

**Bank of England and HM Treasury**

Bank of England



HM Treasury

# The digital pound: a new form of money for households and businesses?

**Consultation Paper**

February 2023







# The digital pound: a new form of money for households and businesses?

Presented to Parliament by the Economic Secretary to the Treasury  
by Command of His Majesty

February 2023



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**Correction slip**

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This document is a Consultation Paper issued jointly by the Bank of England and HM Treasury in relation to the digital pound. It seeks feedback on the policy and technical work undertaken so far in order to inform a future decision on whether or not to progress to building and launching a digital pound and on the current proposal for its form and functions which will be taken forward in the next stage.

The following question in the Consultation Paper was omitted from the Bank of England's online response form: 'Do you have comments on our proposal that non-UK residents should have access to the digital pound, on the same basis as UK residents?'. We have created an additional online response form to allow responses to be given to this question.

The deadline for responses to all questions in the Consultation Paper has been extended from 7 June 2023 to 30 June 2023. This extension provides respondents (including those who have already submitted a response form) with additional time to consider and respond.

The Consultation Paper now reflects this date change and gives the correct details for access to the response forms.

We have also made changes to the numbering of the questions (though not to the questions themselves) within the body of the Consultation Paper, to ensure these are consistent with the numbering provided on pages 94–95.

**Correction 1**

Changes to numbering of questions

On page 66:

Question 3 is re-numbered as question 2.

On page 74:

Questions 4-6 are renumbered as questions 3–5.

On page 91:

Questions 7–13 are renumbered as questions 6–12.

## **Correction 2**

Page 94 currently reads:

The Bank and HM Treasury invite views on the questions listed below. Respondents should provide answers by 7 June 2023. The consultation period will run for a period of four months.

This will now read:

The Bank and HM Treasury invite views on the questions listed below. Respondents should provide answers by 30 June 2023.

With an additional footnote:

On 1 June 2023, the original deadline was extended to 30 June 2023 due to the omission of question 9 of this Consultation Paper from the online response form.

## **Correction 3**

Page 95 currently reads:

You can respond to this survey through our web form.

Page 95 will now read:

You can respond to this survey through [this web form](#) for all questions apart from question 9, and [this additional web form](#) for question 9.

With an additional footnote:

The additional web form was created on 1 June to accept responses to question 9, which was previously omitted from the online response form.

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# Foreword

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The way we use money in the United Kingdom is changing, bringing fresh opportunities and new considerations for public policy.

Banknotes, issued by the Bank of England, are being used less frequently by households and businesses. New technologies are allowing for the emergence of new forms of digital money, and new ways and devices to pay with it. International developments have the potential to affect the UK domestically and as a global leader in finance.

Ensuring that public trust in money remains high, and that our modern forms of money and payments meet the evolving needs of individuals and businesses, are fundamental responsibilities of the Government and the Bank of England. We are determined that the UK should remain at the forefront of innovation in money, payments and financial services. This is part of the Government's vision for a technologically advanced, sustainable, and open financial services sector that is globally competitive and acts in the interests of communities and citizens, creating jobs, supporting businesses, and powering growth across all four nations of the UK.

A UK central bank digital currency – a 'digital pound' – would be a new form of digital money for use by households and businesses for their everyday payments needs. As part of the wider landscape of money and payments it would sit alongside, not replace, cash – a digital counterpart to familiar, trusted banknotes and coins, subject to rigorous standards of privacy and data protection. A digital pound would help to ensure that central bank money remains available and useful in an ever more digital economy, continuing to bolster UK monetary and financial stability while safeguarding the UK's monetary sovereignty in a changing global financial system. It could provide a platform for private sector innovation, promoting further choice, competition, efficiency and innovation in payments. It could also have further benefits for the resilience and functionality of payments in the UK.

On the basis of our work to date, the Bank of England and HM Treasury judge that it is likely a digital pound will be needed in the future. It is too early to commit to build the infrastructure for one, but we are convinced that further preparatory work is justified.

Any future digital pound would be a major piece of national infrastructure which would likely take several years to complete. Its launch would require deep public trust in this new form of money – trust that their money would remain safe, accessible, and private. The journey towards issuing any digital pound therefore necessarily involves an open, national conversation about the future of our money, in parallel with detailed technical consideration by experts across the UK public authorities, and informed by evolving market trends.

This consultation – issued jointly by HM Treasury and the Bank of England – opens that conversation and seeks to begin to build that foundation of public trust. It seeks feedback on the policy and technical work undertaken so far in order to inform a future decision on whether or not to progress to building and launching a digital pound and on our current proposal for its form and functions which will be taken forward in the next stage. It commits us to progressing the next stage of technical and policy work needed to underpin such a decision. This paper is being issued alongside a [Technology Working Paper](#) from the Bank of England, exploring the many technology challenges involved in a digital pound.

In the coming four-month consultation period, HM Treasury and the Bank of England will engage extensively across the UK to seek views on a potential digital pound. Responses to the consultation are invited from all interested members of the public, experts, and the widest range of organisations.

**At this exciting time of change in money and payments, this consultation is a vital step in positioning the UK to act decisively by introducing a digital pound, should we choose to do so.**

Rt Hon Jeremy Hunt MP, Chancellor of the Exchequer

Andrew Bailey, Governor of the Bank of England

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## Part A: Our proposal for the digital pound

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**The Bank of England and HM Treasury judge it likely that a digital pound will be needed in the future. It is too early to decide whether to build the infrastructure for one, but we are convinced the next stage of preparatory work is justified.**

A digital pound would be a retail central bank digital currency (CBDC) – digital money for use by households and businesses for their everyday payments, issued by the central bank, the Bank of England. The Bank of England (the Bank) and His Majesty's Treasury (HM Treasury) plan to accelerate our work on the technology and policy architecture for a digital pound.

A significant factor in determining whether the digital pound is needed will be how the payments landscape evolves in coming years, both in the UK and abroad. In particular, whether new forms of privately-issued digital money emerge and how they interact with existing forms of money and payments. International developments in the provision of CBDCs by other countries, and their potential to affect the UK domestically and as a global leader in finance, will also be important.

At this stage, we judge that it is likely that the digital pound will be needed in the future and that it would offer benefits. As set out in more detail in Part B, the digital pound would maintain public access to retail central bank money, thereby anchoring trust in the monetary system in a more digitalised world and underpinning monetary and financial stability. Also, as our lifestyles and the economy become ever more digital, it would, through partnership with the private sector, promote innovation, choice and efficiency in domestic payments, thereby boosting the UK economy, supporting growth and financial inclusion.

It is too early to take the decision on whether to introduce the digital pound. That decision will be made in coming years taking account of developments in money and payments and based on our findings as we investigate further the operational features and technology needed to deliver a digital pound. For now, the Bank and HM Treasury's priority is to step up development work, build the necessary skills and put in place the technical capability to introduce the digital pound in a timely manner, should a decision be made in future to do so.

The introduction of a digital pound would be a major public and private sector infrastructure project. It would take several years.

Over the next stage of our work, we will work with the private sector to explore potential technology solutions and undertake experiments to inform any future implementation.

This stepping up in our development work and collaboration with the private sector will, in itself, support future development of the digital economy. And as we intensify our work, and as payments and the digital economy evolve, we will maintain a dialogue with all stakeholders, including firms – large and small, new and established – to ensure the digital pound’s design meets their needs.

In this Consultation Paper (CP), we are consulting on a proposal for a retail CBDC, designed for everyday payments by households and businesses. That contrasts with a ‘wholesale CBDC’, which would be used to settle high-value payments between financial firms. The concept of a wholesale CBDC is discussed in a box in Part D of this paper, alongside the Bank’s work with industry to enhance wholesale payments through [RTGS renewal and the RTGS future roadmap](#).

### **We are exploring a digital pound because money and payments are changing.<sup>1</sup>**

Individuals and businesses in the UK use two main forms of money for day-to-day spending – private money, issued by commercial banks, and public money, issued by the Bank of England. ‘Private money’ is typically a claim on a private commercial bank in the form of bank deposits held by households or businesses. This private money is underpinned by the regulation and supervision of commercial banks. ‘Public money’ or ‘central bank money’, by contrast, is issued by the Bank of England. It is currently available to the public only in the form of physical cash.<sup>2</sup> Central bank money is financially risk-free in the sense that there is no credit, market or liquidity risk.<sup>3</sup>

Historically, the majority of payments have been made in cash. However, digital innovation is changing the way we pay. With the convenience of card, app, and digital wallet payment systems, the use of electronic payments has accelerated. In 2021, card payments accounted for close to 60% of UK payments (Chart A.1) and 32% of all payments were contactless.<sup>4</sup> Almost a third of retail sales were made online and about 9 in 10 adults own a smartphone, which can be used to make digital payments, including in-store.<sup>5</sup>

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<sup>1</sup> Forms of money in use now, and in prospect, are discussed in Box B.

<sup>2</sup> The Royal Mint issues coins which can also be considered ‘public money’. Deposits held at the central bank (reserves) are also public money: they exist in digital form but are only available to certain financial institutions.

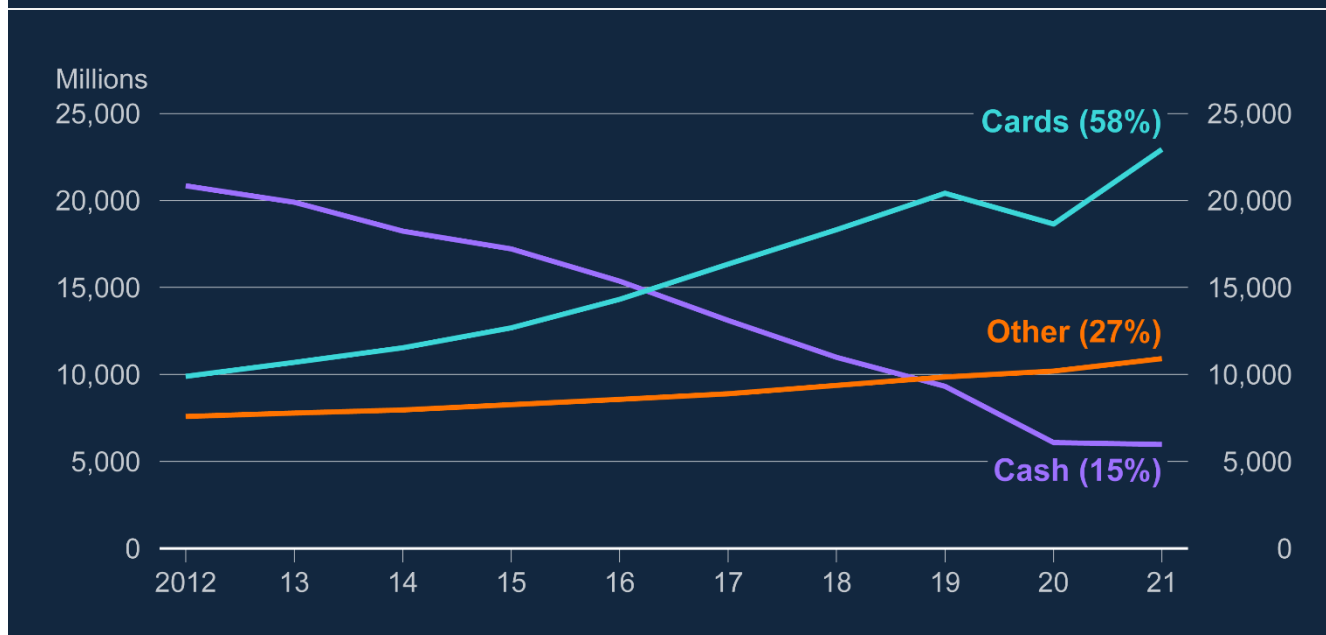
<sup>3</sup> Throughout this Paper, we refer to central bank money as ‘financially risk free’ to reflect the absence of these risks. Operational risks, including those related to the security and resilience of CBDC infrastructure, and the role of ‘Payment Interface Providers’ are considered further in Part D.

<sup>4</sup> UK Finance (2022) – [UK Payment Markets Summary](#).

<sup>5</sup> See [ONS](#) and Ofcom (2022) – [Online Nation 2022](#).

As a result of these innovations, the balance of public and private money used to make payments has shifted. Around 95% of the funds held by individuals to make UK payments today are private money, held as commercial bank deposits, and typically spent electronically, such as by bank transfer or debit card.<sup>6</sup> As spending has become more digital, the use of cash for payments has declined, falling from 55% of transactions to 15% over the past decade.<sup>7</sup>

**Chart A.1: Cash payments have declined while card use has accelerated (a)**



Sources: UK Finance and Bank calculations.

(a) Payment volumes (millions). Cards comprises debit card and credit/charge/purchasing card.

New services and technologies are emerging in money and payments. Some examples are embedded finance, blockchain technology, smart contracts and decentralised finance (Box A). These are often being developed by firms outside of the traditional financial sector, which brings new entrants into payments markets. New functionalities can support novel use cases and features, which are already starting to emerge in wholesale and business-to-business payments. Going forward, were a digital pound introduced, private sector Payment Interface Providers (PIPs) in the digital pound ecosystem would be able to leverage such new functionalities to provide innovative services in retail payments to end users.

<sup>6</sup> Cunliffe (2021) – [Do we need 'public money'?](#)

<sup>7</sup> UK Finance (2022) – [UK Payment Markets Summary.](#)

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Cash, of course, remains vital for many. Around 1.2 million UK adults do not have a bank account and around one fifth of people name cash as their preferred payment method.<sup>8</sup> Cash remains important to a large cross-section of society. Even those who do not use it regularly consider it an important back up form of payment. For those reasons, UK authorities are committed to ensuring continued access to cash. Measures to protect retail access to cash, and the supporting wholesale distribution services, are being introduced in the Financial Services and Markets Bill.<sup>9</sup> But while we ensure continued access to cash, we also have to recognise that it cannot be used in digital transactions, which are becoming an increasingly important part of daily life.

If current trends continue, the public's access to, or use of, central bank money will diminish and the monetary system could become fragmented, posing a risk to monetary and financial stability. The payments landscape could also become concentrated if firms' use of new technologies in money issuance results in dominance by a small number of them. That would pose a risk to competition and diminish the incentives for longer-term innovation.

Considering these payment trends, we judge there is likely to be a benefit from the Bank issuing a digital form of retail central bank money. It would support the safety and interchangeability of money, as well as encourage choice, competition and innovation. The digital pound would complement banknotes and ensure that the Bank continues to provide money that is relevant to the way people choose to pay, both today and in the future. It would also coexist with and complement both existing and new forms of private digital money.

The future payments landscape in the UK will not only reflect these developments in **retail** payments (for households and businesses) and the likely need for a digital pound. There will also be evolution in **wholesale** payments (high-value payments, typically between financial institutions). The Bank already provides central bank money in electronic form for wholesale settlement through its Real-Time Gross Settlement (RTGS) service. The Bank is improving this service through a transformational programme of RTGS Renewal. This will include a new core settlement engine to enable a range of new functionalities and capabilities to promote more efficient wholesale settlement. It would be able to interact with a broader set of actors and technologies. The Bank will continue to engage with the global central banking community to monitor and learn from the wide range of experiments, including those using new technologies, being conducted internationally.<sup>10</sup>

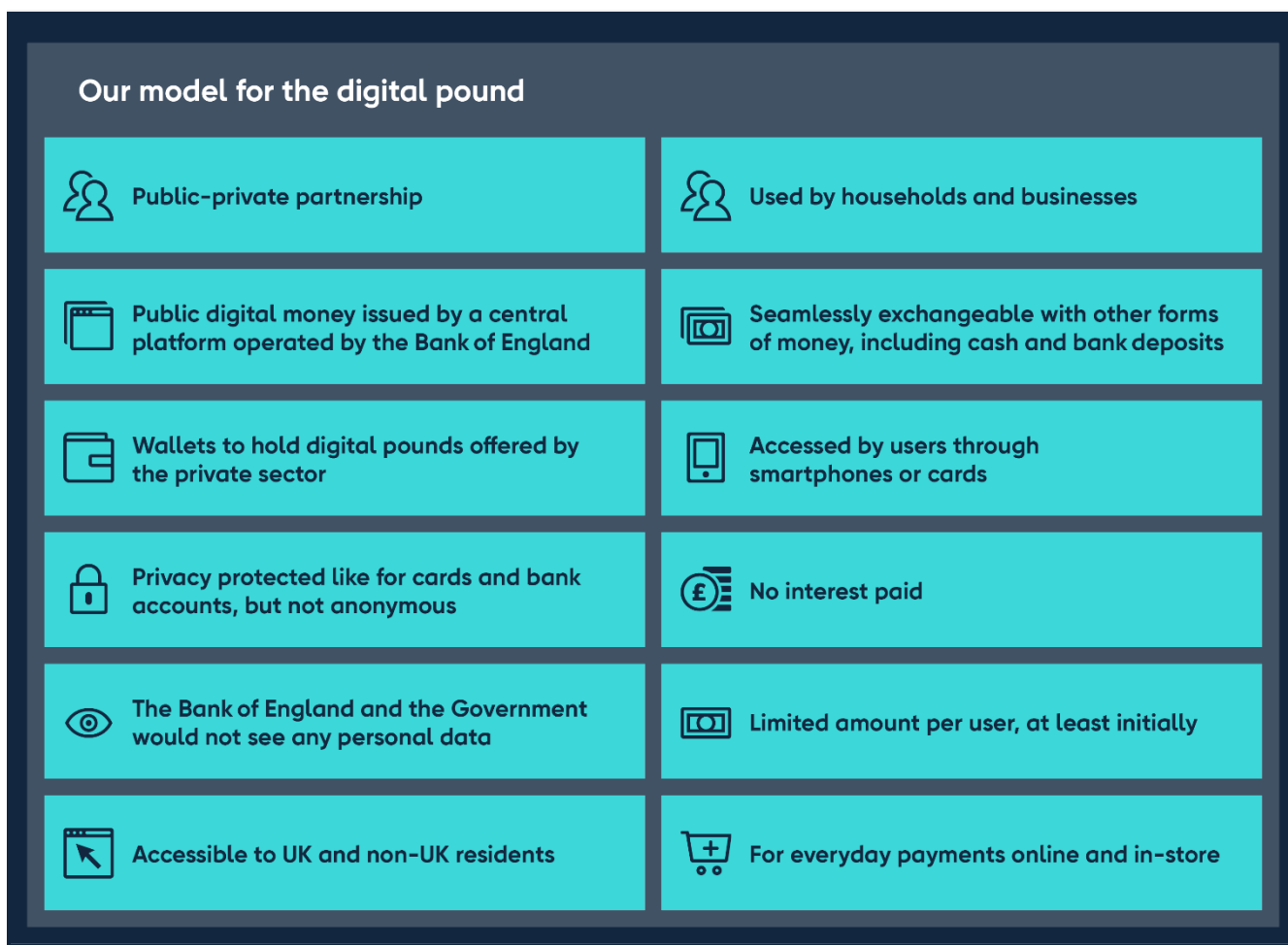
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<sup>8</sup> FCA (2020) – [Financial Lives Survey](#).

<sup>9</sup> UK Parliament (2023) – [Financial Services and Markets Bill](#).

<sup>10</sup> There is significant international experimentation around wholesale settlement. These projects have sought to innovate and enhance domestic interbank settlement (for example, early stages of [Project Jasper](#) and [Project Ubin](#)), securities settlement (for example, [Project Helvetia](#)) and cross-border payments (for example, [Project Jasper-Ubin](#), [Project Inthanon-LionRock](#) and [Project Dunbar](#)). Project Meridian, run by the London Centre of the BIS Innovation Hub, seeks to develop a prototype synchronisation operator to connect counterparties and co-ordinate settlement directly in central bank money.

## The digital pound



### **The digital pound would provide a public platform for private sector innovation.**

The digital pound system would be a public-private partnership. The private sector would play a crucial role in offering innovative and user-friendly services.

The Bank would issue the digital pound. This means it would be a direct claim on the Bank, as cash is today. It would be denominated in sterling, the currency of the UK, and £10 of digital pounds would always have the same value as, and be interchangeable with, a £10 banknote.

The Bank would provide the digital pound and the central infrastructure, including the ‘core ledger’. Private sector companies – which could be banks or approved non-bank firms – would be able to integrate into the central digital pound infrastructure and provide the interface between the Bank and users. They would do this by offering digital ‘pass-through’ wallets to end users. The wallets could be integrated into their other services. They are known as ‘pass-through’ wallets (hereafter referred to simply as ‘wallets’) because the user’s holdings of digital pounds are recorded anonymously on the Bank’s core ledger, in order to safeguard their privacy, and the wallet simply passes instructions from the user to the core ledger. End-users would interact with these wallets rather than directly with the Bank.

Users would interact with digital pounds by using their wallet to see their balance and instruct payments and transfers of digital pounds. It is likely most people would access the wallet via their smartphone, but there would be alternative options, such as a smart card.

We call this approach the 'platform model'. It plays to the respective strengths of the public and private sectors, and we judge it the most efficient mechanism to deliver the digital pound in a way that also catalyses innovation.

Firms providing wallets would be regulated to ensure payments using digital pounds are resilient, reliable, and compatible with other payments. HM Treasury and relevant regulatory authorities would consult on the details of a regulatory regime in future. Standards for participating firms would be set in such a way that encourages a competitive and innovative ecosystem.

To support trust and confidence, the digital pound would be subject to rigorous standards of privacy and data protection. Digital payments account for the majority of transactions today. These generate personal data which is held by users' payment providers, such as banks, to identify users in order to prevent fraud, money laundering and the financing of terrorism. Like current digital payments, the digital pound would not be anonymous because the ability to identify and verify users is needed to prevent financial crime.

Recognising, however, the fundamental importance of trust, the digital pound would be at least as private as current forms of digital money, such as bank accounts. Digital pound users would be able to make choices about the way their data is used. Therefore, our proposal for the digital pound envisages that Payment Interface Providers would identify and verify users, but anonymise personal data before any sharing with the Bank.

As a result, the identity of users would only be known to their Payment Interface Provider, and neither the Government nor the Bank would have access to digital pound users' personal data, except for law enforcement agencies under limited circumstances prescribed in law and on the same basis as currently with other digital payments and bank accounts more generally.



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**The digital pound would be designed to support the Government's and Bank's commitments to mitigate climate change.**

The Government is committed to reaching net zero greenhouse gas emissions by 2050, as part of [a wider strategy of managing, and mitigating, the impacts of climate change](#).<sup>11</sup>

The digital pound would be designed to be consistent with this commitment. While the digital pound would be a new form of digital money, it would be fundamentally different to a cryptoasset and would therefore not make use of the same energy-intensive technologies that underpin some cryptoassets.<sup>12</sup>

**The digital pound would be used like a digital banknote.**

The digital pound would be used like a digital banknote. It would be designed for everyday payments – both in-person and online – and would be a direct claim on the Bank. Like a physical banknote, and many current accounts, no interest would be paid on a digital pound. This makes it useful for everyday payments but not designed or intended for savings.

It should be seamless to exchange digital pounds for cash and bank deposits and vice versa. This would enable people to move money between accounts: £10 of cash or bank deposits could be exchanged for £10 of digital pounds and £10 of digital pounds could be exchanged for £10 of bank deposits or cash. If new, non-bank forms of payment such as stablecoins emerge, they would be required to be exchangeable with the digital pound.

Although a digital pound would be designed with UK users in mind, it would be available to non-UK residents too.

**The digital pound would not replicate physical cash in every respect.**

There would be some important differences with physical cash.

A digital pound would have the same (or stronger) privacy protections as bank accounts, debit cards or cheques. Individuals' personal details would be known to their private sector wallet provider in the same way they are for bank account providers today (and subject to the same privacy protections). But individuals' personal details would not be known by the Government or the Bank of England.

By providing the same privacy as most of the money we use, the digital pound would be designed to protect against fraud and counterfeiting, while not facilitating financial crime.

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<sup>11</sup> The Bank remains on track to meet its 2030 target to reduce absolute greenhouse gas emissions by 63% from 2016 to 2030. The Bank has committed to reduce emissions from its physical operations to net-zero by 2050 at the latest and aims to publish its net-zero transition plan as part of next year's climate disclosure. Bank of England (2022) – [The Bank of England's climate-related financial disclosure 2022](#).

<sup>12</sup> Blockchains which use a 'proof of stake' consensus mechanism are less energy intensive than those which use 'proof of work'.

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The Bank and HM Treasury would welcome views on this approach to privacy. Further information on data and privacy can be found in Section D.2.

Unlike cash, the amount of digital pounds an individual or business could hold would be subject to some restrictions, during an introductory period at least. This would ensure a smooth introduction without unintended consequences for monetary or financial stability. Those restrictions would still enable individuals to use the digital pound for their everyday transactions, including receiving their pay. It would be for a further decision, in the light of experience, whether those restrictions should be made permanent.

## Next steps

**The Bank and HM Treasury consider a digital pound is likely to be needed in the UK though no decision to introduce one can be taken at this stage. We will therefore step up development and move to the next stage of our work.**

This CP, and the Bank's accompanying [Technology Working Paper](#) are the conclusion of the 'research and exploration' phase of our work on the digital pound – Phase 1 of our digital pound roadmap (Diagram A.2). We will now move to Phase 2, to develop further, in both technology and policy terms, the model for the digital pound set out in Part D, upon which we are consulting.

This work in Phase 2, the 'design' phase, will enable us to respond to developments in the payments landscape and materially reduce the lead time if there is a future decision to introduce a digital pound in the future. It will involve investment in the Bank's technology capabilities, and an ambitious approach to the technology roadmap and collaboration with the private sector.

**By the end of the design phase we will have evaluated comprehensively the technological feasibility of a digital pound, determined the optimal design and technology architecture, and supported business model innovation through knowledge sharing and collaboration between the private and public sectors.**

Consistent with our objective of stepping up the development of a digital pound, and positioning the authorities to respond to developments in the payments landscape, our aims for Phase 2 – the design phase – are to:

- Cut lead-times on development and equip ourselves with the knowledge and capabilities to move into a 'build' phase, should there be a decision to introduce a digital pound.
- Determine the technological feasibility and investment needed to build a digital pound.
- Articulate, in detail, what the technology and operational architecture for a digital pound would look like.
- Assess and evaluate the benefits and costs of the digital pound architecture.
- Deepen the Bank's knowledge of CBDC technology and the private sector's understanding of our technology approach.
- Support the development of the broader UK digital currency technology industry through experimentation and proofs of concept.
- Provide the basis for a future decision on whether to introduce a digital pound and move to a 'build' phase.

**Consistent with these aims, the design phase will have two focus areas, both aiming to accelerate development of a digital pound (Diagram A.2).**

The first objective of the design phase is to develop a comprehensive, conceptual architecture that could be used as the blueprint for construction of a digital pound should we decide in the future to proceed to a 'build' phase. This will require us to set out in detail the comprehensive and precise requirements for digital pound technology and the commercial and operational implications of the digital pound.

The second objective is experimentation and proofs of concept – in collaboration with private sector innovators – to inform the development of our potential architecture and to build both the Bank's and the private sector's digital currency technology know-how. The Bank will operate an open and transparent process for participation in proof-of-concept work and share the lessons learned from those experiments.

**The design phase will present opportunities for business model innovation and technology capability in the UK fintech sector, benefits we expect to endure even if we do not build a digital pound.**

Technologies for a digital pound are also relevant to privately-issued digital money, such as stablecoins. By partnering with the private sector on proofs of concept and experiments, the Bank and HM Treasury seek to catalyse private innovation in digital currency technologies, encourage innovative digital money business models, and support knowledge sharing across the UK fintech sector. The design work will also benefit the Bank by informing our assessment of the economic benefits and the risks to financial stability of technologies supporting new forms of private digital money. Given our expectation that digital currency technologies will be significant in shaping the future of finance, the benefits of the design phase are expected to endure even if we do not build a digital pound.

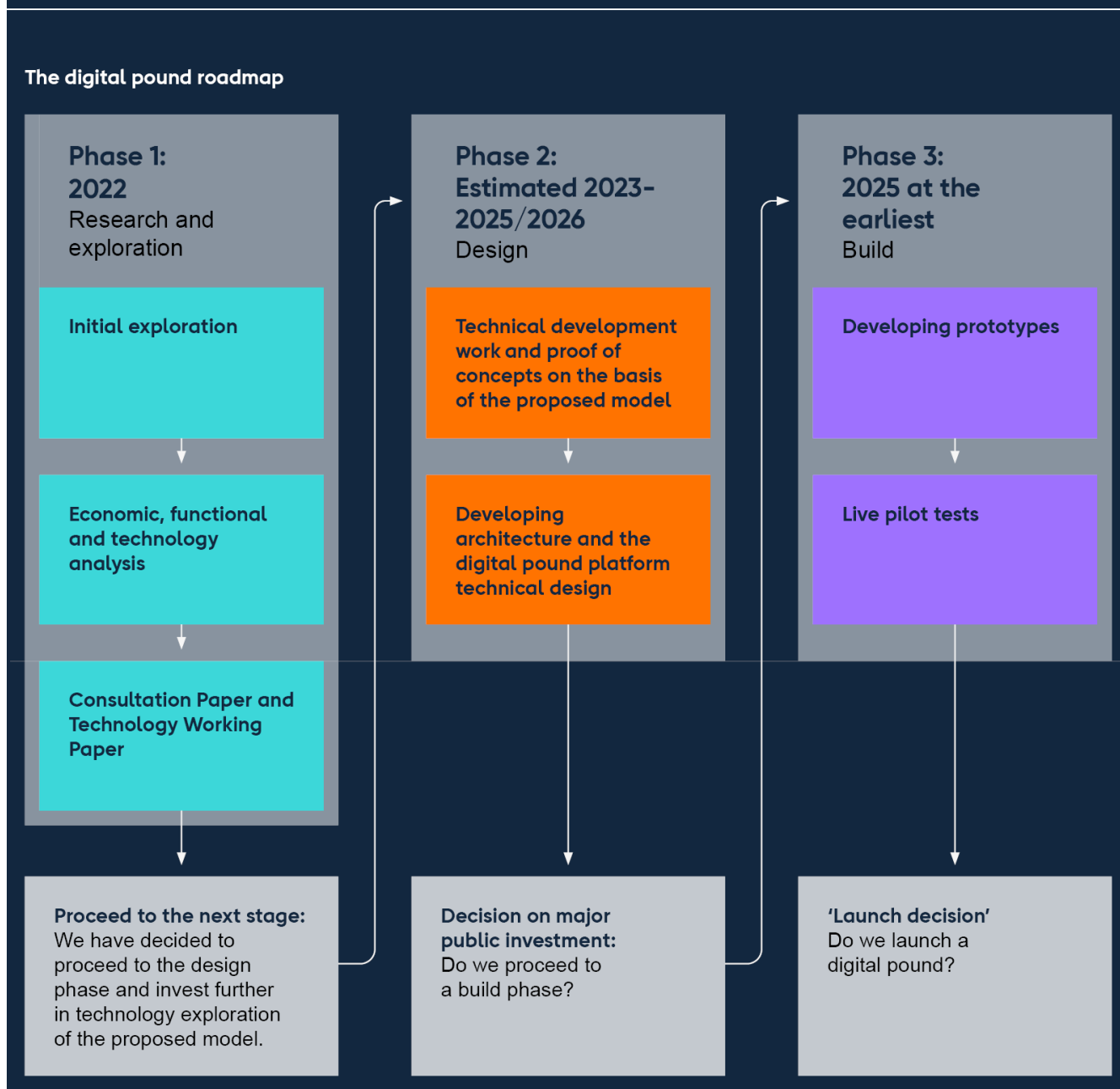
Like the research and exploration phase, the costs associated with the design phase will be funded by the Cash Ratio Deposit (CRD) scheme, which is used to fund the Bank's policy work, and thereafter by the new Bank of England Levy, which will replace the CRD scheme in future. No decision has been taken yet on whether to build or introduce a digital pound, and therefore the funding arrangement for any such build phase is still to be decided.

**After the design phase, there will be a decision on whether to build a digital pound.**

On completion of the design phase, following further consultation, and in light of the evolution in payments, the Bank and the Government will decide whether to proceed to build a digital pound (Diagram A.2). Work undertaken during the design phase would help to generate evidence to support a thorough evaluation of benefits and costs.

If we decide to move into a build phase, it would involve developing a prototype digital pound technology in a simulated environment, before moving to live pilot tests. A digital pound would only be launched if, among other things, it met our exacting standards for security, resilience, and performance.

Diagram A.2: The indicative digital pound roadmap has three phases



**A decision on whether or not to proceed to a build phase would be made at the end of the design phase, around the middle of the decade. This work will shorten the lead time for the introduction of a digital pound, which would be in the second half of the decade.**

The digital pound would be major national infrastructure and would require significant investment. Any decision on whether to build it would require extensive evidence and public engagement. The legal basis for the digital pound will be determined alongside consideration of its design.

Proceeding to the design phase now will enable a digital pound to be introduced in the second half of the decade. It would take time to build infrastructure that is secure, resilient, and high performing. Experience from overseas digital currency projects, and from digital innovation more generally, indicates that building user familiarity and understanding, and ensuring that innovative and customer-friendly applications emerge will be critical to success.

**We will engage stakeholders extensively and be transparent about our work.**

Transparency around our work, and engagement with a diverse group of stakeholders, will be more important than ever in the design phase. We will build upon our approach to date, including our [Engagement and Technology Forums](#). We will also continue engagement with civil society, academics, technologists, and stakeholders across the UK as well as internationally.

**This Consultation Paper seeks views on the key features of the model we intend to take forward in the next phase.**

This CP consults on the proposed design for a digital pound, given our primary motivations.

The remainder of this paper is structured as follows. Part B sets out why there is likely to be a need for the digital pound. Part C sets out the implications of the digital pound for the Bank's objectives of monetary and financial stability. Part D sets out the detailed model of the digital pound that we propose, subject to consultation, to develop further in the next stage of our work.

## Box A: New technologies and payments functionalities

Over recent years, new services and technologies have emerged in money and payments. They are typically being developed and deployed by firms who are outside the traditional financial sector, bringing a range of new entrants into payments markets.

These technologies are enabling new services and functionalities in digital payments, supporting novel use cases and features. These functionalities are already starting to permeate the markets for wholesale and business-to-business payments, supporting new business models and improved efficiencies.

In time, these technologies could also improve retail payments. Private firms who would provide services to digital pound users may be able to leverage some of these innovations. The accompanying [Technology Working Paper](#) explores how some of these technology trends might be applicable in the design of a digital pound.

**Embedded finance** is an innovation that could shape the retail payments experience. This is where financial services, and in particular payments, are integrated into another industry's service, function or feature. Examples include, 'one-click' purchases of goods via social media platforms, 'in-game' payments or, in the future, marketplaces and transactions in the metaverse. Embedded finance is also often associated with '**super-apps**', mobile apps which offer a one-stop shop for a wide array of products and services in a single, seamless, platform.

**Blockchain** technology, which underpins many cryptoassets (for example Bitcoin) also represents a major innovation. This introduced digital assets supported and distributed in a peer-to-peer fashion, backed by cryptography alone and stored on an immutable distributed ledger.

**Smart contracts** automate business logic based on pre-determined terms and conditions. The concept pre-dates the emergence of Blockchain and is not exclusive to any specific technology, but their use has been popularised recently by permissionless blockchain technologies such as Ethereum.

Developments in smart contracts have led a trend towards 24/7, 'always on', automated markets and products, and a wider world of **decentralised finance, or 'DeFi'**. DeFi applications use a combination of these technologies, including blockchain and smart contracts, to enable users to buy, swap, sell and settle crypto products without reliance on central intermediaries or institutions.

**Atomic swaps**, where the transfer of assets is linked to ensure that the transfer of one asset occurs if and only if the transfer of another asset also occurs, have also seen a rise in popularity. They are currently used in some traditional financial transactions to remove settlement risk and reduce liquidity inefficiencies. The Bank is already exploring atomic swaps and settlement in the wholesale market through its work on synchronisation operators as part of our RTGS Renewal programme.

The pseudonymous and public nature of permissionless blockchains has also spurred research and innovation in **cryptography**. That is particularly prominent in Privacy-Enhancing Technologies such as zero knowledge proofs. These can minimise the risk of personal data exposure and maximise data security. These techniques are not just applicable to blockchain and Distributed Ledger Technology (DLT), but to centralised applications as well.

Innovative cryptography can also be used in novel digital identity solutions. Those can enable users to prove their identity, or an attribute of their identity (for example that they are over 18), without having to share all the personal identity data in an ID document. The role of digital identity in the future digital economy could serve to generate further efficiencies and improve KYC and AML processes.



## Box B: Forms of money in use now, and in prospect

**To serve its important role in society, money must satisfy three criteria: it must be a store of value, a medium of exchange and a unit of account.**

Most money today is a kind of IOU (or promise to pay) that is special in that it is widely trusted and therefore performs important social and economic functions. It serves as: (a) **a store of value** with which to transfer purchasing power from today to the future; (b) **a medium of exchange** with which to make payments for goods and services, and (c) **a unit of account** with which to measure the value of all other goods, services, and financial assets.<sup>13</sup>

**There are several forms of regulated money in the UK monetary system.**

**‘Public money’** or ‘central bank money’ is issued by the Bank of England. It is currently available to the public in the form of physical cash.<sup>14</sup> Central bank money is financially risk-free in the sense that credit, market and liquidity risks are absent. **‘Private money’**, by contrast, is typically a claim on a regulated private commercial bank, in the form of digital bank deposits held by households or businesses (Table A.3).

Looking ahead, new forms of money such as ‘stablecoins’ could provide money-like instruments. But it is important that risks are managed robustly. The Financial Policy Committee (FPC) has set out two expectations that stablecoins must meet to be used as money-like instruments in systemic payments chains. The first expectation states that payment chains that use stablecoins should be regulated to standards equivalent to those applied to traditional payments chains. The second expectation states that stablecoins used as a money-like instrument should have standards equivalent to those that apply for commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat.

Stablecoins issued by non-banks could be offered under a tailored regulatory regime proposed by HM Treasury in the future.<sup>15</sup> The Financial Services and Markets Bill, currently in Parliament, seeks to address regulation of certain payment systems and related firms that use ‘digital settlement assets’, drawing on the current Bank of England and Financial Conduct Authority (FCA) regulatory regimes for e-money and payments systems to cover the use of stablecoins. The interaction between the digital pound and systemic stablecoins is discussed in Box E.

<sup>13</sup> See McLeay et al (2014) – [Money in the modern economy: an introduction](#) for a discussion of the evolution of money used in the economy and the types of money present today.

<sup>14</sup> The Royal Mint issues coins which can also be considered ‘public money’. Deposits held at the central bank (reserves) are also public money. They exist in digital form but are only available to certain financial institutions.

<sup>15</sup> The exact scope of stablecoins that will be covered will be developed as the regulatory regime takes shape.

Table A.3: Types of retail money	Issuer	Form
<p><b>Banknotes</b> Banknotes are <b>bearer instruments</b> – those who possess a banknote generally own it, and by handing it to someone else, the new holder becomes the owner.</p>	<p><b>Issued</b> by the Bank of England</p>	<p><b>Physical</b></p>
<p><b>Bank deposits</b> Commercial bank deposits account for around 95% of the money held by households and businesses. They are created by bank lending and are a liability of the banking system — banks stand ready to convert those deposits into central bank money in the form of physical cash or to honour payments customers make with those deposits, which typically involves a transfer of the claim to a customer in another bank. They could include bank deposits that are ‘tokenised’ using distributed ledgers.</p>	<p><b>Privately issued</b> by commercial banks</p>	<p><b>Digital</b></p>
<p><b>Stablecoins</b> Stablecoins refer to cryptoassets that seek to stabilise their value against existing national fiat currencies or other assets, typically by holding backing assets (Box E).</p>	<p><b>Privately issued</b> by bank or non-bank providers</p>	<p><b>Digital</b></p>

### **Unbacked cryptoassets are not money as they are high-risk, speculative assets.**

Cryptoassets are a digital representation of ownership or contractual rights that can be transferred, stored or traded electronically, and which typically use cryptography, distributed ledger technology (DLT) or similar technology.<sup>16</sup>

The majority of cryptoasset activity is driven by the use of highly volatile unbacked cryptoassets as speculative investment assets. Such cryptoassets (the most commonly known being Bitcoin and Ether) comprise around 90% of the total market capitalisation.

These unbacked cryptoassets do not provide holders with a safe or stable store of value or a reliable unit of account.

<sup>16</sup> See Bank of England (2022) – [Financial Stability in Focus: Cryptoassets and decentralised finance](#).

Unbacked cryptoassets do not represent a claim on a future income stream or collateral. As such, they only have extrinsic value in that they are worth only what someone is prepared to pay for them. As a result, large daily swings in their value are common – Bitcoin prices have fallen by 10% or more in a day around 25 times over the past five years.<sup>17</sup>

The outstanding value of cryptoassets, globally, grew around tenfold between early 2020 and November 2021, peaking at US\$2.9 trillion. The market capitalisation has since fallen to under US\$900 billion at the end of November 2022, so that it now represents under 0.2% of global financial assets.<sup>18</sup>

Volatility in the value of unbacked cryptoassets has meant they do not preserve wealth for their holders. Similarly, volatility in their purchasing power means they are unstable units of account. In turn, this volatility has led to their low acceptance as a form of payment so that they are not considered an efficient medium of exchange either.

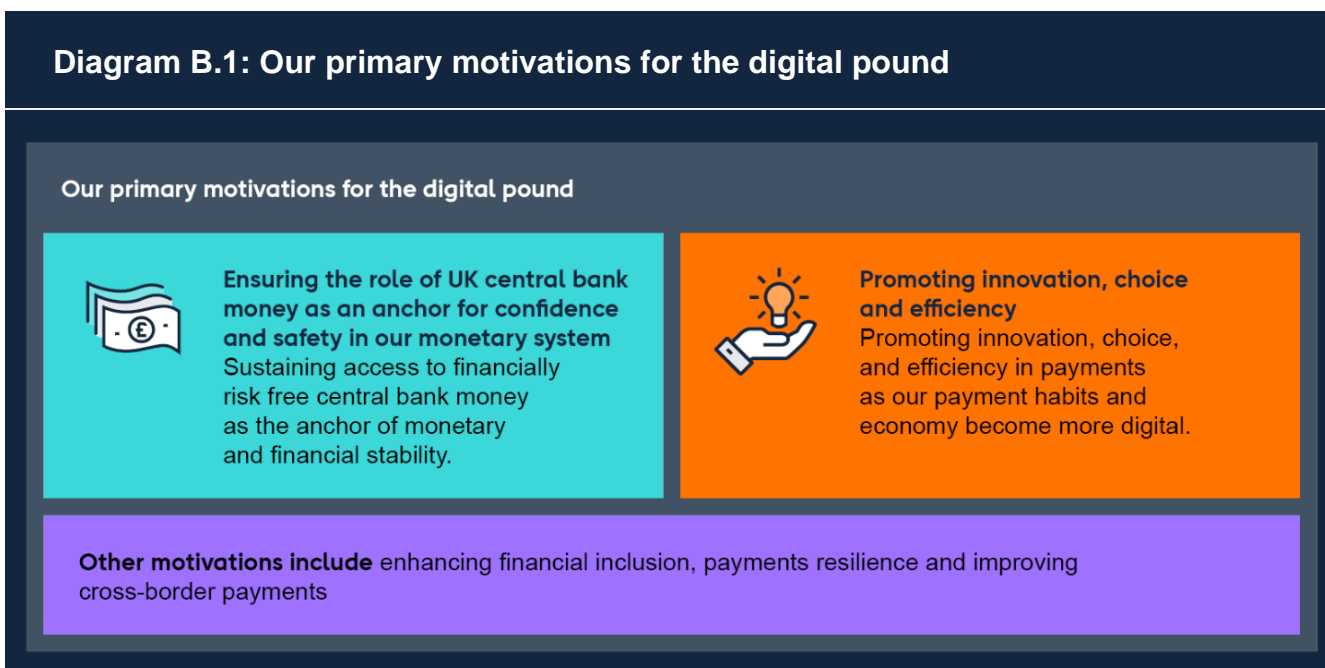
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<sup>17</sup> [CoinMarketCap](#).

<sup>18</sup> [CoinMarketCap](#) and Financial Stability Board (2021) – [Global Monitoring Report on Non-Bank Financial Intermediation](#).

## Part B: The likely need for a digital pound

Diagram B.1: Our primary motivations for the digital pound



**Our primary motivations for the digital pound are the availability of central bank money as an anchor for confidence and safety in money, and promoting innovation, choice, and efficiency in payments.**

Box C discusses trends in the digital economy and the payments landscape. In light of these trends, the Bank and HM Treasury judge there is likely to be a future need for, and benefits from, the digital pound. We consider there are two primary motivations:

1. To sustain access to UK central bank money – ensuring its role as an anchor for confidence and safety in our monetary system, and to underpin monetary and financial stability and sovereignty; and
2. To promote innovation, choice, and efficiency in domestic payments as our lifestyles and economy become ever more digital.

These two motivations go hand in hand. For the digital pound to play the role that cash plays in anchoring the monetary system, it needs to be usable and sufficiently adopted by households and businesses. Some of that adoption will arise from innovation which in turn will be supported by a public digital pound infrastructure available to all eligible private-sector firms that wish to develop new payment services.

There are other motivations for developing the digital pound. These include supporting financial inclusion and improving domestic payments resilience and cross-border payments.<sup>19</sup> These have also helped to inform our design choices, set out in Part D.

## Central bank money as the anchor of monetary and financial stability

### **Uniformity and trust in the safety of money are the bedrock of our economy.**

The stability of the UK economy and monetary system relies on the uniformity of money: that all forms of money – both bank deposits and cash – are valued equally ('at par' or 'face value'), denominated in a common currency (sterling) and interchangeable with each other. £10 in a bank account can be easily changed into a £10 banknote, and deposits held in one bank are valued equally to the deposits in another and can be moved between them.

Access to public money – which is a safe liquid asset backed by the state – and the uniformity of money are critical for the smooth functioning of the economy. That is because they ensure that households and businesses can be confident in the value of money, regardless of its form and issuer.

Widely usable public money that will always be accepted helps to anchor both the perception of uniformity and its reality. Holders of commercial bank money can convert their money into public money at any time they choose.

### **The three pillars of the monetary system that deliver uniformity (Diagram B.2):**

1. **Retail central bank money** – currently in the form of cash – underpins uniformity. Cash is currently the only form of central bank money available to households and most businesses. Its existence and one-to-one convertibility with commercial bank money supports public confidence that financially risk-free money widely accepted for transactions in the UK will be available in both stress and normal times. Convertibility of bank deposits into cash further supports confidence in private money and the banking sector. It provides users with tangible proof that money kept in bank deposits is safe, while the option to withdraw deposits as cash, one-to-one and on demand, gives depositors control of their private money holdings.<sup>20</sup> It provides the acid test for the safety of commercial bank money as commercial banks must be able to convert customers' money into cash – public money denominated in sterling – on demand. As all commercial banks must offer this option, this supports the uniformity of money.

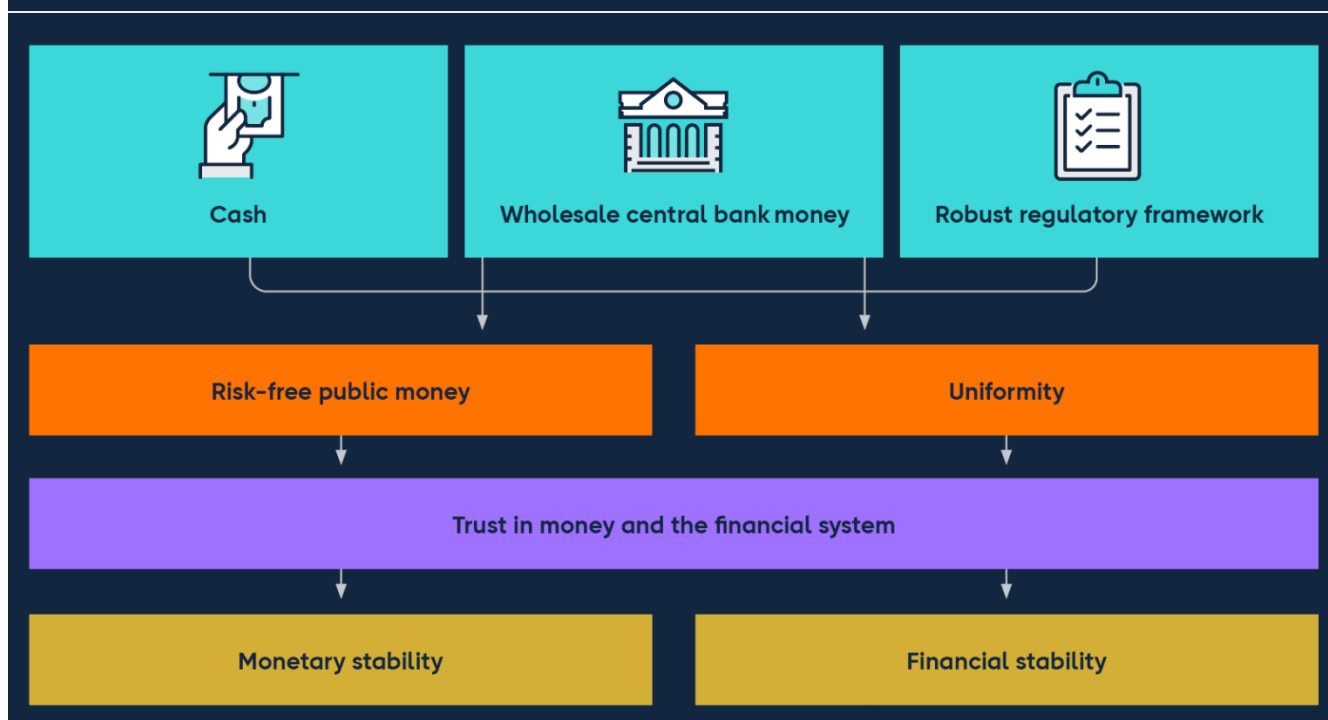
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<sup>19</sup> The Bank and HM Treasury are required by the Equality Act 2010, in the exercise of their respective public functions, to have due regard to the equality considerations set out in the Public Sector Equality Duty. In their exploration of the digital pound, relevant considerations will therefore include the impact of the design on individuals with certain protected characteristics, including the impact on individuals who rely on cash as the dominant means of making payments.

<sup>20</sup> See Panetta (2021) – [Central bank digital currencies: a monetary anchor for digital innovation](#), and Armelius et al (2020) – [Is central bank currency fundamental to the monetary system?](#).

2. **Wholesale central bank money** also anchors the value of private money issued by commercial banks. Wholesale central bank money (deposit accounts held by commercial banks at the central bank, also known as ‘reserves’) is a financially risk-free way for financial firms to store value and make payments to each other via the Bank’s RTGS core infrastructure. Commercial banks commit to settle transactions with other banks in reserves. This ensures uniformity between deposits at different banks as they can always be converted, via the central bank, to deposits in another bank at a rate of one-to-one.
3. **Robust regulation and supervision** target the safety and soundness of financial institutions, the resilience of the wider financial system and therefore private money. Prudential requirements for banks support the public’s confidence that they will meet customer demand to redeem their deposits and honour their commitment to convert deposits into central bank money one-to-one. The [Financial Services Compensation Scheme](#) provides insurance on deposits up to £85,000, further supporting public confidence. And the UK’s resolution regime ensures that if a bank failed, it would do so in an orderly way with disruption to any of its vital services minimised.<sup>21</sup>

**Diagram B.2: Three pillars of the monetary system deliver uniformity and trust in money and the financial system**



<sup>21</sup> The UK established a framework for resolution (known as the ‘resolution regime’) in the Banking Act 2009. This followed the 2008 financial crisis, when alongside other countries, the UK felt it had no choice but to bail the banks out because they were ‘too big to fail’. See [Resolution | Bank of England](#).

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**Uniformity and safety could be threatened by a combination of lower cash use and the emergence of some new forms of private digital money.**

As cash continues to become less central and less usable in many people's lives, central bank money will become less used for everyday transactions. The decline in the use of cash is expected to continue as commerce and payments become more digital, even though UK authorities are committed to keeping cash available as long as there is demand for it.

Technological advances also make it likely that new forms of private digital money that enable new services will emerge (Box A). Stablecoins, for example, are different to conventional bank deposits and are offered by institutions including non-banks, such as big technology platforms. These offer the prospect of much deeper integration of money and payments into digital services, for example through smart contracts. The emergence and take-up of these new forms of private digital money are uncertain, as is whether they are issued by existing financial institutions or new entrants, such as 'Big Tech' firms and start-ups.

There is a risk that new forms of private digital money emerge in a fragmented way, such that they cannot always be easily converted into other types of money. Fragmentation may arise if holders of one form of money can only interact with others using the same system or from the same issuer. It may also arise if there are restrictions on accessing certain services based on the form of payment. For example:

- **Walled gardens and closed loop systems** are closed payment systems in which all operations are controlled by the system operator. For example, an internet platform issuing a certain form of money might impede other firms' ability to provide wallet services for that money. Alternatively, users may not be able to transact with users outside of that specific system. For example, in many countries someone who holds their money in a non-bank can find it cumbersome to transfer balances to a user of a different non-bank (for example, Venmo in the US and, until recently, Alipay and WeChat Pay in China).<sup>22</sup> This contrasts with the UK banking sector, within which someone who holds money in one bank is able to pay someone who holds money in another bank.
- **Convertibility may be costly, complex, or slow** between different forms of digital money, even where conversion is possible. And wallet services providers, who act as intermediaries, might also restrict transactions.

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<sup>22</sup> In October 2022, Alipay and WeChat Pay (which together account for more than 90% of the total mobile payments market in China) launched features that permit inter-platform transfers.

A new form of non-sterling digital money may threaten uniformity if it were used for a significant amount of retail transactions in the UK. If that were to happen at scale, sterling might no longer be the unit of account for a significant portion of UK transactions. This could compromise monetary sovereignty – the UK authorities’ ability to achieve price stability through monetary policy. The Bank might also be unable to gain assurance about the robustness and supervision of a foreign-operated form of digital money. This could compromise financial sovereignty – the UK authorities’ ability to effectively regulate systemic financial institutions and payments systems.

Such an outcome is judged to be unlikely, but if it materialised the impact would be very significant, difficult to resolve and beyond authorities’ risk tolerance (Annex 1).

### **Preventing risks to uniformity underpins the case for the digital pound.**

Declining cash use and the potential emergence of new forms of private digital money suggest that, if current trends continue, the digital pound is likely to be needed in the future, alongside cash, to anchor the monetary system.

The digital pound could support the uniformity of money by replicating the role of cash in a highly digitalised economy. It would offer continued access to retail central bank money: a financially risk-free, highly trusted, and accessible means of payment for households and businesses.

The digital pound could, if designed appropriately, also complement and support new forms of private digital money and payment services. For example, by acting as a digitally-native ‘bridging’ asset between different forms of digital money, it could support their convertibility and enable them to trade at face value.<sup>23</sup> And importantly, by establishing technical standards available to all, it could promote interoperability among different digital platforms. It would also provide a widely usable backstop means of payment, giving households the security that they could exit the banking sector or private payment platforms to a digital, financially risk-free asset.

If, in future, digital money denominated in other currencies became widely available, the digital pound could play an important role in preserving sterling as the unit of account in the UK. For example, by offering users the new functionalities in sterling as offered by new non-sterling digital money, the digital pound would reduce the incentive to use such non-sterling money.

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<sup>23</sup> A ‘digitally native’ form of money only exists in the digital world, rather than having a physical form.



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## Supporting innovation, competition, choice, and efficiency

### Innovation boosts the UK economy and supports growth and inclusivity.

The way we make payments has evolved over centuries – from metallic coins, to banknotes, to the paper-based use of bank deposits like cheques, to the range of options for payments today. These innovations have benefited users, improved security, reduced frictions and the cost of transactions and ensured the way we pay has kept pace with the demands of modern life.

Recent innovations, within an appropriate regulatory framework, have opened up the payments market, enabling new firms to enter, and have widened access to payment services, resulting in improved user experience. Innovation leads to wider participation in markets – by both providers and end-users – as well as improvements in convenience, speed, cost, and choice. Such payments innovations increase productivity and hence the growth of the UK economy.<sup>24</sup> For example:

- **‘Contactless’** card payments, launched in 2007, are now used by close to 90% of people and make up almost a third of all payments in the UK.<sup>25</sup> This innovation has benefited retailers and customers and increased the speed and convenience of smaller transactions.
- Nearly a third of UK adults are registered for **mobile payment apps such as ApplePay or GooglePay**.<sup>26</sup> Such apps offer integration into ecommerce, security benefits, and convenience.
- **‘Payment facilitators’** (for example, Zettle by PayPal, Square, SumUp) have helped merchants, particularly smaller businesses, to accept card payments and join the digital economy.<sup>27</sup>
- **Open Banking** enables consumers and small and medium-sized enterprises (SMEs) to share their transaction data securely with trusted third parties and allows them to initiate payments directly from their payment accounts to the bank account of their payee, without the use of cards. Although in its early days, accepting payments in this way is already reducing transaction costs for some businesses.<sup>28</sup>

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<sup>24</sup> Department for Business, Energy and Industrial Strategy (2021) – [From ideas to growth](#).

<sup>25</sup> Barclaycard (2021) – [Tap, tap, tap: a brief history of contactless payments](#) and UK Finance (2022) – [UK Payment Markets Report](#).

<sup>26</sup> UK Finance (2022) – [UK Payment Markets Report](#).

<sup>27</sup> PSR (2021) – [Market review into card-acquiring services](#).

<sup>28</sup> Open Banking – [How Open Banking can help businesses](#).

### There is scope for innovation to generate further efficiencies in payments.

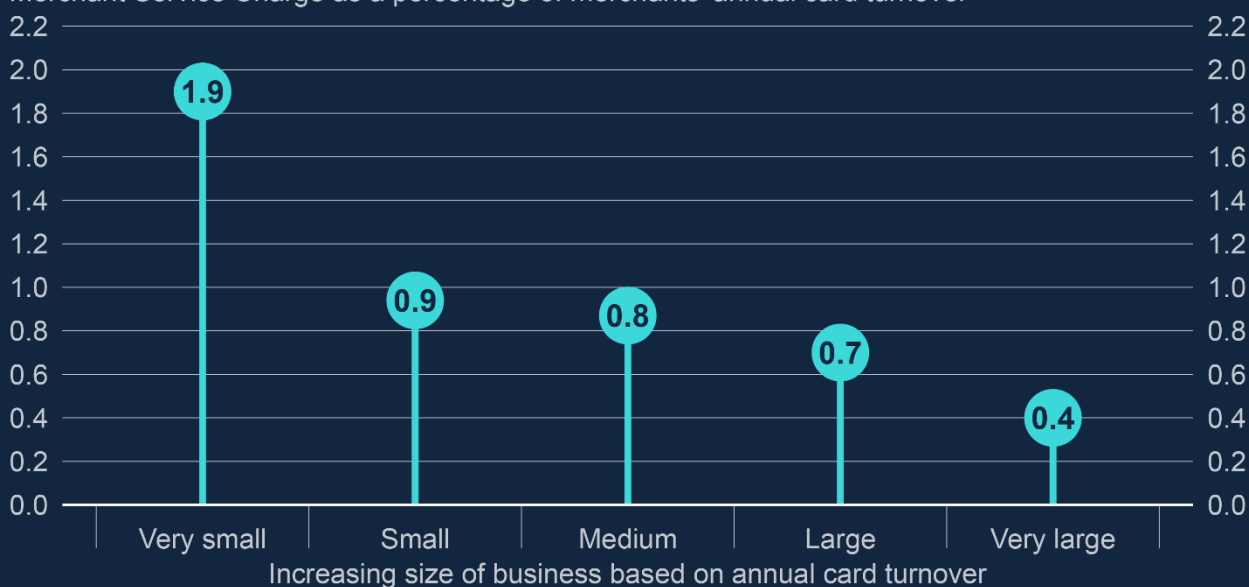
Innovation has not come to an end and there is likely scope for it to further reduce payment costs and generate further efficiencies in payments.<sup>29</sup> That improvement might be facilitated by new technologies and new entrants to payments markets offering new functionalities.

Small and medium-sized merchants pay higher fees for accepting card payments than larger businesses.<sup>30</sup> The average merchant service charge for card payments was 0.6% of each transaction in 2018, but the smallest merchants were paying over four times more on average than very large ones (Chart B.3).<sup>31</sup> Although these costs are not paid directly by customers, they may feed into higher prices in the economy overall.

Elsewhere in the payments landscape, cross-border transactions in particular are often very costly. The average cost of a payment sent to another country is about 6% of the value sent.<sup>32</sup>

**Chart B.3: Charges faced by merchants to accept cards are higher for smaller businesses**

Merchant Service Charge as a percentage of merchants' annual card turnover



<sup>29</sup> This Consultation Paper focuses on the scope for innovation via the digital pound to generate further efficiencies in retail payments. Innovation in UK wholesale payments, by contrast, is primarily being taken forward through the Bank's RTGS Renewal Programme and opening up access, for example to non-bank payment system providers for settlement accounts.

<sup>30</sup> Unlike card-based payments, cash handling between merchant and customer is free at the point of sale for a cash payment. But the merchant does face costs associated with storage, transport and banking of cash.

<sup>31</sup> Haldane (2020) – [Seizing the Opportunities from Digital Finance](#).

<sup>32</sup> The World Bank (2022) – [Remittance Prices Worldwide Quarterly](#).

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**But innovation can come with risks of concentration.**

UK authorities have identified several characteristics of digital markets that may lead to concentration.<sup>33</sup> Those suggest that the future development of private digital money issuance could tend towards a small number of firms taking a significant market share. Such characteristics include network effects (where platforms become more valuable to their users as they grow), economies of scale and scope (which can act as a barrier to entry for small firms), and data advantages (which allow incumbents to hone and personalise their products in a way that is difficult for new entrants to replicate).

As recognised in a recent paper by the Financial Conduct Authority (FCA), ‘concentration and market power are not inherently harmful. The success of a small number of firms can reflect the fact they offer more innovative products, integration that benefits consumers, or greater efficiency.’<sup>34</sup>

Market concentration might limit consumer choice, however. If operators or issuers of new forms of private digital money were to develop and entrench dominant market positions, they may create ‘walled gardens’ or payment systems with low interoperability (as discussed in Part B in the context of risks to the uniformity of money).

Market concentration might also limit the ability of new firms to enter the marketplace. So short-term innovation in digital payments might, under certain conditions, generate dominance and reduce long-term innovation. Such outcomes might be detrimental to the Government’s objectives around competition and innovation. For example, in 2022 the UK Competition and Markets Authority launched an investigation into Google’s Play Store rules, which obliged app developers offering digital content to use Google’s own payment system for in-app purchases.

Authorities must remain proactive to support safe and sustainable innovation. In 2022, the Payment Systems Regulator acknowledged that there is a ‘long-term risk to competition in retail payments’ based on the existing concentration, and the difficulty for new firms to enter the market to address this.<sup>35</sup> And the FCA found that, while Big Tech firms’ entry in financial services could benefit many consumers at least in the short-term, there was a risk in the longer term that competition benefits could be eroded if Big Tech firms created and exploited entrenched market power to harm healthy competition and worsen consumer outcomes.<sup>36</sup>

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<sup>33</sup> The Furman Review for HM Treasury and the Department for Business, Energy and Industrial Strategy (2019) – [Unlocking digital competition: Report from the Digital Competition Expert Panel](#).

<sup>34</sup> FCA (2022) – [DP22/5: The potential competition impacts of Big Tech entry and expansion in retail financial services](#). The paper predominantly considers Google (Alphabet), Apple, Meta Platforms (including Facebook, WhatsApp, Instagram), Amazon and Microsoft.

<sup>35</sup> PSR (2022) – [The PSR Strategy](#) and BIS Bulletin No 45 (2021) – [Regulating big techs in finance](#).

<sup>36</sup> FCA (2022) – [DP22/5: The potential competition impacts of Big Tech entry and expansion in retail financial services](#).

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**The digital pound can support innovation, choice and efficiency.**

The digital pound would be a public-private partnership designed to support innovation and competition. The Bank would provide core infrastructure and the settlement asset – the digital pound – upon which a competitive ecosystem of private sector firms would provide innovative user-facing payment services (Part D). This model of a flexible core platform would lay the foundation for the private sector to innovate to provide new services to the public.

The digital pound could drive further efficiency in the provision of transaction services to merchants and households. But, more importantly, it could provide an open platform for the development of future services by the private sector. Experience of digital innovation to date suggests that new services will emerge as digitalisation of daily life continues.

There are already examples of the direction in which the digital pound could support innovation through improved functionality for users, such as programmability. Technology is emerging that allows users to set rules to limit their spending on certain products, for example on gambling, or to automatically save a small amount of money after each purchase. This technology builds on existing, familiar applications like Direct Debit.

Programmability, delivered by Payment Interface Providers, could also enable the use of smart contracts, which carry out specific actions based on pre-defined terms and conditions. For example, a smart contract could be set up to immediately pay a supplier on signed receipt of goods, rather than having to wait for an invoice to be issued and then paid. Another type of function the digital pound could enable is micropayments, which are payments of extremely low value. Supporting micropayments could enable new business models, such as paying a small amount to read a single newspaper article, rather than having to pay for a whole subscription.

The digital pound's support for greater efficiency in retail payments in the UK would complement the Bank's efforts to enhance wholesale payments through RTGS Renewal.

**The digital pound may offer other benefits. And it should not crowd out other forms of digital innovation.**

The digital pound may offer other benefits, aside from the primary motivations discussed in this section (Box D). Those benefits might include payments resilience, support to financial inclusion and improved cross-border payments. Importantly, the digital pound should not crowd out or prevent other forms of digital innovation by the private sector.

For example, HM Treasury and the Bank are also establishing a regulatory framework for systemic stablecoins.<sup>37</sup> One possibility under consideration is that they could be backed by deposits held with the central bank. Such a stablecoin would be economically like the digital pound, but they could coexist and complement one another (Box E).

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<sup>37</sup> The Financial Services and Markets Bill, which is being considered by Parliament, and relevant planned secondary legislation, aims to bring fiat-backed stablecoins into the remits of relevant UK regulatory authorities. The FCA would regulate activities including stablecoin issuance and custody. The Bank would have responsibility for regulating systemic stablecoins, subject to a HM Treasury decision to recognise these as systemic.

## Box C: Future trends in payments drive the likely need for the digital pound

The digital pound would only be introduced if it supported both the Bank's and HM Government's objectives. A decision to proceed will depend on whether the payments landscape evolves in line with current trends in the UK and abroad, and so the Bank and HM Treasury's priority is to build readiness should it be required. While we cannot say for certain what the digital economy and payments landscape might look like in coming years, we have identified key trends that may influence our decision to proceed.

- First, whether, and how sharply, **cash use continues to decline**. While UK authorities are committed to ensuring continued access to cash for those who wish to use it, trends in recent years suggest the use of cash for payments may continue to decline in the future.
- Second, **the emergence of new forms of private digital money issued by new payment entities**. Today, card-based transactions (for example via Visa and Mastercard) dominate retail payments in the UK. Banks connect with regulated payment and technology companies, enabling electronic payments and settlement with commercial bank money. But new business models and novel technologies, including Distributed Ledger Technology (DLT), mean that payments services can now be offered by non-bank firms. This includes the potential for e-money, stablecoins and deposits at 'narrow banks'.<sup>38</sup> The emergence and take-up of these new forms of private digital money is uncertain, as is whether they are issued by existing financial institutions or new entrants and start-ups.
- Third, whether **new forms of private digital money display adequate interoperability**. This is how easily new forms of money can be converted into existing (and other new) forms. It is also the ease with which new forms of money can be transferred between individuals, as well as whether they can be spent in a variety of places or only on particular platforms or locations.
- Fourth, **international developments in CBDC and private digital money**. Many countries are exploring retail CBDC.<sup>39</sup> Some are already live and some may be introduced in more jurisdictions in the near future.<sup>40</sup> A survey of central banks showed that 68% consider it likely or possible that they will issue a retail CBDC in the short or medium term.<sup>41</sup> Some new forms of digital money might be issued

<sup>38</sup> Deposits at banks with specialist payments-focused business models. Narrow banks typically hold very low risk assets with maturities that match the bank's liabilities.

<sup>39</sup> For example, [European Central Bank \(2020\)](#) and [Federal Reserve \(2022\)](#).

<sup>40</sup> For example, [Central Bank of the Bahamas \(2019\)](#).

<sup>41</sup> BIS (2022) – [Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies](#).

that are denominated in currencies other than sterling, but still available in the UK. These could be dollar (or other) denominated stablecoins or foreign CBDCs available to UK residents.

In addition to these trends in retail payments, there is also innovation in wholesale payments, which will be an important factor in shaping the future payments landscape in the UK and globally. The Bank is renewing its Real-Time Gross Settlement (RTGS) system to support more efficient wholesale settlement in central bank money. In 2024, a new RTGS core settlement platform will be introduced, offering greater resilience and a range of new features and capabilities. Wholesale settlement is discussed in more detail in Box H.

## **Box D: Other motivations for the digital pound**

Beyond its primary motivations, the digital pound may offer additional benefits.

### **The digital pound could improve resilience as an additional payment rail.**

A key aspect of financial stability is the resilience of payment systems used daily by households and businesses. Existing UK payments systems are already regulated and supervised to ensure they are resilient. This intends to avoid disruption and ensures they recover quickly on the rare occasions that disruption occurs. The digital pound could improve resilience as a new payment system that could operate outside of existing ones for digital pound-to-digital pound payments.

Like other digital payments systems, such as card networks, the digital pound would be exposed to risks of electricity outages and cyber-attack. The Bank and other UK authorities would need to ensure the digital pound had the highest standards of resilience against such risks.

### **It could also complement existing financial inclusion initiatives.**

Financial inclusion is relatively high in the UK and the Government has already made good steps towards enhancing it. The digital pound could complement existing initiatives as another option for some financially excluded groups (Box J). One way to achieve this could be through offline payments – payments which can be conducted without a data connection. While challenging to implement (see [Technology Working Paper](#)), this could be valuable in remote areas or for users with limited internet access.

### **Using the digital pound to improve cross-border payments is an opportunity but would take time and require international co-operation to deliver.**

Cross-border payments are typically expensive, slow and opaque. Improving the existing global infrastructure for these is a priority for the G20 group of governments, working with the Committee on Payments and Market Infrastructures.

CBDCs such as the digital pound and those of other countries, would in principle offer the opportunity to start from a clean slate, avoiding frictions that have built up between existing national payments systems. But they would not address all frictions. For example, CBDCs would not themselves alleviate frictions caused by different Anti-Money Laundering regulations/Combating the Financing of Terrorism (AML/CFT) standards between countries. Addressing those is a focus of the G20 and several initiatives are under way globally to improve existing systems (for example through linking up national faster payments systems).

So, while enhancing cross-border payments is not a primary motivation for the digital pound, we would work closely with other countries to ensure that its design did not introduce unintended barriers to payments with other currencies and, in so far as other countries issue their own CBDC, would offer the potential for interlinking.



**Consultation questions**

1. Do you have comments on how trends in payments may evolve and the opportunities and risks that they may entail?

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## Part C: Monetary and financial stability

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### **If introduced, the digital pound would need to support the Bank's objectives for monetary and financial stability.**

The Bank's statutory objectives are to maintain monetary and financial stability, which includes maintaining low and stable inflation, and stable provision of credit to the economy.

The digital pound would contribute to the Bank's objectives by acting as an anchor for the wider monetary system, promoting trust and confidence in money and payments (Part B).

### **Care must also be taken in its design to manage any risks it could introduce to those objectives.**

The digital pound could also pose some risks, which would need to be managed before it could be introduced. The introduction of the digital pound would require adjustment in the financial system. Depending on the speed and scale of uptake by households and businesses, the transition in particular could affect some bank business models. This could affect the cost and availability of credit in the economy and there could also be an impact on the transmission of monetary policy.

If a digital pound were to be introduced, the Bank would seek to limit such financial stability and monetary policy risks through the design of the digital pound, particularly during that transition period. The Bank would aim to ensure the digital pound's introduction was orderly and that the risks in transition were carefully managed.

The Bank does not, however, seek to preserve the status quo structure of the financial system or to protect any business model within the commercial banking sector from the impact of technological innovation and competition.

## Financial stability

### **New forms of digital money, both the digital pound and stablecoins, could adversely impact banks' businesses models and affect the cost and availability of credit.**

The introduction of the digital pound would result in households and businesses switching some of their bank deposits to digital pounds. That loss of deposits for commercial banks is known as 'bank disintermediation' and, depending on the speed and scale, could have implications for financial stability.<sup>42</sup>

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<sup>42</sup> See [Broadbent \(2016\)](#), [Mancini-Griffoli et al \(2018\)](#), [Andolfatto \(2018\)](#), [Kumhof and Noone \(2018\)](#), [Meaning et al \(2018\)](#), and [Chiu et al \(2019\)](#), among others.

As set out in the Bank's 2021 [Discussion Paper](#), banks losing deposits may replace them by borrowing in wholesale funding markets to maintain the same level of lending.<sup>43</sup> To the extent that wholesale funding is more costly than deposits, banks might pass this on in their lending, by increasing the price of credit (loans) to households and businesses or reducing the quantity of credit they are willing to supply, or both (Diagram C.1).

### Diagram C.1: The movement of deposits from banks to digital pounds could impact credit



#### As bank deposits flow to a newly introduced digital pound...

Household and businesses transfer some bank deposits to digital pounds or new form of private digital money eg stablecoins.



#### ...commercial banks lose retail deposit funding...

With the loss of retail deposits, banks could raise longer-term wholesale funding in order to maintain the provision of credit to individuals and businesses.



#### ...and could pass on higher wholesale funding costs to customers...

Wholesale funding is more costly than retail deposit funding, so banks could pass on the higher cost to customers by increasing the price of loans. They could also reduce the quantity of credit and some borrowers could switch to non-banks.



#### ... so credit conditions could tighten but by how much is uncertain.

The impact of a digital pound on the cost and availability of credit is uncertain. An illustrative scenario in the Bank's 2021 Discussion Paper suggested that even if 20% of commercial bank retail deposits migrated to new forms of digital money, the impact on lending rates and credit provision in a steady state could be modest and manageable.

<sup>43</sup> First, banks lose central bank reserves, which are highly liquid assets, when they lose deposits. Second, in order to maintain their regulatory liquidity and funding ratios, banks could raise longer-term wholesale funding from capital markets to buy high-quality liquid assets (HQLA), such as government bonds.

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**The extent of bank disintermediation and impact on the cost of credit depends crucially on the speed and scale of adoption of the digital pound. This is uncertain and would vary between transition, steady state and stress.**

The extent of bank disintermediation and the impact on the cost of credit would depend on the behavioural response of households and businesses to the digital pound, including how much of their money they would want to keep in that form. This is uncertain and very difficult to forecast. And it would probably vary between transition, steady state and stress.

The illustrative scenario in the Bank's 2021 [Discussion Paper](#) suggested that, under the assumptions it used, the impact of even a very high degree of deposit disintermediation on credit conditions in **steady state** would likely be modest. Assuming around 20% of commercial bank retail deposits migrated to new forms of digital money (equivalent to the total amount of non-interest-bearing deposits in the UK), bank lending rates were estimated to rise by around 20 basis points in steady state, although there is considerable uncertainty around this estimate.<sup>44</sup>

The speed of the **transition** to that steady state following the introduction of the digital pound would matter, however. So it is particularly important to manage that period, during which the behavioural response of households and businesses would become clearer, and the financial sector would adjust.

Limits on holdings of the digital pound during a transition period would constrain the extent of outflows from bank deposits and allow UK authorities to learn more about its impact (Part D).

Transition could take several years. During that period, there would be uncertainty about the extent of deposit outflows, and for a given amount of outflows, banks' ability to replace lost retail funding with wholesale funding in a timely and cost-effective way. In turn, there would be uncertainty about the impact on banks' overall cost of funding and the extent to which the cost and availability of credit may be affected. The non-bank sector's ability to replace any fall in bank lending to borrowers and the extent of any disruption to sterling money markets would also be unclear.

In periods of banking or financial **stress**, where consumers seek safety and do not wish to hold assets perceived as risky, demand for digital pounds could be particularly strong. If outflows to digital pounds were particularly large and rapid, banks might be unprepared and find it difficult to replace lost deposits. Existing bank regulation, which includes requirements for banks' liquidity holdings, and hence also their ability to draw on the Bank's liquidity facilities, provides resilience to the banking system against this risk.

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<sup>44</sup> Under other assumptions the increase in lending rates might be around 80 basis points (Chart 3.4 in the Bank's [2021 Discussion Paper](#)).

In time, the financial stability risks of large and rapid disintermediation due to a digital pound could further diminish and should be manageable if the financial system had the time and flexibility to adjust. That adjustment would be through the provision of greater long-term funding to banks, or the provision of more market-based financing to the real economy. However, as noted in the Bank's 2021 [Discussion Paper](#), there could be other increased risks, including from banks becoming more reliant on wholesale funding and less on deposits.

## Monetary stability

**The digital pound would not fundamentally alter the traditional channels of money creation, but it might affect monetary stability.**

Today, money in the UK economy is created in two ways. First, the Bank can increase the amount of money in the economy by creating reserves, which it exchanges for non-money financial assets through open market operations. Second, commercial banks can create bank deposits through lending. When a bank makes a loan, it simultaneously creates a matching deposit in the borrower's account, thereby creating new money.<sup>45</sup> If introduced, the digital pound would not fundamentally alter these channels or necessarily represent new money creation.<sup>46</sup> It would, however, be a new form of money for households to pay for goods and services in their daily life.

The introduction of the digital pound could still have implications for monetary stability though. First, via the transmission mechanism of monetary policy; second, via monetary policy implementation; third, via the equilibrium interest rate and the effective lower bound (ELB); and fourth, via productivity.

**Bank disintermediation might affect the transmission of monetary policy to the real economy.**

The introduction of the digital pound could affect the transmission of monetary policy to the real economy. The overall effects are uncertain – transmission could be weakened or strengthened – and the Bank would monitor them closely. As set out in Box F, using the digital pound as an additional tool for the transmission of monetary policy is not a policy motivation for it.

If banks lost deposits to the digital pound, then they could become more reliant on wholesale funding. It is unclear whether this would strengthen or weaken the monetary transmission mechanism. On the one hand, if wholesale funding costs are more responsive to Bank Rate than deposit rates, then increased use of wholesale funding might mean that bank loan rates become more responsive to Bank Rate. On the other hand, recent research on the monetary

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<sup>45</sup> McLeay et al (2014) – [Money creation in the modern economy](#).

<sup>46</sup> See Box A in the Bank's [2021 Discussion Paper](#) and Box 4 of the Bank's [2020 Discussion Paper](#).

transmission mechanism finds that banks' use of retail deposits (as opposed to wholesale funding) could strengthen the transmission of policy rate changes to loan rates.<sup>47</sup>

Another way in which disintermediation could affect the monetary transmission mechanism is via a greater proportion of lending being performed by non-bank financial intermediaries. Recent research in the US and Denmark finds that lending by non-banks is typically less responsive to monetary policy than lending by banks.<sup>48</sup>

These effects on the monetary transmission mechanism could be larger in times of stress if, as described above, demand for the digital pound becomes particularly strong. To maintain banks' provision of credit to households and businesses in such circumstances and ensure that monetary policy continues to be transmitted effectively, the Bank could conduct liquidity and lending operations.

### **Keeping the digital pound retail-focused would help to ensure that monetary policy is implemented effectively.**

A core part of the Bank's approach to implementing monetary policy is to keep short-term market interest rates close to Bank Rate. The Bank transmits Bank Rate to short-term market interest rates via the remuneration and supply of central bank reserves held by commercial banks, a liability of the Bank. Should wholesale actors use the digital pound widely, this could change the relationship between reserves and sterling money market rates. Keeping the digital pound retail-focused – for example via holding limits – would reduce the likelihood of such money market restructuring taking place. In addition, to ensure that monetary policy can still be implemented effectively, the Bank would intervene to change the supply of reserves more frequently or in larger size. Annex 2 considers the implications of the digital pound on the Bank of England's own balance sheet more broadly.

If households and businesses who hold bank deposits switched to the digital pound, that would reduce the quantity of reserves held by commercial banks. If the introduction of the digital pound did not reduce reserves below the level demanded by the banking system, there would be no impact on the size of the Bank's balance sheet (Annex 2). Instead, it would simply change its composition, with fewer reserves and more digital pounds. However, if the demand for the digital pound caused reserves to fall below the minimum level demanded by banks at the target interest rate, the Bank would intervene to supply reserves to meet banks' demand and ensure the effective implementation of monetary policy.<sup>49</sup>

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<sup>47</sup> [Drechsler et al \(2017\)](#), [Xiao \(2020\)](#) and [Polo \(2021\)](#).

<sup>48</sup> [Nelson et al \(2017\)](#), [Xiao \(2020\)](#), [Elliott et al \(2020\)](#) and [Cucic and Gorea \(2021\)](#).

<sup>49</sup> The Bank recently published an [Explanatory Note](#) setting out its framework for ensuring short-term market interest rates remain close to Bank Rate as the Asset Purchase Facility (APF) is unwound and reserves begin to fall.

If demand for a digital pound grew gradually, the Bank's Short-Term Repo Facility would be available to meet demand for reserves. However, substitution into the digital pound could be larger or more rapid in a stress. In this case, the Bank may choose to deploy longer-term lending operations to supply additional reserves. In either case, all else equal, the creation of reserves would increase the size of the Bank's balance sheet.

No decisions have yet been taken on the framework for meeting demand for the Bank's liabilities (and therefore effectively implementing monetary policy) in the future.

**The digital pound could affect the level of the equilibrium interest rate, with implications for the conduct of monetary policy.**

The 'equilibrium interest rate' is often thought of as an important guide for monetary policy.<sup>50</sup> It is the interest rate consistent with the economy producing output in line with its productive capacity ('potential') and inflation at the target.<sup>51</sup> As such it determines longer-term trends in Bank Rate. For example, if a shock hit the economy and resulted in output being below (or above) its potential, Bank Rate would need to be set below (or above) the equilibrium rate for a period to return output to its productive capacity consistent with the Bank's inflation target.

If introducing the digital pound were to lower the equilibrium interest rate, this would mean the level of Bank Rate would need to be set lower on average. All other things equal, this would imply that there is less scope to cut Bank Rate before hitting the effective lower bound (ELB), constraining expansionary monetary policy more often. This is particularly the case if the equilibrium interest rate is already low for other reasons.

**We judge that the impact of the digital pound on the equilibrium interest rate is small, though this is uncertain.**

The Bank has considered ways in which the digital pound could affect the equilibrium interest rate. To date there is little existing literature on the channels or the magnitude of such effects, and so the Bank's understanding of this issue is likely to develop over time. Two channels in particular are worth considering at this stage.

First, bank disintermediation could lower the equilibrium rate. As described above, disintermediation could lead to higher lending rates as banks experience higher funding costs, and credit provision in the economy shifts towards non-bank lending, which may be more expensive and difficult to access for households and smaller non-financial companies. The resulting higher lending spread could be offset through a structural adjustment that lowered the equilibrium rate.<sup>52</sup>

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<sup>50</sup> The equilibrium interest rate cannot be directly observed, but it is thought to have fallen in recent decades.

<sup>51</sup> Bank of England (2018) – [August Inflation Report](#).

<sup>52</sup> This spread between the borrowing rate and the risk-free rate reflects the risk of the loan and the costs related to intermediation. If this spread increased, for example, pushing up borrowing rates for a given risk-free interest rate, investment would fall, and a negative output gap would open. A lower equilibrium rate is therefore needed to offset the increase in the spread.

Second, the increased likelihood of deposit withdrawals could also lower the equilibrium rate. The digital pound could make bank deposits more susceptible to more frequent inflows and outflows because it could be easier to switch into digital pounds than into cash. As a result, banks may choose to hold more high-quality liquid assets against the increased possibility of high demand for withdrawals.<sup>53</sup> This could lead to a lower proportion of banks' assets being available for longer-term lending: for example, the type of lending that might fund business investment projects. This could slow productivity growth and in turn reduce the equilibrium interest rate.

Overall, we judge that the impact on the equilibrium interest rate from the introduction of the digital pound is likely small and probably slightly negative, though this is uncertain.

**The digital pound could affect the level of productivity, but the direction is uncertain.**

Productivity influences the economy in important ways, affecting key variables such as output, employment and wages. It is a fundamental determinant of potential output growth and the equilibrium interest rate.<sup>54</sup> The digital pound could affect productivity in two opposite ways, with possibly significant but highly uncertain impacts.

On the one hand, the digital pound could lift productivity, directly or indirectly. The direct effect would be through enhanced payments efficiency as payments become faster and/or cheaper. An indirect impact on productivity could also occur if the cost saving from more efficient payments led to additional spending on productive activities, for example to fund investment.<sup>55</sup>

On the other hand, the digital pound may result in bank disintermediation and tighter financial conditions, reflecting higher funding costs or bank lending rates. That would lower investment, weighing on productivity. These are the same channels that affect the equilibrium interest rate, as explained previously.

Overall, the effects of the digital pound on productivity are highly uncertain and judged likely to be small in steady state. But there could be a large effect during a transition period, if banks adjusted to deposit outflows by relying on more expensive wholesale funding. Limits on digital pound holdings would mitigate such bank disintermediation, so changes to the equilibrium interest rate and productivity would likely be contained.

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<sup>53</sup> Ennis and Keister (2013) – [Economic Growth, Liquidity, and Bank Runs](#).

<sup>54</sup> Lopez-Garcia and Szörfi (2021) – [Key factors behind productivity trends in euro-area countries](#).

<sup>55</sup> Bank of England (2018) – Box 6, [August Inflation Report](#).



## **Box E: Interactions between the digital pound and systemic stablecoins**

### **Stablecoins are a new form of digital money, issued by the private sector.**

Stablecoins are a form of cryptoasset that aim to maintain a stable value, typically against existing fiat currencies, by holding safe backing assets. As explained in the Bank's 2021 [Discussion Paper](#), given their perceived safety, they have the potential to become widely used in payments, particularly compared to unbacked cryptoassets (for example Bitcoin).

If appropriately designed, within a robust regulatory framework, stablecoins offering greater functionality than existing forms of electronic money could play an increasingly important role in retail payments, offering benefits such as convenient and cheaper payment services. As set out in Box A, novel features such as programmability, smart contracts or micropayments, could drive demand for new digital payment methods. Stablecoins might also improve consumer choice, better integrate into digital services offering improved functionality, and promote competition. Currently, stablecoins are traded and used as a settlement asset on centralised cryptoasset exchanges and used in decentralised finance (DeFi) applications. But innovative functionality and attractive use cases could result in a stablecoin achieving a large scale and becoming a systemic payment method, widely adopted for retail and/or wholesale payments.

The Bank is working closely with the Financial Conduct Authority and HM Treasury to establish the regulatory framework for systemic and non-systemic stablecoins, with legislation currently before Parliament (Box B).

### **An important feature of systemic stablecoins is the asset used to back their liabilities.**

To meet the FPC's expectations, we would expect that systemic stablecoin issuance would need to be fully backed with high-quality and liquid assets.<sup>56</sup> One model under consideration would be for the backing assets to be held entirely with the central bank. If backed by central bank liabilities, a stablecoin would be economically similar to the digital pound. As the backing assets would be financially risk-free, it may be perceived by end users as a safe alternative to traditional bank payments (though it would still be exposed to operational risks). Another model under consideration would be to back stablecoins with other high-quality liquid assets. In contrast to the digital pound, stablecoins, regardless of their backing asset, would be a liability of the private-sector issuer rather than a claim on the central bank. That means they would be private money, like commercial bank deposits.

Part C of this paper described how new forms of digital money that are safe or perceived to be safe could cause commercial banks to lose some of their retail deposits, making credit provided by banks to households and businesses more expensive. This risk to financial stability might require imposing limits on the digital pound and/or systemic stablecoins, at least in transition.<sup>57</sup>

### **Features other than the stablecoin's backing assets would affect how similar or different it might look to the digital pound.**

Part D sets out our proposed design choices for the digital pound. These seek to balance supporting the take-up of the digital pound and managing risks to monetary and financial stability from its introduction.

Stablecoin regulation would need to consider the implications of any similarities and differences between stablecoins and the digital pound, to ensure coherence in the approach to monetary and financial stability risks, and prevent regulatory arbitrage.

### **In a mixed payments economy, the digital pound could coexist with, and complement, a systemic stablecoin.**

In the past, stability has been achieved by the coexistence of cash and interchangeability of cash and bank accounts, and innovation through the introduction of new banking products and services, for example Automated Teller Machines (ATMs) in the 1960s.

As set out in Part B, the public sector can require uniformity between different forms of money, for example through requiring banks to convert deposits into cash on demand. Private-sector innovation in retail payments can then enhance users' payments experience and widen access to services.

There is scope for new forms of private digital money such as stablecoins to provide further user benefits. But they could pose a threat to the uniformity of money (for example if not easily converted into each other and/or existing forms of money), and to competition (for example if a stablecoin issuer became dominant through network effects, economies of scale and/or data advantages).

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<sup>57</sup> The Bank's 2021 [Discussion Paper](#) on new forms of digital money noted that 'During any such 'transition period', the Bank and other UK authorities may [therefore] wish to limit migration, so that the financial system could adjust to the presence of new forms of digital money in an orderly fashion.'

Therefore, the Bank judges that even if there were a systemic stablecoin that is backed by liabilities of the central bank, and looks economically similar to the digital pound, a significant case for the digital pound would remain:

- The digital pound, issued by the Bank, would preserve access to retail central bank money. As a claim on the Bank of England, this money would be supported by the credibility of the issuing institution. This credibility is underpinned by the institutional framework in which the Bank operates and its focus on public policy objectives, as set out by Parliament.
- In much the same way that cash exists alongside private money, the digital pound does not need to be a dominant form of money in order to meet its public policy objectives. The digital pound could exist alongside other forms of money, including stablecoins. However, private stablecoin issuers would not necessarily have the same motivation to ensure the uniformity and interoperability of different forms of money, given the commercial incentives to establish dominant market positions. This could favour the creation of ‘walled gardens’ with low interoperability. As discussed earlier in this consultation, such dominant positions have the potential to be detrimental to innovation and competition in payments.
- Even setting aside these considerations for market structure, technological challenges might limit the ability of private issuers to achieve wide interoperability. Given the wide range of private providers and private systems in payments, interoperability between all of them poses challenges for co-ordination. The digital pound would provide public infrastructure with low barriers to entry to promote innovation, and technical standards for interoperability. By doing so, and by having the digital pound as a financially risk-free, widely available bridging asset, this could also enhance competition between stablecoins, by helping users to move between, and send payments to, different stablecoin networks.
- While regulation would seek to manage some of the above risks, the presence of the digital pound might complement regulation and further reduce potential harms to competition and innovation that might arise from non-interoperable stablecoins. The digital pound could make it less likely that a stablecoin exploits network effects to establish a dominant position in retail payments.

## Box F: Assessment of monetary policy as a motivator for the digital pound

**Remunerating the digital pound, either positively or negatively, to make monetary policy more effective is not a motivation for issuing the digital pound.**

As noted in the 2021 [Discussion Paper](#), paying an interest rate on the digital pound could in principle provide the Bank with a new monetary policy tool alongside Bank Rate. This is not a motivation for issuing the digital pound, which is one of the reasons it would not be remunerated/interest-bearing (Part D).

### Monetary transmission mechanism

The digital pound could in principle help to strengthen the monetary transmission mechanism, by enhancing the impact of changes in Bank Rate on household spending and saving decisions. A digital pound that pays interest – that is ‘remunerated’ – could be designed to pass through changes in Bank Rate to its holders automatically. This, in turn, could increase pass-through of Bank Rate changes to banks’ retail deposit rates. For example, in response to an increase in Bank Rate and the interest rate paid on the digital pound, banks may need to increase the interest they pay on their deposits by more than otherwise, to avoid households moving their bank deposits into the digital pound. Increased pass-through of changes in Bank Rate to bank deposit rates could also increase pass-through to bank loan rates.

However, the economic response to a change in the interest rate on the digital pound would be uncertain. The digital pound has never been used – indeed, no CBDC has to date been used at scale in any economy – so there is much uncertainty about how paying interest would affect the impact of changes in Bank Rate on the real economy, including on households’ saving and spending decisions.<sup>58</sup> There is also a risk that bank disintermediation might work in the other direction and act to weaken, rather than strengthen, the transmission of monetary policy to the wider economy.

### The effective lower bound (ELB)

Following the global financial crisis, nominal interest rates in the UK and elsewhere reached historically low levels. When nominal interest rates are low, there is a greater risk of hitting the ELB – the point at which further cuts in Bank Rate no longer provide additional stimulus. This limits the ability of monetary policy to stimulate the economy should it be required. The precise level of the ELB is uncertain.<sup>59</sup>

<sup>58</sup> For an explanation of how changes in Bank Rate affect the economy and inflation, see [The monetary transmission mechanism of monetary policy](#), Quarterly Bulletin, 1999 Q2.

<sup>59</sup> Bank of England (2020) – Box 1, August [Monetary Policy Report](#).

An important cause of the ELB is the existence of cash. Cash always pays a nominal interest rate of zero. So if deposit rates fall below zero, depositors might decide to withdraw deposits and hold cash rather than face negative interest rates. This means banks might be unwilling to pass through cuts in Bank Rate to deposit rates below a certain level. In turn, this might impede their ability to pass through Bank Rate cuts to loan rates, and hence weaken the transmission of Bank Rate cuts to the real economy.

This has two implications for the design and impact of the digital pound.

First, applying a negative interest rate on the digital pound would not reduce the ELB. Some commentators have argued that the potential to apply a negative interest rate to the digital pound could enable the Bank to set a more negative Bank Rate.<sup>60</sup> That is, the digital pound could help to reduce the ELB on Bank Rate, helping the Bank to loosen monetary policy further in a low-interest environment, to meet the inflation target.<sup>61</sup>

However, this argument relies on the idea that the digital pound would replace cash. If the digital pound were introduced, and if it paid a negative interest rate, depositors could still convert their deposits to cash so long as cash were available, so applying a negative interest rate on the digital pound would not reduce the ELB. The Bank and UK authorities are committed to sustaining access to cash and meeting cash demand.<sup>62</sup> The digital pound would be designed to complement, rather than replace, cash.

Second, an unremunerated digital pound (ie one that paid no interest) could increase the level of deposit rates at which the ELB occurs. That is because it gives deposit holders another way to avoid negative rates on bank deposits. There are costs to holding physical cash rather than digital deposits – such as storage costs and loss of transactional convenience (for example for digital payments). This means that even though cash does not pay interest, banks might be able to reduce deposit rates somewhat below zero without losing large quantities of deposits to cash. Relative to cash, the digital pound would have negligible storage costs and higher convenience for online transactions. So the introduction of an unremunerated digital pound could make it more difficult for banks to charge negative deposit rates without losing deposits. This might increase the ELB for Bank Rate, and risk constraining monetary policy more often.

As explained in Part D, any decision to revisit our approach to remuneration would be preceded by a review with full consultation. The Bank would provide adequate lead time to allow holders of digital pounds to switch funds into or out of other forms of money such as bank deposits and cash. Part D also explains why the digital pound would not be remunerated, setting aside monetary policy considerations.

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<sup>60</sup> See [Bordo and Levin \(2017\)](#) and [Haldane \(2021\)](#).

<sup>61</sup> In February 2021, the MPC decided to add a negative Bank Rate to the monetary policy toolkit. See the [minutes of this meeting](#). Also see Box 1 of the [August 2020 Monetary Policy Report](#) for more discussion of negative policy rates.

<sup>62</sup> Gov.UK (2021) – [Access to Cash Consultation](#) and HM Treasury (2022) – [Protecting UK wholesale cash infrastructure](#).

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## Part D: Our model for the digital pound

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Part D sets out our proposed model for the digital pound and is organised around three themes:

- Section D.1 sets out the platform model for provision of the digital pound. This describes the roles and expectations of the Bank and of the private sector in its delivery.
- Section D.2 sets out considerations around data and privacy. This describes the robust protections around data protection and privacy for users that would be part of the design for the digital pound.
- Section D.3 sets out the user experience. This describes the design features of the digital pound that would benefit households and businesses and how they might interact with it.

Our analysis has been supported by consumer and merchant research (Annex 3), the discussions of the [CBDC Engagement Forum](#) (comprising senior stakeholders from across business, academia, and civil society (Boxes K and L)), the [Technology Forum](#) (made up of expert technologists) and outreach to major UK financial institutions (Annex 4). More detailed information about design, and some principal technology considerations, can be found in the accompanying [Technology Working Paper](#).

The model for the digital pound set out in Part D is a proposal for a retail CBDC, designed for everyday payments by households and businesses. That contrasts with a ‘wholesale CBDC’, which would be for settlement of high-value payments between financial firms. Wholesale CBDC is discussed in Box H of this paper, alongside coverage of the Bank’s collaboration with industry to enhance wholesale payments through [RTGS renewal and the RTGS future roadmap](#).

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**Any model for the digital pound must meet a set of key criteria.**

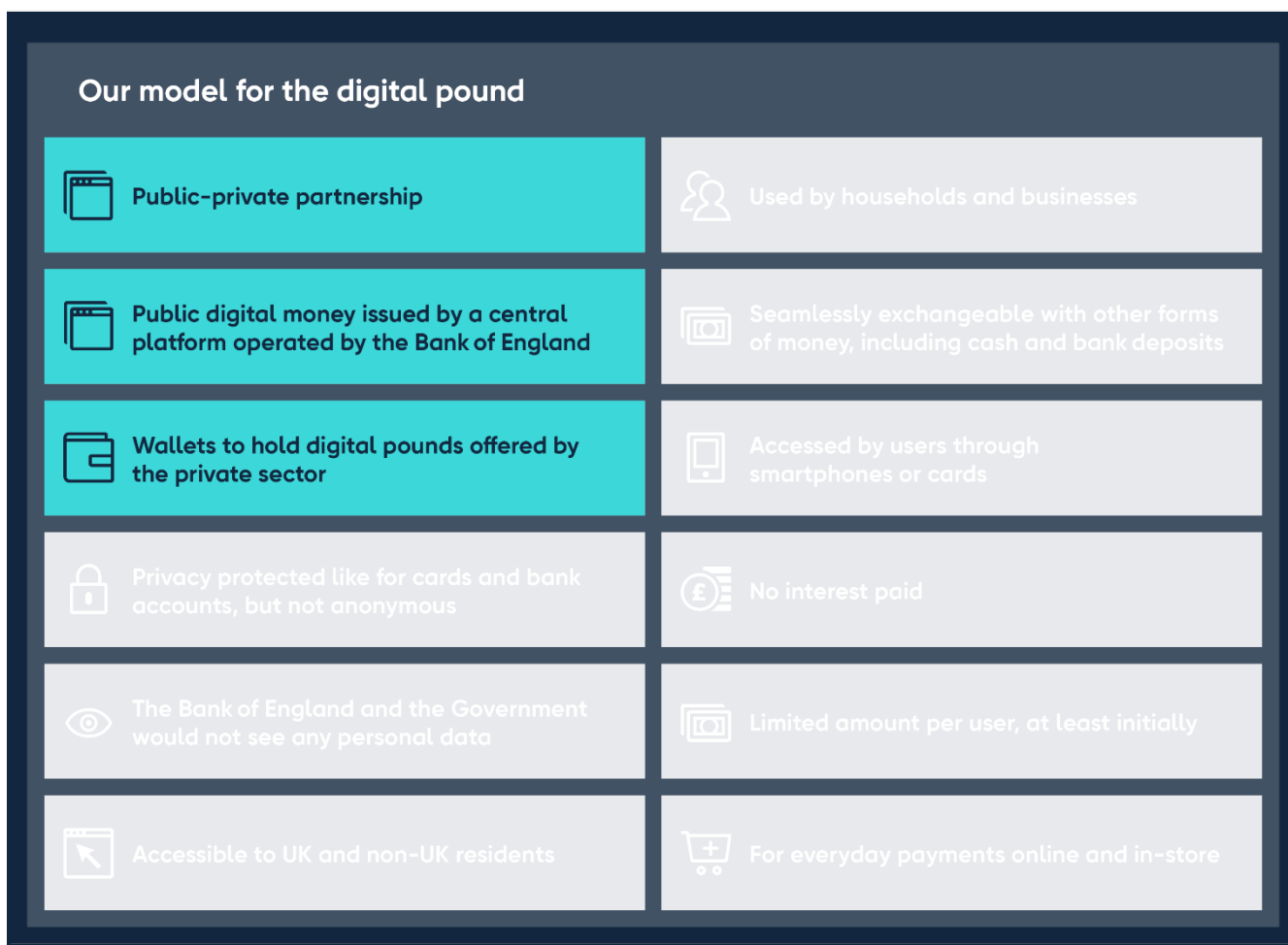
Based on the primary motivations set out in Part B, we have identified a set of criteria for the model of provision of the digital pound. We judge the model set out here meets these criteria and is the best design to support the objectives set out in Part B:

- To ensure that central bank money acts as the anchor of monetary and financial stability, the model should ensure access to financially risk-free central bank money, a direct end-user claim on the Bank and settlement finality for any transactions.
  - The model should be interoperable with other forms of money, in particular cash and bank deposits.
- To support innovation, choice and efficiency, the model should be extensible and flexible reflecting the fact that the future payments landscape is innovative and dynamic.
  - The model should ensure a standard of operational resilience necessary for major national infrastructure.

**Our proposed model supports private sector innovation, safeguards data protection and privacy, and promotes accessibility.**

The model set out in this section is judged to be the best design to support the objectives set out in Part B. It further supports private sector innovation, safeguards data protection and personal privacy, and promotes accessibility.

## Section D.1 The platform model and public-private partnership



**The delivery of the digital pound would be a public-private partnership that reflects the comparative advantages of each sector.**

One of the digital pound's principal aims is to support payments innovation by the private sector. Publicly provided infrastructure that is open to use by all could catalyse innovative and efficient payment (and other) services provided by the private sector. It could also support participation in the digital economy by businesses – particularly small and medium-sized enterprises.

Here we set out our high-level technology and operational architecture and define the infrastructure that would allow digital pounds to be held, transferred and used for payments. We also establish a boundary between what the Bank and the private sector would each do.



We propose that the digital pound should be designed as a platform model, as originally set out in the Bank's 2020 [Discussion Paper](#). In the platform model, the Bank would issue the digital pounds which would be recorded in a 'core ledger'. The Bank would build and operate the ledger – a highly secure, fast and resilient technology platform – which would provide the minimum necessary functionality for the digital pound. Regulated private firms – Payment Interface Providers (PIPs) and External Service Interface Providers (ESIPs) – could then access the core infrastructure via an application programming interface (API). These private sector firms would deal with all user-facing interactions, including handling customers' information, and be able to develop and offer innovative services using the digital pound (Diagram D.1).

**The public sector would offer infrastructure to support private sector innovation.**

In the platform model, a payment made in digital pounds between two users would be processed and settled by a transfer on the Bank's core ledger. Payment Interface Providers (PIPs) would be responsible for initiating these payments, but the transfer of holdings and settlement would occur at the central bank. The exchange of digital pounds into other forms of money, for example bank deposits, would involve links to other payment systems.

As a retail payment system executing payments on a real-time basis, the digital pound infrastructure must be operational 24/7 – i.e. at all times. There would be equivalent expectations for private sector firms involved in the ecosystem.

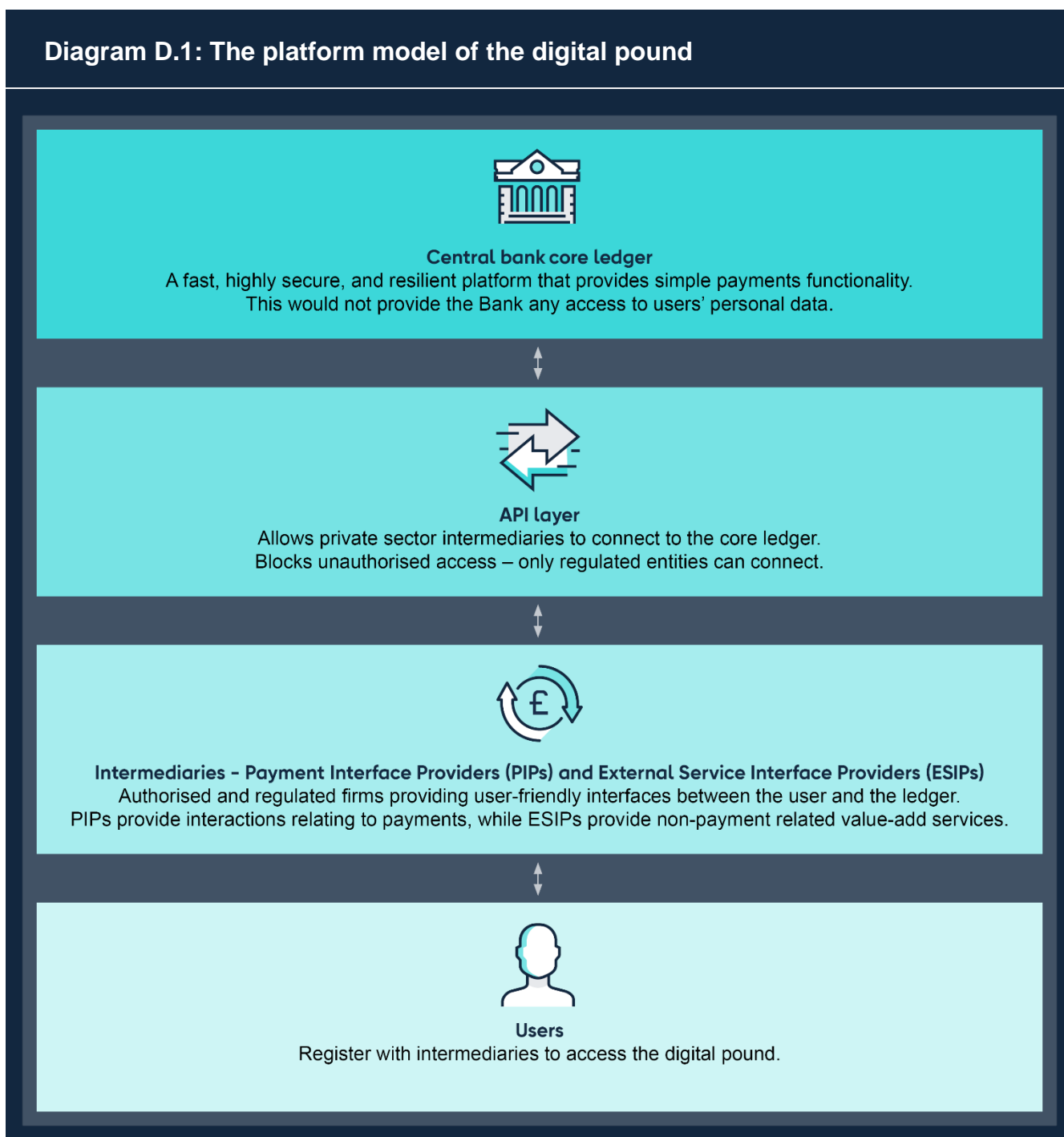
The private sector would be responsible for interacting directly with end users. They would hold the customer's information as banks do now. They would provide digital pass-through wallets – an interface that offers payments services and related products to users. These are known as 'pass-through' wallets because the user's holdings of digital pounds are recorded on the Bank's core ledger, and the wallet simply passes instructions from the user to that core ledger. The private sector would never be in possession of end users' digital pound funds. They would be responsible, however, for recording the identity of digital pound users and carrying out any necessary Know Your Customer (KYC) and Anti-Money Laundering (AML) checks. The Bank would receive payment messages instructing transfers on the core ledger in anonymised form and would not know the identity of the payer and payee.

The platform model is agnostic to many technology decisions. For example, the core ledger operated by the Bank might be centralised, running as a traditional database, or it might use distributed ledger technology (that might be blockchain or another technology). These concepts are discussed in the accompanying [Technology Working Paper](#).

**We consider that the platform model we have proposed best meets our criteria but will test this further in the next phase of our work.**

A platform model offers a robust and unambiguous user claim on the Bank, and supports a diverse, innovative, and competitive Payment Interface Provider (PIP) and External Service Interface Provider (ESIP) ecosystem. It also provides a single infrastructure to support extensibility, offering common APIs for participants to connect to and build upon, as well as managing changes and updates in a single place. Given the possible single point of failure risk with the platform model, it would be necessary to ensure the infrastructure is protected to the very highest standards, including working together with the National Cyber Security Centre. Box G sets out alternative models of provision for comparison.

**Diagram D.1: The platform model of the digital pound**



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**The digital pound model must support innovation and competition.**

The digital pound technology architecture must be flexible, adaptable and extensible. ‘Layered’ architecture comprises the public infrastructure (the core ledger), a significant role for private innovators on the customer facing layers (wallets and devices) and standardised components (API interface). These elements are important for supporting ongoing innovation and ensuring the platform model can keep pace with developments in payments habits and the wider digital economy.

The platform model of provision could support innovation and competition in three ways:

**Mobilise Payment Interface Provider (PIP) participation:** The digital pound would be financially risk-free as market, credit, and liquidity risks are absent.<sup>63</sup> PIPs, and the wallets they provide, would never be in possession of end-users’ digital pound funds so do not pose counterparty or credit risk to their customers. Therefore, PIPs are unlikely to need extensive prudential regulation that is typical of some other types of financial institution. As a result, the digital pound might offer an opportunity for payments innovators to mobilise their businesses in a simple, safe and proportionate framework.

**Accessible and open infrastructure:** The digital pound, as an accessible public platform, could allow new entrants to offer innovative payment services without the need to develop extensive infrastructure or issue money of their own. The Bank would ensure that the digital pound system was open to all innovators who meet the requirements for participation. These would include regulatory requirements, complying with the Bank’s rules as the operator of the digital pound system and being operationally robust. This openness may contrast with some proprietary infrastructures, which might have incentives to be closed or exclusive.

Start-ups and non-financial companies could be encouraged to enter the payments market too. The simplicity of digital pound services could make this system a ‘safe space’ for innovation and might allow providers of wallets to have a wider variety of business models. For example, media, e-commerce and technology firms might integrate digital pound wallets to add payment functionality to their digital business models.

**Extensible architecture:** To keep pace with future payment needs, and support continued innovation, the digital pound ecosystem must be extensible. Extensibility is a measure of how easy it is to expand a system’s features over time without affecting its internal structure. Extensibility would be an important part of the digital pound as it is difficult to predict what future payments needs might be, and how the digital economy might evolve. The core ledger would be a single piece of infrastructure that could be updated and upgraded as demands and needs change.

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<sup>63</sup> To note, however, that the possibility of conduct and operational risks including in relation to the activities of Payment Interface Providers and External Service Interface Providers remains.

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### **Digital pass-through wallets allow customers to interact with their digital pound holdings.**

Digital pass-through wallets would allow users to hold and use the digital pound, which would always be a direct liability of the Bank. Pass-through wallets contrast with a different type of wallet where the user's funds are held as a claim on the wallet provider or held in custody by the wallet.

Wallet providers would be encouraged to provide an array of novel and user-friendly features and services, but all wallets would need to provide certain minimum functionality:

- **Access to digital pounds:** customers must be able to register on the digital pound ledger and open a wallet;
- **Make payments:** wallets should allow users to easily make and accept payments from merchants, to other users, and commercial bank accounts, as well as switch digital pounds into cash;
- **View balances and transaction history:** users must be able to view their activity; and
- **Mobility:** customers must be able to switch easily between wallet providers and, if desired, close their wallet.

### **There would be opportunities for businesses who do not wish to process payments.**

External Service Interface Providers (ESIPs) might also participate in the digital pound ecosystem. These are firms whose business is not payments. ESIPs might provide services that augment digital pound wallets and are of value to users and merchants. Examples of services they might offer include business analytics, budgeting tools and fraud monitoring.

Subject to appropriate controls and user consents, ESIPs might be granted 'read' access to specific data on the digital pound ledger. A Payment Interface Provider authorised to operate in the digital pound system would automatically be able to undertake the activities of an ESIP.

### **Revenue models will be important for incentivising innovation.**

Private innovation depends on the existence of appropriate incentives, and the provision of infrastructure in support of innovation requires sustainable funding. As such, it is essential there are commercial opportunities for PIPs and ESIPs in the digital pound system.

Given the wide range of business models and commercial propositions that could offer digital pound services, it would be for the management of those firms to determine the appropriate revenue models. Some possible revenue streams that might support the provision of digital pound services are set out in Table D.2.

**Table D.2: Possible revenue streams that might support provision of digital pound services**

Revenue model	Examples
Transaction fees levied on merchants	Currently one of the most common revenue models for payment service providers, such as acquirers. Affordable fees would be needed to ensure access to public money.
Service or transaction fees levied on individuals	Fees might apply on high-value, international and business-to-business payments.
Commercial use of data	Subject to the legal and policy considerations set out in Section D.2, PIPs might use transaction data to improve existing operations or to offer new customer-facing services.
Subscription or product fees for value-add services.	PIPs might charge a subscription fee for premium services that go beyond basic wallet functionality, for example budgeting tools.

We welcome feedback from prospective Payment Interface Providers (PIPs) and External Service Interface Providers (ESIPs), as well as wider stakeholders, on the revenue models PIPs and ESIPs may wish to adopt and seek their views on the commercial viability of such services.

We recognise that provision of digital pound services may be ancillary to some firms' main business activities, whose principal revenue streams might be generated from other activities such as e-commerce, media or advertising. This poses the question of whether digital pound related services must be viable on a stand-alone basis, or whether cross-subsidy or support from other business activities or group entities may be appropriate. Cross-subsidisation, as a pricing practice, has the potential to produce both positive but also negative effects for consumers and the wider market, including leading to market concentration and/or dependence on associated non-payments activities for the provision of critical digital pound services.<sup>64</sup> We welcome respondents' views on this, as we will consider this issue in further detail as the regulatory and operational requirements for PIPs and ESIPs are developed.

#### **Involvement of non-financial firms could boost innovation and choice.**

The participation of non-financial firms as PIPs or ESIPs in the digital pound ecosystem, could bring significant benefits for choice and innovation. That would occur if they integrated digital pound payments into their wider business, or they harnessed innovative capabilities from their other activities.

<sup>64</sup> Financial Conduct Authority (2016) – [Price discrimination and cross-subsidy in financial services](#).

For example, micropayments might allow content-sharing platforms and broadcasters to generate revenues from individual content, rather than relying on subscriptions. Digital pound wallets might also at some stage be integrated into 'Internet of Things' (IoT) devices for machine-to-machine payments.

Firms from the following sectors might particularly benefit from adding a digital pound wallet to their services, although this list is by no means exhaustive:

- Media and social media
- Broadcasters and content sharing platforms
- E-commerce and online marketplaces
- Retailers
- Device manufacturers, consumer and home electronics and developers of smart and IoT devices
- Charities and community groups

**Payment Interface Providers (PIPs) and External Service Interface Providers (ESIPs) would operate within a robust legal and regulatory framework to protect users and ensure the resilience and integrity of the system.**

For the digital pound to command trust and confidence and to uphold the Bank's mission of monetary and financial stability, the system would need to be resilient and rigorously governed and regulated.

PIPs and ESIPs would be robustly yet proportionately regulated to ensure resilience, continuity of operations and protection of customers.<sup>65</sup> The specific regulatory treatment of PIPs and ESIPs in the digital pound system would be subject to further work by the relevant authorities. The regulation governing them would be 1) based on the precise activity performed, 2) proportionate to the risks they pose to themselves and the wider financial system, and 3) agnostic to the nature of technology.

As operator of the digital pound system, the Bank would likely impose principles for operation for PIPs and ESIPs, including technical standards, alongside regulatory requirements. Those principles would be developed as the design of the digital pound system matures and as likely business models become clearer but might include those set out in Diagram D.3.

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<sup>65</sup> Currently, in the UK, a number of regulatory authorities have supervisory remit in relation to the payments sector – see the [Financial Conduct Authority](#) (FCA); the [Prudential Regulation Authority](#) (PRA); the [Payment Systems Regulator](#) (PSR); and the [Bank of England](#). There is ongoing work by HM Treasury, FCA, PSR and the Bank to ensure the regulatory regime for payments keeps pace with innovation.

**Diagram D.3: Examples of principles for Payment Interface Providers (PIPs) and External Service Interface Providers (ESIPs)**



- **Availability:** executing payments instructions on a real-time basis, 24/7 with no downtime.
- **Security and resilience:** effective end-to-end risk management to ensure services are available, secure and protected from threats. This includes plans for orderly transfer of users to other PIPs in the event of failure.
- **Fast and convenient:** provide fast, convenient and cost-efficient services.
- **Interoperability:** support exchange and conversion into other forms of money and ease of transfer to other PIPs; including adherence to any system-wide technology or operating requirements for interoperability laid down by the relevant authority.
- **User friendly:** promote ease of use among all users.
- **Inclusion:** offer access to payment services for the most vulnerable, or those in vulnerable circumstances, thereby avoiding unintended exclusion.
- **Diversity and innovation:** offer products and services that meet, evolve with and respond to societal changes and needs.
- **Privacy:** protect user privacy and give users control over who they share data with.

Activities of Payment Interface Providers might need to be restricted to safeguard system resilience, and limitations may need to be set to protect the digital pound system from financial and operational threats. This is to mitigate risks that might impair the system's functionality and availability for users.

There could also be a risk of contagion from certain financial activities that a PIP might undertake with non-digital pound funds, such as credit intermediation. These could threaten financial or operational resilience, including the PIP's provision of wallet and payment services. We would monitor this and consider appropriate mitigants to ensure PIPs are resilient and not exposed to financial risks that might threaten their operational continuity.

**Payment fraud has increased significantly in recent years.**

Fraud is a major issue. There were an estimated 5.2 million fraud offences in the UK during 2021, a 41% increase compared with 2019.<sup>66</sup> In particular, there has been a substantial increase in Authorised Push Payment (APP) fraud. These are scams where a payer is deceived into authorising a payment to a criminal. According to [UK Finance](#), APP fraud losses increased by 71% during 2021 H1 to £355 million, surpassing the amount of money stolen through card fraud for the first time. Given these trends, the digital pound would need to be designed in a way that mitigates the risk of such fraud. Learning lessons from previous implementations of digital payments innovations would be of paramount importance.

**All entities in any digital pound ecosystem would have a responsibility to protect consumers from fraud and uphold robust financial crime controls.**

Protection from fraud is a material consideration for the digital pound and represents a strategic issue for authorities and Payment Interface Providers alike. The mitigation of fraud requires effective financial crime controls, particularly rigorous identity verification, and analytics of user behaviours and payment patterns in the system. However, such safeguards would have trade-offs for financial inclusion, privacy, and overall system cost, given that identity verification and transaction monitoring would require resources and technology that may be expensive, and data and proof of identity that some may struggle to access or consider intrusive (Section D.2). The authorities will be mindful of this balance as they explore the digital pound, and it would be a significant consideration in any eventual design.

PIPs participating in the digital pound system would be held to at least the same standards relating to financial crime as those to which regulated payment services providers are held today, including to prevent money laundering, terrorist financing, and fraud.

No system is fool proof, and like any digital payment system, the digital pound would be exposed to fraud risk. A liability and compensation framework for instances of fraud in the digital pound system would be needed. Further in-depth consideration will need to be given, by the relevant authorities in consultation with stakeholders, on the optimal liability and compensation framework for instances of fraud in the digital pound system.

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<sup>66</sup> See [ONS Crime Survey for England and Wales](#).



## **Box G: Alternative models of provision to the platform model**

While the platform model is our preferred approach, there are other provisioning models that have been proposed. We set those out here. While these models do not, at this time, appear as suited to our policy objectives they are viable alternatives and may inform some part of any ultimate implementation. The platform model is the basis of an illustrative conceptual model within the accompanying [Technology Working Paper](#).

### **An alternative approach is a delegated model.**

Another approach would be a ‘delegated’ model. In this model, rather than have all holdings stored on the core ledger, individual Payment Interface Providers (PIPs) would have their own ledgers recording customer holdings. Transactions between users with the same PIP would occur on that PIP’s ledger. For users of different PIPs, the transaction between them would be facilitated on the Bank’s core ledger. The core ledger in the delegated model records the movement of funds between different PIPs. This contrasts with the platform model, where the core ledger would process every transaction between every user.

We judge that a delegated model is less effective at meeting our criteria. In this model, the PIP rather than the Bank has a record of a user’s holdings of digital pounds. This could undermine how clear and direct the user’s claim on the Bank is. This approach also places greater technical and operational requirements on PIPs. That may be advantageous in reducing risks of the core ledger as a single point of failure, but could increase mobilisation requirements, making it harder for smaller firms to act as PIPs.

### **A bearer instrument model is not appropriate.**

Another approach is a bearer instrument model, where ownership of digital pounds is recorded on individual user devices, and transactions take place between users, with no interaction with the central bank. This is close to the way cash works at present. Such an approach presents several challenges. While hardware devices (for example, phones, wearables, cards) are difficult to hack, if that happens it is difficult to detect and to fix. Further, there is no trusted intermediary involved in transactions. That could give rise to ‘double spend risk’, where a user attempts to copy and spend the same digital pound multiple times. Also, a bearer instrument approach, where users never have to check back in with a central ledger, would lead to completely anonymous payments. This would go against our design principles for privacy and data protection, as well as laws to prevent financial crime (see Section D.2).

There is additional complexity for conducting transactions between two individuals over distance as both hardware devices would need to be updated accurately. For these reasons, bearer instrument models are not appropriate as the only operating model for the digital pound, but they may have uses as part of other use cases: bearer instruments may be the best approach for offline payments, for example.

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**Reserve backed stablecoins would be economically similar to the digital pound, but are not a CBDC.**

A non-bank stablecoin could have backing assets held entirely with the central bank. While this would be economically similar to the digital pound, such a stablecoin would be a liability of the private-sector issuer rather than a claim on the central bank. Such an approach has been described by some as ‘synthetic CBDC’ but, given the user’s claim is not on the central bank, this is not considered a CBDC, and is therefore not under consideration as part of our models of provision.<sup>67</sup>

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<sup>67</sup> BIS (2020) – [Central bank digital currencies: foundational principles and core features](#) provides further discussion of the term ‘synthetic CBDC’.

## Box H: Wholesale CBDC

### Retail and wholesale CBDC

The Bank and HM Treasury are consulting on a proposal for a retail CBDC that would allow central bank money to be used in electronic form for everyday payments by households and businesses.

Wholesale payments are high-value transactions, typically between financial institutions, including the settlement of securities and foreign exchange. At present, the Bank enables wholesale settlement through the Clearing House Automated Payment System (CHAPS) and its Real-Time Gross Settlement (RTGS) service, whose participants include financial market infrastructures. The balances held within RTGS are a direct claim on the Bank of England and therefore a form of wholesale central bank money, as set out in Diagram B.2.

New technologies present the opportunity to innovate in the provision of wholesale money to financial institutions. Firms and public authorities, including the Bank of England, have been active in exploring them, through the enhancement of existing infrastructure or the concept of establishing a new wholesale CBDC platform.

There are many different models under investigation and different potential solutions or technologies to deliver enhanced provision of wholesale settlement in central bank money:

- **Transparency:** using modern data interfaces and automation to allow financial firms and end users to be informed in real time about the status of payments and reach consensus for transactions to proceed;
- **Availability:** providing reliable settlement services on a 24/7 basis;
- **Efficiency:** minimising frictions in delivery of wholesale settlement;
- **Atomicity:** complex transactions can be made safer and more efficient by coordinating movements of assets and funds across different ledgers; and
- **Access:** expanding the use of central bank money for settlement, both by increasing uptake among already-eligible institutions and by extending eligibility to more types of institutions.

In delivering those outcomes, a wholesale CBDC could facilitate the innovation and experimentation that is taking place in wholesale markets, such as the development of DLT-based exchanges and settlement systems where tokenised financial securities could be issued and traded.

There are three broad approaches that could be adopted to realise these benefits:

1. Enhance existing systems
2. Enable private sector innovation
3. Establish a new wholesale CBDC platform

### 1. Enhance existing systems

The Bank already provides central bank money in electronic form for wholesale settlement through its RTGS service. The Bank is improving this service through a transformational initiative to renew and enhance the current system.<sup>68</sup> At the heart of this is the delivery in 2024 of a modern, flexible and efficient core settlement engine, which will be modular, flexible and based on open standards (including ISO20022 for messages).

Following consultation with industry, the Bank is developing a roadmap for RTGS beyond 2024.<sup>69</sup> This will deliver greater digitisation of wholesale settlement and represent a fast and well understood approach to realising many of the benefits commonly associated with a wholesale CBDC.

The key features that will be delivered in the improved service are:

- The Bank will increase the **transparency, efficiency** and speed of information exchange through adopting the ISO 20022 standard and through the provision of APIs, and plans to expand the range of available APIs over time to meet user needs.
- The Renewed RTGS will be more **available** and capable of extending near 24/7 operation. The Bank plans to explore which approach to operating hours delivers most value to industry while meeting our public policy objectives.
- The Roadmap for RTGS beyond 2024 includes proposals to deliver **atomicity** by allowing third parties using DLT to coordinate transactions between RTGS and other ledgers. The Bank continues to explore this via Project Meridian, a joint initiative with the BIS Innovation Hub London Centre which is prototyping and testing the end-to-end flow of synchronised settlement.

<sup>68</sup> Bank of England – [RTGS Renewal Programme](#).

<sup>69</sup> Bank of England (2022) – [Roadmap for RTGS Service Beyond 2024](#).

## 2. Enable private sector innovation

Within the RTGS Renewal Programme, the Bank's focus has been to develop our roadmap for ongoing improvements to the RTGS service, in line with industry feedback and incorporating elements from previous proofs of concept and experiments. These have included:

- **DLT Proof of Concept:** a project to explore and demonstrate basic functions of wholesale settlement using DLT.<sup>70</sup> The Bank built on this work via a second exercise working with Baton Systems, Clearmatics Technologies Ltd, R3 and Token to ensure our renewed RTGS service could connect with systems based on DLT and other innovative technologies.<sup>71</sup>
- **Cross-border Synchronisation:** a joint project with Ripple demonstrating that synchronised FX transactions in two different simulated RTGS systems can be achieved, leading to the incorporation of synchronisation functionality into the roadmap for renewal.<sup>72</sup>

Building upon this collaboration with industry, the Bank has developed new policies and structures to enable the benefits of innovative technologies to be delivered by new types of private sector firms.<sup>73</sup>

In 2017, the Bank widened access by making non-bank payment service providers eligible to apply for a settlement account in RTGS.

In 2021, the Bank launched its Omnibus Account policy, which allows an operator of a payment system to fund their participants' balances with central bank money.<sup>74</sup> The Bank has already accepted an application for an operator that uses DLT. Omnibus Accounts will allow private sector operators to provide settlement in central bank money in ways that deliver the benefits of transparency, availability and atomicity, while also supporting innovative use cases of central bank money to improve access.

The Bank continues to engage with private sector firms to understand potential new models of wholesale settlement and how these can be supported going forward. Alongside this work, the Government announced in April 2021 the creation of a new sandbox for firms exploring how to use technologies such as DLT to improve financial market infrastructure. The sandbox will be delivered jointly by the Bank, HM Treasury and the FCA, and will launch later in 2023.

<sup>70</sup> Bank of England (2016) – [PwC FinTech Accelerator Proof of Concept](#).

<sup>71</sup> Bank of England (2018) – [Baton Systems, Clearmatics Technologies Ltd, R3 and Token proof of concept](#).

<sup>72</sup> Bank of England (2017) – [Ripple proof of concept](#).

<sup>73</sup> Cunliffe (2022) – [Reflections on DeFi, digital currencies and regulation](#).

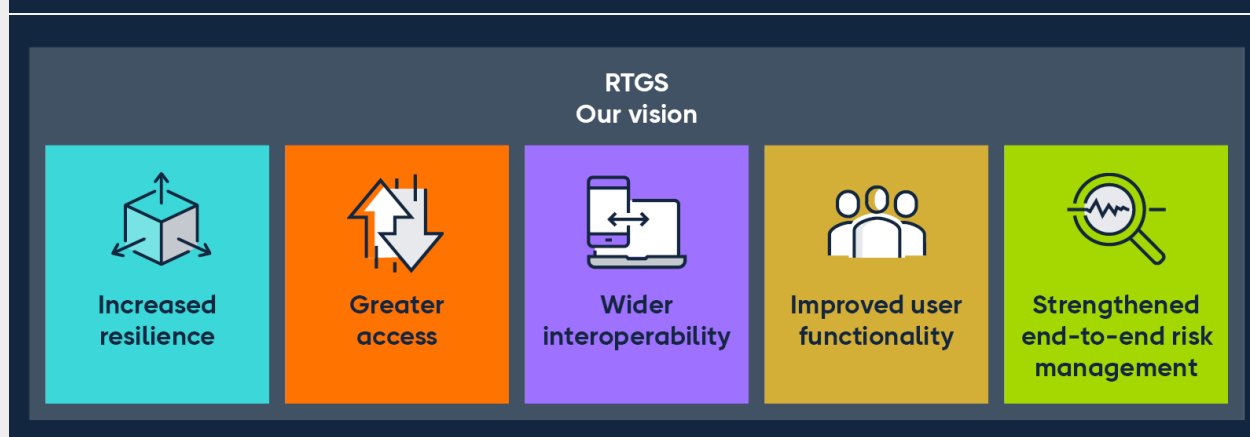
<sup>74</sup> Bank of England (2021) – [Bank of England publishes policy for omnibus accounts in RTGS](#).

### 3. Establish a new wholesale CBDC platform

A new platform could enable a wide range of new technological capabilities. However, in the UK, this approach would have a long lead time compared to the renewed RTGS which will start delivering in 2024.

The global central banking community continues to experiment with technologies associated with wholesale CBDC (including establishing new infrastructure). The Bank engages closely with such initiatives to evaluate whether wholesale CBDC technologies offer benefits to the UK and, if so, whether they might best be delivered via the renewed RTGS service, or whether new infrastructure might be needed. In particular, the Bank is closely involved with the work of the BIS Innovation Hub, especially its London Centre, so is well positioned to understand and learn from the range of experiments and approaches being trialled internationally with regard to wholesale CBDC, and wholesale settlement more broadly.<sup>75</sup>

**Diagram D.4: The Bank of England's vision for RTGS**



### Consultation questions

2. Do you have comments on our proposition for the roles and responsibilities of private sector digital wallets as set out in the platform model? Do you agree that private sector digital wallet providers should not hold end users' funds directly on their balance sheets?

<sup>75</sup> As at July 2022, 28 central banks were investigating CBDC with wholesale applications in some capacity (proofs of concept or research). Auer et al (2022) – [Rise of the CBDCs: drivers, approaches and technologies](#).

## Section D.2 Data protection and privacy



### The digital pound would be subject to rigorous standards of privacy and data protection. This is fundamental to trust and confidence in money.

Individuals' privacy, user control and the proper use of personal data in line with UK data protection laws are of paramount importance to the public, the Bank and the Government. Research by the Information Commissioner's Office (ICO) shows that the public continues to be concerned about issues relating to the storage and use of their personal data.<sup>76</sup> Those issues have become more important as the UK economy has become more digital. Access to, and use of, personal data has also become increasingly commercially valuable for firms, making informed choice and control around the sharing and use of data by consumers critical.

Transparency and clear understanding of the rights and tools around personal data will promote good data use, which is critical to the success of the digital pound.

<sup>76</sup> ICO (2021) – [Information Rights Strategic Plan: Trust and Confidence](#), page 14.

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**All digital payments made by individuals today, such as card payments or bank transfers, generate personal data.**

Digital transactions like debit card purchases or bank transfers generate personal data in relation to location, time and date, method of payment and transaction value. Digital transactions account for the majority of transactions in the UK today.

**These personal data are held and used by providers – banks and other payment firms – for anti-fraud and financial crime reasons.**

Personal data from bank account transactions is used and stored by firms to comply with legal and regulatory data capture requirements in the UK's Anti-Money Laundering (AML) and Combatting the Financing of Terrorism (CFT) Regimes. For example, those regimes require that users' personal data is captured by firms in order for them to carry out the customer due diligence, or sufficient monitoring required to detect money laundering.<sup>77</sup> Firms also have to comply with data capture requirements in the UK's Payment Services Regulations 2017.

**Access to these data is governed by applicable UK data protection laws, which are supported by ICO guidance.**

As with all personal data controlled and processed – including personal data from bank account transactions – firms also have to comply with UK data protection laws.<sup>78</sup> Subject to UK data protection law, such personal data can also be used and stored by providers to manage commercial relationships, develop marketing activities as well as develop and tailor products and services.

**Law enforcement agencies or competent authorities which seek to access and process personal data for the primary purpose of law enforcement have to do so on a fair and lawful basis.**

Today, law enforcement agencies and competent authorities can seek to access personal data held by firms, for example bank account transactions data, so long as the primary purpose is law enforcement. This purpose is defined in Section 31 of the Data Protection Act 2018 as the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, including safeguarding against and prevention of threats to public security.

Firms that hold personal data can also share those data provided that there is a lawful basis. For example, firms might share personal data where there is a need to report a crime or comply with a formal request or court order from a law enforcement authority.

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<sup>77</sup> The UK's AML and CFT Regime includes the [Money Laundering, Terrorist Financing and Transfer of Funds \(Information on the Payer\) Regulations 2017](#), and the [Funds Transfer Regulation 2015](#).

<sup>78</sup> UK Data Protection Law includes the UK General Data Protection Regulation, the [Data Protection Act 2018](#) and the [Privacy and Electronic Communications Regulations 2003](#).



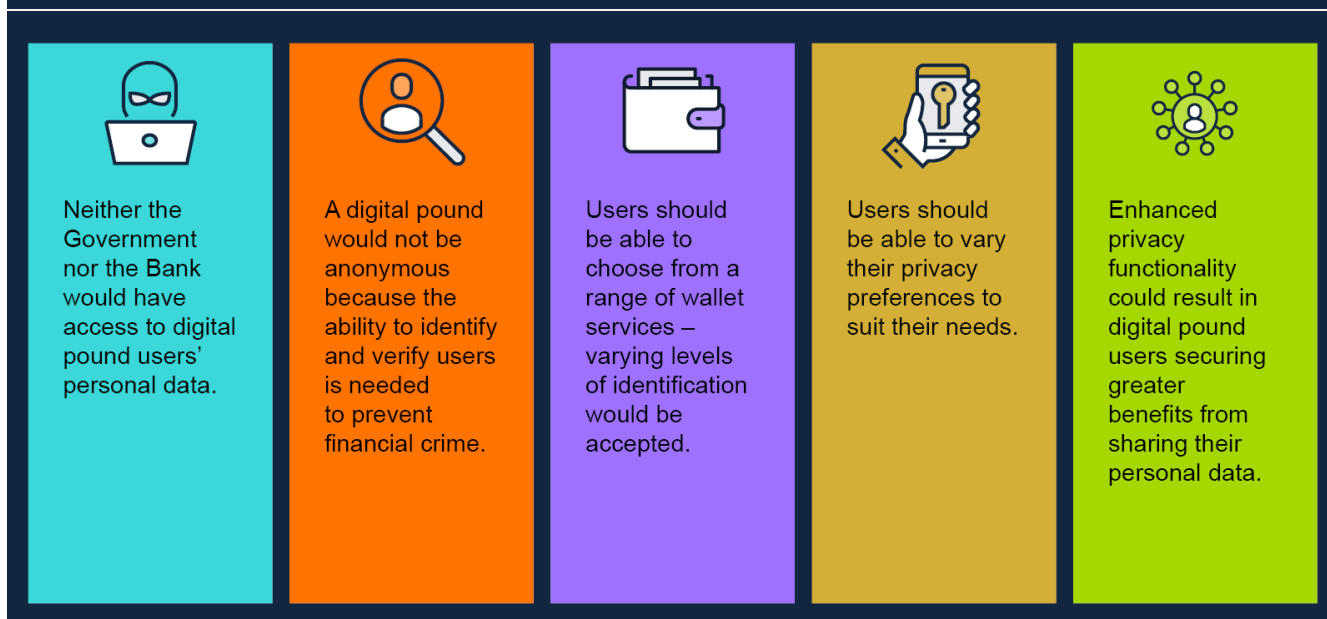
Before sharing individuals' personal data, Article 6(1) of the UK GDPR requires that firms must be satisfied that sharing personal data with a law enforcement authority is lawful. This is because firms are obliged to protect the personal data of individuals that they control and process.

**The digital pound would have at least the same level of privacy as a bank account and would also allow users to make choices about data use.**

Responses to the Bank's 2020 [Discussion Paper](#) emphasised the importance that users place on having privacy in their transactions. Security and privacy were often cited as aspects on which there should be little or no room for compromise. The Bank and Government agree, and this perspective informs our proposals for the digital pound's design.

We therefore propose that the digital pound is at least as private as current forms of digital money, like the money in a commercial bank account or e-money. Digital pound users will be able to make choices about the way their data is used. We are supportive of, and encourage, firms to offer services that enable holders to opt for enhanced privacy functionality and exert greater user control of personal data. The digital pound will be set up in a way that enables this.

**Diagram D.5: Privacy objectives for the digital pound**



As set out in Diagram D.5, the key objectives of the digital pound in the context of privacy and data protection are that:

- Neither the Government nor the Bank would have access to digital pound users' personal data except for law enforcement agencies under limited circumstances, prescribed in law, and on the same basis as currently with other digital payments.
- The digital pound would not be anonymous because the ability to identify and verify users is needed to prevent financial crime.
- Users should be able to choose from a range of wallet services – varying levels of identification would be accepted to cater to different preferences and ensure that the digital pound is accessible for all.
- Users should be able to vary their privacy preferences to suit their needs, within parameters set by the law and the Bank and the Government as part of system design.
- Enhanced privacy functionality could result in digital pound users securing greater benefits from sharing their personal data.

**The Bank of England, as operator of the payment system, would not have access to personal data.**

Our proposal for the digital pound foresees that Payment Interface Providers (PIPs) would manage user wallets, but the Bank would run the digital pound infrastructure by operating and maintaining the core ledger.

PIPs would anonymise personal data before any sharing with the Bank (Diagram D.6). It is crucial that, from the Bank's perspective, these data would be anonymised and not be considered personal data. The Bank will conduct tests, and evaluate the legal, technical, and operational standards needed to operationalise such a system in the next phase of its work.

Access to some data may be useful in the running of the core ledger, and to support innovation. We propose that while the Bank would not have access to users' personal data, it should have access to anonymised transaction data and aggregated system-wide data. This would provide an overview of the total transactions – for example, volumes and values – taking place over a given period.

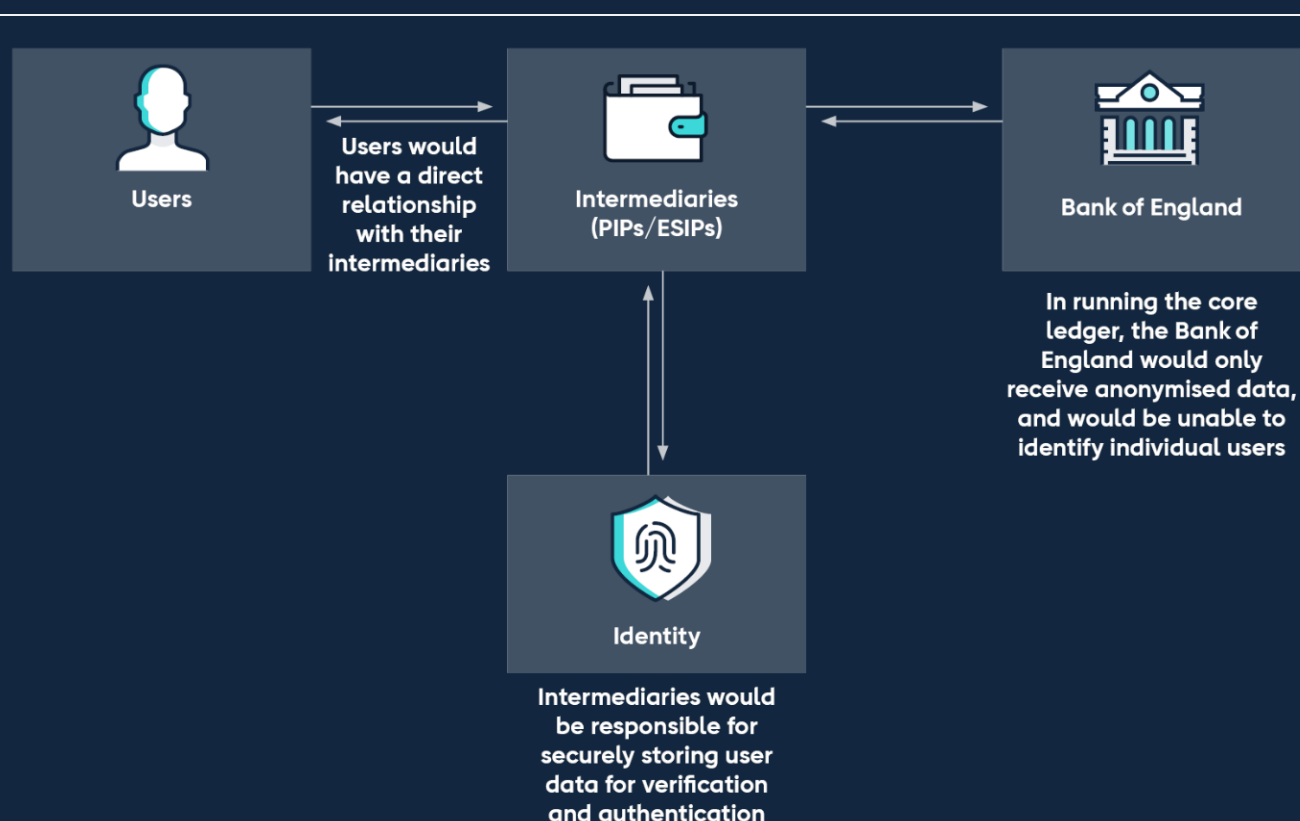
Those data could also provide insights that may support innovation and improve the provision of services to both digital pound users and PIPs. The Bank and HM Treasury will consult on what data might be collected and for what purposes in due course.

**As is the case today with private forms of digital money such as bank accounts, law enforcement agencies and competent authorities could only access digital pound data where there is a fair and lawful basis. This is in compliance with data protection laws.**

Law enforcement and competent authorities may need information on digital pound transactions to carry out law enforcement or intelligence investigations. In the same way and on the same basis as currently for existing commercial bank accounts, any law enforcement or Government agency that seeks to access and process digital pound users' personal data from PIPs would have to do so on a lawful basis in compliance with the Data Protection Act 2018.

Outside these instances, and as is the case for other existing forms of digital money including bank accounts, the law enforcement agencies and competent authorities would not have access to digital pound users' personal data.

**Diagram D.6: Users will interact with intermediaries, rather than directly with the Bank**



As is the case currently, law enforcement and government agencies may need information on transactions to carry out investigations. They would have to do so on a lawful and fair basis.

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**The digital pound would not be anonymous because, just like bank accounts, the ability to identify and verify users is necessary to prevent financial crime. Payment Interface Providers (PIPs) would gather and have access to personal data.**

Just like opening a bank or other payment account, some level of identity verification would be required when opening a digital pound wallet, in order to prevent financial crime. These requirements would be consistent with those that legally apply today and in the future for financial and payments institutions. The UK Digital Identity and Attributes Trust Framework, including the confidence levels outlined in Good Practice Guide 45, could be used by PIPs and users to support access to a digital pound.<sup>79</sup>

PIPs would hold the direct commercial relationships with users. To establish and maintain these relationships, PIPs would require identity information of wallet account holders, which would allow them to carry out KYC checks and comply with AML regulations. They would be responsible for ensuring their compliance with data protection law and the preservation of digital pound users' privacy rights. Digital pound users would continue to be able to protect their personal data to today's legal standards and future data protection rights.

**Small cash payments are anonymous but larger value transactions require more data collection to help mitigate financial crime.**

Cash, as a physical form of money, has lower amounts of data collection than other forms. However, the UK AML and CFT Regime dictates that additional information about the payer must be collected for large-value transactions made in cash.

**The digital pound would have lower frictions than physical cash, so carries higher risks of abetting crime. It is not therefore appropriate to allow such anonymity for digital pounds.**

The physical, as opposed to digital, nature of cash means that it is harder to make large payments with, or store large amounts of, cash than it is to do the same with digital money, which in itself acts to limit the scale of its use in financial crime. In this regard, the digital pound would be more similar to a bank account than cash and hence it would be inappropriate to allow large-scale anonymous transactions in digital pounds.

**However, we are supportive of exploring ways to allow small numbers of small value transactions in digital pounds to have higher levels of privacy.**

It may, however, be appropriate and possible to allow low values of digital pounds to be spent with lower data collection requirements. We are supportive of firms exploring this in two ways: tiered identity verification and enhanced privacy controls.

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<sup>79</sup> The Trust Framework creates a set of rules and standards to facilitate common recognition and interoperability of certified digital identities. This allows an individual to bind personal information to their digital identity and share this information as needed. The system allows for information to be established with varying levels of confidence. These levels of confidence are stipulated by a combination of the number of pieces of identity evidence, the strength and validity of the evidence, their activity history, and identity fraud.

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**Digital pound users should be able to choose from a range of wallet services. Varying levels of identification would be accepted to ensure services are accessible for all.**

An important way in which different services can be provided to users, reflecting differing preferences and to ensure accessibility for all, is to support and encourage tiered access to the digital pound.

Tiered accounts – allowing customers to make low value digital payments with lower KYC requirements – exist in the payments market today. Many existing payments firms develop and shape their customer value propositions around what is legally permitted by linking the strength of user identity verification to access and payments functionalities.

For the digital pound, tiered access would allow for different levels of user access and functionality based on the amount of identification (ID) a user is willing or able to provide. The stronger ID information a user provides, the more types and higher values of payments they would be able to undertake. For example, users might be able to open a basic digital pound wallet with limited ID, which would allow for limited functionality, low-value payments. For more advanced and higher value services, users would provide more or stronger forms of ID. This tiered approach would link the strength of a user's proof of identity to the transaction amounts and types permitted in their digital pound wallet.

Basic access to the digital pound wallet with limited identity verification can be designed so as to be consistent with existing legal requirements in the UK AML and CFT Regime and the Payment Services Regulations 2017. To support access to the digital pound, HM Treasury and the Bank would be supportive of the private sector developing and offering basic tiered access to all users and welcomes views from respondents on this point.

**Digital pound users should be able to vary their privacy preferences to suit their needs.**

HM Treasury and the Bank of England would seek to provide for a digital pound that offers users control over their personal transactions data. This is consistent with the UK's [National Data Strategy](#) and the Government's aim to create an environment where data is appropriately usable, accessible, and available across the economy, while protecting people's data rights and private enterprises' intellectual property.

Some private providers currently offer the option to shield some personal data generated when making some forms of digital payments for privacy or security reasons, for instance with prepaid and disposable cards. For these services, providers must collect the data that is required for legal purposes, for example in the course of AML checks, but (unlike in many other services) they do not collect additional data. Subject to user agreement, the data which digital pound users decide not to shield could be used by Payment Interface Providers for commercial purposes, for example to provide additional value-added services.

The digital pound should be designed to enable PIPs to offer such services. Users' control over personal data generated by their transactions could be achieved by designing a system that supports good data protection and privacy by design which includes privacy-enhancing techniques. This is explored in more detail in the [Technology Working Paper](#).

Any commercial use of personal data would need to comply with UK data protection laws. Informing digital pound users of their rights, the value of their personal data and putting at their disposal the tools to control that data might provide users with the opportunity for additional choice or convenience and would help build the trust that will be essential to the uptake of the digital pound.

### **Enhanced privacy functionality could result in digital pound users securing greater benefits from sharing their personal data.**

The UK has been at the forefront of the successful execution of increased data sharing to benefit consumers. For example, Open Banking enables customers to direct their banks to securely share their data with third-party providers and has led to the emergence of innovative services and benefits for customers.

Research commissioned by the ICO found that choices over personal data are very important to consumers who want to understand what they can do with their personal data, for example preserving or maintaining their privacy or even securing economic value from its use. There is public appetite for trading personal information for access to products and services.<sup>80</sup>

The UK's [National Data Strategy](#) recognises that a data ecosystem which removes barriers to responsible data-sharing and use has the potential to transform almost every part of our society and economy. Mission 1 of the Strategy is focused on unlocking the value of data across the wider economy. Lawful use of digital pound data – governed by choices made by users of the digital pound – could contribute to this strategy.

#### **Consultation questions**

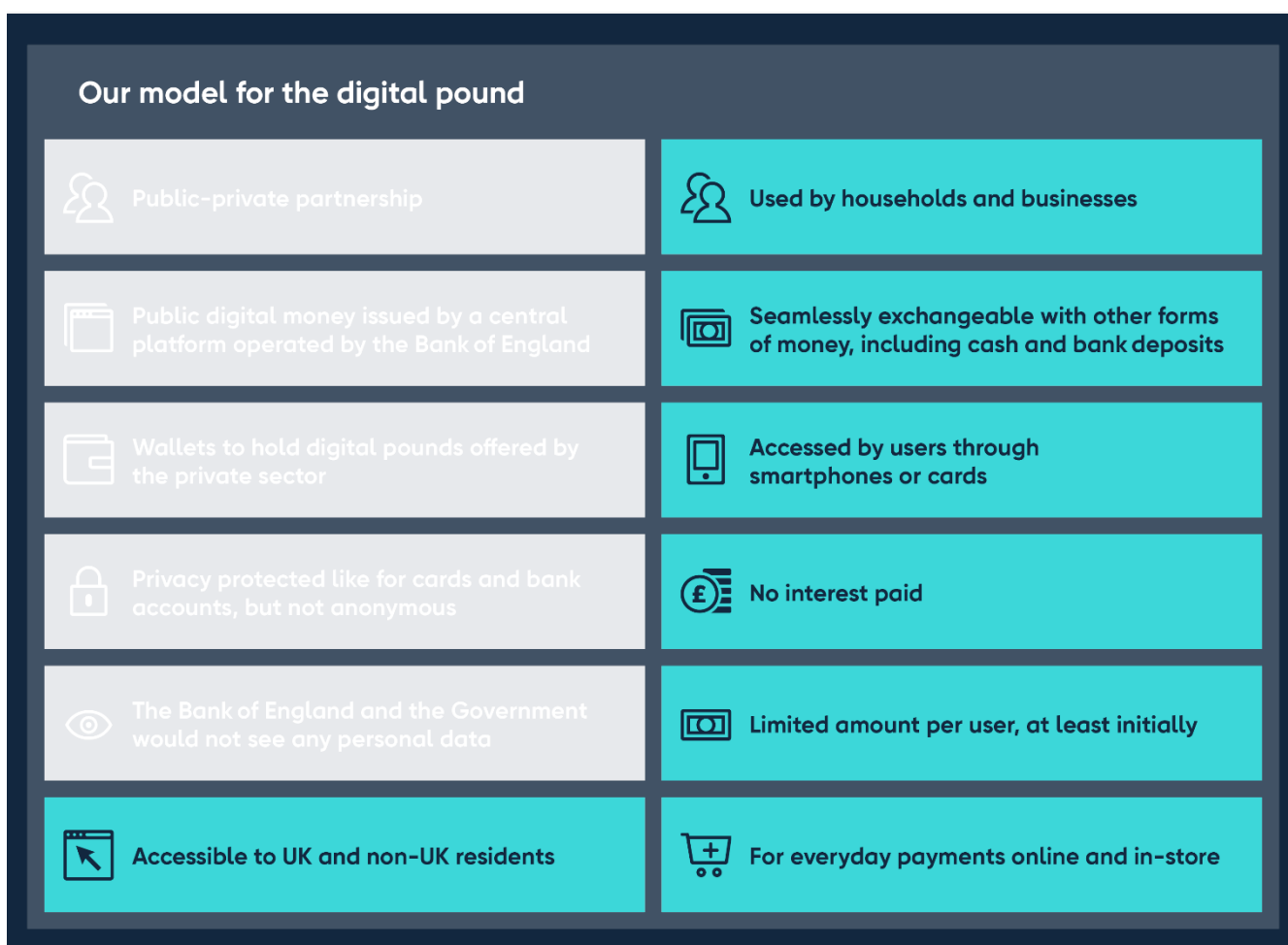
3. Do you agree that the Bank should not have access to users' personal data, but instead see anonymised transaction data and aggregated system-wide data for the running of the core ledger? What views do you have on a privacy-enhancing digital pound?

4. What are your views on the provision and utility of tiered access to the digital pound that is linked to user identity information?

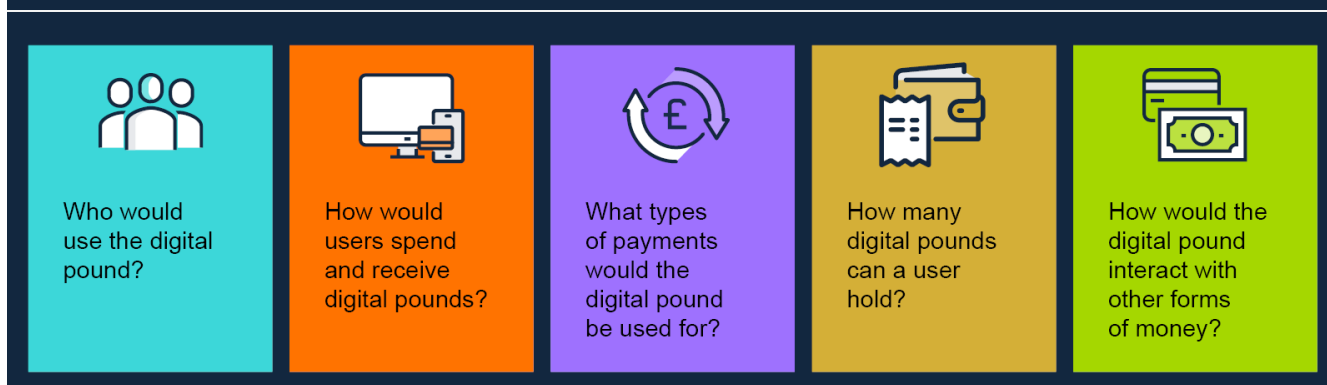
5. What views do you have on the embedding of privacy-enhancing techniques to give users more control of the level of privacy that they can ascribe to their personal transactions data?

<sup>80</sup> ICO (2021) – [Information Rights Strategic Plan: Trust and Confidence](#), page 5.

## Section D.3 User experience for households and businesses



**Diagram D.7: the user experience of the digital pound**



### People and businesses would be the main users of the digital pound.

The digital pound would be designed for households and businesses to use for everyday payments – both in-person and online. This section set out aspects of design that are relevant to individuals using the digital pound (for more information on how businesses might use the digital pound, see Box I).

The digital pound would support two essential types of payment:

- Person-to-business (P2B) – both ‘in-store’ (such as buying groceries in a supermarket) and ‘online’.
- Person-to-person (P2P), such as sending money to a friend.

The Bank’s recent consumer research found that most (88%) P2B in-store payments are made using debit and credit cards, but cash is still relevant for two in five consumers.<sup>81</sup>

Online, card payments are most popular (74%), while other options such as wallets like PayPal provide an increasingly used alternative. That is likely because convenience and the speed of notice of receipt of payment are the most important factors in the payment experience.

There may be scope to improve existing methods used by individuals to make transfers. There are generally fewer methods available for P2P payments compared to options for when individuals pay businesses, and current P2P payments can be inconvenient. The Bank’s consumer research found that 81% of respondents made a P2P payment, mostly by online bank transfer.<sup>82</sup> The digital pound could offer an easy method of P2P payment and add to the current choices available.

All UK residents would be able to hold and use digital pounds. Non-UK resident individuals would be able to hold and use digital pounds when visiting the UK (for example, as tourists), and when outside the UK for payments with either a UK or non-UK resident. To ensure consistency and equal treatment, non-residents’ holdings of digital pounds would be on the same basis as residents.

Non-resident access would involve two requirements. First, a recognition regime to determine which non-UK Payment Interface Providers and External Service Interface Providers could offer digital pound wallets and other services. That would ensure that UK standards of resilience, consumer protection, AML, KYC and any other legal requirements are upheld. Second, the UK authorities might reserve the right not to grant access to digital pounds for non-residents from certain high-risk jurisdictions. That includes potentially considering the Financial Action Task Force’s list of countries judged as having weak regimes to combat AML and CFT.

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<sup>81</sup> Market research (Annex 3).

<sup>82</sup> As part of the Bank’s market research with YouGov and London Economics, 72 participants took part in a discussion forum. This included a seven-day payment diary. See Annex 3 for further information.



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**Payments in digital pounds may involve a variety of devices.**

Users should be able to make and receive digital pound payments in a range of ways, including, but not exclusively:

- Smart devices, in particular smartphones, but also desktops, laptops, tablets, wearables, and Internet of Things (IoT) devices;
- Smart cards, similar to existing payment cards today;
- E-commerce websites and applications; and
- Point-of-Sale (PoS) devices, including those that exist in stores today.

Ultimately, the specific devices and form factors would be developed by private providers.<sup>83</sup> The Bank would still have a role in defining aspects of how they operate, and ensuring they meet necessary standards for accessibility and inclusion.

**Users would be likely to make digital pound payments using smartphones or cards.**

Based on current trends in payments, we expect that most users would access their digital pounds via a wallet hosted on their smartphone. Users would be able to sign up for a wallet, which would allow them to manage their balance and make payments. Payments could then be made either by placing a smartphone near a reader, much like with card or mobile payments today, or by using the digital pound wallet to send a payment to another person or business (Diagram D.8). Payments would be quick, with immediate confirmation that the payment has been processed alongside updated balances.

Digital pound payments under the proposed model could also use options such as physical cards, which would help support financial inclusion and accessibility. That is because not everyone has a smartphone, and some people find them difficult to use.

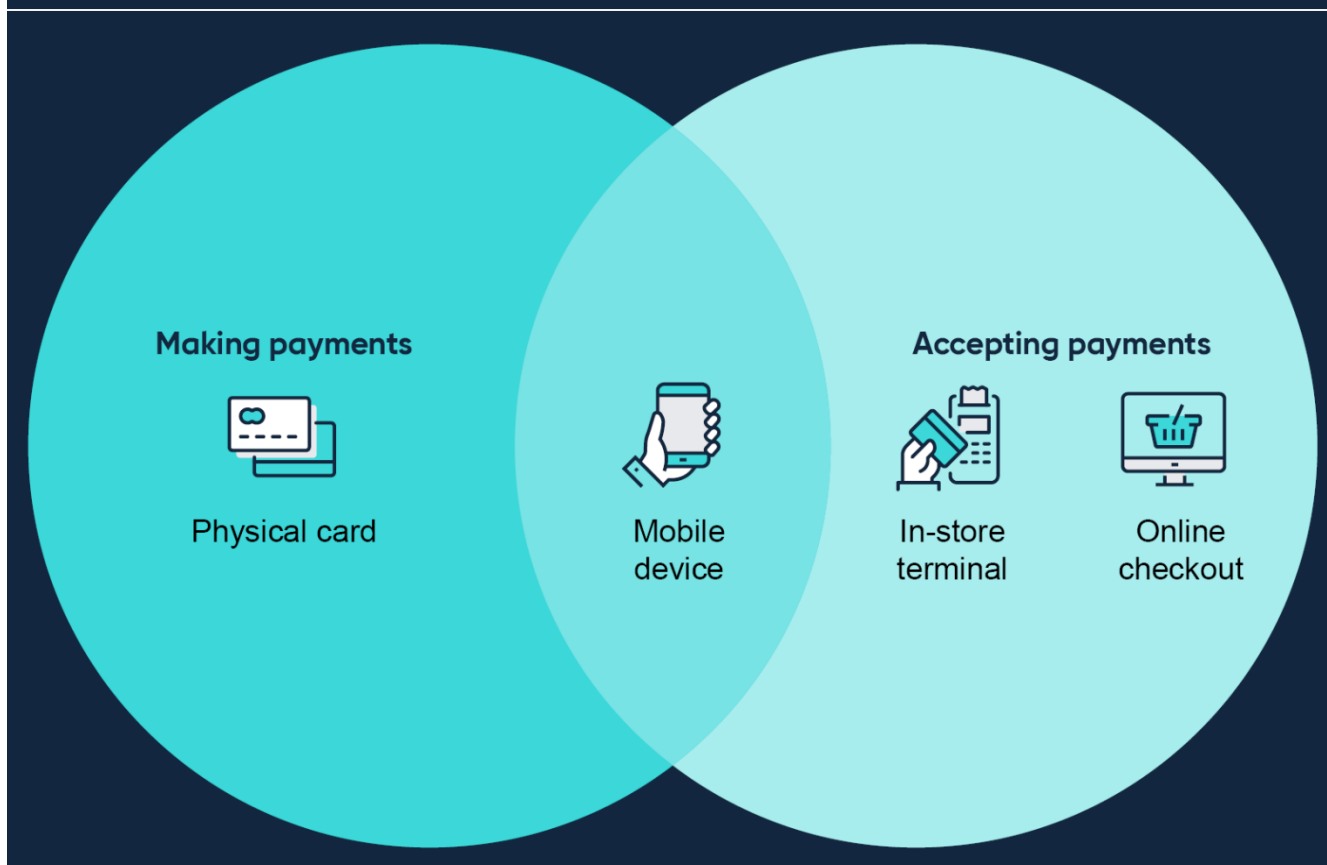
Initially, using digital pounds would be designed to feel like existing payment methods. It would need to be designed to work with existing online and in-store payments technology, such as card readers. That would mean that merchants would not have to buy new infrastructure, encouraging adoption.

Encouraging innovation is a priority for the digital pound. We expect that innovators could develop new devices and ways to pay which offer more convenience and functionality. That might include devices such as wearables (for example, smartwatches or wristbands) and IoT devices (for example, smart speakers, intelligent fridges or TVs).

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<sup>83</sup> Form factors include, for example, smartphones, tablets, wearables, smart cards etc.

**Diagram D.8: The digital pound would be compatible with different devices to ensure it can be used for making and accepting payments.**



**Although in-store, online and person-to-person payments would be the initial focus of the digital pound, that may broaden out in future.**

All payments should be able to be made using the digital pound so long as they are lawful, observe any restrictions (for example, maximum user holdings – see below) and comply with regulatory obligations laid down by authorities. Subject to a payment being lawful, the Bank would be neutral in processing it, and does not envisage applying any limitations on payments on ethical grounds.

Over time, we would expect the digital pound to enable a broader range of payments than those commonplace today. That is especially important given the evolving payments landscape and our wish to facilitate innovation. Examples of those payments might be split, batch or micropayments.<sup>84</sup> We also intend to do further exploration of offline and cross-border payments.

<sup>84</sup> Split payments are where one payment instruction has multiple beneficiaries. Micropayments are payments for very small amounts.

We do not propose to develop a digital pound that enables government or central bank-initiated programmable money. As discussed in Part B, payments programmability could provide enhanced functionality for users to set rules on their payments. While it may be possible to program the digital pound so that it could only work in certain ways, this is not relevant to HM Treasury and the Bank's policy objectives for the digital pound. Further, this functionality could damage the uniformity of the CBDC and cause user distrust. For these reasons, HM Treasury and the Bank will not pursue government or central bank-initiated programmable functions.

However, during our research, stakeholders highlighted the potential benefits of programmability for innovation and user experience. HM Treasury and the Bank would therefore permit Payment Interface Providers and External Service Interface Providers to implement such functionalities themselves, but they would require user consent and not be at HM Treasury or the Bank's direction.

### **Like a physical banknote, the digital pound would be unremunerated.**

Our vision for the digital pound is similar to that of a digital banknote. Accordingly, we propose that the digital pound, like banknotes, would not be remunerated. This means it would not pay (nor charge) an interest rate. That is for three reasons:

- First, the digital pound is intended to be a means of payment, like cash or a current account. It is not intended as a savings product, so it does not need to be remunerated. Not remunerating the digital pound would also mean it would not compete with bank accounts as a way to hold savings. This would reduce impacts on the banking sector.
- Second, using the digital pound for monetary policy reasons is not a motivation for its introduction (Part C and Box F). That means there is no current need for the digital pound to be remunerated.
- Third, to achieve its objective as a monetary anchor, the digital pound would need to be widely available and useable, but does not need to be the dominant form of money for retail payments. Remuneration is therefore not required to incentivise its uptake.

### **Any decision to revisit the approach to remuneration after the digital pound is introduced would be preceded by a review with full consultation.**

Were the approach to remuneration to change after the digital pound was introduced, it would follow consultation and the Bank would provide adequate lead time, so that holders of digital pounds were able to exit from, or enter, the system in an orderly manner, if they wished to. That would allow them to switch their funds held in digital pounds into other forms of money such as commercial bank deposits and cash.

**The Bank would place some limits on holdings of digital pounds, at least during its introductory period. An individual limit of between £10,000 and £20,000 is proposed.**

Although the digital pound should be widely available for retail use to achieve its objectives (Part B), it must also be designed in a way that manages any risks to financial and monetary stability. As set out in Part C, those risks largely stem from any large and rapid outflows from bank deposits into digital pounds, and from wholesale use disrupting the function of critical money markets. These risks would depend on uptake of the digital pound, which is difficult to predict and may vary during the introductory period and times of stress.

A limit on individual holdings would be intended to manage those risks by constraining the degree to which deposits could flow out of the banking system. That is important during the introductory period as we learn about the impact of the digital pound on the economy.

That limit would, however, be set in a way that supports wide usability of the digital pound. For example, users may want to use their digital pound wallet to receive their salary, which may vary over time and may include bonuses or overtime payments. Any limit would also need to consider the roll-over of any balances from the previous month. So the limit should be set in a way that ensures there is enough headroom to accommodate these, as well as supporting transactions. Technical solutions will also be required to ensure that incoming payments that would otherwise breach these limits do not fail. For example, one mechanism might be functionality for incoming funds that would take a user's holdings of digital pounds above the limit to be automatically 'swept' into a nominated account where it can be held in another form of money, such as a commercial bank deposit.

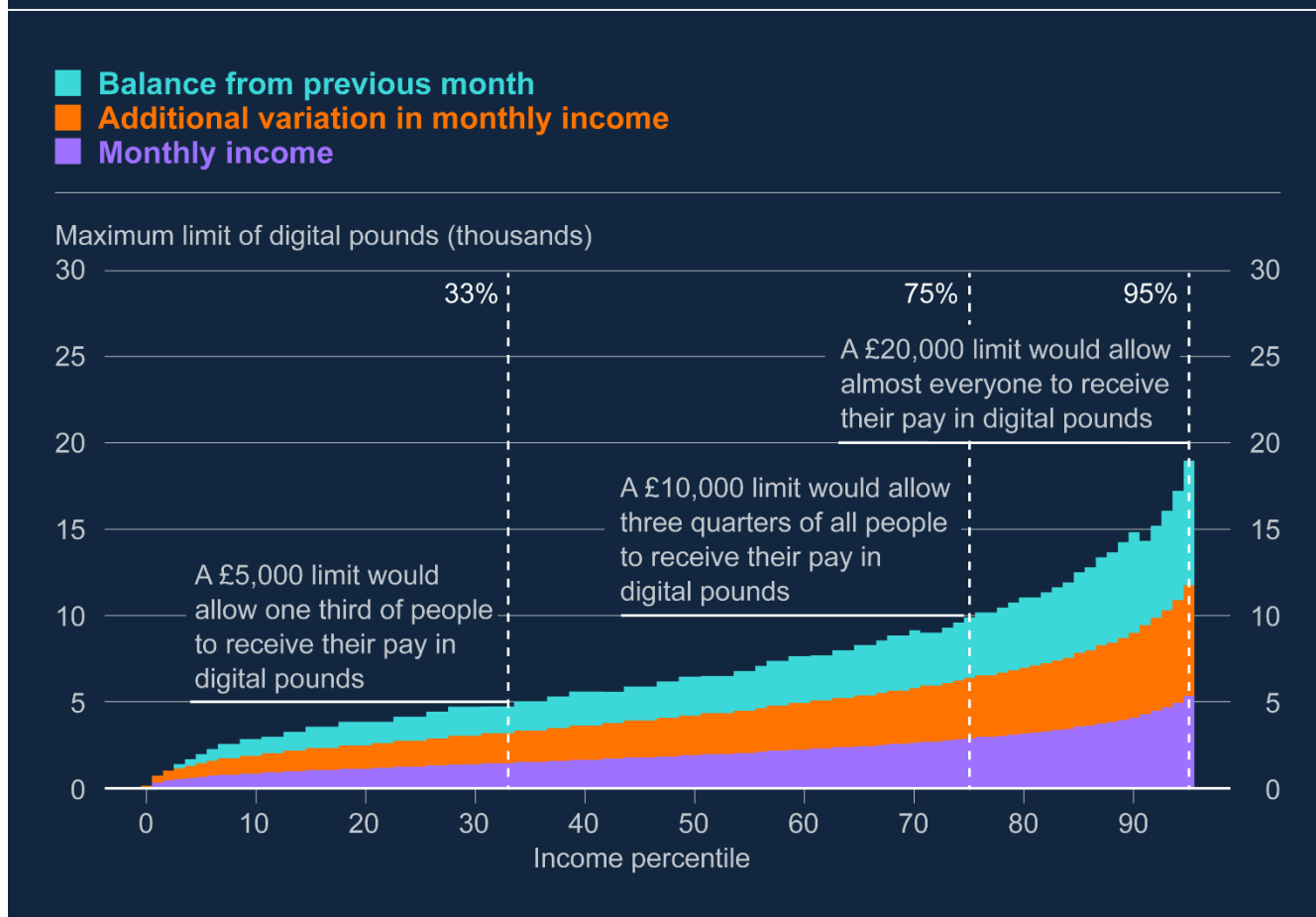
We judge that a limit of between £10,000 and £20,000 per individual is likely to strike an appropriate balance between managing risks and supporting wide usability of the digital pound.

Chart D.9 combines monthly data on income distributions and estimates of potential variation in non-regular incomes and roll-over balances, to show how various limits on digital pound holdings could affect usage depending on users' income.

For example, a limit of £10,000 would allow 75% of UK income earners to hold their salary, pre-existing balances as well as an illustrative 10% bonus or overtime payment. Incomes vary by region, age, and gender, so a limit could be more restrictive for some individuals than others. A £20,000 limit would allow 95% of income earners in the UK to use their digital pound wallet to receive their salary without regularly reaching their holding limit. That would improve usability but be less effective at curbing outflows from bank deposits.

We seek feedback on the proposed holding limit of £10,000–£20,000 per individual. We also recognise the limit may vary over time to take account of developments in the period leading up to, and after, any launch.

**Chart D.9: A limit between £10,000 and £20,000 would allow most people to receive their pay in digital pounds <sup>(a)</sup>**



Sources: Office for National Statistics, XpertHR and Bank calculations.

(a) Monthly disposable (post-tax) income from the Household Finances Survey (HFS) (April 2019 – March 2020); an illustrative bonus of 10% of annual salary (based on a salary survey from 2017) is applied across the entire income distribution; bonus assumed to be paid as a lump-sum in a single month; the monthly roll-over balance is estimated from monthly income less expenditure.

### **We also welcome views on a lower limit, such as £5,000.**

A lower limit, such as £5,000, would be more effective at curbing the potential for large and rapid bank deposit outflows. That would provide a stronger safeguard against risks to financial stability, including those which could arise were there also other new forms of digital money, such as stablecoins, to which deposits could flow out to at the same time.

But a limit of £5,000 could prove less useful, as only about one third of people would be able to comfortably receive their salary and bonus as digital pounds.

We welcome feedback from respondents to this consultation on the optimal holding limit for the digital pound, to reach an informed decision in future.

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**Limits would be in place at least during transition. They could be amended in future.**

Limits would be in place at least during the transition period. That period, which may last several years, is when uncertainty about demand for the digital pound would be highest and the Bank would be learning about how the economy reacts to its introduction.

Any future changes to limits would follow consultation and include an assessment against our guiding principles of: adoption and use of the digital pound; developments in the UK payments landscape; and whether other means of managing financial stability risks could be used instead.

**Moving between digital pounds and other types of money must be fast and easy.**

Households and businesses currently use a mix of bank deposits and cash and can move between them with relative ease. It must also be simple, fast and convenient to move between the digital pound and other forms of money, in particular cash and bank deposits.<sup>85</sup>

Interoperability is supported today by infrastructures, for example LINK and ATMs for switching between cash and bank deposits.<sup>86</sup> As we continue our in-depth technology research, we will review the extent to which existing and prospective infrastructures, including the renewed RTGS service and the New Payments Architecture (NPA) can support interoperability for the digital pound.

The Bank's accompanying [Technology Working Paper](#) discusses the options for enabling interoperability between the digital pound and cash, and the digital pound and bank deposits respectively.

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<sup>85</sup> The physical nature of cash makes moving between it and other forms of money more challenging than digital money, but it is important that the aim remains to achieve simple, fast and convenient movement. This is likely to require working with existing cash distribution market participants.

<sup>86</sup> [LINK](#).

## Box I: Corporates and the digital pound

The digital pound is designed for use by households and businesses. Most of the user experience set out in Part D reflects the likely use by individuals, rather than businesses. Corporate use of the digital pound is still being explored and would particularly benefit from further input from stakeholders on the issues set out in this box.

The principles for corporate use of the digital pound are similar to that of individuals. That is, the digital pound should be used for everyday payments, it should be fast and easy to use and to move between other forms of money.

### How many digital pounds should corporates be able to hold?

Similar to individuals, there would be limits on the amount of digital pounds that corporates can hold but the proposed amount is still being explored.

For retail payments, businesses would need to be able to accept any payments made by their customers in digital pounds. As with individuals, though, there would need to be restrictions on corporates. That would safeguard against risks to monetary and financial stability from switching of wholesale deposits currently held with banks and diversion of corporate funds that would otherwise be invested in other financial assets.<sup>87</sup>

Given the larger size of corporate balance sheets, any limits would need to be significantly larger than the £10,000–£20,000 proposed for individuals. But corporates also vary in size and in the volume of transactions they undertake. That makes it more challenging to design a one-size-fits-all limit for corporates. It may be necessary to set a relatively high limit to ensure they can receive payments at peak times.

Technology solutions might support a lower corporate limit, safeguarding against risks to financial and monetary stability, while not impairing corporates' ability to make and receive payments. For example, holdings above the level of the limit might be automatically 'swept' into a nominated bank account. This might occur at a set frequency, for example, at the end of, or at regular intervals during, the day. Or, if the transfer to bank deposits was near-instantaneous, on any incoming balance that would breach the limit. That might allow for a low limit for corporates, even towards zero. Whether such automated transfers are both desirable and feasible will be an area for further research.

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<sup>87</sup> This would also avoid individuals registering as a corporate to avoid the individual holding limit.

### **Which types of corporate should have access to the digital pound?**

The digital pound is for retail payments and not for financial market activity. The most direct way of maintaining a retail focus would be to restrict which types of business could hold digital pounds. For example, financial firms' access could be restricted to prevent wholesale financial activity being conducted in digital pounds given the disruptive impact this could have on core financial markets.

In practice, distinguishing which type of business should or should not have access to the digital pound is challenging. Large non-financial firms may still be active in financial and money markets which could be deemed to be 'wholesale' activity. And financial firms may need to make payments considered to be 'retail', such as paying their staff or paying out insurance claims to customers.

The Bank will explore this issue through a combination of research and engagement with private sector firms.

Non-resident individuals would have access, but whether, and to what extent, non-resident corporates have access to the digital pound will also be subject to further work.



## **Box J: Financial inclusion**

### **Tackling financial exclusion, particularly as financial services become more digital, is a priority for the Government.**

Financial inclusion means that everyone, regardless of their background or income, has access to useful and affordable financial products and services such as banking, payment services, credit, insurance, and the use of financial technology.

Tackling financial exclusion across the UK is an important priority for the Government. It means ensuring that people can access useful, affordable financial products and services whatever their income or background and at all stages in their financial lives.

Advancements in technology, societal changes and economic trends foster innovation and provide opportunities to make products and services more inclusive and accessible. However, they may also result in new risks for consumers – especially those who are vulnerable. These risks need to be mitigated by adequate and flexible policy development, effective regulatory frameworks and consideration of inclusive product design.

The Government works closely with regulators, industry and the third sector to advance financial inclusion. And it recognises that fair and affordable access to relevant financial products and services is vital in people's everyday lives, whether that is opening a bank account to receive an income, accessing credit, securing insurance, or retirement planning.

Building people's financial capability so they can use and maximise their use of financial products and services is also important. Government policy on financial capability focuses on ensuring that people can access the guidance and advice they need and have the confidence and skills to successfully engage with their personal finances.

### **Government initiatives have continued to make progress on financial inclusion.**

Over the last year, the Government has continued to make significant progress on financial inclusion. The UK has a vibrant financial services sector and levels of financial inclusion are high compared to many of its international counterparts.

For example, the Government's work on access to banking and bank accounts is critical to allow people to manage their money effectively, securely, and confidently. The nine largest personal current account providers in the UK are legally required to offer basic bank accounts to customers who do not have a bank account or who are not eligible for a bank's standard current account. As of 30 June 2021, there were over 7.2 million basic bank accounts open at the nine designated institutions.<sup>88</sup>

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<sup>88</sup> Gov.UK (2022) – [Basic bank accounts: July 2020 to June 2021](#).

In the longer-term, access to cash is key to the Government's work on financial inclusion. The Government is legislating to protect access to cash and ensure that the UK's cash infrastructure remains sustainable. Covid-19 has increased the pace of digitisation and the adoption of alternative ways of making payments, but the Government recognises that millions of people continue to use cash across the UK, particularly those in vulnerable groups.

Other examples of the Government's recent work on financial inclusion include the legislation that has been introduced to enable credit unions to offer a wider number of products and services and the piloting of a No-Interest Loan Scheme.

### **The digital pound could provide an extra option for some financially excluded groups.**

There are multiple factors that contribute to financial exclusion and those who are financially excluded are typically less engaged with the financial services industry. It is therefore challenging to determine the likely level of appetite for the digital pound among this group. But the introduction of the digital pound has the potential to encourage innovative approaches from industry to tackle some existing financial inclusion issues. For example, consideration of how to get payments to people who do not have a bank account. It could also provide greater functionality for those with specific vulnerabilities and greater product diversity in the market.

CBDCs have been launched in some other countries with a view to tackling financial inclusion issues around access to payments. But these benefits are unlikely to present themselves in the same way in the UK, given our established and well-functioning payments infrastructure.

### **Adoption among the financially excluded could be hampered by an unwillingness or inability to use digital payments. Digital inclusion therefore needs to be promoted alongside financial inclusion.**

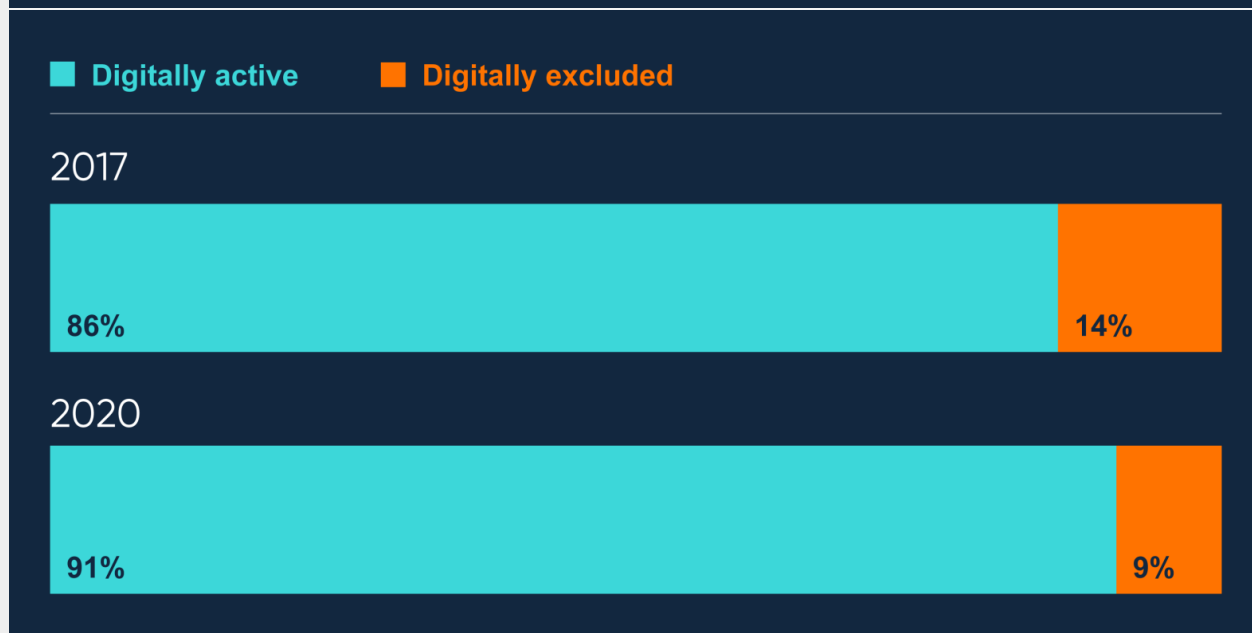
With the ever-increasing digitisation of financial services, it has become clear that some financial exclusion is ultimately driven by digital exclusion. Some individuals may not have the digital skills or access to the right technology required to navigate and access financial services and products such as online banking or payments. It is estimated that, in February 2020, 4.7 million adults were digitally excluded, representing almost 10% of the population (Chart D.10).<sup>89</sup> The link between a lack of digital skills and connectivity and financial exclusion was further demonstrated by the Covid-19 pandemic which highlighted the need for access to digital infrastructure and skills necessary to fully participate in society and the economy.

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<sup>89</sup> Financial Conduct Authority (2020) – [Financial Lives Survey](#).

The digital pound should be designed in a way which can provide for those who are digitally excluded to avoid driving further exclusion of this population from innovative and valuable new financial services.

**Chart D.10: Almost 10% of the population are classified as being digitally excluded**



**The digital pound must be simple and straightforward to use, using familiar methods and devices. And it must be understood and trusted as a form of money.**

The digital pound may have limited potential to accelerate financial inclusion in the UK. But it is a way to provide another option for certain financially excluded groups and could lead to innovative approaches that improve access to financial products and services.

There are several challenges that need to be overcome for the digital pound to be accessible to those that are most financially and digitally excluded, which are being considered as a part of its design. For example:

- It will need to be as simple and straightforward to use as possible.
- As a new form of money, understanding and trust among the public is crucial. The roles of Government, the central bank and industry will need to be set out clearly.
- Because the digital pound might be harder to access for those without the internet or smartphones, offline capabilities or other solutions are being explored.
- In line with the current approach to basic bank accounts, the application process, access points, and means of identification need to be designed to help people access services.

## **The needs of vulnerable people are being considered in the design of the digital pound.**

Financial inclusion and the needs of vulnerable people are being considered by HM Treasury and the Bank from the initial design stage of the digital pound. Our aim is that it should be designed, developed and implemented carefully so it contributes to financial inclusion to the extent it can, by seeking to ensure the needs of all users, including vulnerable individuals, are explored throughout.

Cash is expected to continue to play a role in society, particularly for those who are older or more vulnerable, for some time. In February 2020, the FCA found that 5.4 million adults relied on cash to a very great or great extent in their day-to-day lives.<sup>90</sup> The digital pound would not seek to replace cash or cause further financial exclusion for groups who rely on and prefer physical financial services infrastructure.

Further design considerations for the digital pound could include the use of tiered wallets, explored above, which may offer an opportunity to tackle some of the financial inclusion issues driven by ID requirements. Using tiered wallets, users with limited forms of ID could open basic digital pound wallets allowing limited, low-value payments. This could provide a more accessible gateway into digital payments for some of the financially excluded.

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<sup>90</sup> FCA (2021) – [Financial Lives Survey](#), page 36.

## Box K: Lessons learnt from our engagement with civil society groups

Throughout the exploration phase we have engaged with multiple civil society groups, both bilaterally and in different multilateral fora such as the [CBDC Engagement Forum](#) and ad hoc roundtables. The purpose has been to identify drivers of financial exclusion and explore whether the digital pound could present opportunities to mitigate them.

- We heard that, for many people, the physical nature of cash is a key feature for budgeting purposes, so digital alternatives like the digital pound could struggle to deliver the same functionality.
- We discussed how trust and familiarity were key reasons to use cash for certain groups of people – the role of trusted intermediaries was identified as very important for a potential roll out of the digital pound, as especially vulnerable individuals would need support from trusted third parties to become comfortable with a new payment method; we discussed the possibility of civil society groups becoming wallet providers (Payment Interface Providers) for vulnerable groups.
- Consumer protection was considered crucial for adoption of the digital pound by vulnerable groups, as they could be at risk when using a new payment method.
- Overall, civil society groups thought the digital pound was not necessarily the only way to tackle financial exclusion and that existing policies could be improved to achieve some of the inclusion goals.

## Box L: Lessons learnt from the Engagement Forum

As part of our strategy to engage with industry and consumers, in 2021 the Bank and HM Treasury set up the [CBDC Engagement Forum](#). The objective of the Engagement Forum is to gather input from a diverse cross-section of expertise and perspectives to inform the Bank's exploration of the challenges and opportunities of CBDC. The Forum membership includes financial institutions, technology and fintech firms, academics, civil society, merchants and consumer groups.

The Forum has discussed a range of topics, including potential use cases for a retail CBDC, opportunities to tackle financial exclusion and co-existence with other forms of money.<sup>91</sup> Themes from these discussions have been considered in this CP.

Some Forum members were sceptical about the current need for a retail CBDC in the UK, which they considered to already have an efficient payments system. However, members recognised its potential to spur innovation and largely supported the idea of CBDC as a basic but extensible platform to allow the private sector to innovate. They agreed a flexible platform should allow innovators to shape and accommodate future use cases that could be difficult to anticipate today. The Forum has also emphasised the need for clarity around policy choices and the technical and regulatory parameters authorities would put in place for CBDC for the private sector to start identifying potential use cases and commercial opportunities within the CBDC ecosystem.

The Forum also reflected on the opportunities that CBDC could offer for person-to-business (P2B) payments and the conditions that would need to be in place for a retail CBDC to be adopted by consumers and merchants. It was argued that achieving widespread adoption of new payment methods was very complex, but programmability, smart contracts or micropayments could drive demand for CBDC payments.

Financial and digital inclusion has also been a topic of interest for Forum members, who discussed the obstacles that some individuals face to access basic banking and payment services, especially in an increasingly digital economy. Members looked at some of the main drivers of exclusion and discussed how CBDC as a new payment system could tackle those. While the Forum identified opportunities, it also acknowledged that a CBDC would not be a 'silver bullet' and that its effectiveness to tackle exclusion would depend on a range of policy and regulatory questions that would need to be addressed by the Bank and the Government.

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<sup>91</sup> Minutes from the meetings can be found on [the Bank's website](#).

## Consultation questions

6. Do you have comments on our proposal that in-store, online and person-to-person payments should be highest priority payments in scope? Are any other payments in scope which need further work?

7. What do you consider to be the appropriate level of limits on individual's holdings in transition? Do you agree with our proposed limits within the £10,000–£20,000 range? Do you have views on the benefits and risks of a lower limit, such as £5,000?

8. Considering our proposal for limits on individual holdings, what views do you have on how corporates' use of digital pounds should be managed in transition? Should all corporates be able to hold digital pounds, or should some corporates be restricted?

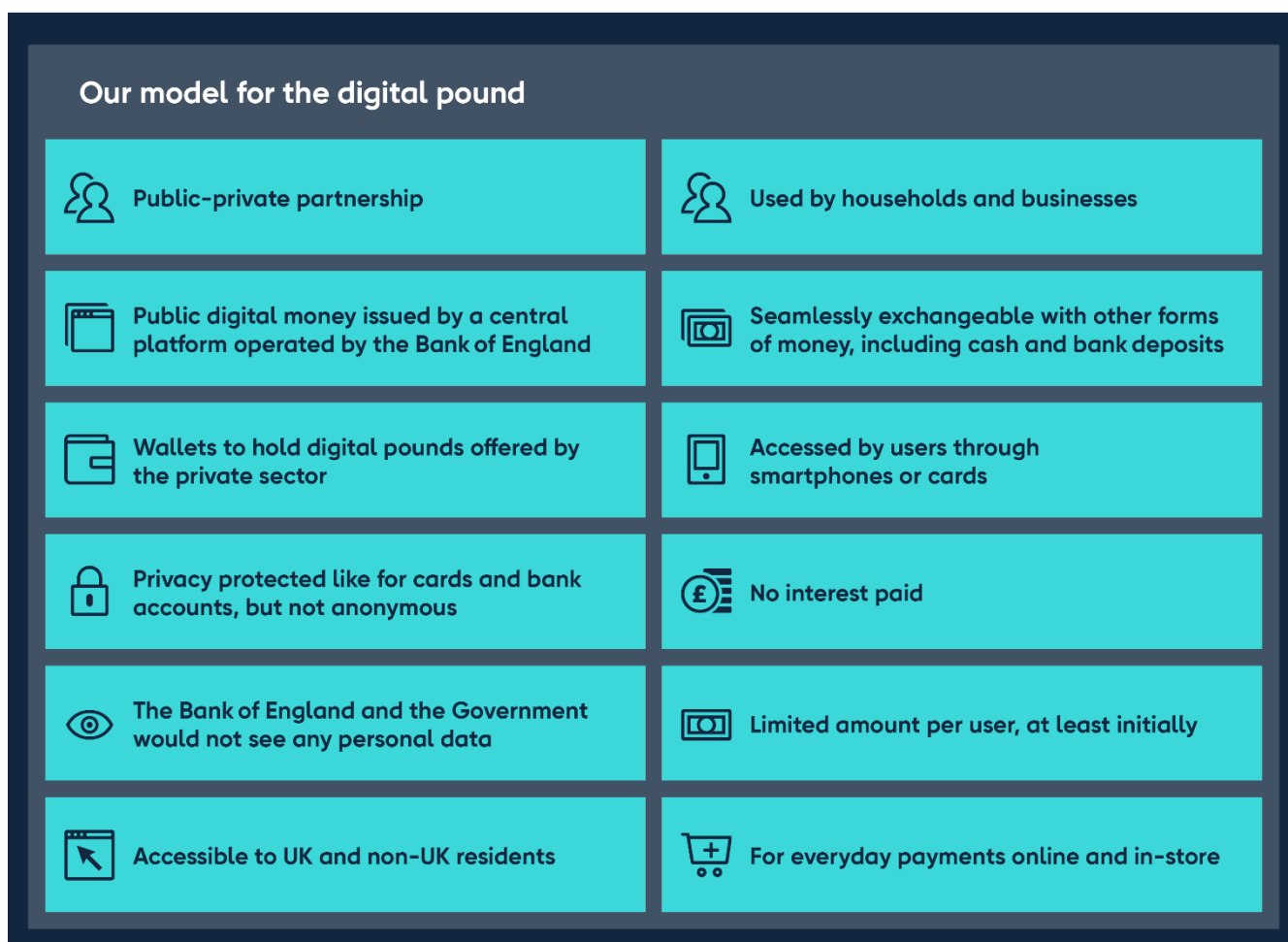
9. Do you have comments on our proposal that non-UK residents should have access to the digital pound, on the same basis as UK residents?

10. Given our primary motivations, does our proposed design for the digital pound meet its objectives?

11. Which design choices should we consider in order to support financial inclusion?

12. The Bank and HM Treasury will have due regard to the public sector equality duty, including considering the impact of proposals for the design of the digital pound on those who share protected characteristics, as provided by the Equality Act 2010. Please indicate if you believe any of the proposals in this Consultation Paper are likely to impact persons who share such protected characteristics and, if so, please explain which groups of persons, what the impact on such groups might be and if you have any views on how impact could be mitigated.

# Conclusion



The Bank and HM Treasury judge it is likely that the digital pound will be needed in the future and that it would offer benefits. The digital pound could sustain retail access to central bank money, support confidence in the different forms of money used for day-to-day payments, and promote innovation, choice, and efficiency in payments in an increasingly digital world.

The digital pound, as described in this paper, would have much in common with cash. Like cash, the digital pound would be provided by the Bank; safe, simple, convenient to use; widely accepted; and easily understood. It would be designed for everyday payments, rather than savings and so, like cash, it would not pay interest.

The case for introducing the digital pound depends to a significant degree on how the payments landscape evolves in coming years. In particular, the extent to which cash use further declines, whether new forms of privately-issued digital money emerge and how they interact with existing forms of money and payments.



It is too early to take a decision on whether to build the infrastructure for the digital pound. At the current time, while we judge the digital pound is likely to be needed, we cannot know this with certainty.

As such, the Bank and HM Treasury judge it is important we move to the next stage of our development of the digital pound. We will invest in the 'design phase' of our roadmap, meaning that, while no firm decision has been taken on whether to build the digital pound, we will step up our development work, build the necessary skills and put in place the technical capability to introduce the digital pound in a timely manner, in the event a decision is made in future to do so. And, even if we decide not to proceed to build a digital pound, our technology explorations, and collaboration with the private sector will present benefits to the wider UK fintech community.

The next stage will involve the development of a comprehensive architecture for the digital pound, and associated experimentation and proofs of concept in partnership with the private sector. We expect at the end of the design phase that the Government and the Bank will decide whether to proceed to build the digital pound. The legal basis for the digital pound will be determined alongside consideration of its design.

Responses to this consultation will inform the next stage of work and constitute an important step towards making a final decision on whether to build a digital pound. The Bank and HM Treasury welcome feedback on the questions posed in this CP by a range of stakeholders.

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## Consultation process

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The Bank and HM Treasury invite views on the questions listed below. Respondents should provide answers by 30 June 2023.<sup>92</sup> After this, the Bank and HM Treasury will assess the responses. These responses will inform our future work and exploration of the digital pound.

### Consultation questions

1. Do you have comments on how trends in payments may evolve and the opportunities and risks that they may entail?
2. Do you have comments on our proposition for the roles and responsibilities of private sector digital wallets as set out in the platform model? Do you agree that private sector digital wallet providers should not hold end users' funds directly on their balance sheets?
3. Do you agree that the Bank should not have access to users' personal data, but instead see anonymised transaction data and aggregated system-wide data for the running of the core ledger? What views do you have on a privacy-enhancing digital pound?
4. What are your views on the provision and utility of tiered access to the digital pound that is linked to user identity information?
5. What views do you have on the embedding of privacy-enhancing techniques to give users more control of the level of privacy that they can ascribe to their personal transactions data?
6. Do you have comments on our proposal that in-store, online and person-to-person payments should be highest priority payments in scope? Are any other payments in scope which need further work?
7. What do you consider to be the appropriate level of limits on individual's holdings in transition? Do you agree with our proposed limits within the £10,000–£20,000 range? Do you have views on the benefits and risks of a lower limit, such as £5,000?
8. Considering our proposal for limits on individual holdings, what views do you have on how corporates' use of digital pounds should be managed in transition? Should all corporates be able to hold digital pounds, or should some corporates be restricted?
9. Do you have comments on our proposal that non-UK residents should have access to the digital pound, on the same basis as UK residents?

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<sup>92</sup> On 1 June 2023, the original deadline was extended to 30 June 2023 due to the omission of question 9 of this Consultation Paper from the online response form.

10. Given our primary motivations, does our proposed design for the digital pound meet its objectives?

11. Which design choices should we consider in order to support financial inclusion?

12. The Bank and HM Treasury will have due regard to the public sector equality duty, including considering the impact of proposals for the design of the digital pound on those who share protected characteristics, as provided by the Equality Act 2010. Please indicate if you believe any of the proposals in this Consultation Paper are likely to impact persons who share such protected characteristics and, if so, please explain which groups of persons, what the impact on such groups might be and if you have any views on how impact could be mitigated.

## Who should respond?

The Bank and HM Treasury welcome responses to any of the questions, but do not expect respondents to provide an answer to every question. We are keen to hear from a wide range of stakeholders, which includes community or charitable-focused organisations, the payments industry, businesses, and the general public.

You can respond to this survey through [this web form](#) for all questions apart from question 9, and [this additional web form](#) for question 9.<sup>93</sup>

By email:

[Digitalpoundconsultation2023@bankofengland.co.uk](mailto:Digitalpoundconsultation2023@bankofengland.co.uk) or [CBDC@HMTreasury.gov.uk](mailto:CBDC@HMTreasury.gov.uk)

By post:

Digital Pound Consultation  
CBDC Unit  
Bank of England  
Threadneedle Street  
London  
EC2R 8AH

Or

CBDC  
HM Treasury  
1 Horse Guards Road  
London  
SW1A 2HQ

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<sup>93</sup> The additional web form was created on 1 June to accept responses to question 9, which was previously omitted from the online response form.

By telephone: 020 3461 4878 (Bank of England)

Should you have any additional requirements, please contact us through one of the above channels and we can provide this in accessible formats.

## **Privacy notice: Bank of England**

By responding to this consultation, you provide personal data to the Bank of England (the Bank). This may include your name, contact details (including, if provided, details of the organisation you work for), and opinions or details offered in the response itself.

The response will be assessed to inform the Bank's work as a monetary authority, as a supervisor of financial services firms and as the central bank of the United Kingdom, both in the public interest and in the exercise of the Bank's official authority. The Bank may use your details to contact you to clarify any aspects of your response.

We will retain all responses for the period that is relevant to supporting ongoing financial services law and policy developments and reviews. To find out more about how we deal with your personal data, your rights or to get in touch please visit [Privacy and the Bank of England](#).

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure to other parties in accordance with access to information regimes including under the Freedom of Information Act 2000 or data protection legislation, or as otherwise required by law or in discharge of the Bank's functions.

Please indicate if you regard all, or some of, the information you provide as confidential. If the Bank receives a request for disclosure of this information, we will take your indication(s) into account but cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system on emails will not, of itself, be regarded as binding on the Bank.

## **Privacy notice: HM Treasury**

### **Data subjects**

This privacy notice relates to the use of personal data of any individuals identifiable from information provided in the consultation responses.

### **The data we collect (data categories)**

Personal data collected is likely to include individuals' names and email addresses. It is possible that respondents may also volunteer additional information that identifies them or third parties.

### **Legal Basis for processing**

Article 6(1)(e) – the processing of this personal data is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in HM Treasury. For the purpose of this consultation, the task is consulting on departmental policies or proposals or obtaining opinion data in order to develop effective government policy.

The personal data is processed for the purpose of obtaining the opinions of members of the public and representatives of organisations and companies, about departmental policies, proposals, or generally to obtain public opinion data on an issue of public interest. HM Treasury will use your personal data to record your comments and views and take your reply into account – as far as possible with all other replies – when decisions are being made because of the consultation. Your personal data may also be used to contact you about your response to the consultation if needed.

### **Purpose**

The personal data is processed for the purpose of obtaining the opinions of about government policies, proposals, or an issue of public interest.

HM Treasury will use your personal data to record your comments and views and take your reply into account – as far as possible with all other replies – when decisions are being made because of the consultation. Your personal data may also be used to contact you about your response to the consultation if needed.

### **Who we share your data with?**

The personal data will only be made available to those with a legitimate need to see it as part of the consultation process.

As the personal information is stored on HM Treasury IT infrastructure, it will be accessible to HM Treasury's IT contractor. HM Treasury's IT contractor will only process this data for our purposes and in fulfilment with the contractual obligations they have with us.

Information provided in response to this consultation may be published or disclosed in accordance with the access to information regimes. These are primarily the Freedom of Information Act 2000 (FOIA) and the Environmental Information Regulations 2004 (EIR).

### **How long we will hold your data (retention)?**

Information in responses to consultations will generally be published and therefore retained indefinitely as a historic record under the Public Records Act 1958. HM Treasury will not include any personal data when publishing information in response to this consultation. Personal information in responses will be retained for three calendar years after the consultation has concluded.

### **Your rights**

- You have the right to request information about how your personal data are processed and to request a copy of that personal data.
- You have the right to request that any inaccuracies in your personal data are rectified without delay.
- You have the right to request that your personal data are erased if there is no longer a justification for them to be processed.
- You have the right, in certain circumstances (for example, where accuracy is contested), to request that the processing of your personal data is restricted.

### **How to submit a Data Subject Access Request (DSAR)**

To request access to personal data that HM Treasury holds about you, contact:

HM Treasury Data Protection Unit  
1 Horse Guards Road  
London  
SW1A 2HQ

[dsar@hmtreasury.gov.uk](mailto:dsar@hmtreasury.gov.uk)

- You have the right to object to the processing of your personal data where it is processed for direct marketing purposes.
- You have the right to data portability, which allows your data to be copied or transferred from one IT environment to another.

## Complaints

If you have any concerns about the use of your personal data, please contact us via this mailbox: [privacy@hmtreasury.gov.uk](mailto:privacy@hmtreasury.gov.uk).

If we are unable to address your concerns to your satisfaction, you can make a complaint to the Information Commissioner, the UK's independent regulator for data protection.

The Information Commissioner can be contacted at:

Information Commissioner's Office  
Wycliffe House  
Water Lane  
Wilmslow  
Cheshire  
SK9 5AF

0303 123 1113

[casework@ico.org.uk](mailto:casework@ico.org.uk)

Any complaint to the Information Commissioner is without prejudice to your right to seek redress through the courts.

## Public Sector Equality Duty

HM Treasury and the Bank, in the exercise of its public functions including its banknote issuance and other functions relating to the proposals in this paper, is subject to a statutory duty set out in the Equality Act 2010 (Equality Act) to 'have due regard' to equality considerations, comprising the need to: (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act; (b) advance equality of opportunity between persons who share a relevant protected characteristic under the Equality Act and persons who do not share it; and (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it (the Public Sector Equality Duty or PSED). For the purposes of issuance of the digital pound, there are significant policy and technological decisions which would need to be taken to ensure fair and equitable access. As part of the policy development process, the Bank and HM Treasury will have due regard to the equality considerations set out in the PSED, including conducting Equality Impact Assessments.

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# Annexes

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## Annex 1: The digital pound and international risks

**The digital pound might improve cross-border payments. But it may also increase the UK's exposure to economic shocks from abroad.**

The UK, as an open economy, could benefit from a digital pound that improved cross-border payments (for example, cheaper or faster payments for international trade or remittances) (Box D). But a digital pound, or a new form of privately-issued sterling digital money, could change the structure of the financial system in a way that increases the UK's exposure to foreign shocks.

First, it could make UK banks more reliant on wholesale funding. The availability and cost of that funding could be more susceptible to foreign economic shocks because it could be provided by foreign investors or denominated in foreign currency.<sup>94</sup>

Second, an increase in UK bank funding costs could increase the cost, or reduce the availability, of their lending to the UK real economy. This could prompt households and businesses to borrow more from abroad. That could include borrowing from foreign banks, foreign non-banks, or UK non-banks that might be funded by non-UK investors or hold portfolios of global assets.<sup>95</sup> Reliance on such institutions for funding the UK real economy would also make it more vulnerable to foreign shocks.

**Non-residents' access to the digital pound could amplify capital flow volatility, but the impact would probably be limited.**

Non-residents' holdings of the digital pound over and above non-residents' existing holdings of sterling assets, could amplify capital flow volatility. That is because the digital pound might be vulnerable to sharp inflows or outflows in response to shocks from abroad. The magnitude of movements in such holdings and their impact would probably be limited, however.

First, a digital pound restricted to 'retail' uses would likely not have a significant impact on capital flow volatility. That is because capital flows into and out of the UK are dominated by much larger and more volatile flows between financial institutions.

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<sup>94</sup> [Ivashina et al \(2015\)](#) found that banks with greater reliance on wholesale funding cut their lending by more during the euro-area sovereign debt crisis.

<sup>95</sup> [Hoggarth et al \(2013\)](#) discuss how lending to the UK economy by foreign bank branches resident in the UK was more volatile than that by UK-incorporated banks around the time of the global financial crisis.



Second, there could be an offsetting channel, if non-residents held digital pounds instead of, for example, UK bank deposits. This could reduce the impact on UK credit conditions of shocks to foreign demand for sterling assets. For example, lower foreign demand for UK assets would be in part absorbed by lower foreign demand for digital pounds so the fall in foreign demand for UK bank deposits (and thus their lending) would be lower.

**Widespread use of non-sterling digital money could compromise the UK's monetary and financial sovereignty.**

If a new form of non-sterling digital money were used for a significant amount of retail transactions in the UK, it could compromise the UK's monetary and financial sovereignty – the UK authorities' ability to achieve price stability through monetary policy, and to regulate financial institutions and payments systems that are systemically important in the UK.

Widespread use of non-sterling digital money could compromise monetary sovereignty because if sterling were no longer the unit of account for a significant portion of UK retail transactions, monetary policy would affect a lower proportion of money in the UK and become less effective at achieving the inflation target.

Financial sovereignty might also be compromised if the Bank were not able to co-operate sufficiently with the lead supervisor of foreign-operated private digital money. That might prevent the UK authorities from regulating and supervising such a systemically important non-UK payment system.

**Widespread adoption of a non-sterling digital form of money in the UK is unlikely but its impact would be very significant and be beyond the tolerance of UK authorities.**

Digital payments in the UK are already widespread, so it is judged unlikely that UK households and businesses would see a compelling case for switching to non-sterling digital payments services, especially since this would carry foreign exchange risks. Furthermore, G7 Finance Ministers and Central Bank Governors **pledged** in 2021 that 'CBDCs should be designed to avoid risks of harm to the international monetary and financial system, including the monetary sovereignty and financial stability of other countries.' So, any future CBDC issuers, at least in G7 countries, have committed to design them in such a way that would avoid the risk of currency substitution in other countries.

It is possible, however, that non-sterling digital money would offer attractive new functionality in the future. Non-sterling digital money could become widely adopted if it tapped into existing digital networks to offer new propositions. That is judged unlikely but, if it materialised, the impact would be very significant and so this scenario is beyond UK authorities' risk tolerance.

By reinforcing the use of sterling for UK payments and enabling new payments functionality, the digital pound could pre-emptively reduce the chance of widespread adoption of non-sterling digital money in the UK. That would help preserve the UK's monetary and financial sovereignty.

The UK's strong macroeconomic policy framework – including an independent, inflation-targeting central bank – also reduces the risk that non-sterling money might come to be used widely for payments in the UK.

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## Annex 2: Impact of the digital pound on the Bank's balance sheet

**The digital pound could make the Bank's balance sheet larger and affect the level of central bank reserves, with potential implications for the volatility of short-term interest rates. This can be managed by deploying the tools available to the Bank to ensure the demand for its liabilities is met.**

The Bank's balance sheet plays a central role in the delivery of the Bank's statutory policy objectives to maintain monetary and financial stability. The Bank's balance sheet is used to implement monetary policy by ensuring market interest rates are aligned with Bank Rate, to purchase assets for monetary policy or financial stability purposes, and in the provision of liquidity insurance.<sup>96</sup> These actions affect the size and composition of assets and liabilities on the balance sheet.

Today, most of the Bank's liabilities consist of on-call wholesale balances held by eligible firms (mainly banks) known as reserves (we use the term 'banks' hereon to refer to all eligible firms for simplicity). Banks hold reserves to make wholesale payments in sterling and to meet their regulatory liquidity requirements.

The aggregate supply of reserves and their price is controlled by the Bank and is central to the implementation of monetary policy. The Bank supplies sufficient reserves so that commercial banks have little need to bid up money market rates above Bank Rate to borrow reserves. At the same time, remuneration of reserves at Bank Rate means that banks have no incentive to lend excess reserves at a lower rate (Diagram E.1).

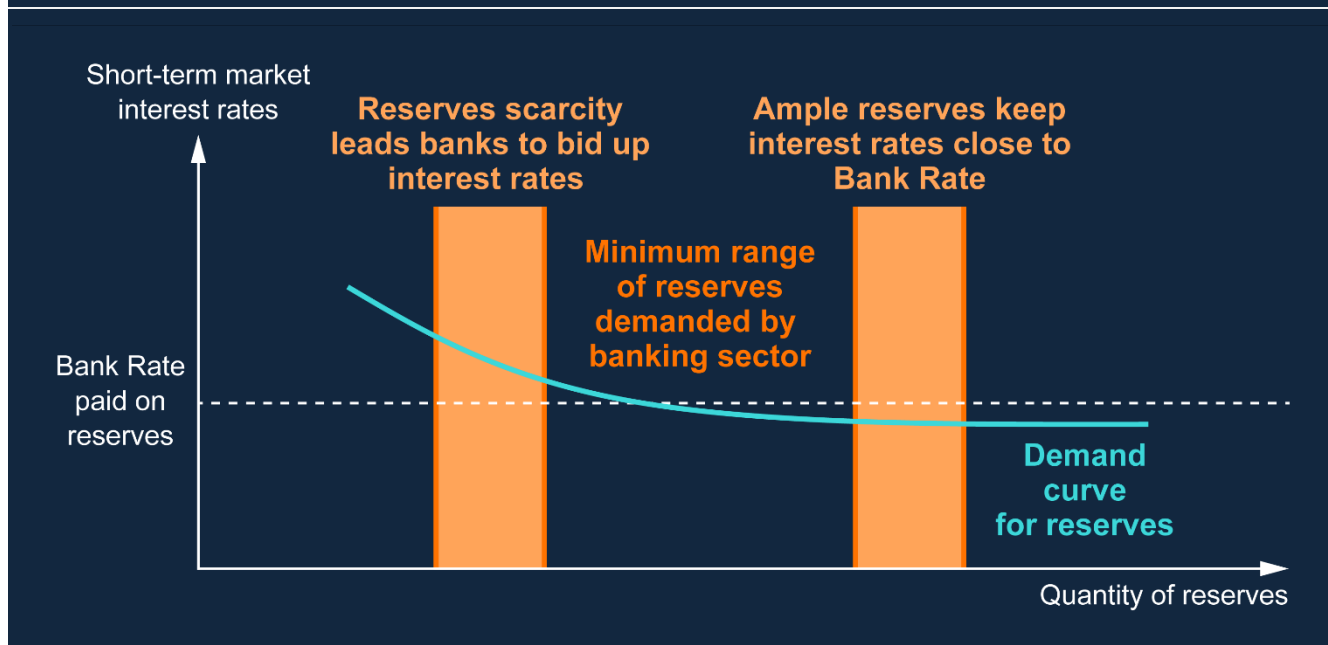
Were households to switch commercial bank deposits to the digital pound, they would be exchanging one asset for another. For the Bank's balance sheet, this will initially affect the composition of its liabilities: it will reduce the amount of reserves on the Bank's balance sheet but increase the level of digital pounds by the same amount.

The ultimate impact of this switch on the Bank's balance sheet will depend on where this leaves the quantity of reserves relative to banks' demand for them. As long as reserves remain above the minimum level demanded by banks at the prevailing level of Bank Rate (Diagram E.1), the switch from commercial bank deposits to the digital pound would change the type of liabilities on the Bank's balance sheet. But it would leave the overall size of the Bank's balance sheet unchanged, as all demand for the Bank's liabilities would be met.

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<sup>96</sup> Bank of England— [Understanding the central bank balance sheet](#). See [Hauser \(2022\)](#) for further detail on how the balance sheet can support the Bank's monetary and financial stability objectives.

Diagram E.1: The demand curve for reserves



**If demand for the digital pound caused reserves to fall below the minimum level demanded by banks, the Bank would intervene to provide more reserves, resulting in a larger balance sheet.**

The switch from commercial bank deposits to the digital pound could cause the amount of reserves in the system to fall below the minimum level demanded by banks (Diagram E.1).

All else equal, banks are likely to respond by seeking to borrow reserves in money markets, increasing the rates they are willing to pay to do so and thereby causing short-term rates to rise relative to Bank Rate. In this scenario, and under the current monetary policy framework, the Bank would increase the supply of reserves to the banking system through its Short-Term Repo Facility to ensure banks' demand is met and therefore that short-term market rates remain close to Bank Rate.<sup>97</sup>

Alternatively, the Bank may choose to deploy longer-term lending operations. In either case, the creation of reserves would result in an increase in liabilities on the Bank's balance sheet. This would be matched by an equivalent increase in the assets held by the Bank, leading to an overall increase in the size of the Bank's balance sheet (see Diagram E.2).

<sup>97</sup> In pursuit of monetary stability, the Bank would stand ready to supply reserves on demand to move total reserves further to the right in Diagram E.1 and move market rates closer to Bank Rate.

Small changes in the level of reserves are not a new challenge for the Bank to manage. Banknotes, for example, also have the potential to absorb reserves or affect the size of the balance sheet. The Bank has several mitigants in place to manage these balance sheet changes, as it would do for the digital pound. The post-QE monetary policy framework would continue to be robust to changes in the level of reserves.<sup>98</sup>

**Diagram E.2: Illustrative central bank balance sheet with the digital pound <sup>(a)</sup>**

**Central bank balance sheet**  
Time moves from left to right →

Steady state existence of a digital pound		High demand for a digital pound		Bank of England intervention	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Other	Other	Other	Other	Other	Other
Central bank operations	Reserves	Central bank operations	Reserves (-)	Central bank operations	Reserves (+)
Asset purchases		Digital pounds	Asset purchases	Digital pounds (+)	
		Banknotes			Banknotes
				Banknotes	

Source: Bank of England.

(a) This chart is purely illustrative. The steady state composition and size of the balance sheet, at the point where the digital pound is introduced, is highly uncertain.

<sup>98</sup> The Bank recently published an [Explanatory Note](#) setting out its framework for ensuring short-term market interest rates remain close to Bank Rate as the APF is unwound and reserves begin to fall.

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## Annex 3: Market research

In early 2022, the Bank commissioned YouGov and London Economics to carry out market research on payment preferences and behaviours. This research comprised quantitative surveys to consumers and small and medium-sized enterprises, and a consumer-focused forum where respondents completed payment diaries, questionnaires and tasks. There were also in-depth telephone interviews with individuals who lacked digital confidence or access to the internet. The results were categorised into three main topics: attitudes and current payment behaviour; how people pay and store money; and the future of money.<sup>99</sup>

### Attitudes and current payment behaviour

Participants had a range of confidence levels in managing their finances. Most (87%) relied upon established traditional financial institutions with which they regularly interacted, rather than newer digital banks or cryptoassets. This was the same across both online surveys and telephone interviews. Those who indicated low confidence with technology preferred physical bank branches over digital methods for accessing banking services.

Participants expected to be able to use a variety of payment methods and were frustrated when unable to do so. Safety and convenience were the most important factors when choosing new payment methods or a new current account. Debit cards were the favoured method for online and in-store purchases, as they were considered convenient, fast, and easy to track. While cash use has declined, it was still used by a significant number of consumers in our research – around 40% used cash at least once a week. The safety and control, its physical presence and familiarity made cash the most trustworthy form of payment for some participants.

### How people pay and where they save money

While consumers often used a mixture of different payment methods for their day-to-day spending, security and convenience were the most important factors when deciding which payment method to use. Their preferred method was also influenced by the value of the purchase and whether it occurred in-store or online.

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<sup>99</sup> Research conducted in February/March 2022. Nationally representative sample of 2,022 consumers (1,922 online and 100 by phone) and 1022 SMEs (all online). Seventy two consumers participated in the online qualitative study.

Those who used the internet less often were more likely to use cash regularly. These participants were also less likely to switch to another payment method. When they did, they valued recommendations from family and friends. Many, most notably during telephone interviews, feared that online banking and mobile payments could be hacked. These participants preferred the physical safety cash provided them with.

### **Future of money and cryptoassets**

There was a broad negative reaction to cryptoassets across consumers. Very few found them to be safe or trustworthy. There was also some scepticism towards Big Tech companies, especially with regards to data protection. When offered the choice between a publicly provided form of digital money (similar to the digital pound) and one provided by a technology firm, there was a slight preference towards the public offering.

### **Initial attitudes towards the digital pound**

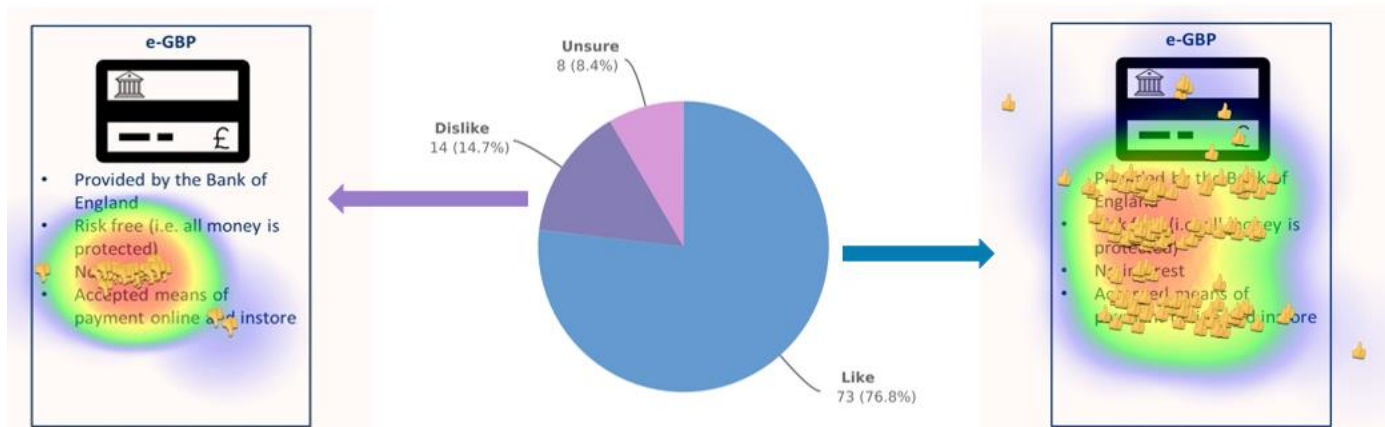
The market research used the terms 'e-GBP' or CBDC to describe a digital form of money with similar features to the digital pound outlined in this paper. Those features tested (safety of funds, widely accepted and easy to use) generally appealed to consumers. But there was uncertainty around the role an 'e-GBP' would play alongside existing payment methods and how it differed to cryptoassets. There was also some confusion as to whether 'e-GBP' was to be used for savings, investments or payments. Like the results around current financial products, those who were more confident with technology found it more appealing than other participants.

Participants were also introduced to a hypothetical digital money account.<sup>100</sup> They were asked how they felt about this digital money account and to react to its features using a 'thumbs up' or 'thumbs down' feature (Diagram E.3).

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<sup>100</sup> This study was conducted with 72 participants. Participants were able to give positive, negative or neutral/unsure reactions to any of the features and visuals in the exercise as indicated in Diagram E.3. Participants who gave at least one negative reaction also gave at least one positive reaction.

### Diagram E.3: Feelings about the features of a hypothetical digital money account



Most reactions were positive. Participants generally liked that it was provided by the Bank, that it was fully protected, and that it was a widely accepted means of payment. Overwhelmingly, the only feature disliked was the fact it did not pay interest.

Thirty per cent of participants said they would be likely or very likely to use the account. And some who were not likely to use it said they would be more likely to use it if it became popular among friends and family, or if more retailers accepted it as a means of payment. Generally, the participants unlikely to use it were those who did not want to use digital money at all.

Participants were also asked to name up to five features they would find appealing if this account were to be offered. The most mentioned were perks, rewards, discounts or a high interest rate. Some cited speed and visibility of transactions, budgeting tools and ease of use as other desirable options.

In a separate exercise, the same participants were asked to react to the idea of a CBDC after reading a short explainer. Around 20% said that they found CBDC appealing or very appealing, especially if it was offered alongside other payment methods rather than replacing them. Some (42%), however, were unsure, citing misunderstanding or lack of information about how it worked. A third of the group had concerns about money becoming less physical and being more reliant on the internet.



Additional qualitative research was undertaken to identify whether consumers distinguished between public and private forms of money and how they defined these concepts. The study revealed a strong consensus about the current importance of physical currency (banknotes and coins) in society. However, understanding of the difference between public and privately-issued forms of money was generally low. The ultimate issuer of money was considered less important than other features such as universal acceptance, safety or familiarity.<sup>101</sup>

When presented with hypothetical scenarios, participants appeared to prefer uniformity in money, prioritising wide acceptance as a form of payment. This could be associated with some of the characteristics of public money. General sentiment towards the Bank of England was broadly positive, with most considering it to be a trustworthy institution. Initial reactions to Big Tech firms introducing financial services in retail payments were mostly negative. Those who self-identified as not being digitally confident appeared less concerned by whether money was public or private, as long as there was a physical option (like banknotes) available to them.

In the design phase the Bank will consider using consumer research projects where they may best contribute to the design phase of the digital pound.

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<sup>101</sup> Additional research with YouGov involved six text-based focus groups and 10 in-depth telephone interviews. This exercise explored whether attitudes to public and private money differed according to social group, age range, geographical location, and digital confidence.

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## **Annex 4: Lessons learnt from our engagement with major financial institutions**

Given the importance of banks for the financial system, the Bank and HM Treasury have engaged extensively with them on the opportunities, risks and design choices for the digital pound.

For the most part, financial firms sought further clarity from the Bank and HM Treasury on the public policy case for the digital pound and the commercial opportunities it could enable. While banks recognised the potential of the digital pound to enable innovation, make certain processes more efficient, and improve cross-border payments, they questioned whether those features were exclusive to a central bank-issued digital currency, or could be also achieved via private sector innovations and improving existing payments infrastructure.

Some UK banks have already started thinking about the future of the payments landscape and many are actively exploring how to interact with new forms of digital money and decentralised finance (DeFi). Banks with a large international footprint have presence in markets where CBDCs are being piloted and have shared insights from those projects with the Bank and HM Treasury.

Banks noted the outflow of retail deposits into digital pounds would need careful management, especially in transition. Banks warned about the risks of relying too much on wholesale funding to replace consumer deposits flowing into the digital pound. The assessment of these risks varied between financial institutions, and between traditional and the newer digitally native institutions. To address these concerns, some are looking into options to manage potential disintermediation risks, such as exploring how digital pound deposits might be recycled back into the banking sector.

Some banks discussed risks that stablecoins pose to the financial sector, such as limited interoperability with other forms of money, and within DeFi. They considered that the digital pound could be a way to mitigate those risks. Some also saw the potential of the digital pound to enable innovation and improve efficiency in payments. Banks also mentioned the possibilities of CBDCs improving cross-border payments.

Generally, banks anticipated being involved as providers of pass-through wallets to give their customers a full set of payment options.

We will continue to engage with financial institutions throughout the next phase of work on the digital pound, both bilaterally and through multilateral outreach with specific industry groups.

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## Glossary and abbreviations

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AML – Anti-Money Laundering.

APF – Asset Purchase Facility.

API – Application Programming Interface.

APP – Authorised Push Payment.

ATM – Automated Teller Machine.

BIS – Bank for International Settlements.

CBDC – central bank digital currency.

CFT – Combatting the Financing of Terrorism.

CHAPS – Clearing House Automated Payment System.

CP – Consultation Paper.

CRD – Cash Ratio Deposit.

DeFi – decentralised finance.

DLT – distributed ledger technology.

ELB – effective lower bound.

ESIP – External Service Interface Provider.

FCA – Financial Conduct Authority.

FPC – Financial Policy Committee.

FX – Foreign Exchange.

G7 – Group of Seven.

G20 – Group of Twenty.

GDPR – General Data Protection Regulation.

HFS – Household Finances Survey.

HQLA – High Quality Liquid Assets.

ICO – Information Commissioners Office.

ID – identification.

IoT – Internet of Things.

KYC – Know Your Customer.

LINK – the UK's largest cash machine network connecting virtually all the UK's ATMs.

NPA – New Payments Architecture.

ONS – Office for National Statistics.

P2B – person to business.

P2P – person to person.

PET – Privacy-Enhancing Technologies.

PIP – Payment Interface Provider.

PoC – Proof of Concept.

PoS – Point-of-sale.

PRA – Prudential Regulation Authority.

PSED – Public Sector Equality Duty.

PSR – Payment Systems Regulator.

RTGS – Real Time Gross Settlement.

SME – Small and medium-sized enterprise.



