetary policy implementation framework
- the Bank of Canada’s role as lender of last resort

As in many other advanced economies, in Canada these arrangements have emerged and evolved over decades (in some cases, over more than a century) of policy iteration.⁸ **Box 1** provides a historical perspective. It is generally agreed that the current monetary system in Canada has been appropriate and fit for purpose (Bank of Canada 2020). In Canada, the vast majority of market transactions are quoted and settled in Canadian dollars using privately issued money, mostly commercial bank deposits, that trade at par with each other. Banks are considered safe by the public; past failures, being rare events, have not endangered the value of deposits.⁹

Box 1: The evolution of the Canadian monetary system

A series of papers about the history of public and private bank notes issued in Canada (Fung, Hendry and Weber 2017), the United States (Weber 2014, 2015a, 2015b) and Sweden (Fung, Hendry and Weber 2018) demonstrate the many iterations and refinements that were required in banking, payment and bank note regimes to achieve monetary systems that were efficient and stable and promoted the uniformity of money in its different forms. Each country followed a different path but was eventually able to achieve uniformity and a well-functioning monetary system. In each case, a retail central bank money proved to be key to the overall monetary system along with banking regulation and a wholesale payments system.

⁷ The *Constitution Act, 1867* states that the “exclusive Legislative Authority of the Parliament of Canada extends to all matters ... including, ... Currency and Coinage; ... Banking, Incorporation of Banks, and the Issue of Paper Money; ... Legal Tender.”

⁸ We could have included several other acts and regulations in our definition of the monetary system of Canada: for example, the resolution and bail-in regimes to safely windup failed institutions, the *Retail Payment Activities Act* and the *Financial Consumer Agency of Canada Act*. However, the list above is the minimum set of arrangements needed for the argument in this paper.

⁹ Since the Canada Deposit Insurance Corporation (CDIC) was established in 1967, there have been 43 failures of member institutions, the last one being the Security Home Mortgage Corporation in 1996, which affected approximately 2,600 Canadians. See CDIC (2022) for more details.

Canadian banks began to issue bank notes in 1817, but it was not until 1890 that the various private bank notes and the government's Dominion notes were perfectly safe and traded at par with each other. Achieving this required several updates to banking regulations—especially the *Bank Act* revisions of 1871, 1880 and 1890—as well as improvements in the interbank settlement framework. Regulations were designed to promote the safety of private bank and Dominion notes so people could confidently pay with them and exchange them at par. This provided efficiency in goods and financial transactions as well as an effective market-disciplining device on private sector risk-taking behaviour.

The monetary system enables the coexistence and complementarity of public and private forms of money. Most of the money within the system is privately issued in the form of bank deposits. The public forms of money (bank notes held by individuals and settlement balances held exclusively by financial institutions) are a small fraction of the total value of monetary aggregates.

It is hard to overstate the importance of a well-functioning uniform monetary system for welfare because these arrangements constitute the basis for all exchange in a market economy. All economic agents, from households to firms to public entities, rely on regulated forms of money. This allows them to confidently transact in a common unit of account without expending resources to determine whether those forms of money will be accepted at face value or whether they carry credit risk from the issuer. In short, the key benefit of a well-functioning monetary system is that it provides confidence, efficiency in trade and financial stability.

The most important necessary characteristics of a well-functioning monetary system are the establishment of a unit of account and mechanisms to ensure the uniformity of money: that different forms of money—public and private, electronic and physical—trade at par. Multiple regulated forms of money can exhibit deviations from par, but if these deviations are small, predictable and related to the costs of the transactions, we do not consider them to violate uniformity (see **Box 2**). Deviations that are compensation for some form of perceived risk would be a break in uniformity.

There is plenty of historical evidence of dysfunctional monetary systems where multiple monies with different qualities circulated concurrently, trading between each other at varying rates. This generates substantial disruption for market transactions, even if they are nominally denominated in the same unit of account. A frequently used example of an inefficient monetary system is the US free-banking era between 1837 and 1864. Bank notes issued by state-chartered banks during this era were all denominated in US dollars, but some notes regularly traded at a discount based on local conditions and perceptions of risk.¹⁰ Banks issuing private bank notes during this period were not entirely safe and lacked an efficient mechanism to settle transactions or to transfer notes between them. Had central bank currency been available during this time, there would likely have been fewer deviations from par because banks would have had the incentive to improve the quality of their money to remain competitive.¹¹ **More extreme**

¹⁰ Ales et al. (2008) and Weber (2015) document how, during this period, notes issued by state-chartered banks circulated at par locally but traded at a discount elsewhere (varying by location and over time), counterfeiting was prevalent, and bank notes were not entirely safe.

¹¹ Clearly, stronger banking regulation was also required during this period to control risk-taking behaviour at banks.

examples of dysfunctional monetary systems are dollarized economies, where the state loses the capacity to define and enforce the use of a domestic unit of account.

Uniformity of money is not achieved by any single policy. Instead, a monetary system achieves uniformity thanks to the interplay of the institutional arrangements mentioned above. One component is the set of regulations that ensures that issuers of private forms of money behave responsibly in their issuance and risk management.¹² This results in expected safety in the value of those liabilities. Another component is the payment system regulations and infrastructures that allow the safe, easy and quick movement of value from one institution to another.¹³ Together with retail public money, these components allow private liabilities to trade at par.

We close this section by discussing the extent to which a monetary system must be provided publicly or privately. We argue that a well-functioning monetary system can be thought of as a pure public good; in other words, the benefits of a well-functioning monetary system—such as uniformity, safety and confidence in money—are non-rivalrous and non-excludable (Davoodalhosseini and Rivadeneyra 2020). As with other pure public goods, without regulation, the private sector would tend to undersupply it by, for example:

- excluding users
- providing less than perfectly safe private money
- reducing interoperability between different forms and hindering their usefulness as a medium of exchange

But public goods do not need to be supplied entirely by the public sector; the private sector could provide components of the system under appropriate oversight and regulation. Indeed, the current monetary system can be described as a system that is set up by the public sector but that leads to the provision of both public and private *forms* of money. The public sector is best positioned to set up the system because it takes a social planner's perspective of maximizing welfare, it is not driven by a profit motive, and it better accounts for the externalities involved.

Box 2: Definitions of money and degrees of uniformity

While economists typically cite three functions of money in its definition (unit of account, medium of exchange and store of value), in practical terms, different representations of value tend to satisfy those functions to a varying degree. Similarly, the arrangements that constitute a monetary system frequently address the question of what is to be considered money in legal terms and therefore subject to oversight and regulation. These strict definitions of money are somewhat unhelpful if we want to discuss new forms of money.

¹² In the Canadian case, this includes Office of the Superintendent of Financial Institutions (OSFI) guidelines, which outline the best practices expected from federally regulated financial institutions. These include solvency, prudential and accounting standards. See OSFI, "[Table of Guidelines](#)," for more information.

¹³ On the regulation side, there are the *Canadian Payments Act*; the *Payment Clearing and Settlement Act*, which focuses on systemically important and prominent payment systems; and the recently enacted *Retail Payment Activities Act*, which introduces a regulatory structure for retail payment intermediaries not covered elsewhere. On the infrastructure side, there is the Lynx system to settle interbank payments in central bank money.

For the purposes of our analysis, we need to be more precise about what we mean by *forms of money*. For this paper, forms of money are instruments or their protocols intended to facilitate exchange and provide a store of value. Different forms of money might be of varying quality as means of payment or stores of value. By being more flexible about what constitutes money, we can discuss forms such as cryptocurrencies, which, as we know, are extremely volatile and frequently subject to scams that lead to losses. Nonetheless, these forms of money attempt to disrupt regulated forms of money; dismissing them because they are not money under the traditional economics definition would miss considering their potential for disruption.

Since different forms of money can have varying degrees of quality, the rate of exchange between them can vary as well. Therefore, we can have different degrees of uniformity in a monetary system. Under “weak” uniformity, only regulated forms of money would be expected to trade at par; any non-regulated forms of money would not be expected to trade at par. Under “strict” uniformity, any form of money denominated in the same unit of account would trade at par.¹⁴

In addition to thinking of uniformity across regulated and non-regulated forms of money, we can also consider whether small deviations from par are violations of uniformity. In practical terms, even in well-functioning monetary systems, different forms of money do not always trade perfectly at par everywhere. We consider deviations from par between public forms (cash and reserves) and private forms (deposits) as not violating uniformity if they are small, predictable and related to the cost of transforming one type of money into another. Examples of these deviations are fees for using automated banking machines, interchange fees charged to merchants in card-based payments and fees charged for bank drafts.

3. The role of cash in the current monetary system

The availability of cash is an essential component in the monetary system that helps ensure money remains uniform. To understand the role of cash in uniformity, we first need to establish the effects that cash has on the pricing of both bank deposits and electronic means of payment. **First, depositors’ demand for cash constrains the market power of banks by limiting their ability to reduce interoperability or to charge fees that could create large wedges between cash and deposits. Second, cash, as an alternative to card-based payments, constrains the market power of payment service providers in physical point-of-sale transactions.**

Currently, cash is widely adopted by consumers, merchants, corporations and financial institutions, even if it is becoming less frequently used in transactions.¹⁵ Further, cash is widely recognized by all economic agents, held by large swaths of the Canadian public and easy to use because it requires no technology. Lastly, the outstanding value of cash is substantial, around 4% of nominal gross domestic product, and its provision is perfectly elastic at the wholesale level (i.e., the Bank of Canada provides whatever cash financial

¹⁴ Our definition is slightly different from that of Brunnermeier and Landau (2022). They use the concepts of soft and strong uniformity, where strong separates what is considered money and what is not.

¹⁵ Between 2009 and 2020, the share of payments at the point of sale conducted with cash declined from 54% to 22%. The value of cash transactions fell from 23% to 9% in the same period. See Chen et al. (2021).

institutions request) and relatively elastic at the retail level (through automatic banking machines [ABMs] and bank branches).¹⁶

Because of customers' demand for and expectation of the availability of cash, financial institutions make cash available, either directly in their branches or using partnering ABMs.¹⁷ To be able to meet such demand, banks acquire cash through the Bank Note Distribution System (BNDS) or partner banks if they are not direct members of the BNDS. Given this market setup, cash allows individuals to easily transform private forms of money into a public form.

It is important for our argument to highlight that there are currently no regulatory requirements for deposit-taking institutions to make good on their demand deposits in cash. The *Bank Act* specifies only the location in which a deposit should be redeemable without any reference to the form.¹⁸ This implies that banks provide cash because of their customers' demand. It can also be argued that an explicit requirement to redeem deposits in cash was not specified because cash redemption is part of the implicit social contract between banks and the state over bank responsibilities in exchange for certain privileges. Banks would have agreed to this because satisfying customer demand for cash was good for their broader business. **In a future where cash demand is weaker, the business driver may not be strong enough, and a regulatory requirement may be necessary.**

The above discussion is related to the long-standing debate about the risk of runs as a disciplining device for the risk-taking behaviour of banks.¹⁹ **Our argument—that cash constrains the market power of banks in providing means of payment—does not rely on the risk of bank runs being empirically true or not. Our argument is in addition to any mechanism that might work through bank runs. As a consequence, the potential role of cash in bank runs has no bearing in our main point. Instead, we claim that banks in equilibrium understand and satisfy the demand from retail customers to make cash widely available (despite the associated cost) because it is the dominant or optimal strategy to do so.**

To illustrate the current equilibrium outcome, where banks supply cash in response to customer demand, think of a situation in which an individual bank announces that it will no longer make cash available to its

¹⁶ There are some restrictions on access to cash through financial institutions. For example, ABM withdrawals may be subject to daily limits and fees. So, for small and medium-sized transactions, supply is essentially perfectly elastic, but for large-value transactions, supply is less elastic.

¹⁷ In Canada, most demand and fixed individual deposits are held at institutions with large networks of branches and ABMs. Online-only banks such as Tangerine Bank and Simplii Financial represent a small portion of deposits and provide access to cash through partner networks, the first belonging to Scotiabank and the second belonging to the Canadian Imperial Bank of Commerce. Tangerine holds approximately 2% of demand and fixed deposits.

¹⁸ Section 461 of the *Bank Act* states that "the amount of any debt owing by a bank by reason of a deposit in a deposit account in the bank is payable to the person entitled thereto only at the branch of account and the person entitled thereto is not entitled to demand payment or to be paid at any other branch of the bank." Because cash has always been available and is legal tender, more specific information about what banks must pay out when a deposit is withdrawn has not been necessary. In a possible future without cash, banks could only pay out a withdrawal in terms of a transfer to another bank's deposit.

¹⁹ For example, see Diamond and Dybvig (1983) and Calomiris and Kahn (1991). In spite of our main argument hinging on the competitive effect of cash on the banks' market power in providing means of payment, we want to mention a channel by which cash can still be relevant for bank behaviour. While deposit insurance allows banks to withstand a run of retail depositors, bank managers would rather avoid being subject to one. Lineups at bank branches are observable and would likely attract unwanted media attention even if they would not lead to a bank failure.

customers but will continue providing redemptions through transfers to other banks and payments using the established channels (bank drafts, wire transfers, debit, etc.). We conjecture that in response, some, if not many, of this institution's customers would move their deposits to institutions that still offer cash. Regardless of the scale of the migration of deposits (which could imply a risk to the solvency of the institution), the bank would prefer not to explore this option, regardless of the savings in the cost of cash distribution, because it would endanger the relationships it has with its customers.²⁰

The outcome of this experiment would be quite different if banks could coordinate on a strategy to all become cashless. In that scenario, customers would have to accept the terms under which banks would redeem their deposits. (Recall that in Canada, there is no regulatory requirement to redeem deposits in cash.) Sweden is a case in point.²¹ In the early 2000s, the Sveriges Riksbank introduced a new structure for cash management to reduce the number of Riksbank offices, and commercial banks set up a system of private cash storage (Riksbank 2010). The effect of the Riksbank policy was to help banks coordinate in reducing cash services, which led to the fastest decline in the use and holding of cash in the world.

In general, the effect on welfare of such coordination would depend on whether cash distribution savings would be passed on to customers and whether those savings would compensate for the decrease in access to cash. Alas, we think that banks would not pass on those savings and, on the contrary, could exert added market power by increasing fees or reducing the quality of service. The point here is that the current equilibrium is such that cash availability constrains the market power of banks in their pricing of deposits as a means of payment.²²

Cash also constrains the market power of payment service providers for physical point-of-sale transactions. This second channel is separate from but complements the first because bank deposits are the liabilities used in electronic card-based transactions. In card-based arrangements, a fee is charged to merchants (usually a percentage of the transaction), which the card networks use to fund incentive programs to motivate consumers to adopt and use cards.²³ The wide availability of cash provides some merchants with the ability to refuse cards entirely, although the number of merchants that do so today is quite small. Note that, as with cash and deposits at banks, merchants are not legally required to accept cash, so their choice to accept it is driven by consumer demand.

²⁰ A different strategy would be for this bank to offer higher deposit rates or lower fees to compensate customers for the inconvenience, potentially negating the overall savings to the bank. Indeed, digital banks today do not offer cash directly, although their customers can access cash through partner ABMs, subject to certain fees. Typically, banks without branches were digital at the outset; they did not transition to being branchless. These banks attract customers for whom branches and direct cash access are not important.

²¹ Cash use in Sweden has declined significantly in recent years—only 9% of people used cash for their most recent purchase in 2020, which was down from 39% in 2010 (Riksbank 2021). This was caused in part by bank branches becoming cashless (ABMs are still available) and by banks promoting the use of Swish, a bank-owned faster payment system that allows depositors to use their phones to make mobile payments instantly from their bank accounts.

²² Market power in the deposit market is well documented. Drechsler et al. (2017) depict how market power affects the transmission of monetary policy. Lagos and Zhang (2021) show the role of cash in this mechanism.

²³ This market setup has been extremely successful because it provides convenience to consumers. In 2020, 76% of retail transactions in Canada were conducted with debit and credit cards (Chen et al. 2021). This market exhibits problems like overuse and regressiveness that have been extensively documented in the economics literature and in competition cases. See, for example, Felt et al. (2021) and Usher et al. (2021).

Having established the role that cash plays in constraining the market power of banks and payment service providers, we need to explain how this helps maintain the uniformity of money. A bank must balance several competing incentives when deciding its business model. On one hand, to attract customers, it denominates its liability—deposits—in the official unit of account and makes it easy to acquire. In other words, it ensures that its deposits interoperate with cash (through ABMs) and other private liabilities (through card-based payment systems, wires, etc.). On the other hand, it attempts to compete monopolistically by differentiating its liability to be able to increase prices and reduce outside connections; that is, it attempts to create what is called a walled garden or closed platform. One example is the preferential treatment of within-institution payments. The demand for cash by customers tips the balance toward the first set of incentives. The bank satisfies consumer demand for cash and supplies a more homogeneous money product that can be exchanged easily with other payment providers. **Therefore, when all banks behave in the same manner, all forms of private money are interlinked at the retail level by cash demand.** As we will discuss in the next section, this argument should apply to any issuer of private money, be it an established bank or a new entrant, faced with an existing demand for retail public money.

For example, take the case of ABM fees and the interchange fee charged to merchants. **Without cash, banks and card networks would have more scope to exert market power in the form of higher interchange fees in card-based payments and reduced interoperability between deposits and other forms of money.**

The mechanism we outlined in this section has been studied theoretically by Lagos and Zhang (2022), who emphasize the importance of cash now that most transactions are conducted with bank liabilities (inside money). In their model, cash constrains market power because it behaves as a latent means of payment that limits the terms under which banks and other providers can price deposits and payments even if cash is never used. The availability of cash, or outside money, goes farther and helps discipline market power in the intermediation of credit, settlement or payment services.

4. Current trends

This section describes three concurrent trends threatening the monetary system. The next section discusses the channels through which these trends could affect the monetary system. The three trends are:

- the increasing digitalization of the economy in general
- the declining use of cash at the point of sale and for person-to-person transactions
- the growth of demand for cryptoassets and stablecoins

There is some but not full overlap between these trends. For example, the decline in cash use partially results from the digitalization of the economy, but it is also driven by other factors, such as demographics.

These three trends already affect the economy to one extent or another. Digitalization is the largest and most advanced, while cryptoassets are still a relatively small niche. Our intent is not to determine the magnitude or precise timeline for any of these trends but rather to look to the long term and consider potential risks. Our hypothesis—that a relevant retail public money is necessary for a well-functioning

monetary system—does not depend on these trends. The form of that public money—cash or a CBDC or both—could, however, depend on which trend is more likely to materialize.

As part of the first trend, economic activity is increasingly being conducted online as a percentage of total economic output. This trend began in the 1990s and will likely persist for some time. These changes in the economy are illustrated in:

- the growth of social media platforms and their expansion into commerce and payments
- the explosion of big tech companies such as Amazon, Google and Apple
- advancements in new technologies such as artificial intelligence, big data and quantum computing

Mobile computing and smartphones are another important component of this digitalization, providing people with access to online stores anywhere and at any time. Currently, only private money can be used in online economic activity, so a growing sector of the economy has no direct access to central bank money. As such, this economic digitalization is marginalizing the use of and access to retail public money. Note that even if the decline in the use of cash at the point of sale were to bottom out at a level deemed acceptable and sustainable, its importance as a share of transactions in the economy would continue declining.

A component of the digitalization of the economy is private sector payments. Most private sector payments are now conducted digitally, with only a small fraction using cheques and bank drafts. Electronic payments improved efficiency in payments and made private sector money more usable.

As for the second trend, at one point, virtually all retail transactions in Canada were conducted using cash. However, over time, banks and other private sector entities introduced private sector payment systems to make the money they issued more accessible and convenient. This has improved the efficiency of the payment system but has eroded the value and volume of transactions completed using cash. **In the latest method of payments survey conducted by the Bank of Canada, only 22% of transactions at the point of sale were conducted using cash** (Henry et al. 2024). Cash use has been in decline since at least 2009, raising the concern that if the trend were to continue, cash could disappear from use in the medium term. There is good reason to believe, however, that cash will not disappear that quickly and its use will probably level off at some low level for an extended period. But it is possible, if not likely, that at some point the use of cash will decline to a point where financial institutions are no longer interested in supporting its distribution and merchants are no longer willing to accept it in transactions.

Third, digital assets—cryptoassets in particular—have attracted increasing interest since the introduction of Bitcoin in 2009. The latest variant, stablecoins, is an attempt to create coins that have a stable value with respect to other means of payment and, therefore, are more likely to be adopted as money for regular exchange of goods and services. New cryptoassets and stablecoins are easy to create; the years since Bitcoin's inception have seen a proliferation of issuance in attempt to capitalize on market interest and extract profits through early wide adoption in an industry based on strong network effects. The overall market capitalization of the cryptoasset market peaked at about US\$3 trillion in late 2021 but has since declined significantly. The possibility of significant capital gains continues to attract new investors even though crypto prices remain highly volatile. Because of this ongoing excessive volatility, these assets are still much more investment products than they are useful means of payment (Balutel et al. 2022). But it

remains possible that the technology will mature, acceptance will solidify, and prices will stabilize. If this were to happen, adoption for conducting regular transactions would become more likely.

A similar market trend is central banks' growing interest in CBDCs. Most central banks around the world are now at least researching a CBDC, with several launched and some large jurisdictions progressing to the pilot stage or advanced stages of research. The potential implications of widespread adoption of a foreign CBDC would be like those for adoption of a cryptoasset or stablecoin. **The fact that they are issued by a central bank increases the risk that Canadians could find them stable and attractive enough (even with residual exchange rate risk) for use in everyday payments.**

As discussed above, our hypothesis does not depend on these trends being highly likely. At this point, we are only highlighting the risks. The widespread use of an alternative digital currency is quite unlikely but would represent significant consequences. If Canada were to see widespread adoption of a private digital currency or a foreign CBDC, then the Bank of Canada's ability to conduct monetary and financial stability policy would be significantly eroded. Canadian monetary sovereignty depends on most people using the Canadian dollar to make purchases and conduct business.

5. Risks to the monetary system from current trends

The digitalization of money and of the economy in general poses risks to the monetary system. With digital technology, new monies are easier than ever to create. This may promote innovation but could also lead to segmentation and differentiation (Brunnermeier and Landau 2022). Concurrently, the relative importance of cash in the economy is diminishing, driven by a declining use of cash at the point of sale as well as a growing importance of digital commerce (Chen et al. 2021). Lastly, big technology companies based on digital platform models are considering entering the process of creating money, at various stages, partly driven by the complementarity between data and platform activities (Chiu and Koeppl 2021).

The two channels through which these trends could endanger the monetary system are:

- an increased fragmentation of the monetary system
- increased exertion of market power by issuers of private money

First, with a more rapid and diverse process for creating money, the monetary system is at a higher risk of becoming fragmented (Brunnermeier and Landau 2022). These alternative forms of money could be used for separate purposes and possibly priced differently due to their inherent risks. Thousands of new digital currencies have been introduced, many of which have failed. Building the necessary payment network to gain widespread adoption is difficult, but with so many attempts being made, the right formula may eventually be discovered.

Second, in an increasingly digital economy, without a public form of money acting as an outside option for consumers—a role played by cash today—issuers of private forms of money would be increasingly in a position to exercise market power to differentiate their liabilities from one another in an attempt to extract rents.

These risks to the monetary system could materialize in several ways. With respect to monetary sovereignty, the most important risk is the adoption of an alternative unit of account. This could begin if new forms of money not denominated in Canadian dollars (e.g., cryptocurrencies, stablecoins or foreign CBDCs) achieve significant adoption. By the nature of network effects in payments, this would not likely occur spontaneously, especially when the Canadian dollar is well entrenched. However, this could occur in specific sectors of the economy.²⁴ The need for money that is digitally native in, for example, decentralized finance (DeFi), distributed platforms and tokenization could provide consumers with sufficient incentives to use an alternative unit of account for those activities.²⁵ Another example is Canadian exporters receiving payment in a foreign digital currency that they could use to pay other Canadians. This already happens to a certain extent but could expand rapidly if people view these alternative forms of money as somehow superior. Lastly, established digital platforms (such as ride-hailing and social media) could add wallet functionalities, allowing users to hold digital assets not denominated in Canadian dollars that they could use for domestic payments.

A more plausible risk to the system is to lose uniformity through:

- the reduction of interoperability
- the creation of walled gardens
- attempts at differentiation of money

An example is a stablecoin that would promise to maintain its value in terms of some fiat currency but could then create interoperability hurdles after being adopted in sufficiently large amounts. New and innovative forms of money, which are initially outside the regulatory perimeter, have two incentives in designing their system:

- to have good connections to other systems to support entry to gain adoption
- to make it hard to leave their platform or ecosystem to keep business

Many cryptocurrencies and platforms already display these behaviours. Traditional issuers of regulated forms of money could also contribute to the reduction of interoperability and uniformity by increasing fees or creating significant hurdles to withdraw money.

Lastly, regulatory sovereignty is the capacity to craft, pass and enforce the appropriate regulations. This could be at risk if the monetary system does not provide private firms that intend to issue private money sufficient incentives to:

- seek to be regulated and to comply with existing regulations
- denominate their liabilities in the common unit of account
- seek a high degree of interoperability with other forms of money in the economy

²⁴ This already happens in most economies to a certain extent; for example, banks offer US-dollar accounts to snowbird Canadians to save and use for travel to the southern United States in the winter. But if it remains small and localized, it is probably a net positive for the economy by expanding service choice. Larger, widespread use of alternative currencies would pose significant costs to the economy in terms of inefficient trade based on multiple currencies as well as risks to monetary sovereignty.

²⁵ Examples are several competing versions of the metaverse and platforms like Helium (a decentralized wireless infrastructure) and Mastodon (equivalent to X, formerly known as Twitter).

These risks are beyond the typical efforts of any issuer of private money to participate in and influence the process of creating regulations.

Notice that monetary and regulatory sovereignty risks interact with each other. If monetary sovereignty is weakened, the risk of an inability to implement regulatory policies increases. This is especially true for new policies that are intended to account for the entry of new forms of money.

6. Policy options

In our view, there are two distinct sets of policy actions that can respond to the risks outlined above:

- issuance of a CBDC to complement the public money role played by cash
- implementation of changes and updates to the regulatory components of the monetary system

A policy response that uses both sets of actions could be called a *status quo policy* in the sense that it would attempt to preserve the current economic role of retail public money (either in physical or digital form) and the effectiveness of its regulatory regime.

Our analysis suggests that a monetary system without a relevant retail form of public money would be at greater risk of losing monetary sovereignty and its financial regulatory regime may become less effective.²⁶ Therefore, preserving continuity in the monetary system would most likely require ensuring that a viable version of retail public money is available in the future—CBDC fulfilling the role of cash in a digitalized economy—along with updates to the financial regulatory regime.

We do not suggest a “CBDC alone” approach. On the contrary, in the status quo policy, the availability of retail public money interplays with the evolution of the regulatory components of the monetary system to ensure their continued effectiveness.

The alternative could be the “regulatory responses alone” approach—confronting the potential risks to the monetary system entirely with updates to the regulatory regime.²⁷ This would be suboptimal for two reasons:

- the inherent limitations in regulatory changes
- the complementarity between regulation and the existence of retail public money

Regulation is limited by how quickly it can be developed and implemented as well as by its precision and scope. For good reasons, regulatory changes inherently follow trends in the marketplace and aim for stability. With increasing and continuous waves of innovation, this means regulation can quickly become out of date. Further, history has demonstrated that regulation does not always get it right the first time, so missteps will occur that will require correction over time (**Box 1**).

²⁶ Monetary sovereignty is typically thought of as binary: the state controls the unit of account, or it does not. Brooks (2021) argues that there is a gradual variation in the degree of monetary sovereignty and in the consequences that different countries face should they lose it. We take this same view.

²⁷ Potential alternative policy actions could include requirements for financial institutions to provide unrestricted account access, lower fees, offer new services (e.g., smart contracts), expand deposit insurance or not monetize users’ payment data.

A regulatory response alone would assume that regulations are much more effective than they are. To support confidence, uniformity and the unit of account, regulation would need to work almost perfectly on its own in most circumstances and would need to anticipate potential crises in the future. Given that this is clearly asking too much, there will be an ongoing need for a retail public money that is universally accessible.

Finally, regulatory changes are discrete by their very nature, representing a stepwise response to a changing environment. Cash and, by extension, a CBDC can respond more elastically as an ever-present latent means of payment and store of value. Retail public money serves as a backup mechanism to regulation and wholesale public money to further increase the discipline on new forms of money being introduced.

The second reason regulation alone is not the best policy is the complementarity between regulation and the existence of retail public money. In other words, regulation alone would be weaker and possibly insufficient to maintain the unit of account. **As an illustration, look to those countries with weak monetary policy that have unsuccessfully implemented laws to try to force people to use the official unit of account. Inevitably, large underground economies emerge that undermine those laws.** It takes a regulatory structure and a good public money (i.e., a form of money that people can use for purchases and have confidence it will retain its value) to enforce the unit of account.

An argument in favour of the regulatory response alone is that it could be a simpler policy if it is guided by the requirement that all forms of private money ultimately settle in central bank money through intermediaries. This requirement—which likely implies that more financial intermediaries have access to the central bank balance sheet—would certainly help maintain uniformity. However, it is unlikely to have the same effect as it did in the past, when cash was widely used. The increased diversity of forms of money and the strong complementarities between the customer data and financial transactions inherent in the business models of digital platforms are market forces that did not exist during previous waves of innovation. In the past, customers exercised a disciplining effect on the issuers of private money through cash demand, providing issuers with the incentive to stay within the regulatory perimeter and to connect with other regulated forms of money. Also, the implied wider access to the central bank balance sheet would imply regulatory changes, bringing us back to the limitations of regulatory responses discussed above.

Other policies could also be considered. Our story is ultimately about the competitive pressure exerted by cash on issuers of private money. If competition between issuers of private money is the key mechanism, we should also consider other policies that support competition. One example is encouraging the entry of new banks and intermediaries. Indeed, this policy should be pursued independent of a CBDC. But entry into banking is rare in Canada due to the high costs involved, so other methods will likely be more successful. New policies such as open banking and wider access criteria to payment systems such as Lynx and Real-Time Rail will also be important for increasing competition in the payment sector. But having a strong level of competition in payments does not negate the competition and other benefits that would come from having an outside option available to consumers.

The last alternative policy could be an indefinite support for cash. As we know, the Bank has already committed to supporting cash for as long as there is demand for it. However, this is unlikely to be sufficient

to preserve a role for public money in the long term because, as argued in section 4, the digital economy is likely to eventually overpower the physical one where cash is economically relevant.

Public money is crucial to linking the different forms of private money. It acts as a bridge between private monies whose issuers have the individual incentives to create closed-loop walled gardens in the hopes of promoting their own business and network growth instead of overall economic welfare. Retail public money provides individuals with the ability to exit not only their current financial institution but also the whole private financial system. To be a successful anchor for the economy, public money must be freely available to all households, businesses and sectors of the economy.²⁸

In a future with no retail public money, retail depositors can only exit their bank to go to:

- another bank
- other financial assets (e.g., stocks, corporate bonds or government bonds)
- commodities (e.g., gold)
- foreign currency

In a general financial crisis, people would not move to another bank and would consider only government bonds, gold and foreign currency to be attractive ways to store wealth. But bonds and gold are illiquid and cannot be used for purchases, while the last option entails foreign exchange risk, may not be accepted locally in payments and is a direct threat to monetary sovereignty. In a crisis, a retail public money can serve to protect monetary sovereignty because it is a safe and highly liquid means of payment.

The universal access to safety and security allows retail and wholesale public money to define the unit of account, support uniformity of the currency, and serve as an anchor for confidence and stability in the financial system.

7. Conclusion

The goal of this note is to outline the main arguments for why cash (or a retail public money) has been, and remains, essential to a well-functioning monetary system. Retail public money is a cornerstone of the monetary system, along with the regulatory framework and other components, that supports confidence in the system and the uniformity of the currency. In a future where cash is less relevant and is no longer a competitive payment alternative to private money, issues could arise in the uniformity of the Canadian dollar in its many different forms or with the exertion of excessive market power by private money providers. Similar thinking about the role of public money in the monetary system is also emerging in other advanced economies.

Given this role of retail public money, it is likely that a digital form of cash, a CBDC, will be needed in order to maintain the status quo. Cash and a CBDC could continue to support:

²⁸ Brunnermeier and Landau (2022) point out that there is no modern example of a well-functioning monetary system without retail public money. In their assessment, governments should not run the risk of discovering if retail public money is indeed necessary. Our argument is stronger because we establish that retail public money is indeed necessary in a well-functioning system.

- the Canadian dollar unit of account
- the uniformity of money
- monetary and regulatory sovereignty
- the overall confidence in the stability of the financial and monetary systems

A retail CBDC with qualities like those of cash would be able to work with other components of the monetary framework (e.g., financial regulation, deposit insurance) to support a well-functioning monetary system.

The arguments in this paper should apply equally well to new sectors of the economy that emerge over time (e.g., the blockchain sector, programmable money, smart contracts, DeFi, the Internet of Things) as they do in the traditional economy. No sector of the economy of any real size should be closed off to the use of retail public money. Future work, however, will need to examine in more detail the interaction between the role for public money and what is typically referred to as one of the positive cases for a CBDC to promote growth in certain sectors of the new digital economy.

8. References

Ales, L., F. Carapella, P. Maziero and W. E. Weber. 2008. "A Model of Banknote Discounts." *Journal of Economic Theory* 142 (1): 5–27.

Armeliu, H., C. A. Claussen and S. Hendry. 2020. "Is Central Bank Currency Fundamental to the Monetary System?" Bank of Canada Staff Discussion Paper No. 2020-2.

Balutel, D., W. Engert, C. Henry, K. Huynh, M. Voia. 2022. Private Digital Cryptoassets as Investment? Bitcoin Ownership and Use in Canada, 2016-2021. Bank of Canada Staff Discussion Paper No. 2022-44.

Bank of Canada. 2020. "[Contingency Planning for a Central Bank Digital Currency.](#)"

Brooks, S. 2021. "Revisiting the Monetary Sovereignty Rationale for CBDCs." Bank of Canada Staff Discussion Paper No. 2021-17.

Brunnermeier, M. and J.-P. Landau. 2022. "[Digital Euro: Policy Implications and Perspectives.](#)" Study requested by the ECON committee of the European Parliament.

Calomiris, C. W. and C. M. Kahn. 1991. "The Role of Demandable Debt in Structuring Optimal Banking Arrangements." *American Economic Review* 81 (3): 497–513.

Canada Deposit Insurance Corporation (CIDC). 2022. "[Bank Failures in Canada: A History.](#)"

Chen, H., W. Engert, M.-H. Felt, K. P. Huynh, G. Nicholls, D. O’Habib and J. Zhu. 2021. "Cash and COVID-19: The Impact of the Second Wave in Canada." Bank of Canada Staff Discussion Paper No. 2021-12.

Chiu, J. and T. Koepl. 2021. "Payments and the D(ata) N(etwork) A(ctivities) of BigTech Platforms." Mimeo. Queen’s.

Cunliffe, J. 2021. "Do We Need 'Public Money'?" Speech at the OMFIF Digital Money Institute, London, UK, May 13.

Cunliffe, J. 2023. Money and payments: a 'black ships' moment? Speech at the Economics of Payments XII Conference at the Federal Reserve Board, Washington DC.

Davoodalhosseini, S. M. and F. Rivadeneyra. 2020. "A Policy Framework for E-money." *Canadian Public Policy* 46 (1): 94–106.

Diamond, D. W. and P. H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91 (3): 401–419.

Drechsler, I., A. Savov and P. Schnabl. 2017. "The Deposits Channel of Monetary Policy." *Quarterly Journal of Economics* 132 (4): 1819–1876.

Engert, W. B. Fung, and S. Hendry. 2018. "Is a Cashless Society Problematic?" Bank of Canada Staff Discussion Paper No. 2018-12.

Felt, M.-H., F. Hayashi, J. Stavins and A. Welte. 2021. "Distributional Effects of Payment Card Pricing and Merchant Cost Pass-through in Canada and the United States." Bank of Canada Staff Working Paper No. 2021-8.

Fung, B., S. Hendry and W. E. Weber. 2017. "Canadian Bank Notes and Dominion Notes: Lessons for Digital Currencies." Bank of Canada Staff Working Paper No. 2017-5.

Fung, B., S. Hendry and W. E. Weber. 2018. "Swedish Riksbank Notes and Eskilda Bank Notes: Lessons for Digital Currencies." Bank of Canada Staff Working Paper No. 2018-27.

Gorton, G. B. and J. Zhang. 2021. "Taming Wildcat Stablecoins." *University of Chicago Law Review* 90 (forthcoming).

Henry C., M. Shimoda, J. Zhu. 2022. "2021 Methods-of-Payment Survey Report." Bank of Canada Staff Discussion Paper No. 2022-23.

Henry C., D. Rusu, M. Shimoda. 2024. "2022 Methods-of-Payment Survey Report: Cash Use Over 13 Years" Bank of Canada Staff Discussion Paper No. 2024-1.

Kahn, C., S. Quinn and W. Roberds. 2014. "[Central Banks and Payment Systems: The Evolving Trade-off between Cost and Risk](#)." Norges Bank conference *Of the Uses of Central Banks: Lessons from History*, Oslo, June 5–6.

Lagos, R. and S. Zhang. 2021. "The Limits of Monetary Economics: On Money as a Medium of Exchange in Near-Cashless Credit Economies." *American Economic Review*.

Lagos, R. and S. Zhang. 2022. "The Limits of Onetary Economics: On Money as a Constraint on Market Power." *Econometrica* 90 (3): 1177–1204.

Panetta, F. 2022. "Central Bank Digital Currencies: Defining the Problems, Designing the Solutions." Contribution to a panel discussion at the US Monetary Policy Forum, New York, February 16.

Sveriges Riksbank. 2010. "Follow-up of the New Depot Structure for Cash Management." Dnr 2010-258-ADM.

Sveriges Riksbank. 2021. "Payments Report 2021."

Usher, A., E. Reshidi, F. Rivadeneyra and S. Hendry. 2021. "The Positive Case for a CBDC." Bank of Canada Staff Discussion Paper No. 2021-11.

Weber, W. E. 2014. "The Efficiency of Private E-Money-Like Systems: The U.S. Experience with State Bank Notes." Bank of Canada Staff Working Paper No. 2014-15.

Weber, W. E. 2015a. "The Efficiency of Private E-Money-Like Systems: The U.S. Experience with National Bank Notes." Bank of Canada Staff Working Paper No. 2015-3.

Weber, W. E. 2015b. "Government and Private E-Money-Like Systems: Federal Reserve Notes and National Bank Notes." Bank of Canada Staff Working Paper No. 2015-18.