New forms of digital money

Discussion Paper

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Content

We are keen to hear from a wide range of respondents on the topics and questions posed in this paper, including the payments industry, technology providers, payments users, financial institutions, academics, other central banks and public authorities, and broader society. We will be accepting feedback for three months from the point of publication, so this should be submitted no later than 7 September 2021.

The questions we have raised can be found at the end of the Executive summary below.

Respond to the Discussion Paper

If you have any questions on this process, you can contact DP-DigitalMoneyResponses@bankofengland.co.uk.

Foreword

The Bank of England's mission is to promote the good of the people of the United Kingdom by maintaining monetary and financial stability. One key way we fulfil this is to make sure people have confidence in the money they use, whether to store wealth or to make payments. We do this by issuing money in the form of banknotes and central bank reserves. And we ensure the safety of the other main form of money used in any modern economy – bank deposits held by households and businesses, also known as 'commercial bank money'.

Over the past decade, there has been rapid innovation in how people make payments, and Covid-19 has accelerated these trends. The use of physical cash in payments continues to decline, and demand for convenience, especially with regard to e-commerce, has fuelled public appetite for digital payments. Fintech firms, and in some cases big technology firms, are developing alternatives to traditional forms of money. These include 'stablecoins' – cryptoassets that aim to reduce volatility by pegging their value to government-sponsored – or 'fiat' – currencies. At the same time, central banks globally are exploring the possibility of issuing a digital form of central bank money – often referred to as Central Bank Digital Currency (CBDC).

This Discussion Paper sets out the Bank's emerging thoughts on new forms of digital money, which include both systemic stablecoins and a UK CBDC. It builds on the Bank's previous Discussion Paper on CBDC published in March 2020,[1] and the Financial Policy Committee's expectations for stablecoins set out in the December 2019 Financial Stability Report.[2] The Bank has not yet made a decision on its detailed regulatory approach to stablecoins, or on whether to introduce a CBDC in the UK. These questions will need to be considered in consultation with Her Majesty's Government.

My hope is that this paper will be the basis for further research and dialogue between the Bank, the payments industry, technology providers, payments users, financial institutions, academics, other central banks and public authorities, and broader society. I encourage anyone with an interest in these issues to respond to this Discussion Paper.

Andrew Bailey

One-page summary

New forms of digital money, either publicly or privately provided, would be the latest innovation in an evolving landscape for the way in which payments are made in the economy. They could contribute to faster, cheaper, and more efficient payments. And they could potentially enhance financial inclusion. But they could also carry risks.

Presently, payments typically rely on the use of either cash or deposits held in commercial banks – referred to as 'commercial bank money'. If new forms of digital money are to become widely used as a trusted form of retail payments, it is essential that the public can have the same confidence in them as they have in existing forms of money.

Public confidence in money is central to the Bank of England's objectives. It is the foundation of both monetary and financial stability. Monetary policy seeks to maintain the stability of prices for the goods and services people consume. Financial stability seeks to avoid interruptions in the provision of financial services that people rely on.

Implications for monetary and financial stability arise because commercial banks, and the money they create through lending, are an important part of the economy. By offering people an alternative to commercial bank money, new forms of digital money could affect the cost and availability of borrowing from banks. All else equal, that could make it more difficult for monetary policy to ease financial conditions. Against that, new forms of digital money could increase the resilience of payments.

New forms of digital money could potentially offer benefits in terms of cost and functionality. And there could be potential gains from a shift to more market-based financing. It is also possible that they could enhance the transmission of monetary policy.

But these opportunities can only be realised if new forms of digital money are safe. They could be privately provided – in the form of 'stablecoins'. Or they could be publicly provided – in the form of a central bank digital currency.

The Financial Policy Committee has set out its expectations for stablecoins. These aim to ensure the same level of public confidence in stablecoins as commercial bank money. The regulatory models outlined in this Discussion Paper illustrate potential ways to meet these expectations. Establishing a secure regulatory environment for stablecoins to operate within the UK would also lay a clear foundation for sustainable innovation. Importantly, there is significant uncertainty around the demand for new forms of digital money and their impact on the economy. Precautionary arrangements may therefore be needed to allow the space for an assessment of the impact of new forms of digital money on the financial system after any launch.

This Discussion Paper sets out the Bank's emerging thoughts on new forms of digital money. The Bank welcomes views on them from a wide range of stakeholders.

Executive summary

The purpose of this Discussion Paper is to broaden the debate around new forms of digital money and to solicit views on the Bank's emerging thoughts from a wide range of stakeholders. Throughout, new forms of digital money are assumed to be stable in value with a retail focus.

There are two forms of money most commonly used in the UK. Central bank money is a liability of the central bank. It is available to the public in the form of cash. It is also available to commercial banks in the form of central bank reserves. Private money mainly takes the form of deposits in commercial banks – that is, claims on commercial banks held by the public. This 'commercial bank money' is created when commercial banks make loans to households and companies – referred to as the 'real economy'.

Money has three main purposes – it acts as a unit of account, a means of payment and a store of value. Central bank money establishes and maintains sterling as the unit of account for virtually all transactions in the UK economy and, in doing so, anchors the monetary system. Commercial bank money is widely used as both a means of payment and a store of value. But use of commercial bank money, in turn, relies on both its relative efficiency and public confidence that it can be exchanged for central bank money in the form of cash.

New forms of digital money would be the latest innovation in an evolving landscape for the way in which payments are made in the economy. But rather than use commercial bank money as the basis for transactions, providers of new forms of digital money would create and use their own money or 'coin'. And these could be issued by companies, including large technology platforms, with the capacity to scale up and grow rapidly.

For the purpose of this Discussion Paper, new forms of digital money are assumed to be denominated in sterling. Unlike cryptoassets such as Bitcoin, which do not have an anchor, they are also assumed to be backed by assets that make them stable in value. But, unlike commercial bank money, it is further assumed they would not be created by lending to the real economy.

This Discussion Paper focuses on new forms of digital money that have significant potential to be systemic. In the context of new forms of digital money, the precise definition of 'systemic' will need to be refined. For the purpose of this Paper it is taken to mean that new forms of digital money have the potential to scale up and grow rapidly, and to become widely used as a trusted form of sterling-denominated payments by households and non-financial businesses – referred to collectively as 'retail payments' – in the UK.

Like existing forms of money, new forms of digital money that are systemic could be publicly or privately provided. In this Paper, the term 'systemic stablecoin' – often referenced as 'stablecoin' for simplicity – is used to refer to those that are issued by private companies. A central bank digital currency – or CBDC – meanwhile, would be an electronic form of central bank money provided for retail use.

New forms of digital money could be preferred by the public to commercial bank deposits, but they will endure only if they can be trusted as a store of value and as an accepted means of payment. This means that stablecoins must promise, credibly and consistently, to be fully interchangeable with existing forms of money. In other words, they must be anchored. This is essential for ensuring that users have the same confidence in stablecoins as commercial bank money.

A large-scale displacement of commercial bank money by new forms of digital money could mean a higher fraction of money in the economy backed by high-quality liquid assets (HQLA) rather than by loans to the real economy. In that event, real economy loans could be financed instead by more stable, and expensive, sources of funding, reducing the efficiency with which commercial banks extend credit. As a result, there could be a greater reliance on non-banks for credit provision.

Overall, there may be a trade-off between the optimal provision of transaction services – that is, payments – and intermediation services – that is, credit. On the one hand, the introduction of new forms of digital money may improve the range of transaction services available to people. On the other hand, it might reduce the efficiency of credit provision in the economy.

The emergence of new forms of digital money raises fundamental questions across a range of public policy objectives. The Bank is working collectively with other UK and international authorities to understand the challenges and opportunities presented by systemic stablecoins.

New forms of digital money raise important issues that cut across the responsibilities of a number of UK authorities. For example, while the Bank supervises systemic payment systems as part of its financial stability objective, the Financial Conduct Authority (FCA) is the sole regulator for a range of other payment firms. In addition, the Payment Systems Regulator (PSR) is the economic regulator of the payments industry. In future, under the proposed approach of Her Majesty's Treasury (HMT) to stablecoin regulation, the Bank would regulate systemic stablecoins. Matters in relation to consumer protection and to rules around conduct would fall within the responsibility of the FCA.

The Bank's mission is to promote the good of the people of the United Kingdom. It achieves this by maintaining monetary and financial stability. And the foundation for meeting these objectives is public confidence in the money circulating in the UK, denominated in sterling. This entails the provision of safe money as a means of payment for households, businesses and the wider financial system. And it entails the security and reliability of those payments.

In 2019 Q4, the Financial Policy Committee (FPC) considered the regulation of stablecoins that have the potential to become widely used as a means of retail payments. The FPC is a committee of the Bank, responsible for identifying, monitoring and taking action to remove or reduce systemic risks.

The FPC has set out its expectations for stablecoins. Stablecoins were assessed alongside traditional networks of systems involved in making a retail payment – or 'payment chains'. And they were further assessed alongside existing forms of private money. The purpose of the FPC's expectations is to ensure the same level of public confidence in stablecoins, both as a means of payment and a store of value, as commercial bank money. The regulatory conditions that may need to be imposed upon stablecoin providers to meet these expectations need to be considered carefully.

The Bank's mission relates to a number of other public policy objectives that could be met by new forms of digital money. Whether new forms of digital money could meet these policy objectives would depend not only on how providers design and operate them, but also on broad use and acceptance by both households and businesses as they interact.

The Bank recognises the importance of central bank money not only for those who want to use it, but also for its unique role in anchoring value and promoting confidence in the monetary system. In the form of cash, central bank money is the only risk-free form of money available to households and non-financial businesses. A CBDC could play an important role in sustaining, and potentially expanding, retail access to central bank money.

The Bank is further committed to supporting innovation and improving how payments function. New forms of digital money would represent a different kind of innovation. They could boost economic activity, by contributing to faster, cheaper, and more efficient payments with greater functionality. The Bank also considers that there is value in ensuring access to money that offers data protection and privacy and that promotes, rather than hinders, financial inclusion. Promoting greater financial inclusion improves welfare and boosts economic participation.

The Bank also recognises the economic benefits of stablecoins operating within a competitive environment. A non-competitive outcome could stifle innovations that would otherwise improve services and reduce costs for users. And it could pose a risk to financial stability if firms became so important that they are 'too-big-to-fail'. In this context, interoperability refers to the ability of users to switch, without barriers or undue friction, between different forms of sterling money and different payment services. The Bank recognises the importance of interoperability between services, but is otherwise technology neutral, subject to meeting its objectives.

Bank staff have modelled an illustrative scenario of the demand for new forms of digital money, the resulting response of banks, and the impact on credit conditions. It is conditioned on the assumption that stablecoins would meet the FPC's expectations.

Both non-financial factors and remuneration are considered as reasons why new forms of digital money could potentially be preferred to commercial bank deposits. Non-financial factors such as convenience, trust, and perceived safety are assumed to play a key role in determining demand for new forms of digital money. Under the illustrative scenario, around a fifth of household and non-financial corporate deposits transfer to new forms of digital money owing to non-financial factors. In contrast, interest rates that could be offered on new forms of digital money are assumed to have a relatively small impact on deposits leaving the banking system.

Commercial banks would have to adapt their balance sheets in response to retail deposits leaving the banking system. Under the illustrative scenario, it is assumed that banks seek to broadly maintain levels of lending. Further, they are assumed to maintain their liquidity positions. In particular, as deposits migrate to new forms of digital money, banks are assumed to restore their liquidity positions, and hence their ability to continue lending, by issuing long-term wholesale debt. Since this is more costly than deposit funding, overall funding costs are assumed to rise.

An increase in banks' funding costs is assumed to increase interest rates on new bank lending. As a result, some borrowers may find it cheaper to seek credit opportunities in the non-bank financial sector. Overall, under the illustrative scenario, the impact on lending rates and credit provision is modest.

But there is significant uncertainty around the illustrative scenario. In practice, the emergence of new forms of digital money could produce very different outcomes. Demand for new forms of digital money could be significantly higher or lower, and more sensitive to choices around remuneration. Commercial banks could tighten credit conditions further, with greater implications for how credit is provided than implied by the illustrative scenario. And non-banks may be unable or unwilling to increase their intermediation of credit as much as assumed in the illustrative scenario.

Such uncertainty is one reason why the Bank may wish to consider arrangements that allow the financial system to assess the impact of new forms of digital money after they launch. Only when new forms of digital money emerge, and deposits begin to migrate away from the banking system, will the implications for the wider financial system start to become apparent. 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.

Together, the demand for new forms of digital money and the impact on banks and credit conditions create both a number of opportunities and risks for economic stability. These relate to public confidence in money, banking sector liquidity resilience, credit conditions, money market functioning, and the implementation and transmission of monetary policy.

Public confidence in the role of sterling as the unit of account for virtually all transactions in the UK economy is central to the Bank's objectives. Unless adequately regulated, stablecoins could undermine confidence in money and payments and in the financial system as a whole. This underscores the importance of the FPC's expectations for ensuring the same level of public confidence in stablecoins as commercial bank money. New forms of digital money that are safe could better meet the payment needs of people, including through greater resilience of payments.

During a system-wide banking stress, the availability of new forms of digital money could increase the proportion of banks' deposits that are withdrawn. Private liquidity insurance is calibrated to help mitigate liquidity risks. And, in aggregate, given existing liquidity resources, the banking system should be able to withstand sudden deposit outflows. But there is significant uncertainty around how smoothly such a deposit outflow would unfold, emphasising the importance of banks ensuring they have access to the Bank's liquidity facilities.

Turning to the provision of credit, greater reliance on longer-term stable funding by banks could reduce the likelihood of a sharp deterioration in bank credit conditions. However, banks will also be vulnerable to a deterioration in sentiment in wholesale funding markets. As a result, lending rates could be more volatile overall for those borrowers unable to access other sources of financing. And while there are potential gains from a shift to market-based financing, whether or not they are realised will depend on how the financial system adapts. As part of its responsibility for identifying, monitoring and taking action to remove or reduce systemic risks, the FPC will monitor any implications of a shift to market-based finance for UK financial stability.

There could also be implications for money markets. The smooth functioning of these markets is important for the Bank to meet its objectives. Any large-scale reallocation of cash around the financial system has the potential to impact how money markets function. Hence, there is a risk of some disruption to money markets in the short-term, as new forms of digital money emerge. But in the long-run, these markets should adapt to the introduction of new forms of digital money.

The emergence of new forms of digital money could also impact the Bank's future framework for controlling interest rates. For example, it could lead to increased volatility in market interest rates. Such volatility is likely to be manageable, since the Bank stands ready to lend in those markets to banks against eligible collateral. Nevertheless, the Bank may need to consider some revisions to its proposed future framework for controlling interest rates. At the same time, if new forms of digital money offered interest rates on deposits that tracked Bank Rate, they could potentially enhance the transmission of monetary policy to bank lending rates. If it was preferred to cash, a CBDC could also soften the lower bound on monetary policy. In practice, however, the UK authorities remain committed to ensuring access to cash to those that need it.

Overall, new forms of digital money present a number of potential opportunities in steady state, but only if they meet the FPC's expectations. Given potential risks over the short-term, however, arrangements may need to be considered to manage any transition.

> Regulation lays the groundwork for innovation and needs to be clearly established before a systemic stablecoin could safely operate in the UK, supported by internationally agreed principles. Stablecoins have the potential to offer both a new means of payment and a new way of storing wealth. The regulatory framework needs to be designed to support both functions.

HMT propose to bring systemic stablecoins into the Bank's regulatory remit, in line with its responsibilities for systemic payments systems under the Banking Act of 2009. This is outlined in HMT's recent consultation on the UK regulatory approach to cryptoassets and stablecoins.[3] The legislative changes to be made by Parliament in order to implement the outcomes of this consultation are vital to ensure the Bank and other UK authorities have the necessary remit and powers to fully regulate stablecoins both in line with the risks they pose and under the principle of 'same risk – same regulatory outcome'.

The proposals in this Discussion Paper build on HMT's framework while outlining further issues not covered in that consultation. These include the potential application of a banking model and banking-like requirements to stablecoins, and the possible need for limits.

The Bank will consider responses to this Discussion Paper and then will work with other relevant authorities to consider what legislation might need to be introduced. The specific regulatory framework that will apply to stablecoins will be the subject of a future Bank consultation, pending the conclusion of HMT's legislative process.

The FPC's stablecoin expectations inform the design of regulation for stablecoins. The expectations aim to ensure the safety of stablecoins as an alternative to both existing payment systems and commercial bank money. Establishing a secure regulatory environment for stablecoins to operate within the UK would also lay a clear foundation for sustainable innovation and allow consumers to realise safely the benefits they may offer.

The FPC's first stablecoin expectation relates to the principles and expectations that payment regulation should aim to achieve. In this regard, UK authorities are already considering the regulatory approach for payments, including in response to both systemic and non-systemic stablecoins. The Bank considers that its existing approach to payment system regulation could ensure that the payments-related risks of stablecoins are appropriately addressed. But systemic risks may not exist purely within the core payment system operator. In that case, critical links in the payments process should also be regulated by the Bank.

The FPC's second expectation relates to the use of stablecoins as money. This recognises that the Bank's payments regime alone would not be sufficient to ensure the safety of a new form of digital money. Certain key features of the banking regime would also need to be reflected in any regulatory model meeting the FPC's second stablecoin expectation. The Bank's view is that these include: legal claim, capital requirements, liquidity requirements and support from a central bank during a stress, and a backstop to compensate depositors in the event of failure.

The regulatory model for stablecoins could include different applications of these features – as long as it offers equivalent protections to those for commercial bank money. As part of this, a key requirement will be to ensure that, unless the stablecoin is operating as a bank, the backing assets for stablecoins cover the outstanding coin issuance at all times.

A range of regulatory models could potentially meet the FPC's second stablecoin expectation, and prudential requirements would vary in line with risks. One option is for a stablecoin issuer to be subject to the current banking regime. This is flexible and risk sensitive and would adapt to reflect the risks of stablecoins. However, it may not be the best fit for firms such as stablecoins that do not lend. Hence, there may be a case for offering an alternative model that restricts the assets that stablecoins can use to back their liabilities. This would rebalance the focus towards those risks most relevant to the stablecoin issuer. These risks include operational and outsourcing risks.

A model that restricts stablecoins to holding liquid assets could allow a regulatory approach that is more aligned to their risks. And a model in which liabilities are backed by central bank reserves would eliminate many risks for coinholders, but still expose stablecoins to operational risk. Meanwhile, a model in which liabilities are backed by commercial bank deposits would lead to greater tiering in the banking system. This refers to a symbiotic relationship – in this case between the stablecoin and its custodian bank – that can result in higher financial stability risks due to the interconnectedness between systemically important firms.

The regulatory model for stablecoins would also need to consider the wider regulatory context, as well as other systemic entities beyond the stablecoin issuer. Implementation of any models to achieve the FPC's expectations would aim to maintain a payments landscape where users can substitute between different forms of money, without consequence for their level of protection.

Regulation should further be proportionate and risk-based. Among other things, this means that non-systemic forms of digital money – such as non-systemic stablecoins and e-money – may exist, as they do today, but without the same protections as new forms of digital money widely used for retail payments.

Any regulatory model for stablecoins would further need to be supported by arrangements by which issuers can obtain liquidity support from the Bank. This is important for ensuring liquidity problems do not result in failure. Access to the Bank's balance sheet would depend on the backing model and would be subject to suitable criteria. If a stablecoin was backed by central bank liabilities, the Bank would need to take into account the interaction of these liabilities and reserve balances in the management of its future balance sheet.

Finally, there is a strong case for considering the value of transitional arrangements that aim to ensure that new forms of digital money can emerge without threatening monetary and financial stability. During a transitional phase, a number of risks could arise. The banking sector could prove unprepared to withstand large outflows of deposits, non-banks may not be willing or able to replace bank lending to some borrowers should that be required, and sterling money markets may be disrupted. To manage the uncertainty around the impact of new digital forms of money, the Bank is considering the need for the use of limits during any transition period, subject to consideration of the wider regulatory framework and discussions with other relevant authorities.

Questions for discussion:

The role of money in the economy
How might new forms of digital money affect money and credit creation? Are there channels beyond those explored in this paper?

Public policy objectives
How important is direct access for the general public to central bank money in a digital world?

Do you agree with the Bank's view on protection and privacy? What would you regard as a minimum set of protections?

What steps could be taken, and by whom, to help promote interoperability of new forms of digital money with other payment systems, and thereby foster a competitive environment?

An illustrative scenario
Does the illustrative scenario have the right components and responses with which to assess the impact of demand for new forms of digital money on the macroeconomy?

Implications for macroeconomic stability
Can respondents identify any other significant risks to economic stability from new forms of digital money even when stablecoins are adequately regulated?

Do respondents see any other impediments to, or benefits from, a shift to market-based financing in the event of a tightening in bank credit conditions?

Do respondents have any other concerns over the ability of banks and markets to adjust to the introduction of new forms of digital money in addition to those identified?

The regulatory environment
Do respondents think there are any other features of the banking regime that need to be reflected in the regulatory model for stablecoins?

Do respondents agree with the Bank's assessment of the four possible regulatory models for stablecoins? Are there other models the Bank should consider?

Given the large uncertainty around a new steady state and risks identified during any transition to new forms of digital money, are there any other reasons for imposing limits? How should such potential limits be structured?

How to respond

Responses to these questions should be submitted by 7 September 2021 using the response template available on the Bank's website. Queries, or additional information other than responses to the questions posed, may be submitted to DP-DigitalMoneyResponses@bankofengland.co.uk.

1: The role of money in the economy

The purpose of this Discussion Paper is to broaden the debate around new forms of digital money and to solicit views on the Bank's emerging thoughts from a wide range of stakeholders.
This Discussion Paper is based on the premise that new forms of digital money have the potential to benefit society as a whole. They could improve the way in which people transact with one another. And they could enable further innovation. But before they could be used widely there is a broad set of issues – around the safety of money and macroeconomic stability – that need to be considered, side by side. Before society can realise potential benefits from new forms of digital money, it is essential that perspectives on these issues from a wide range of stakeholders are understood.

This section sets the context for the Bank's emerging thoughts on new forms of digital money. It examines existing forms of money and their uses. It considers the conditions under which new forms of digital money might be preferred to existing forms. And it examines how any migration from the banking system towards new forms of digital money could impact the financial system and wider economy – through the lens of money and credit creation.

Throughout, new forms of digital money are assumed to be stable in value with a retail focus.
For the purpose of this Discussion Paper, new forms of digital money are assumed to be denominated in sterling. Unlike cryptoassets such as Bitcoin, which do not have an anchor, they are also assumed to be backed by assets that make them stable in value. Thus they have the potential to be widely used in the UK economy as an alternative to existing forms of money. But, unlike commercial bank money, it is further assumed they would not be created by lending to UK households and non-financial companies – or the 'real economy'.[4]

Importantly, proposed new forms of digital money are also assumed to have a retail focus, aimed at use by households and non-financial businesses. This applies equally to new forms of privately issued digital money and a form of digital money issued by the central bank. The Bank published a Discussion Paper on Central Bank Digital Currencies – or CBDC – in March 2020.

Other new forms of digital money could, of course, exist. For example, they could be denominated in non-sterling currencies, or have a wholesale focus – including use by financial institutions such as pension funds and insurance companies. But these would raise an additional set of issues to those covered in this Discussion Paper.

1.1: Existing forms of money

Central bank money establishes and maintains sterling as the unit of account for virtually all transactions in the UK economy and, in doing so, anchors the monetary system.
There are two forms of money most commonly used in the UK. Central bank money is a liability of the central bank. It is available to the public in the form of cash. It is also available to commercial banks in the form of central bank reserves. Currently, banknotes in circulation amount to around £87 billion, compared to reserve balances of around £827 billion.[5] Private money mainly takes the form of deposits in commercial banks – that is, claims on commercial banks held by the public. This 'commercial bank money' is created when commercial banks make loans.

Money is central to economic activity. It has three main purposes. It acts as a unit of account – allowing people to value goods and services and to measure things such as how much they own or owe to others. It is a means of payment – used by people to pay for goods and services. And it provides a store of value – allowing people to save until they want to use it as a means of payment.

The role of money as a unit of account is established and maintained by central bank money, particularly in the form of central bank reserves. These reserves act as the ultimate settlement asset in the economy. And through changing the interest rates on reserves, monetary policy seeks to ensure that the rate at which the prices of goods and services rise – known as inflation – is stable and low. This underpins confidence in the value of money, by providing an anchor.

Commercial bank money is more widely used as both a means of payment and a store of value.
Commercial bank money – that is, people's bank deposits – is created through the intermediation of credit (Box A).[6] Commercial banks lend to their customers. And these loans are used to purchase goods and services from other

households and businesses who typically deposit the money back at banks. Some bank deposits are used for saving purposes. Some are pure transactional balances that are held for use in making payments. And others are used for both purposes.

In recent decades, commercial bank money has become the main form of money people use to make payments. Around 95% of the funds households and businesses hold that are typically used to make payments are now held as commercial bank deposits rather than cash. This compares to around two thirds in the 1980s.[7]

But use of commercial bank money relies on both its relative efficiency and public confidence that it can be exchanged for central bank money in the form of cash.
Many people are increasingly finding commercial bank money to be more efficient to use than cash. Digital payments, for example, can only be made with private money. In recent years, these have become more common than cash transactions. Between 2017 and 2019, the number of people using cash just once a month or less in the UK more than doubled, to 7.4 million.[8] This trend has been accelerated by the Covid-19 crisis (Box B).

But for commercial bank deposits to be used, people have to be confident that they can be exchanged for cash. This confidence is ensured through a combination of features. Banks are regulated and supervised to ensure they are being operated in a safe and sound way. Bank deposits are insured up to a value of £85,000.[9] This insurance is further strengthened through modified resolution and insolvency procedures. And banks are eligible to access central bank reserves through the Bank's liquidity facilities. This comprehensive regime ensures that people have no need to worry about the distinction between cash and bank deposits as they go about their business.

1.2: New forms of digital money

New forms of digital money would be the latest innovation in an evolving landscape.
The way in which commercial bank money is used for payments has continued to evolve. Regulatory initiatives such as Open Banking have encouraged greater competition and innovation.[10] And new institutions, including non-banks, have emerged with innovative business models to transform the way in which people use money to transact with one another. This includes the emergence of electronic money – or 'e-money'.

E-money is broadly defined as an electronic store of monetary value that may be used for making payments.[11] While e-money has been in existence for over a decade, most recent data submitted to the FCA from e-money firms in regular reporting indicates there is only €9.7 billion of e-money funds in issue in the UK. As described in Section 5, requirements for these funds do not presently extend to ensuring the same level of confidence as commercial bank money. The use of e-money is, however, growing, and could in the future present systemic risks.

New forms of digital money would be the latest innovation in this evolving landscape. But rather than use commercial bank money as the basis for transactions, providers of new forms of digital money would issue and use their own money, or 'coin'. They could also operate more independently of existing payment platforms and networks. They could offer functionality that means they have the potential to become widely used and accepted. And they could be issued by companies, including large technology platforms, with the capacity to scale up and grow rapidly. This could be due to a range of factors, including new technologies and a large existing customer base.[12]

This Discussion Paper focuses on new forms of digital money that have significant potential to be systemic. In the context of new forms of digital money, the precise definition of 'systemic' has yet to be refined.[13] For the purpose of this Paper it is taken to mean that new forms of digital money have the potential to scale up and grow rapidly, and to become widely used as a trusted form of sterling-denominated payments by households and non-financial businesses – referred to collectively as 'retail payments' – in the UK.

Like existing forms of money, new forms of digital money that are systemic could be publicly or privately provided. The term 'systemic stablecoin' – often referenced as 'stablecoin' for simplicity – is used to refer to those that are issued by private companies. A CBDC, meanwhile, would be an electronic form of central bank money provided for retail use. As such, it would be a direct liability of the central bank, rather than of private banks or coin issuers.

They could be preferred to commercial bank deposits, but they will endure only if they can be trusted as a store of value and as an accepted means of payment.

Commercial banks offer a range of interest rates on their deposits. They typically offer lower rates on transactional balances than on savings accounts. This lower rate reflects the service they provide to users in making payments. By the same logic, new forms of digital money could be preferred to some commercial bank transactional deposits purely on the basis of the services they provide. For example, as described in Section 2, they could contribute to faster, cheaper, and more efficient payments. And they could open the door to future innovations that meet the evolving transaction needs of people.

Existing proposals for systemic stablecoins suggest that many would be focused solely on being a means of payment. Hence, they are unlikely to pay interest to coin holders. But this could change, for example, if the general level of interest rates rises. This would make it harder for stablecoins to compete purely on the basis of the services they provide. Equally, a CBDC could be designed to be both a means of payment and a store of value.

To be widely used, any new form of digital money will need to be trusted, similar to commercial bank money. As a direct liability of the central bank, and risk-free form of money, a CBDC should attract the same level of public confidence as cash. But a private stablecoin will only be trusted as both a store of value and an accepted means of payment if it is subject to appropriate safeguards.

Stablecoins must promise, credibly and consistently, to be fully interchangeable with existing forms of money. In other words, they must be anchored.

For stablecoins to be used alongside commercial bank money, the Bank must be satisfied that they are safe. This does not have to mean that the providers of stablecoins should be regulated exactly the same as commercial banks. But it does mean that the viability of their business models must not depend on looser regulation for the same level of risk – a form of 'regulatory arbitrage'. And they must not rely on making promises that they cannot guarantee to keep over time.

To be acceptable for wide-scale use in payments, stablecoins must promise to be fully interchangeable with existing forms of money. And this promise must be both credible and consistent across time. This means that a stablecoin must be regulated to ensure it has the right protections to cover the risks it is taking in its backing assets. And users must have the right to redeem stablecoins, and exchange them for other forms of money including central bank money, on demand and without loss of value – 'at par'. This is essential for ensuring that users have the same confidence in stablecoins as commercial bank money.

1.3: Money and credit creation

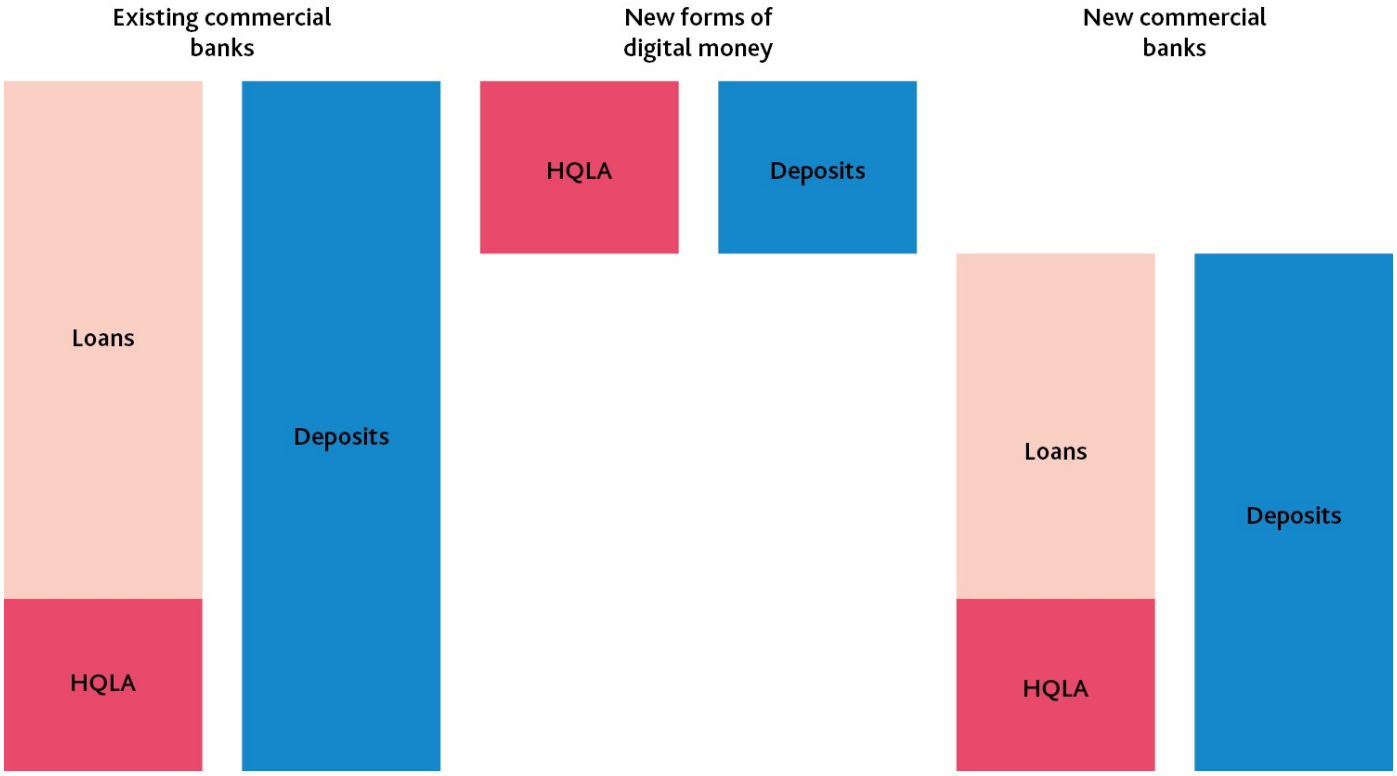
A large-scale displacement of commercial bank money could mean a higher fraction of deposits backed by high-quality liquid assets rather than by loans to the real economy.

A large-scale displacement of commercial bank money could have a direct impact on the way in which money and credit is created. This is because, currently, commercial banks retain a significant proportion of the money they create as balances in customers' deposit accounts. Losing those balances forces banks to turn to wholesale sources of funding, which are more expensive. This is likely to increase the cost of financing new loans, reducing bank credit in the process.

Commercial banks are the biggest lender to the real economy. As loans are illiquid assets that cannot be easily sold for cash, banks also need to hold assets that can be liquidated easily. This means they can honour their promise to redeem people's deposits on demand. These high-quality liquid assets (HQLA) amount to a small proportion of deposits, with the remainder of deposits backed by loans.

Section 5 outlines a number of alternative models for a stablecoin issuer to back its deposit liabilities. In most cases, it would hold deposits in liquid assets rather than back them with loans to the real economy. Similarly, if a central bank provided a CBDC, it would back the CBDC with liquid assets, as cash is at present. A migration of deposits from commercial banks to new forms of digital money might therefore imply that a higher fraction of the total stock of money in the economy would be backed by liquid assets, rather than by loans to households and companies (Figure 1.1).

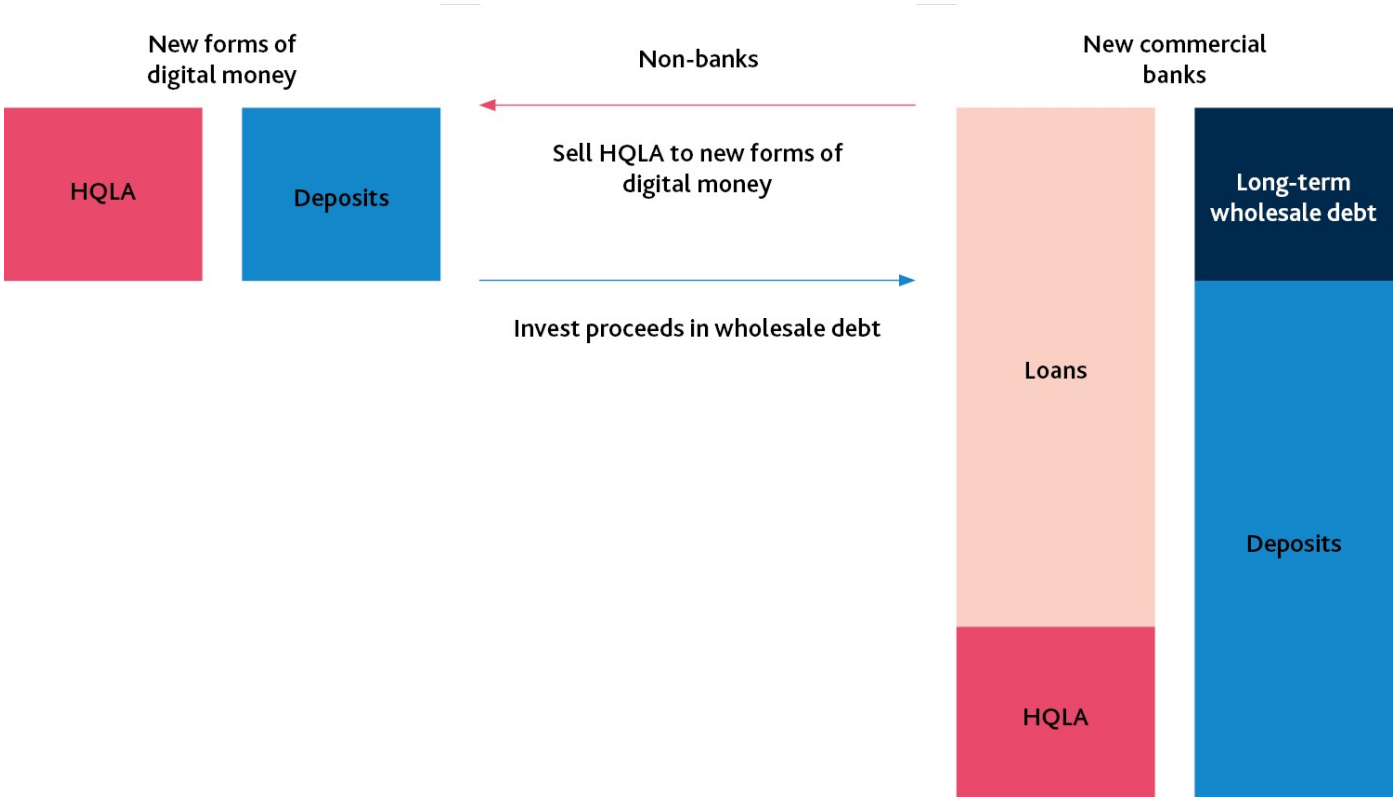
Figure 1.1: A migration from commercial banks to new forms of digital money could imply more deposits being backed by liquid assets, rather than by loans
Stylised view of how deposits are backed currently and with the introduction of new forms of digital money



Real economy loans could be financed instead by more stable, and expensive, sources of funding, reducing the efficiency with which commercial banks extend credit.

Increased holdings of HQLA would be met by purchases from the wider financial system. The non-bank financial institutions that sold the HQLA would, in turn, recycle the proceeds into the banking system in the form of wholesale deposits. Such deposits are considered to be more likely to be withdrawn at short notice than retail deposits. As a result, they cannot be backed by illiquid loans and instead must be backed by HQLA. However, banks could 'term out' these deposits, by issuing longer-term wholesale debt. Since this is a stable source of funding, it could be used to finance real economy loans (Figure 1.2). But it is also a more costly source of funding for banks than customer deposits and so the cost of bank lending could be expected to rise.

Figure 1.2: Non-banks could use the proceeds from sales of HQLA to purchase wholesale debt issued by banks
Stylised view of how real-economy loans could be backed by a combination of deposits and wholesale funding

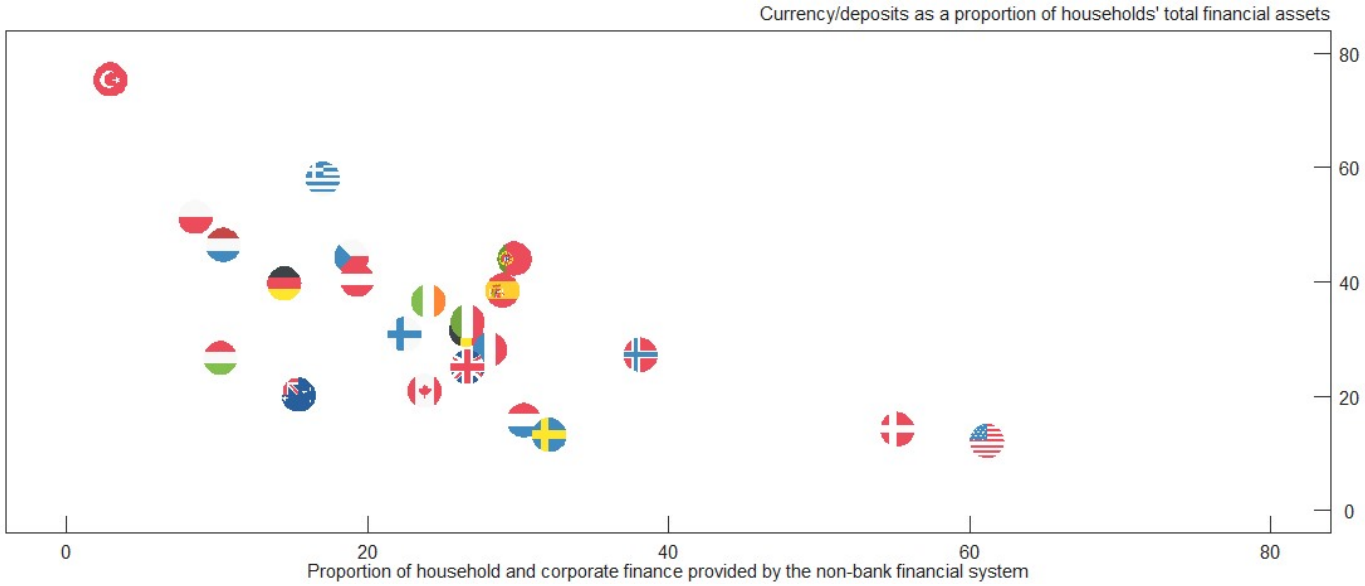


As a result, there could be a greater reliance on non-banks for credit provision.
Section 3 sets outs an illustrative scenario in which commercial banks seek to maintain lending to the real economy. They do this both by competing for deposits through higher deposit rates and by replacing deposit funding by issuing more wholesale debt, which non-banks would purchase. Under this scenario, there is a modest rise in the cost of bank lending. Further implications of this scenario for macroeconomic stability are discussed in Section 4.

An alternative scenario is one in which commercial banks reduce lending to the real economy. In this case, it is possible that non-banks would extend more credit to the real economy directly. Many advanced economies operate with higher levels of non-bank finance than the UK and with correspondingly smaller shares of household assets held as deposits with the banking system (Chart 1.1). But non-bank finance is unlikely to be a perfect substitute for bank finance, especially for lending to some smaller companies. That is because this lending often requires the lender to have specialist information. This is currently an area in which commercial banks have an advantage given the information contained in their customers' deposits.

Chart 1.1: Economies with high levels of non-bank finance are typically associated with a lower proportion of household wealth stored in commercial banks

Correlation between proportion of household wealth stored in commercial bank deposits and the proportion of credit provision financed by the non-bank financial system (a)



Sources: Association for Financial Markets in Europe, Bank for International Settlements (BIS), Bank of England, European Mortgage Federation – European Covered Bond Council, LCD, an offering of S&P Global Market Intelligence, Organisation for Economic Co-operation and Development, Securities Industry and Financial Markets Association and Bank calculations.

(a) Non-bank finance is calculated as the total value of debt instruments, leveraged loans, covered bonds and securitisations. There are other forms of non-bank finance, but data for these are not available for all the countries shown on a consistent basis. For a more comprehensive measure of non-bank finance in the UK see Chart 3.3.

Overall, there may be a trade-off between the optimal provision of transaction services and intermediation services.

The introduction of new forms of digital money may involve a trade-off. On one hand, it may improve the range of transaction services available to people. By increasing competition, it could also lead to improved remuneration of transactional balances. On the other hand, it might reduce the efficiency of credit provision in the economy. This could be in terms of quantity – if non-bank finance is unable to fill the gap left by a reduction in bank lending. And it could also be in terms of quality – if the information contained in transactions accounts enables banks to make better, and more-informed, lending decisions.[14]

Changes in the provision of transaction services and credit supply could also have implications for the equilibrium interest rate – that is the risk-free interest rate that would be required to maintain economic output at potential and inflation at the target. Reduced credit provision, for example, could reduce the equilibrium interest rate by raising the cost of financing in the economy.[15] All else equal, that could make it more difficult for monetary policy to ease financial conditions.

Broader implications of new forms of digital money for both credit provision and the implementation and transmission of monetary policy are discussed in Section 4.

Question for discussion:

How might new forms of digital money affect money and credit creation? Are there channels beyond those explored in this paper?

Box A: Money creation

This box describes how commercial bank money is created through the intermediation of credit.[16]

In the modern economy, most money takes the form of bank deposits. The principle way these deposits are created is through commercial banks making loans. Whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower's bank account, thereby creating new money. For example, when a bank extends a mortgage to someone to buy a house, it does not typically do so by giving them thousands of pounds worth of banknotes. Instead, it credits their bank account with a bank deposit of the size of the mortgage. At that moment, new money is created.

Importantly, only deposit-takers create private money through making loans. If, for example, a non-bank made a loan, the borrower's bank account would be credited by the amount of the loan. But the non-bank's bank account would be debited by the same amount at the same time. As a result, there would be no increase in money overall.

Although commercial banks create money through lending, they cannot do so freely without limit. Banks are limited in how much they can lend if they are to remain profitable in a competitive banking system. Prudential regulation also acts as a constraint on banks' activities in order to maintain the resilience of the financial system. And the households and companies who receive the money created by new lending may take actions that affect the stock of money – for instance, they could quickly 'destroy' money by using it to repay their existing debt.

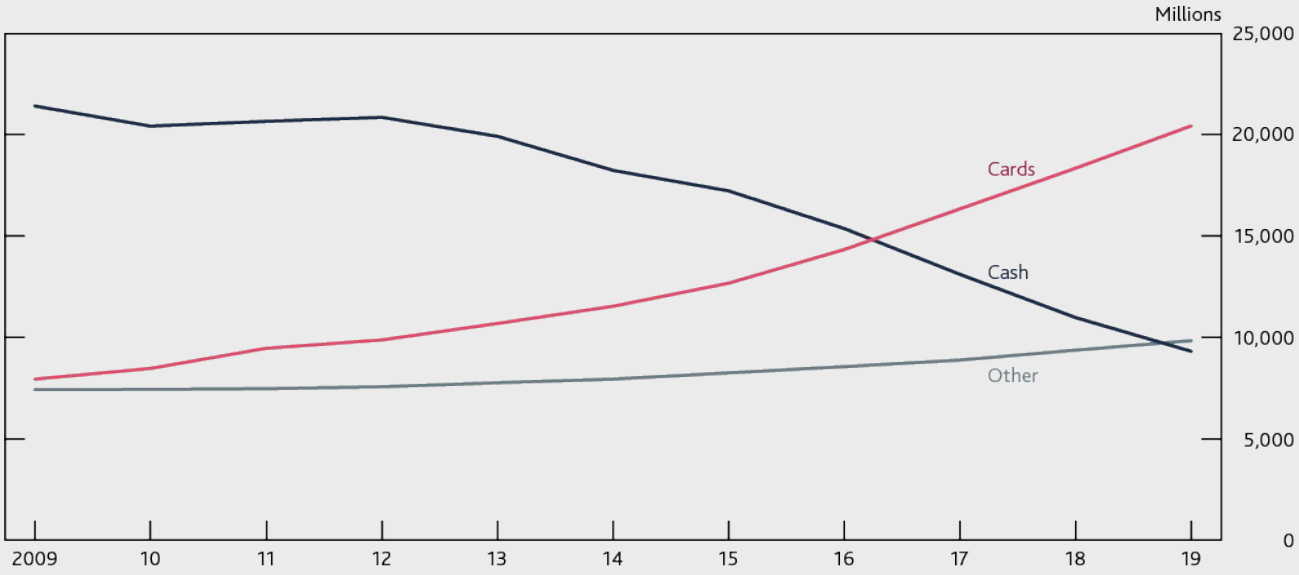
Monetary policy acts as the ultimate limit on money creation. The Bank aims to make sure the amount of money creation in the economy is consistent with low and stable inflation. In normal times, the Bank implements monetary policy by setting the interest rate on central bank reserves. This then influences a range of interest rates in the economy, including those on bank loans.

In exceptional circumstances, when interest rates are at their effective lower bound, money creation and spending in the economy may still be too low to be consistent with the central bank's monetary policy objectives. One possible response is to undertake a series of asset purchases, or 'quantitative easing' (QE). QE is intended to boost the amount of money in the economy directly by purchasing assets, mainly from non-bank financial companies. This increases the amount of bank deposits those companies hold (in place of the assets they sell).

Box B: Trends in the use of digital payments

Over the past decade, there has been a steady decline in the use of cash for retail transactions. This has been accompanied by a marked increase in digital payments, particularly card payments. In mid-2016, cards overtook cash for the first time as the most frequently used payment in the UK, and their use continues to grow (Chart A).

Chart A: Cards are now the most frequently used form of consumer payment
Consumer payments volumes (a)



Sources: UK Finance and Bank calculations.

(a) Other comprises cheque, direct debt and automated credit (Bacs Direct Credits, Faster Payments Service, CHAPS and in-house standing orders and remote banking payments). Cheque includes inter-bank, inter-branch and in-house items, but excludes cash acquisition.

The Covid-19 crisis has accelerated these trends. The temporary closure of shops, restaurants, and other forms of face-to-face retail has led consumers to turn increasingly to online shopping. And to promote safe transactions, many shops have encouraged contactless forms of payment over the use of cash.[17] At the same time, data from LINK, the UK's largest cash machine network, suggest that cash transactions have fallen sharply.

Headline statistics include:

- Cash withdrawals were 60% lower in late March 2020 (first lockdown) than the same period in 2019.[18]
- In January 2021, the value of cash withdrawals was still close to 40% lower than during the same period the previous year.[19]
- In December 2020, the total value of contactless transactions was 64.7% higher than in December 2019.[20]

Importantly, despite these trends, cash remains a vital payment method for some. In 2020, the FCA found that 1.2 million adults in the UK were unbanked.[21]

2: Public policy objectives

The emergence of new forms of digital money raises fundamental questions across a range of public policy objectives.
This section examines new forms of digital money in the context of the Bank's mission. This is to maintain monetary and financial stability. It also considers how new forms of digital money interact with some other public policy objectives. As in Section 1, it focuses on new forms of digital money that are systemic. This means they have the potential to scale up and grow rapidly, and to become widely used as a trusted form of sterling-denominated retail payments.

The Bank is working collectively with other UK and international authorities to understand the opportunities and challenges presented by systemic stablecoins.
Such new forms of digital money raise important issues that cut across the responsibilities of a number of UK authorities. For example, while the Bank supervises systemic payment systems as part of its financial stability objective, the Financial Conduct Authority (FCA) is the sole regulator for a range of other payment firms. In addition, the Payment Systems Regulator (PSR) is the economic regulator of the payments industry. In future, under the proposed approach of Her Majesty's Treasury (HMT) to stablecoin regulation, the Bank would regulate systemic stablecoins. Matters in relation to consumer protection and to rules around conduct would fall within the responsibility of the FCA.

It is essential that the UK authorities work together to understand the opportunities and challenges presented by systemic stablecoins. With this in mind, the Bank and other UK authorities have been actively engaging with HMT on the future regulatory landscape, including through HMT's recent consultation on the UK regulatory approach to cryptoassets and stablecoins.

In parallel, authorities around the world are considering how to respond to the potential emergence of systemic stablecoins. There are various international initiatives underway, in which the Bank, other UK and international authorities, and global standard setters are heavily involved (Box C). An internationally coherent approach is required to ensure comprehensive and consistent standards. This is important not least because stablecoins may be used to transact across borders. The issues covered in this Discussion Paper can usefully inform the international debate.

2.1: The Bank's mission

The Bank's decisions around new forms of digital money will be guided by its core objectives, central to which is ensuring confidence in sterling.
The Bank's mission is to promote the good of the people of the United Kingdom. It achieves this by maintaining monetary and financial stability. The financial system is an important part of meeting this mission, but the Bank does not seek to preserve the status quo or any particular business model. Rather, the Bank seeks to ensure that financial innovations, including new forms of digital money, do not impair its ability to maintain monetary and financial stability. Ideally, they would enhance it.

Monetary policy seeks to maintain price stability. It does so by ensuring that inflation is low and stable. And it is implemented by influencing the cost of borrowing in the economy and the reward from saving. Financial stability seeks to avoid interruptions in the provision of financial services that people rely on. It is implemented in two ways. First, through macroprudential policy and regulation of the financial system as a whole. And second, through prudential regulation and supervision of individual firms.

The foundation for meeting the Bank's objectives is public confidence in the money circulating in the UK, denominated in sterling. This entails the provision of safe money as a means of payment, for households, businesses and the wider financial system. And it entails the security and reliability of those payments.

The Financial Policy Committee (FPC) has set out its expectations for stablecoins, to ensure the same level of public confidence in stablecoins as commercial bank money.
The FPC is a committee of the Bank. It is responsible for identifying, monitoring and taking action to remove or reduce systemic risks. This is with a view to protecting and enhancing the resilience of the UK financial system.

In 2019 Q4, the FPC considered the regulation of stablecoins that have the potential to become widely used as a means

of retail payments.[22] These were assessed alongside traditional networks of systems involved in making a retail payment – or 'payment chains'. Since stablecoins also offer a new form of digital money, they were further assessed alongside existing forms of private money. The FPC judged that:

- Payment chains that use stablecoins should be regulated to standards equivalent to those applied to traditional payment chains. Firms in stablecoin-based systemic payment chains that are critical to their functioning should be regulated accordingly.
- Where stablecoins are used in systemic payment chains as money-like instruments they should meet standards equivalent to those expected of commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat.

The purpose of these expectations is to ensure the same level of public confidence in stablecoins – both as a means of payment and a store of value – as commercial bank money. The regulatory conditions that may need to be imposed upon stablecoin providers to meet these expectations need to be considered carefully. How the FPC's stablecoin expectations might be met in practice is discussed in Section 5 of this Discussion Paper.

Broader implications of new forms of digital money for both monetary and financial stability are discussed in Section 4.

2.2: Other public policy objectives around new forms of digital money

The Bank's mission relates to a number of other public policy objectives that could be met by new forms of digital money.

New forms of digital money offer opportunities for a range of other public policy objectives, some of which are in the Bank's remit. Whether new forms of digital money could meet these policy objectives would depend not only on how providers design and operate them, but also on broad use and acceptance by both households and businesses as they interact.

The Bank recognises the importance of central bank money not only for those who want to use it, but also for its unique role in anchoring value and promoting confidence in the monetary system.

As discussed in Section 1, central bank money establishes and maintains the role of sterling as the unit of account for virtually all transactions in the UK economy. In the form of cash, it is the only risk-free form of money available to households and non-financial businesses.[23] While the transactional use of cash has declined (Box B), an unpublished Bank of England survey in January 2021 found that cash is the first choice payment method for 21% of people in the UK, and the stock in issue continues to rise.

At the retail level, the availability of risk-free central bank money promotes trust in other, private forms of money, such as commercial bank deposits. It acts as a mechanism to switch between different types of privately issued money. This means that depositors can withdraw cash from one bank account and redeposit it elsewhere, while maintaining exactly the same value. Cash also builds confidence by giving people an alternative way to hold their money. In doing so, it promotes the uniformity and substitutability of different forms of money. Importantly, this uniformity of money is experienced every day by the public, building their trust and understanding in the system.[24]

By establishing sterling as the unit of account, central bank money further safeguards the ability of the Bank to maintain monetary and financial stability. In the form of sterling-denominated central bank reserves, central bank money is the mechanism through which monetary policy seeks to keep inflation low and stable. And reserves act as the ultimate settlement asset in the financial system. The absence of cash would not change that, as reserves would still be available in sterling. But if new forms of privately issued money denominated in another currency were to become widely used, that could impact the efficacy of the Bank's tools for maintaining monetary and financial stability.

A Central Bank Digital Currency (CBDC) could play an important role in sustaining, and potentially expanding, retail access to central bank money. Unlike cash, CBDC would be a new form of central bank money that is digital in nature. The Bank has not yet made a decision around CBDC but is actively exploring the opportunities and risks of doing so (Box D). A CBDC would be a public liability backed by the security and resources of the state. Where coupled with innovations such as programmable money and micropayments, a CBDC may increase the utility of central bank money when

compared to cash. And it could support a resilient, innovative and competitive payments landscape.

The Bank is committed to supporting innovation and improving how payments function.
The Bank is contributing to a number of initiatives to improve how payments function. This includes a programme of work to deliver innovation-focused enhancements to the infrastructure that the Bank operates for moving money between banks and other institutions in real time – known as Real-Time Gross Settlement (RTGS).[25] This programme will increase resilience and access, offer wide interoperability, improve user functionality and strengthen end-to-end risk management. The Bank has further committed to supporting innovation in its response to the Future of Finance report. These initiatives could make significant impacts on the payments landscape, even without any new forms of digital money.

New forms of digital money would represent a different kind of innovation. This is both in the form of money offered and in the infrastructure used to make payments. Such innovation could boost economic activity. It could contribute to faster, cheaper, and more efficient payments with greater functionality. And it could open the door to future innovations that meet the evolving transaction needs of households and businesses. For example:

- New forms of digital money could enable cheaper payments through encouraging technological innovation and by increasing competition, lowering the costs faced by retailers when accepting payments.
- By offering real-time settlement, new forms of digital money could avoid the liquidity costs that are incurred by the multi-day settlement timeframe that currently often occurs. Monies exchanged would immediately belong to the recipient and the payment would be irrevocable (with refunds and returns processed as separate payments).
- As an independent means of payment, new forms of digital money could act as a contingency in the event of a disruption to other mechanisms. For example, they could help alleviate temporary problems with card payment networks.
- New forms of digital money could help meet future payment needs. For example, they could allow users to execute payments automatically based on some defined criteria – so called ‘programmable money’. They might also enable payments for very small amounts – or ‘micropayments’ – if they allow small transactions to happen at a lower cost than today.
- New forms of digital money could further act as a potential building block towards better cross-border payments. This would mean, for example, that households and non-financial businesses could make cross-border payments quicker and cheaper. Importantly, however, this will also rely on other progress on, for instance, common settlement windows, compliance checks and messaging standards in different jurisdictions.[26]

Whether and how individual forms of digital money would meet these needs will depend heavily on their economic, functional and technological design. It may also depend on the development of the relevant regulatory framework. Different new forms of digital money could meet some of these needs. Or they could meet some or all of these needs for a subset of users. This strengthens the case for people being able to switch between different forms of money and payment systems. This ‘interoperability’ is discussed later in this section.

Importantly, it is likely that both new forms of digital money, as well as improvements in how existing payment systems function, could each address some of these needs.

The Bank considers that there is value in ensuring access to money that offers data protection and privacy and that promotes, rather than hinders, financial inclusion.
All electronic payments involve the creation, and transfer, of information, some of which could be sensitive. New forms of digital money could require the use of advanced analytics and bigger data sets. This is because they may offer the benefit of more tailored, convenient and inclusive payment services. They may further involve greater use of customer data. For example, new forms of digital money will require a customer interface – often called ‘wallets’. And some intermediaries who provide these wallets might propose to use their access to consumer data as an important part of their business model.

This poses an important set of considerations about how best to safeguard privacy when new payment services involve the transfer or use of potentially sensitive data. Box E discusses data protection related matters for stablecoins and CBDCs, including potential risks for end-users, such as entities using end-users’ data for monetisation purposes, the need to better inform and educate them on the new services and compliance with existing data protection and regulations

against illicit finance. A failure to meet users' reasonable expectations of privacy would be detrimental for confidence and trust in money and payments. Matters of privacy and data protection are for other authorities, such as HM Government and the Information Commissioner's Office. But given the importance of these matters for its mission, the Bank will take a keen interest in their work. And it will seek to collaborate closely with them.

As systemic stablecoins have yet to emerge, it is too early to determine what proportion of the UK population they would present an attractive commercial proposition for. Equally, it is too early to know whether potential users would trust them to protect their privacy. A central bank could place a greater priority on a CBDC providing users with money that offers privacy, trust, or greater accountability to the public than private sector providers.

Promoting greater financial inclusion improves welfare and boosts economic participation. As such, user technology that enhances financial inclusion could be an important benefit of new forms of digital money. This could include inclusive features for those with specific access needs, for example, visibility assistance, or integration with affiliated services like digital ID.

Currently, people who are unable or unwilling to use electronic or online services can rely on cash to make transactions. The FCA estimate there are currently 1.2 million unbanked people in the UK, with significantly more who are not digitally literate.[27] As such, it would be preferable for new forms of digital money to take the needs of, and barriers faced by, these groups into account and support their access to basic payment services. Reflecting this, the Bank remains committed to the ongoing provision of cash.[28]

The Bank recognises the economic benefits of stablecoins operating within a competitive environment. Some intrinsic features of payments markets could contribute to the development of a concentrated market for new forms of digital money with high barriers to entry. These include:

- High technological or financial requirements and sunk costs, which could discourage new entrants into a market.
- Inertia, or 'status quo bias' whereby potential customers find it easier to stay with an existing provider, even if it is relatively easy to switch. Again, this could discourage providers from entering a market as they may not be confident of attracting customers.
- Network effects, whereby consumers and retailers are more likely to adopt a payment method when they are confident it benefits them. This means having a large number of users and being widely accepted and used.
- First-mover advantage, which may be reinforced by network effects. Providers that launched early could attract a critical mass of users and therefore establish market dominance.

A non-competitive outcome could diminish rather than enhance people's welfare. It could stifle innovations that would otherwise improve services and reduce costs for users. And it could risk financial stability if firms became so important that they are 'too-big-to-fail'. Stablecoins would be more beneficial to society if the market is vibrant and competitive. This includes being open to new entrants. In this regard, it would be beneficial if the payments landscape could accommodate a future CBDC, were it judged desirable for the Bank's objectives. This would mirror how cash has a place alongside forms of private money. Any future CBDC should also seek to support competition.

The Bank does not have a direct remit to promote competition in payments. But it clearly has an interest given emerging market structures could impact financial stability. It will therefore be important for the Bank to engage with other public authorities as they consider any potential competition issues in the market for new forms of digital money. These authorities include the Competition and Markets Authority, FCA and the PSR.

The Bank further recognises the importance of interoperability between services, but is otherwise technology neutral subject to meeting its objectives.

Interoperability, in this context, refers to the ability of users to switch – without barriers or undue friction – between different forms of sterling money and different payment services. For stablecoins, some degree of interoperability is essential. This is because they will need to meet the FPC's stablecoin expectations. And this means users must be allowed to exchange their coins into existing forms of money. At a minimum, therefore, stablecoins will need to interoperate with the banking system.

Interoperability is also important for fostering competition in the provision of payment services. Ideally, there would be interoperability not only between users of different digital wallets in the same coin, but also between users of different coins and payment systems. And importantly, this interoperability should be provided at reasonable cost, or no cost, to users. For example, it should be no more costly or complicated to make payments between digital coins and other payment systems than those involving commercial bank money. Ideally, such payments should also be no more costly or complicated to make than those between users of the same digital coin.

Ensuring that new forms of digital money are fully interoperable raises important challenges for infrastructure. Interoperability that allows people to make payments between different commercial banks today, with minimal friction, is delivered by common infrastructure such as the UK's Faster Payments Service (FPS). But whereas existing payments systems move assets and liabilities between commercial banks, new forms of digital money will be different propositions.

They could need a different charging structure, for example, if low costs per transaction are a key part of their proposition. Or they may involve higher volumes of payments that existing infrastructure is not designed to process. They may also have different data requirements. For example, in a payment between two digital coin systems the destination wallet address would need to be preserved throughout the chain.

If new forms of digital money were to use existing infrastructure, they may be limited by its functionality, speed and cost. Future innovations like micropayments and smart contracts may also not be viable. Limiting inter-system payments to current standards may further push users towards effectively closed-loop systems. This could arise, for example, if payments within a network were materially 'better' than payments between different networks.

Developing any new infrastructure that is fully interoperable would need private sector participants to be fully engaged. This could require a series of initiatives. For example, FPS only emerged after a number of stages: an initial HM Treasury review into competition in the UK banking sector; followed by a joint Government-industry task force; and culminating with industry led development.[29]

Standards are also an essential part of interoperability. Any infrastructure would need to consider technology and data standards so that information could be exchanged seamlessly between the different systems involved. The development of these standards will require the public and private sectors to work together. It will also require international co-operation. In doing so, it would be important to understand what existing standards could be deployed, or adapted. And whether new standards would need to be introduced, including to support some of the more novel features of new forms of digital money. The digital money industry may also need to consider a common set of standards for interfaces. This would be similar to the standards for application program interfaces under Open Banking.

The Bank further recognises that the developers of any new infrastructure should be conscious of their environmental impact.

Questions for discussion:

How important is direct access for the general public to central bank money in a digital world?

Do you agree with the Bank's view on protection and privacy? What would you regard as a minimum set of protections?

What steps could be taken, and by whom, to help promote interoperability of new forms of digital money with other payment systems, and thereby foster a competitive environment?

Box C: International developments concerning new forms of digital money

New forms of digital money could, in principle, be operated in one jurisdiction, denominated in the currency of another, and used by consumers in a third. Regulators globally, including the Bank, believe that the regulatory response must match this. And it must be rooted in common international standards. In particular:

- The G7 has maintained that 'no global stablecoin project should begin operation until it adequately addresses relevant legal, regulatory, and oversight requirements through appropriate design and by adhering to applicable standards'.[30]
- The G20 has developed a roadmap for improving cross-border payments. This includes a commitment to explore the potential role of new payment infrastructures and arrangements, such as stablecoins and CBDCs.[31]
- The Financial Stability Board (FSB) has developed a set of principles for stablecoin regulation. These principles represent a common platform for an agreed international approach to be developed. This will help avoid divergences in the regulatory approaches of different jurisdictions. The FSB has also agreed that, alone, the principles are not sufficient. Existing standards must be examined and updated where necessary.[32]
- A group of leading central banks, including the Bank, have outlined a series of foundational principles relevant to potential CBDCs. It assessed that 'a CBDC robustly meeting these criteria and delivering the features set out… could be an important instrument for central banks to deliver their public policy objectives'.[33]
- The Committee on Payments and Market Infrastructures and International Organization of Securities Commissions are leading work to assess how the international standards for systemic payment systems (the Principles for Financial Market Infrastructures) apply to stablecoins. This includes international supervisory responsibilities and how to assess systemic importance.[34]

Box D: A central bank digital currency in the UK

The Bank has not yet taken a decision as to whether to launch a CBDC. Any future decision will be based on a thorough assessment of how a CBDC might impact the Bank's mission and wider government objectives.

The Bank considered the opportunities, challenges and design questions associated with a CBDC in the UK in its March 2020 Discussion Paper. It welcomes the extensive responses received and has released, alongside this Discussion Paper, a summary of those responses. Along with responses to this Discussion Paper, these will help inform any eventual decision on whether and how to introduce a CBDC in the UK.

Similar to its approach to stablecoins, this decision would be based on the Bank's mission to maintain monetary and financial stability, as well as broader public policy objectives. The range of public policy questions that arise around CBDC are broader than monetary and financial stability and involve public authorities other than the Bank. Therefore there is a need for a co-ordinated and comprehensive strategy for any decision regarding CBDC in the future.

In April 2021, the Bank and HM Treasury announced the joint creation of a CBDC Taskforce. This is to ensure a strategic approach is adopted between the UK authorities as they explore CBDC. The Bank also announced the creation of a CBDC Engagement Forum and a CBDC Technology Forum. These will engage stakeholders and gather input on CBDC.[35]

Box E: Data and privacy for new forms of sterling digital money

Privacy and data protection issues are design and operational aspects for new forms of digital money. This is because of the flows of information they involve. A stablecoin payment would involve at least the stablecoin issuer, wallet provider, payer and payee. And even a CBDC would likely involve private sector Payment Interface Providers as intermediaries between the central bank and end user.

Any private sector firm issuing or intermediating payments in new forms of digital money would need to be fully compliant with current UK data protection laws. Firms would also need to adjust to any future regulation in this space.

Subject to meeting these regulations, design choices around data would need to be made. These would relate to the data that each entity in a stablecoin or CBDC payment system accesses, holds and processes, and for what purpose. Different purposes include: on-boarding end-users, processing transactions, and compliance with regulations against illicit finance, such as Anti-Money Laundering (AML) and Combating the Financing of Terrorism rules. Compliance with these regulations would seem likely to rule out models where users are fully anonymous.

The data protection and AML regulatory frameworks are outside the Bank's remit. However, both stablecoins and CBDC would likely involve commercial entities that will have access to end-users' personal data and that could attempt to monetise them, for example, by analysing spending patterns across different demographics. Policy choices around these issues are likely to have significant societal, as well as technical, implications. In considering them, the Bank would therefore need to work closely with HM Government, other authorities, including the Information Commissioner's Office, and broader society, to identify ways to better inform end-users in relation to the new services and risks associated with them.

3: An illustrative scenario

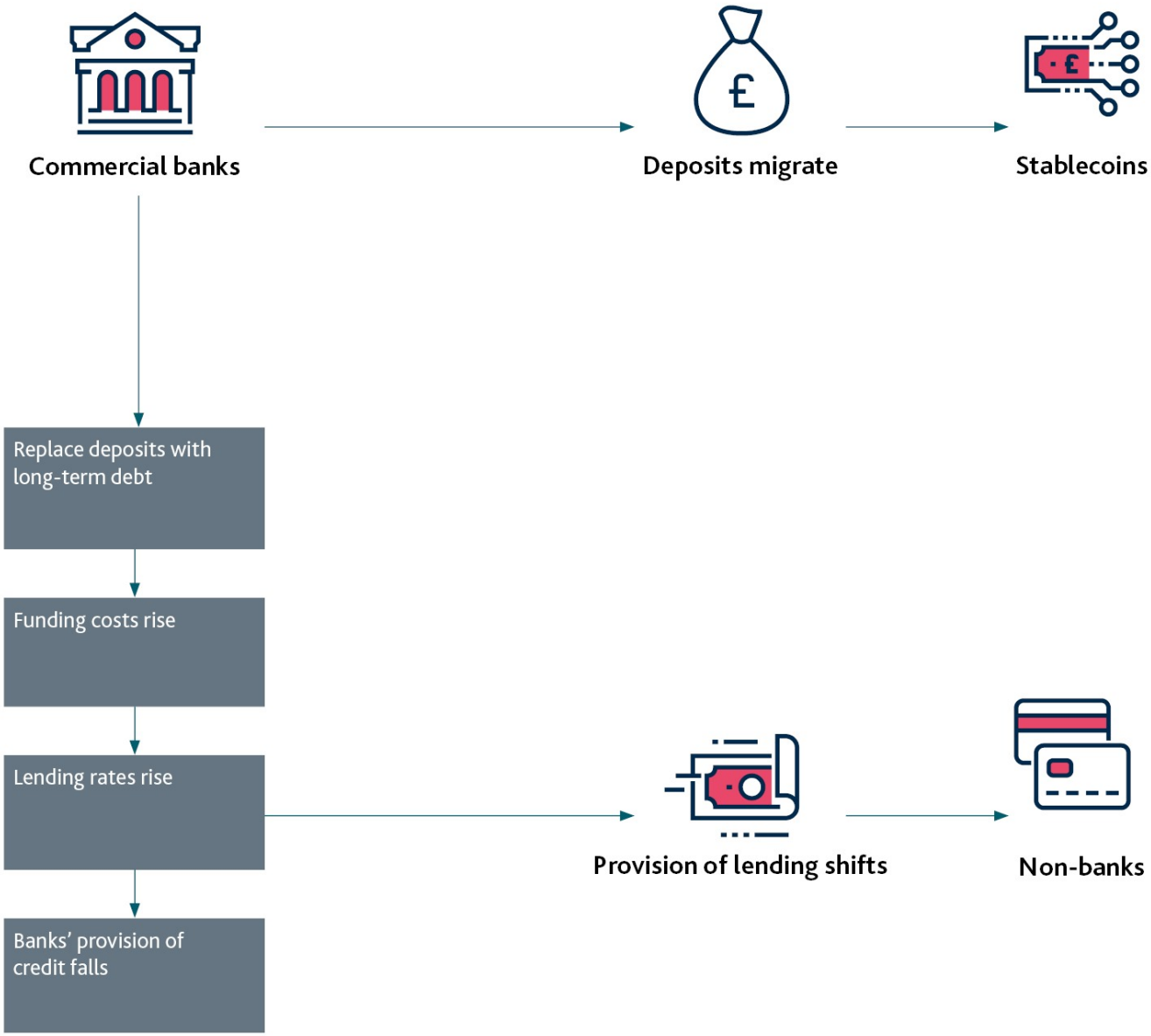
Bank staff have modelled an illustrative scenario of the demand for new forms of digital money, the resulting response of banks, and the impact on credit conditions.

New forms of digital money are not yet widely used in any economy. So it is difficult to forecast with any certainty the extent to which they will be demanded and under what conditions. Equally, commercial banks have never been confronted with a large-scale, system-wide displacement of the deposits they create. So there is little evidence upon which to assess their collective response and the resulting impact on credit conditions.

The scenario developed in this section should therefore be viewed as purely illustrative. It offers one view on the steady-state demand for new forms of digital money, the resulting response of banks, and any impact on credit conditions. In line with the rest of the Discussion Paper, it assumes that new forms of digital money would be provided for retail use only and that they are systemic. This means they have the potential to scale up and grow rapidly, and to become widely used as a trusted form of sterling-denominated retail payments.

Under the scenario, potential demand for new forms of digital money is driven by a range of non-financial factors, such as the convenience of making payments. These factors are translated into a proportion of household and corporate sector deposits that are assumed to migrate away from the banking sector. In responding to this loss in deposits, commercial banks are assumed to seek to broadly maintain both their current level of lending and liquidity positions. Together, this means that they need to seek an alternative source of funding, which is assumed to be in the form of long-term wholesale debt. This leads to an increase in their overall funding costs and, in turn, to an increase in bank lending rates. Thereby, there is an impact on credit provision with some borrowers seeking opportunities in the non-bank sector. Under the scenario, this impact is modest.

Figure 3.1: Overview of the illustrative scenario



The range of uncertainty around this steady-state scenario is large, even accounting for the sensitivities described at the end of this section. It is nevertheless useful for informing any implications of new forms of digital money for monetary and financial stability. Section 4 discusses these implications, alongside the potential risks associated with a transition to any new steady state. Even where new forms of digital money grow rapidly, such transition could take a number of years to complete.

It is conditioned on the assumption that stablecoins would meet the Financial Policy Committee's (FPC's) expectations.

Importantly, the scenario is conditioned on the assumption that any stablecoin would meet the FPC's stablecoin expectations, as detailed in Section 5. Any new form of privately issued digital money that did not meet these expectations would pose unacceptable risks at the level of demand described in the scenario.

3.1: Demand for new forms of digital money

Both non-financial factors and remuneration are considered as reasons why new forms of digital money could potentially be preferred to commercial bank deposits.

Section 2 highlighted the potential value new forms of digital money might offer to users as a means of payment. In principle, they could also be preferred to some commercial bank deposits that are held as a store of value. For example, they could compete with the rates of return offered on commercial bank deposits – referred to as 'remuneration'. And there could be factors that mean they are preferred as a store of value for reasons unrelated to remuneration.

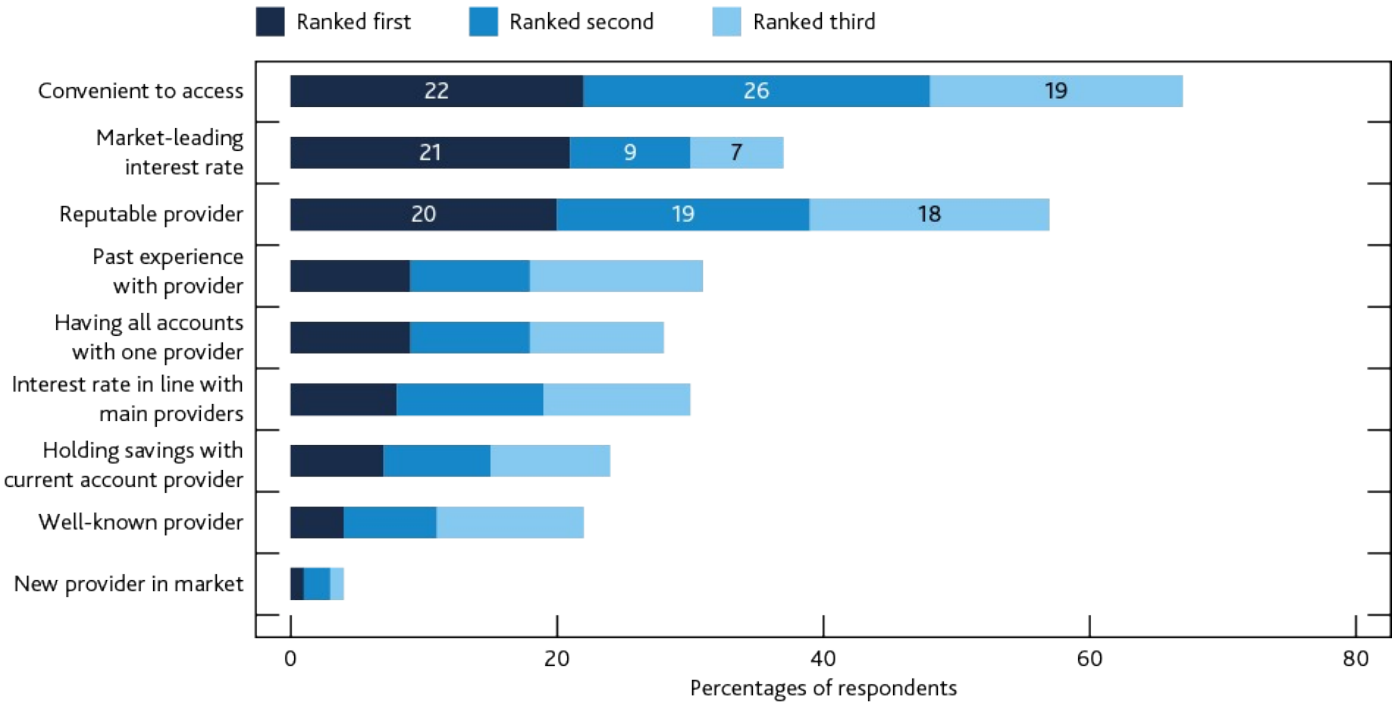
The illustrative scenario incorporates non-financial factors that may influence demand for new forms of digital money both as a means of payment and as a store of value. The potential for remuneration choices to further influence this demand are then also considered.

Non-financial factors such as convenience, trust, and perceived safety are assumed to play a key role in determining demand for new forms of digital money.

Evidence from the use of commercial bank deposits suggests that depositors value some non-financial factors highly. For example, the FCA's Cash savings market study showed the top two reasons most commonly cited for choosing an easy access account or Cash ISA were 'convenient to access' and a 'reputable provider' (Chart 3.1). But translating these factors onto non-financial demand drivers of new forms of digital money is complicated. This is because, while potential issuers could be trusted, they may not have the requisite experience to be considered by people as a reputable provider of financial services – for example, technology firms. In the illustrative scenario, three factors are therefore considered: safety, convenience and a trusted brand.

Chart 3.1: Convenient to access and a reputable provider are the top two reasons for choosing an easy access account, according to an FCA study

Proportion of respondents naming features that were important to them when choosing an account



Source: Financial Conduct Authority.

In practice, these factors may be offset somewhat by inertia. In 2020, the FCA Financial Lives survey reported that two-thirds of UK households have had their main current account for 10 years or more. And only 9% had switched in the past three years. This is despite variation in interest rates offered across the market. This suggests that they can be reluctant to switch accounts even when there is monetary gain available and the cost of switching is low (Adams et al (2020)).

It is possible that inertia may be even greater in the case of switching to new forms of digital money. For example, customers may be wary of losing benefits such as arranged overdrafts and the ability to use the commercial bank branch network. And they may be less likely to embrace alternative products more broadly. A PwC survey in 2019 found that people take a relatively low interest in financial services products compared to other industries. And they rarely scan the market for new offerings. In that survey, 48% of respondents further said they would not consider purchasing any financial product from a so-called 'FinTech' provider.

Under the illustrative scenario, around a fifth of household and non-financial corporate deposits transfer to new forms of digital money owing to non-financial factors.

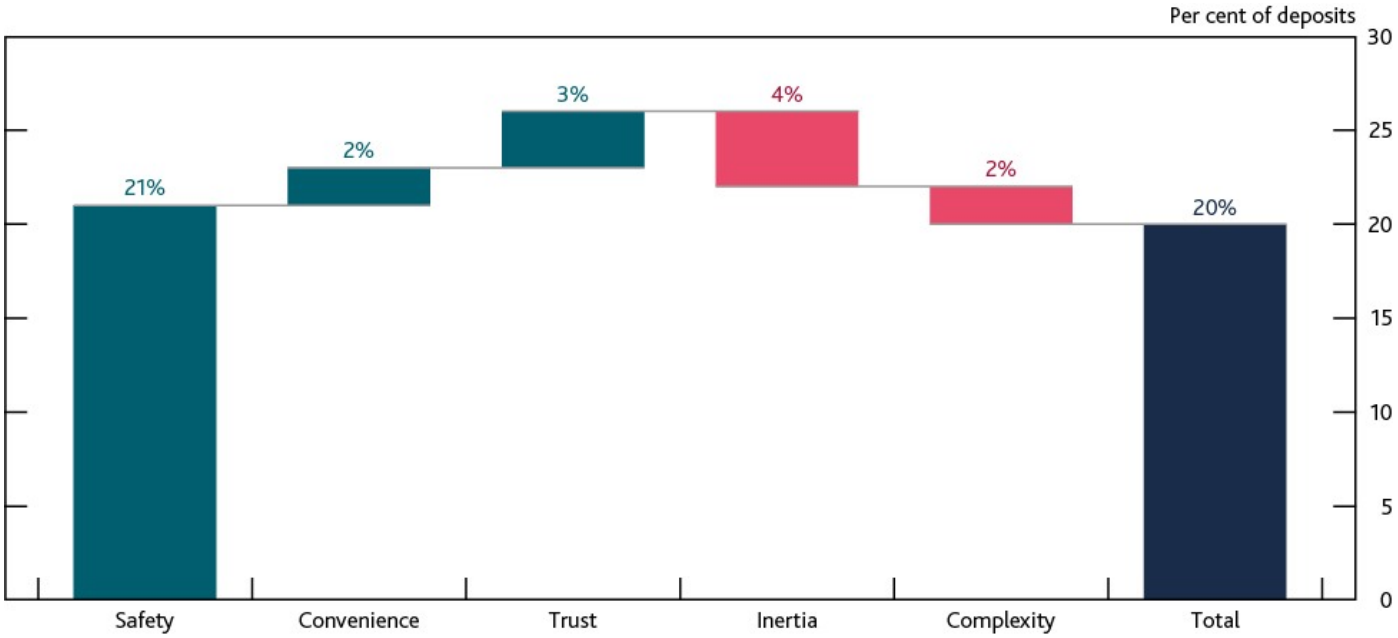
The illustrative scenario involves around a fifth of all commercial bank retail deposits migrating to new forms of digital money owing to non-financial factors.[36] This is equivalent to the total proportion of non-interest bearing deposits in the UK.

Under the scenario, it is assumed that certain depositors would perceive new forms of digital money as **safe** enough to attract their uninsured commercial bank balances. These are balances that sit above the limit for banks of £85,000 insured by the Financial Services Compensation Scheme (FSCS). Depositors could perceive digital money as being more secure than these balances because it is either issued by the central bank (in the case of a Central Bank Digital Currency (CBDC)) or, as part of the regulatory framework (see Section 5), benefits from a deposit guarantee that is both credible and easy to understand given the simplicity of its structure (in the case of a stablecoin).

In the case of households, it is assumed that those with uninsured balances but who nevertheless suggest they are keen to protect their savings migrate to new forms of digital money.[37] In the case of non-financial corporates, meanwhile, all uninsured balances – which are often central to the management of their cash flow – are assumed to migrate. Overall, 21% of total household and corporate deposits are assumed to migrate because of safety (Chart 3.2).

Chart 3.2: Around a fifth of household and corporate deposits are assumed to migrate to new forms of digital money owing to non-financial factors

Assumed total household and corporate commercial bank deposits migrating to digital money, by non-financial factor



Turning to **convenience**, it is assumed that households would find new forms of digital money convenient enough to hold balances similar to the amount of money they currently withdraw from commercial banks to make payments in cash. They are also assumed to be relatively inactive at managing their digital money balances and only top them up around once a month, for example, when their salaries are paid. Companies are assumed to manage their digital money balances more actively and so hold a little less than households. Together, this translates to around 2% of deposits (Chart 3.2).

According to an Ipsos MORI/OMFIF report, UK depositors value convenience factors such as ease of use and widespread acceptance most in a payment system. In turn, these are affected by the cost to merchants of accepting payments. The Payment System Regulator has estimated the average service charge to merchants at around 0.6% per transaction, rising to around 1.9% for small businesses.[38] For digital money to be found convenient under the illustrative scenario, it is implicitly assumed that it offers payment methods on at least comparable terms. This is realistic in the sense that some proposers of stablecoins suggest they could charge as little as 10% of average charges.

Turning to **trust**, a Bain study suggested that around 30% of households trust at least one technology company more than their primary bank.[39] Under the scenario, it is assumed that around 20% of these households would be comfortable switching to a new form of digital money. That is equivalent to the proportion of people that use mobile phones to make in-store payments – such as through Apple Pay or Google Pay. In total, this represents about 3% of total retail bank deposits (Chart 3.2).

Finally, it is assumed that there are two offsetting impacts. The first is inertia. Reflecting this, new forms of digital money are assumed to achieve only 80% of their potential demand on the basis of safety, convenience and trust. That is a little larger than the estimated market share of mature payment technologies, such as contactless card payments for in-store transactions and the Faster Payments Service for single-immediate interbank payments worth less than £250,000. This assumption reduces demand for new forms of digital money by around 5% (Chart 3.2). The second offsetting impact is complexity. This refers to the possibility that some households may be deterred from new forms of digital money simply because they are seen as too complex. An indicator of financial sophistication suggests this would reduce demand for digital money by around 2%.[40]

Interest rates that could be offered are assumed to have a relatively small impact on deposits leaving the banking system.

New forms of digital money could also attract deposits if the interest rates they offer compare favourably to commercial bank deposits. Equally, stablecoins could offer other monetary incentives, such as switching bonuses or cashback on purchases.

In practice, non-bank providers of digital money are likely to be more focused on payments than on attracting deposits primarily held as a store of value. In that case, it is possible that they offer no monetary incentives at all. Stablecoins will also be constrained as to the interest rates they can offer on deposits by the returns on the assets they will use to back those deposits. To meet the FPC's stablecoin expectations, these assets will at the least need to be high quality and highly liquid (see Section 5). Such assets are likely to generate a lower return than is available to commercial banks, who can back a proportion of their deposits with higher-yielding assets such as loans.

If new forms of digital money did offer competitive remuneration rates, it is impossible to know in advance how this might interact with other factors to impact demand. Under the illustrative scenario, it is assumed that demand is relatively insensitive to changes in interest rates. This is in line with evidence for commercial bank deposits. For example, analysis by Chiu and Hill (2015) estimates that a 1% increase in the bank deposit rate was associated with an increase in the stock of deposits of around 0.3% over 12 months. In practice, elasticity of demand for new forms of digital money could be somewhat greater if, for example, the perceived costs to users of setting up a new relationship with them is lower than with commercial banks.

3.2: Response of commercial banks to a loss of deposits

Commercial banks would have to adapt their balance sheets in response to retail deposits leaving the banking system.

In response to deposits migrating to new forms of digital money, banks are assumed to compete for deposits. And they do this by offering higher interest rates. Given the assumed insensitivity of deposit demand to interest rates, however, this has only a limited impact. Therefore, banks adapt their balance sheets. In doing so, it is assumed that they seek broadly to maintain levels of lending – for example, through mortgages, corporate loans and credit facilities. Further, they are assumed to maintain their liquidity positions. These positions, in turn, depend on both the short-term liabilities of banks – including deposits – and on the high-quality liquid assets (HQLA) held to meet those liabilities – such as gilts and central bank reserves.

Other things equal, a loss of retail deposits will be accompanied by a fall in the reserve balances of the banks in which these deposits were held. Simultaneously, however, some or all of this fall may be recycled back through the financial system. By way of illustration, Figure 3.2 shows a stylised view of how money may be recycled through the financial system when digital money funds are backed by HQLA. In this case, the HQLA are purchased from non-banks, which deposit the proceeds with banks. This leaves the amount of central bank reserves for the banking system as a whole broadly unchanged.

Figure 3.2: Retail deposits migrating from banks return in the form of wholesale deposits
Stylised view of how money may be recycled through the financial system when digital money funds are backed by HQLA

For simplicity, the diagram shows the case when digital money is directly backed by HQLA. As digital money deposits are ultimately backed by HQLA, other backing models would produce similar outcomes.

However, banks' liquidity ratios will still be impacted. This is because wholesale deposits may be more likely to be withdrawn, so that more HQLA need to be held against them than against retail deposits (Box F). It follows that, if banks intend to maintain their liquidity ratios, they will have to replenish their liquid assets. And if they intend to maintain levels of lending, this means they must seek alternative sources of funding to do so.

Banks are assumed to restore their liquidity positions, and hence their ability to continue lending, by issuing long-term wholesale debt.

The illustrative scenario seeks to set out a steady-state position for banks' balance sheets. This is assumed to be achieved through the interaction of two key mechanisms.

The first mechanism relates to any deficits in banks' HQLA that arise from the migration of deposits. In this case, banks are assumed to replenish such deficits by buying gilts from non-banks. The second mechanism then relates to the wholesale deposits that get recycled back to banks, including as a result of their own purchases of gilts. In this case,

banks are assumed to increase the maturity of – or 'term out' – such deposits by issuing additional long-term debt to wholesale investors.[41] This simultaneously removes some wholesale deposits and, with the long-term debt that replaces them, replicates the stable properties of the lost retail deposits. By borrowing at maturities greater than one year, banks also maintain their stable funding positions, as specified by the Net Stable Funding Ratio.

With these mechanisms in place, the precise changes in banks' balance sheets will depend on the assets a digital money uses to back its deposits. This is because this choice of backing model determines in what form the lost deposits return to the banking system. Examples of backing models are discussed further in Section 5. There are three broad options:

If new forms of digital money were backed by central bank reserves:[42] these reserves would flow from banks to new forms of digital money, leaving banks with, other things equal, a deficit in HQLA. In this case, banks are assumed to replenish their liquid assets by purchasing gilts from non-banks. They then 'term out' the resulting wholesale deposit inflows by issuing long-term wholesale debt.

If they were backed by HQLA: digital money issuers would need to purchase the required HQLA. Since banks will need to manage their own liquidity positions, it is assumed this is purchased from the non-bank sector. This would mean lost deposits would return to the banking system in the form of wholesale deposits. Banks are again assumed to manage these by 'terming out'.

If they were backed by commercial bank deposits: banks' retail deposits would be replaced by deposits held in trust on behalf of digital money issuers. Similarly to wholesale deposits, these would require banks to hold more HQLA. They are assumed to purchase gilts as in the first case, and 'term out' the resulting wholesale deposits in the same way.

Importantly, in each case, it is assumed that either banks or digital money issuers would have to buy gilts and that commercial banks would increase their issuance of wholesale funding, which is financed by the non-bank sellers of the gilts.

Overall, banks' funding costs are assumed to rise.
The interest rate banks pay on long-term wholesale funding is typically higher than on deposit funding. Other things equal, replacing lost deposits with more long-term wholesale funding therefore implies an increase in banks' overall funding costs.

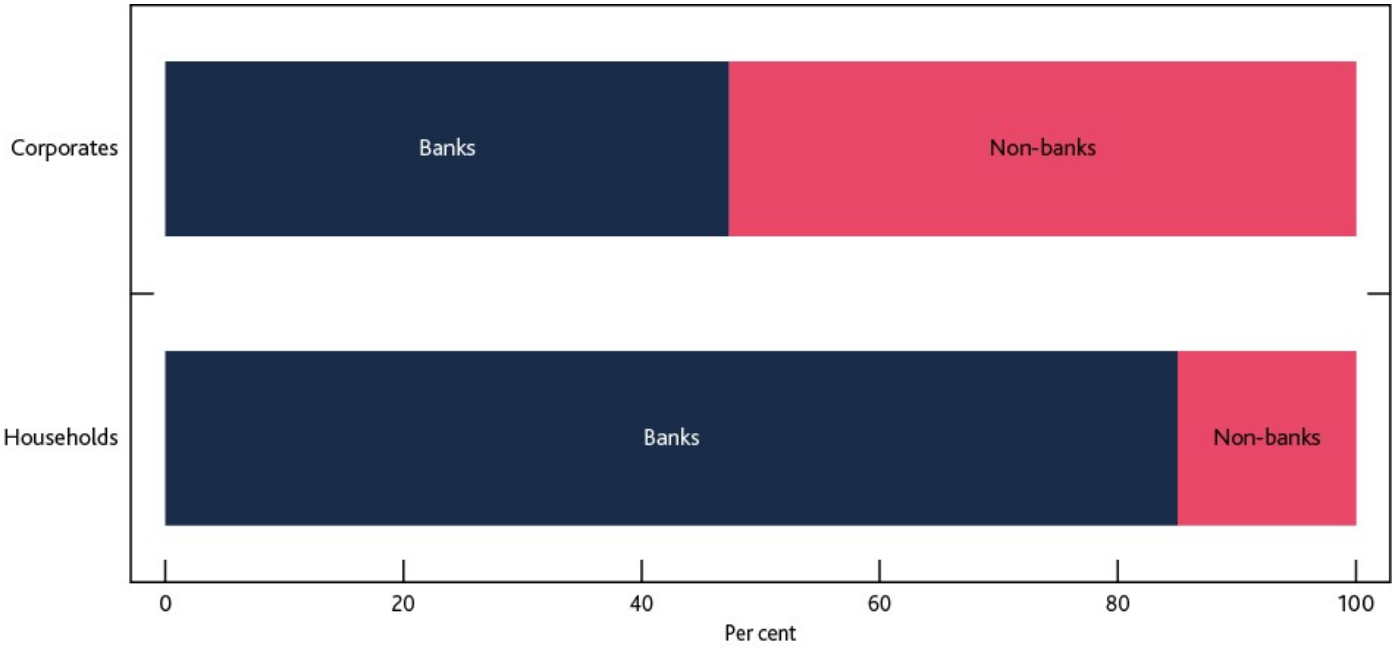
Under the illustrative scenario, there are three additional factors that determine the extent of the rise in funding costs. First, the increase in deposit rates that arises as banks are assumed to compete for deposits. Second, while non-bank investors are assumed to be willing to lend more to banks, the cost of issuing bank debt rises as the volume increases. Third, increased demand for gilts, by either banks or the digital money issuer, are assumed to depress gilt yields by diminishing the available supply. Bank debt and gilts are assumed to have some degree of substitutability and so the increase in demand for gilts partly offsets the increase in yield on bank debt.

3.3: The effect on bank lending rates and credit provision

An increase in banks' funding costs is assumed to increase rates on new bank lending.
The subsequent impact on lending rates will depend on how banks re-price loans in response to these higher funding costs. In the scenario, banks are assumed to price lending off a mix of both wholesale and deposit funding.[43] Under this assumption, both funding costs and bank lending rates rise by around 20 basis points.[44] In principle, this could be accommodated by a loosening of monetary policy. But in the illustrative scenario that rise in lending rates is assumed to lead to a tightening of bank credit conditions.

Some borrowers may find it cheaper to seek credit opportunities in the non-bank financial sector.
Borrowers also have access to non-bank sources of credit. In principle, any increase in bank lending rates could increase the scope for non-banks to compete in lending to both households and companies. Such lending could be extended either directly or via other financial intermediaries such as investment funds.[45] Currently, non-bank lending accounts for roughly half of all lending to UK corporates (Chart 3.3). This is through a combination of bond markets, asset-based finance, non-bank loans and peer-to-peer lenders. In contrast, only 15% of lending to UK households comes from the non-bank sector.

Chart 3.3: Non-banks account for around half of all lending to UK corporates, but households are more reliant on banks
Proportion of debt outstanding for UK corporates and households (a)



Sources: Bank of England, Bank for International Settlements (BIS), Deloitte, Finance & Leasing Association, firm public disclosures, Integer Advisors, London Stock Exchange, ONS, Peer-to-Peer Finance Association, Refinitiv and Bank calculations.

(a) Data are as of end-2019. Where end-2019 data were unavailable, data for the closest available data have been used.

Under the illustrative scenario, it is assumed that some corporate borrowers find it cheaper to take advantage of credit opportunities in the non-bank sector. For example, medium-sized UK companies who were previously unwilling to accept costs associated with non-bank sources of credit,[46] but who now find it cheaper to do so than borrowing from a bank. But the cost of non-bank lending is assumed to remain too high for smaller companies, who are therefore assumed to continue relying on bank credit.

Overall, under the illustrative scenario, the impact on lending rates and credit provision is modest. Credit provision to the wider economy falls by a little over 1%. This reduction broadly represents borrowers that are unable to afford bank credit and are either unable or unwilling to access credit from alternative sources in the non-bank financial sector.

3.4: Uncertainties and sensitivities to the key assumptions

There is significant uncertainty around the illustrative scenario.
The illustrative scenario depends crucially on the underlying assumptions related to demand, the response of banks and non-banks and wider economic factors. In practice, the emergence of new forms of digital money could produce very different outcomes. It is impossible to produce a meaningful range of outcomes without giving the impression of greater certainty than is warranted. Nevertheless, it is important to understand the sensitivities to the different assumptions underpinning the scenario.

Demand for new forms of digital money could be significantly higher or lower, and more sensitive to choices around remuneration.

Demand could be higher than in the illustrative scenario. For example, if a new form of digital money is widely accepted and trusted enough to be used for more household transactions than included in the scenario. More depositors could be comfortable switching to new forms of digital money than have been seen to switch previously to payment innovations, attracting a larger share of all deposits. More generally, if customers are more likely to switch to a new form of digital money than between existing payment methods then inertia and uncertainty could be lower, raising demand.

Alternatively, inertia may be stronger than assumed. This could reflect the experience of Open Banking, which has only attracted around 5% of depositors since its introduction.[47] Alternatively, banks could offer more attractive and user-friendly products, the benefits of which outweigh perceptions about convenience, safety and trust.

Remuneration choices could also play a greater role than assumed. Interest rates offered on deposits have been at historically low levels since the global financial crisis. Consequently, there has been little differentiation, in monetary terms, between different types of account. This may help explain why measured interest rate sensitivity has remained low.

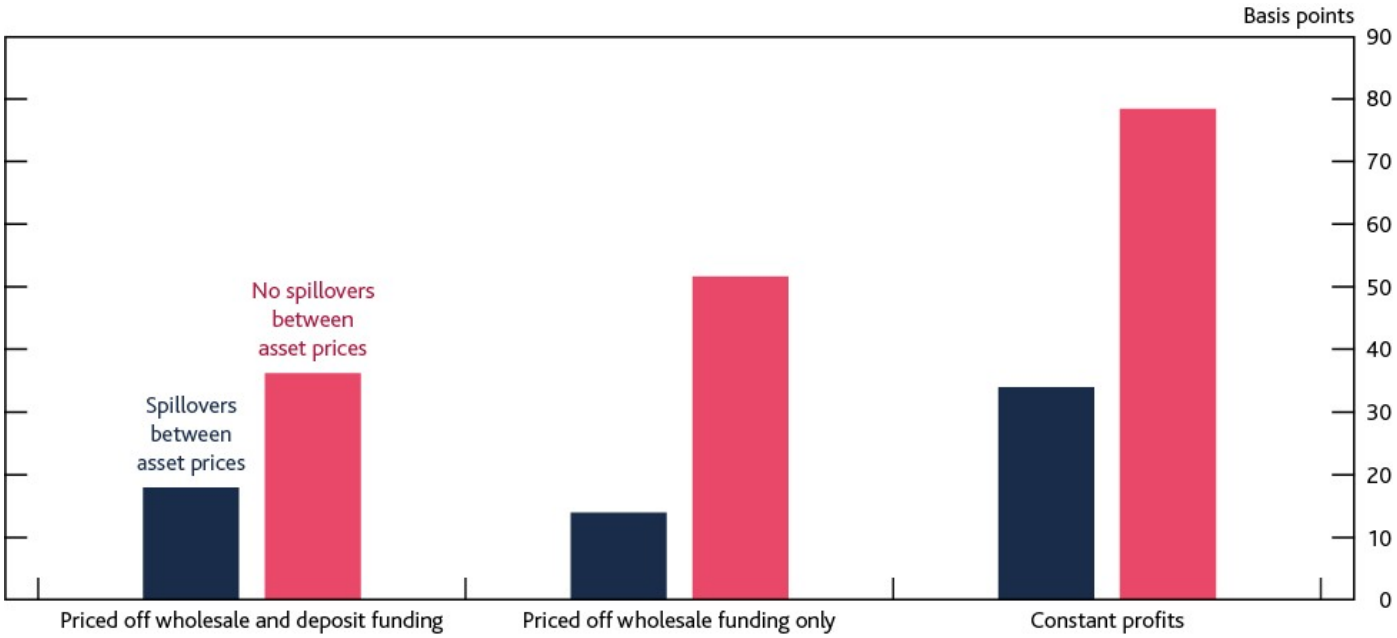
Commercial banks could tighten credit conditions further, with greater implications for how credit is provided than implied by the illustrative scenario.

Under the illustrative scenario, banks are assumed to seek broadly to maintain levels of lending to the real economy. If this assumption did not hold, it could have greater implications for how credit is provided following the emergence of new forms of digital money.[48] In practice, banks would have a clear incentive to continue lending as long as it remained profitable. But there are still key uncertainties relating to the impact on credit conditions.

One uncertainty is around the way in which banks price loans. In the illustrative scenario, banks are assumed to price loans off a mix of both wholesale and deposit funding. If banks instead priced loans off wholesale funding only, the implied tightening in credit conditions would be smaller (Chart 3.4). If instead banks sought to maintain their existing levels of net interest income, the implied tightening in credit conditions would be larger.

Chart 3.4: There is uncertainty around the increase in lending rates resulting from the introduction of new forms of digital money

Changes in lending rates associated with introduction of new forms of digital money under different bank pricing and asset price spillover assumptions



Another uncertainty is around the substitutability of long-term bank debt and gilts. In the illustrative scenario these are assumed to have some degree of substitutability. This means that increased bank debt issuance raises gilt yields (partly offsetting the overall decrease), and increased gilt demand reduces yields on bank debt (partly offsetting the overall increase). If these assets were not substitutable, the overall rise in yields on bank debt and fall in gilt yields would be larger. And the increase in loan rates would be more severe (red bars in Chart 3.4).

And non-banks may be unable or unwilling to increase their intermediation of credit as much as assumed in the illustrative scenario.
Substitutability between the two could further be weakened by restrictions on rebalancing written into the non-banks' mandates. For example, some investment funds may be unable to carry out large-scale switches either because they are required to passively follow an index or because of limits on the total proportion of bank debt they can hold. Such limits could reflect the fact that, historically, prices for long-term bank debt have tended to be more volatile than for government debt. And they are viewed as far less safe in a stress scenario.

If non-bank investors required a higher premium than assumed in the illustrative scenario, the resulting increase in bank lending rates would impact credit availability for bank borrowers. Equally, if non-banks demanded higher rates of return to lend directly to real economy borrowers, credit conditions would be tighter overall.

Such uncertainty is one reason why the Bank may wish to consider precautionary arrangements that allow the financial system to assess the impact of new forms of digital money after they launch.
Only when new forms of digital money emerge, and deposits begin to migrate away from the banking system, will the implications for the wider financial system start to become apparent. 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 (Section 5).

Question for discussion:

Does the illustrative scenario have the right components and responses with which to assess the impact of demand for new forms of digital money on the macroeconomy?

Box F: The liquidity positions of commercial banks

Banks typically run a maturity mismatch. That occurs because the majority of their liabilities, such as deposits, are on average shorter maturity than their assets. Banks' real economy assets are typically long-term and illiquid, meaning they are not available to meet liabilities as they fall due, for example, during a stressed outflow of deposits.

To mitigate this, banks are subject to both the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) requirements. The LCR is a test of resilience to a short-term acute liquidity stress, and requires banks to ensure they invest a proportion of their funding in high-quality liquid assets (HQLA) – such as government bonds and central bank reserves. The NSFR ensures that, over a longer time horizon, banks are not excessively funded by short term, unstable liabilities. Both regulations incorporate assumptions on the liquidity of banks assets and the stability of their liabilities. The stability of banks' liabilities take into account factors that include but are not limited to:

- **The type of depositor**. Household deposits are generally assumed to be the most stable type of sight deposit, and least likely to run during a stress. Non-financial corporate deposits are assumed to be more likely to do so, and deposits from other financial institutions most likely. For example, for the LCR, banks are required to hold HQLA covering 10% of household deposits over the £85,000 Financial Services Compensation Scheme deposit insurance limit. By contrast, they are required to hold HQLA covering 100% of on-demand wholesale deposits placed by financial institutions.
- **The purpose of the deposit**. Operational deposits, such as those intended to allow a company to make and receive payments are assumed to be less likely to run. Balances for the purposes of generating return are therefore assumed to be more likely to run.
- **Residual maturity**. The LCR considers that liabilities that mature beyond 30 days are stable and do not run in a stress. This could, for example, include savings deposits where the customers is contractually unable to withdraw their money for a period of greater than 30 days. The NSFR, considers liabilities that mature in greater than one year as the most stable.

Any replacement of lost household and corporate deposits to substitute for lost funding would impact a bank's liquidity position. For example, if it received more wholesale deposits to replace outgoing household deposits, other things equal, its liquidity ratio would fall given the same amount of HQLA, as those deposits have higher liquidity requirements. Conversely, if it issued more long-term wholesale debt, this would not immediately attract a requirement under the LCR.

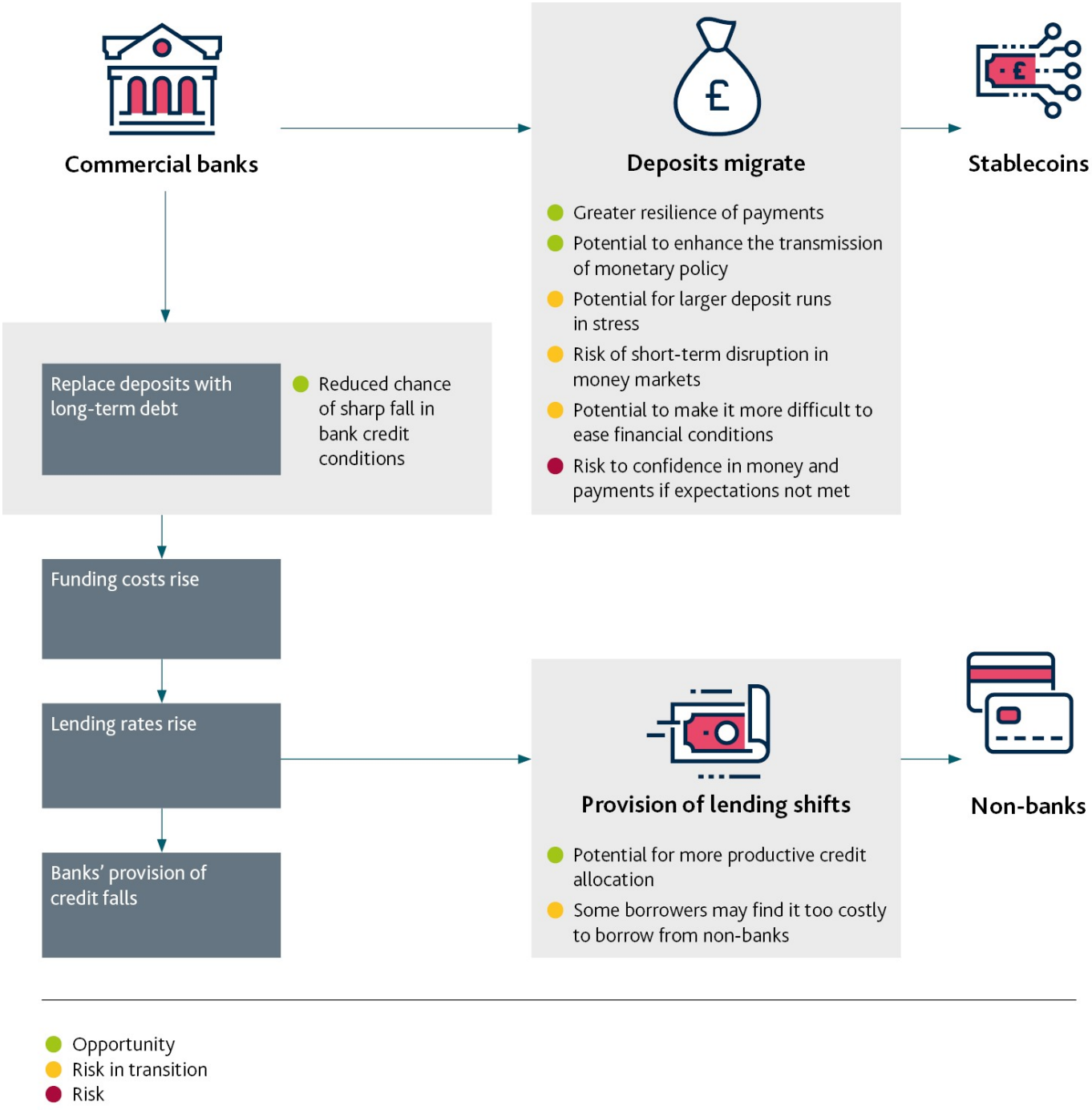
4: Implications for macroeconomic stability

Together, the demand for new forms of digital money and the impact on banks and credit conditions create both a number of opportunities and risks for economic stability.

The Bank of England's mission is to promote the good of the people of the United Kingdom by maintaining monetary and financial stability. It is through the lens of these objectives the Bank will consider its approach to new forms of digital money.

This section examines five issues around macroeconomic stability in relation to new forms of digital money. In doing so, the focus is on new forms of digital money that are systemic. This means they have the potential to scale up and grow rapidly, and to become widely used as a trusted form of sterling-denominated retail payments. In each case, the potential opportunities for enhancing monetary and financial stability are considered alongside the potential risks. The intention is to assess the balance of risks between the two. This is to determine whether new forms of digital money pose a significant threat to the Bank's objectives and whether any such threat can be mitigated.

Figure 4.1: Overview of implications for macroeconomic stability



Risks are distinguished between those arising in a future steady state, and those that will be more relevant during a transition towards widespread use of new digital forms of money. The majority of risks relate to this transition. Managing these may require alternative arrangements. These are discussed further in Section 5. Broader implications for the international monetary and financial system are discussed in Box G.

4.1: Confidence in money and payments

Unless adequately regulated, stablecoins could undermine public confidence in money and payments and in the financial system as a whole.

As described in Section 1, public confidence in the money circulating in the UK, denominated in sterling, is central to the Bank's objectives. Ensuring confidence in sterling entails the provision of safe money as a 'risk-free' means of payment for households, businesses and the wider financial system. And it entails the security and reliability of those payments. If

a stablecoin were to fail to honour its obligations, or suffer an operational failure such as a breach of privacy, this could undermine public confidence in money and payments, and in the financial system as a whole.

This underscores the importance of the Financial Policy Committee's (FPC's) stablecoin expectations. These are designed to ensure that stablecoin issuers are held to the same standards as operators of existing payment systems, and that the coins they issue are regulated to standards equivalent to commercial bank deposits.

Conversely, new forms of digital money that meet the FPC's expectations could better meet the payment needs of people, including through greater resilience of payments.
Assuming they are safe – that is, they meet the FPC's expectations –new forms of digital money also have the potential to present a range of opportunities. As described in Section 1, they have the potential to boost economic activity by contributing to faster, cheaper, and more efficient payments. And they could open the door to future innovations that meet the evolving transaction needs of people. In doing so, they could also improve the resilience of payments, benefitting society as a whole.

Currently, consumers in the UK tend to use cards for making purchases at the point of sale. And these are the dominant way to make e-commerce payments. The operational resilience of card networks is therefore critical. And as a single point of failure, these networks could pose significant risks to the financial system. By providing an additional way of making payments that does not rely on the existing card network, new forms of digital money could both enhance financial inclusion and improve overall resilience.

Multiple networks are less likely to suffer outages at the same time. Provided new forms of digital money are interoperable with existing payment systems, they could therefore offer an alternative in the event of a stress within existing systems by allowing users to easily switch between the two. There is also a possibility that new technology to support new forms of digital money could be designed to be more resilient. For example, a new form of digital money could allow users to make payments without needing to connect to other parts of the payment infrastructure. This could result in users being less vulnerable to large scale outages of existing payment networks.

4.2: Banking sector liquidity resilience

During a system-wide banking stress, the availability of new forms of digital money could increase the proportion of banks' deposits that are withdrawn.
The potential for deposit runs on the banking system is a well-established risk, particularly given that internet users could move deposits at any time. The question in this case is to what extent the presence of new forms of digital money could increase the severity of these runs. Further, in the event they do so, it is important to understand whether existing liquidity insurance is sufficient.

Deposit runs take place when depositors search for safety and they believe the likelihood of losing their deposits outweighs the cost of moving. The former is mitigated by deposit protection schemes such as the Financial Services Compensation Scheme. This ensures that depositors promptly receive their insured deposits if their bank fails. It also removes the first-mover advantage of withdrawing deposits early to receive them in full that can spark a run in the first place. However, runs may still occur when deposits are uninsured, or when the costs of moving are very low.

Currently, deposits could move to three substitutes:

- Another bank that is perceived to be safer
- Alternative savings or investment vehicles, such as National Savings & Investment, money market funds, or e-money
- Withdrawn as physical cash

By offering an additional, and potentially more attractive, way to withdraw money from the banking system, new forms of digital money could increase the volume of deposits involved. For example, they could offer a more convenient alternative to large cash holdings. And their value could be less volatile than other alternatives. Depositors may be particularly willing to transfer their money into new forms of digital money if the costs of switching into them are low. If the nature of the stress is such that commercial bank deposits as a whole become less trusted, this could also increase the amount of deposits, particularly uninsured deposits, people transfer.

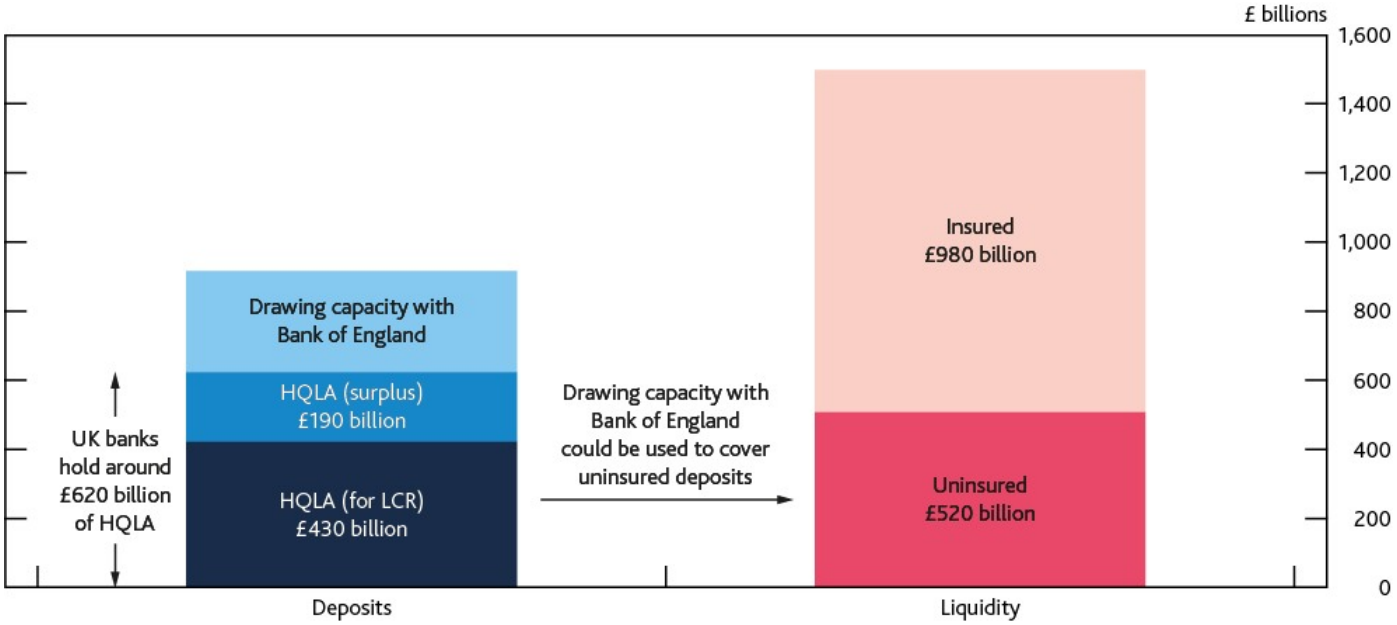
Private liquidity insurance is calibrated to help mitigate liquidity risks.
Liquidity insurance supports financial stability by ensuring the banking system is able to withstand shocks to its liquidity and funding without transmitting them further to other parts of the financial system. It comes in two forms. First, banks self-insure against liquidity risks by holding stocks of high-quality liquid assets (HQLA) and funding their balance sheet with stable liabilities. Second, they can access additional liquidity via the Bank of England's liquidity facilities. They do so by drawing against collateral they have pre-positioned with the Bank, or by placing additional collateral as necessary.

To help ensure they have adequate self-insurance, the prudential framework that applies to firms includes the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). These are global standards on the liquidity and funding resilience of banks.

The LCR requires that banks hold enough liquid assets to cover projected outflows of liabilities over a 30-day stress period. In the stress period, different categories of liabilities are assumed to flow at different rates (Box F). It could be that, following the emergence of a new form of digital money, certain types of deposits become more likely to flow out of the banking system than currently. This could warrant increasing the deposit outflow rate associated these deposits in the LCR standard, to reflect the additional liquidity risk.

In aggregate, given existing liquidity resources, the banking system should be able to withstand sudden deposit outflows.
Currently, major UK banks hold around £620 billion of HQLA against their short-term liabilities.[49] Their LCR requirements amount to £430 billion, leaving a surplus of around £190 billion (Chart 4.1). They could also draw from the Bank's liquidity facility against collateral they have prepositioned. Taken together, this means there is sufficient additional liquidity that banks could use if outflows of uninsured deposits were higher than those consistent with the LCR.

Chart 4.1: Banks could use current liquidity holdings and liquidity available from the Bank to cover their uninsured deposits
Decomposition of major UK banks' deposits and HQLAs



But there is significant uncertainty around how smoothly such a deposit outflow would unfold, emphasising the importance of banks ensuring they have access to the Bank's liquidity facilities.
Although in aggregate the UK banking system could cover an outflow of all uninsured deposits, there are three residual risks. First, the distribution of HQLA is unlikely to match perfectly the location of outflows in a stress. Second, and relatedly, while a broad range of firms can access the Bank's liquidity facilities via the Sterling Monetary Framework (SMF), not all eligible firms have chosen to sign up for all the Bank's lending facilities. In March 2021, of 218 SMF participants, 109 were signed up to the Bank's Open Market Operations (including the ILTR[50]) and 163 were signed up for the Discount Window Facility. Third, given the unusual nature of such an outflow of deposits there is a risk that unforeseen frictions means that outflow may not take place smoothly.

Since the financial crisis, the Bank has taken a number of steps to broaden access to its facilities. This includes expanding access to all Prudential Regulation Authority (PRA)-regulated banks and building societies, PRA-regulated broker dealers, and certain central counterparties (CCPs). It has also taken steps to broaden the range of collateral that is eligible for use in its facilities, including less liquid assets such as raw loans.

The Bank's facilities are there to be used by firms, subject to conditions, as and when liquidity needs arise.[51] Banks are encouraged to sign up for facilities so that they are available in their liquidity management toolkit. They are also encouraged to preposition collateral, to ensure that the Bank's facilities are readily available should banks choose to use them.

4.3: Credit conditions

Greater reliance on longer-term stable funding by banks could reduce the likelihood of a sharp deterioration in bank credit conditions.
Under the illustrative scenario in Section 3, as deposits migrate to new forms of digital money, banks are assumed to replace them predominantly with long-term debt. This would reduce some of the proportion of bank funding that is vulnerable to the kind of runs discussed in Section 4.2. Other things equal, this should reduce the likelihood that banks will have to cut back lending sharply during a stress.

In principle, banks could choose to replace deposit funding instead with debt that has a maturity of less than a year. In that case, they would face additional requirements under the NSFR to guard against the possibility that such funding may be difficult to replace during a prolonged stress. This risk was shown during the global financial crisis. Equally, banks will need to manage any liquidity risk that arises from the type of debt they issue. For example, they would need to ensure their assets do not become over-encumbered by using them to issue too much secured long-term debt. Elevated asset encumbrance poses risks, for example potential shortages of collateral available for liquidation in stress.[52]

But lending rates could be more volatile overall for those borrowers unable to access other sources of financing.
Of course, banks will also be vulnerable to a deterioration in sentiment in wholesale funding markets. Prices in these markets tend to be more sensitive than deposits to market sentiment and to bank-specific risks, which banks could pass through to lending rates. And wholesale funding markets can become impaired. For example, in the 2020 Q1 'dash for cash', market participants were focused on building or maintaining buffers of cash rather than seeking returns through lending, including to banks, as set out in the May 2020 interim Financial Stability Report.

More volatile lending rates could particularly impact small and medium-sized enterprises (SMEs). They tend to be particularly reliant on banks for credit as it is often not economical for them to produce the range of public information that would be required to access capital markets. And as discussed in Section 1, non-bank lenders may not be able to offer finance to SMEs as efficiently as banks, if they lack the deposit-account information that banks use to monitor their financial performance.

The Bank has recognised for some time that an increasingly digitalised economy will lead to changes in the provision of financial services, highlighting, for example, the need for a platform to boost access to finance for small businesses.[53] A Working Group, convened by the Bank, HM Treasury and the Financial Conduct Authority (FCA) has been established recently to investigate ways of facilitating investment in productive finance.[54]

And while there are potential gains from a shift to market-based financing, whether or not they are realised will depend on how the financial system adapts.

In theory, there could be significant benefits to be gained from a marked shift to market-based financing. First, it offers an alternative source of credit for some borrowers. This could allow them to continue borrowing even if the banking system was to enter into stress. Second, some academic literature (for example, see Allen and Gale (1999)) suggests that bank-based systems can stifle lending to the most innovative enterprises due to the higher risk involved. It is further suggested that the non-bank financial system is better able to provide credit to higher-risk, potentially more productive investment opportunities.

Whether or not any such gains are realised will depend on how the financial system adapts. At one extreme, banks could retain the same share of lending as currently, financed by increased issuance of wholesale debt. Given that debt holders are more likely to exert market discipline than depositors, this could lead to less risk taking by banks than currently.[55] Conversely, if the non-bank financial system evolves to overcome the informational asymmetries associated with lending to companies that do not make detailed public financial disclosures, for example, it is possible that more productive opportunities would be financed.

Importantly, there are also a number of potential vulnerabilities associated with market-based finance, for example, fragilities to liquidity in some markets upon which non-banks rely. These vulnerabilities have previously been highlighted by the FPC and were exposed during the 'dash for cash' observed with the onset of Covid-19 in mid-March 2020.[56] If the potential gains from a marked shift to market-based financed are to be realised, the underlying issues that contributed to that episode will need to be addressed.

The FPC will monitor any implications for financial stability.

The FPC has an established process to assess systemic risks from market-based finance. It receives regular briefings from the Bank and the FCA on potential risks to financial stability presented by different sectors and activities. It also holds, at least annually, a dedicated discussion on these risks. And it undertakes a regular deep analysis of certain market-based financial activities that merit further investigation. If there was significant growth in market-based finance, certain non-bank lenders or intermediaries may become systemically important. This could necessitate a change in how they are regulated.

4.4: Money market functioning

The smooth functioning of money markets is important for the Bank to meet its objectives.

The sterling money market, in which short-term wholesale borrowing and lending takes place, is used by banks and other institutions to manage the amount of cash they hold. As the financial crisis showed, disruption in money markets can spread to the wider economy because it may lead banks and other financial intermediaries to hoard liquidity, reducing activities that serve the real economy.

The Bank also takes an active role in money markets to implement monetary policy, using the SMF. Market operations conducted under the SMF affect market interest rates, in particular short-term interest rates in the sterling money market. As such, any disruption in the sterling money market could impede the Bank's ability to implement monetary policy effectively under the current framework.

Money market transactions, specifically overnight unsecured deposit transactions, are also used to determine the SONIA interest rate benchmark. The Bank has a particular interest in ensuring the robustness of SONIA given that it is the preferred benchmark for the transition to sterling risk-free rates from Libor. And SONIA is an important interest rate benchmark in its own right. It is referenced as a benchmark in over £90 trillion of new transactions each year.[57] To safeguard both monetary and financial stability it is important that its integrity is not undermined.

There is a risk of some disruption to money markets in the short term but, in the long run, these markets should adapt to the introduction of new forms of digital money.

In the short term, any large-scale reallocation of cash around the financial system could disrupt money markets. For example, it could have implications for the distribution of cash within the financial system, where relationships between different borrowers and lenders are currently well-established. Importantly, however, the emergence of new forms of digital money will not, in aggregate, remove cash from the financial system. Moreover, as explained in Section 1, commercial banks will continue to accept wholesale deposits and will continue to need to hold liquid assets to back them. As such, banks will remain an important participant in money markets – along with participating non-bank financial institutions. This means that substantial amounts of cash would likely remain in money markets. So while money markets may have to adapt to the presence of digital money providers, there is little reason to expect they will not be able to do so in the long run.

Importantly, this conclusion relies on new forms of digital money having a retail focus only. If they were made available at the wholesale level, this could have more far-reaching consequences for money market functioning, which are beyond the scope of this Discussion Paper.

4.5: Implementation and transmission of monetary policy

The emergence of new forms of digital money could impact the Bank's future framework for controlling interest rates.

Monetary policy is mainly implemented by setting the interest rate paid on reserves held at the central bank by commercial banks. This interest rate is known as Bank Rate. Since central bank reserves are the ultimate means of settlement for banks, this influences the rate at which they are willing to lend or borrow on similar terms in sterling money markets. These are the markets in which the Bank lends to commercial banks and, in turn, they lend to each other and to other financial institutions.

Largely as a consequence of the asset purchases that have occurred since quantitative easing (QE) began in 2009, there is currently an ample supply of reserves on the Bank's balance sheet.[58] However, the Bank has previously indicated that, at the point at which the Monetary Policy Committee (MPC) decides to reduce the stock of purchased assets under QE, it will move to allowing the size of its balance sheet to be determined by the banking system's demand for reserves.[59]

In an environment of fewer reserves, flows out of commercial bank deposits into new forms of digital money backed by central bank reserves (see Section 5 for options on backing models) could oblige banks to borrow more frequently and unexpectedly in money markets. This could lead to increased volatility in market interest rates. Such volatility is likely to be manageable, since the Bank stands ready to lend in those markets to banks against the security of eligible collateral. Nevertheless, the Bank may need to consider some revisions to its proposed future framework for controlling interest rates.

If new forms of digital money offered interest rates on deposits that tracked Bank Rate, they could potentially enhance the transmission of monetary policy to bank lending rates.

Changes in money market interest rates then feed through to a wider range of interest rates in different markets and at different maturities. These include the interest rates that banks charge borrowers for loans and offer savers on their deposits. An important factor in determining the speed and extent to which changes in Bank Rate pass through to bank lending rates is the funding costs commercial banks face in financing lending to the real economy. If, for example, an increase in Bank Rate leads to a rise in those funding costs, commercial banks will tend to compensate for the loss in income by raising lending rates.

Most banks rely on a mix of wholesale debt and deposit funding. The cost of debt funding is determined in traded asset markets. But interest rates offered on bank deposits will depend on banks' business models and competitive conditions. Competition arises since, although commercial banks create deposits through lending, there is no guarantee that a deposit will stay with the lending bank. A housing transaction, for example, would see the purchase price of the house transfer from the lending bank to the bank of the seller.

New forms of digital money should not change the fundamental link between the interest rate on central bank reserves held by commercial banks and the price of credit. But they could alter the strength of that relationship, including by altering the mix of commercial bank funding. And they could further alter the conditions under which commercial banks compete for the deposits they create. In the illustrative scenario in Section 3, as deposits migrate to new forms of digital money, banks issue more wholesale debt and also compete for the deposits they create.

New forms of digital money would be more likely to enhance the transmission of monetary policy to lending rates if they were interest-bearing and passed through interest rates with greater speed or extent than commercial banks, prompting banks to respond. Among other things, their capacity for doing so will depend on how their deposit liabilities are backed.

For example, a stablecoin backed by central bank reserves remunerated at Bank Rate would be likely to pass through change in Bank Rate faster and more fully than other models. This is because a rise in Bank Rate, for example, would directly increase their net interest income and hence profits, which, in a competitive environment, should be competed away. Equally, a Central Bank Digital Currency (CBDC) could be specifically designed to automatically pass through changes in Bank Rate to holders.

If it was preferred to cash, a central bank digital currency could also soften the lower bound on monetary policy.
In a low interest rate environment, pass-through is limited by the effective lower bound on interest rates. This arises largely because cash is a substitute for deposits and is unremunerated – so that, at very low interest rates, it is as efficient as a store of value as it is a means of payment.

In principle, a CBDC could be used, in conjunction with a policy of restricting the use of cash. If the interest rate on the CBDC could go negative, this could soften the effective lower bound on interest rates and lower the welfare loss associated with the opportunity cost of holding cash.

In practice, however, the UK authorities remain committed to ensuring access to cash to those that need it. The Bank, HM Treasury, FCA and the Payment Systems Regulator have been working together on the Joint Authorities Cash Strategy Group to monitor the use of cash, ATM availability, and ensure cash remains available despite the impacts of Covid-19. There are no plans to change this.

4.6: Conclusions

New forms of digital money may result in changes to the financial system that could affect the cost and availability of credit. They could also present a number of potential opportunities in steady state but only, in the case of stablecoins, if they meet the FPC's expectations.
New forms of digital money may result in changes to the financial system that could affect the cost and availability of credit. As described in Section 1, they could reduce the efficiency of intermediation services and potentially make it more difficult for monetary policy to ease financial conditions. Furthermore, lending rates could be more volatile overall for those borrowers unable to access other sources of financing. However, if they resulted in displaced deposits from the banking system being replaced by long-term debt, they could also reduce the likelihood of a sharp deterioration in credit conditions, often associated with runs on commercial bank deposits. Depending on how the non-bank financial system adapts, they could also open the possibility of a more efficient allocation of credit across the economy.

New forms of digital money could also present a number of potential opportunities in steady state, subject to adequate regulation. They have the potential to contribute to faster, cheaper and more efficient payments with greater functionality. And resilience of payments could increase with an additional way of making payments. There are also conditions under which new forms of digital money might enhance the transmission of monetary policy and potentially soften the effective lower bound.

The most significant risk arises from the potential for stablecoins in particular to undermine confidence in money and payments, and hence in the wider financial system. This can be mitigated by ensuring that stablecoins meet the FPC's stablecoin expectations. As highlighted in Section 3, however, there is inevitably great uncertainty around this assessment. The Bank will therefore need to keep the risks posed by new forms of digital money, and the ways by which those risks might be mitigated, under review.

Precautionary arrangements may also need to be considered to manage any transition.
The scale and speed of changes to the financial system would depend on the demand for new forms of digital money. And during any transitional phase, risks could arise. The banking sector could prove unprepared to withstand large outflows of deposits, non-banks may not be willing or able to replace bank lending to some borrowers should that be required, and sterling money markets may be disrupted.

Such risks should be manageable over the longer term, including through continuing initiatives to encourage more institutions to access the Bank's liquidity facilities and to boost access to finance for small companies. In the short to medium-term, however, it would be prudent to recognise these risks and make precautionary arrangements accordingly.

Questions for discussion:

Can respondents identify any other significant risks to economic stability from new forms of digital money even when stablecoins are adequately regulated?

Do respondents see any other impediments to, or benefits from, a shift to market-based financing in the event of a tightening in bank credit conditions?

Do respondents have any other concerns over the ability of banks and markets to adjust to the introduction of new forms of digital money in addition to those identified?

Box G: Implications for the international monetary and financial system

New forms of digital money have the potential to improve the efficiency of cross-border payments. But they could also impact how the international monetary and financial system functions. This would be through effects on capital flows, interest rates and exchange rates.

When international capital can move freely, domestic residents have the choice as to whether to hold their wealth in domestic or foreign assets. New forms of digital money have the potential to become a new internationally traded safe asset (Ferrari et al (2020)). This would rely on them being widely available and perceived to be as safe as cash. That in turn could facilitate stronger rebalancing between domestic and foreign assets in response to shocks. And this could amplify capital flow, exchange rate and interest rate movements. For example, if residents can hold a foreign digital money, they are more likely to switch out of domestic bonds into the foreign digital money in response to a positive shock abroad. This could tighten domestic financial conditions. In this way, issuance of a digital currency in one jurisdiction could affect the domestic monetary policy stance in another.

The international use of any currency depends on a number of factors including economic weight, openness and depth of financial markets, the credibility of economic and legal systems and widespread acceptance. In the limit, countries with less credible monetary frameworks could see their domestic currency displaced by a new form of digital money. This would be similar to the process of 'dollarisation' seen in some countries where domestic cash is displaced by US dollars.

Domestic financial systems could also become more exposed to international shocks if the new forms of digital money led banks to become more dependent on wholesale funding, including from abroad (Section 3). Wholesale funding is more responsive to developments in international capital markets than deposits (see Hills and Hoggarth (2013)), potentially leading to greater volatility. And if this funding is more expensive, in addition to putting upward pressure on domestic lending rates, banks could seek some higher yielding but riskier investments abroad. For example, they could invest in emerging market economies, increasing the exposure to international shocks.

In a financial crisis, rapid shifts into new forms of digital money issued by the 'safest' central bank or private issuer could lead to an international 'dash for cash'. In this case, investors would sell off even safe assets such as long-term government bonds in order to obtain short-term highly liquid assets. That could lead some countries to face difficulties in meeting their liquidity needs. This in turn has implications for the architecture of the global financial safety net – including foreign exchange reserves, central bank swap facilities and IMF lending facilities.

If countries attempted to impose limits on cross-border holdings of new forms of digital money, this could be seen as a type of capital control. New forms of digital money could therefore pose new questions as to how the existing international 'rules of the road' on capital flow management need to be updated.

Some of these international spillovers can be managed through design features. For example, the currency could be required to be held in resident accounts rather than in more anonymous and mobile token form. Or quantity or price rationing systems could encourage its use for the financing of trade rather than speculative investment.

International spillovers point to the need for international cooperation on design choices and regulatory approaches (Box C). For example, Brainard (2020) warned that a poorly designed CBDC issued in one jurisdiction could create financial stability issues in another jurisdiction. The Bank is committed to supporting an internationally coherent approach.

5: The regulatory environment

Regulation lays the groundwork for innovation and needs to be clearly established before a systemic stablecoin could safely operate in the UK, supported by internationally agreed principles.
Section 2 outlined the Bank's responsibility for maintaining UK monetary and financial stability. In light of this, Section 3 developed an illustrative scenario around the emergence of new forms of digital money and used it to assess the implications for macroeconomic stability. Section 4 then concluded that new forms of digital money may result in changes to the financial system that could affect the cost and availability of credit. And they could also present a number of potential opportunities in steady state but only, in the case of stablecoins, if they meet the Financial Policy Committee's (FPC's) expectations. It further noted that precautionary arrangements may be needed to manage any transition.

Throughout, the focus of this Discussion Paper has been on new forms of digital money that are or could quickly become systemic. This means they have the clear potential to scale up and grow rapidly, and to become widely used as a trusted form of sterling-denominated retail payments. This section continues, as noted in Section 1, to use 'stablecoins' to refer to systemic stablecoins for ease of reference. It also further distinguishes 'stablecoins' that are systemic from 'non-systemic stablecoins' – that is, stablecoins that are not widely used for payments and would not be subject to Bank regulation. Further details as to how the Bank's approach to systemic stablecoins fits within the wider UK regulatory approach can be found in Box H.

The FPC's stablecoin expectations inform the design of regulation for stablecoins.[60] The expectations aim to ensure the safety of stablecoins as an alternative to both existing payment systems and commercial bank money. To meet these expectations, a regulatory framework would need to be clearly established before a stablecoin could safely operate in the UK. Establishing a secure and clear regulatory environment for stablecoins to operate within the UK would also lay a clear foundation for sustainable innovation and allow consumers to safely realise the benefits they may offer.

HM Treasury (HMT) propose to bring systemic stablecoins into the Bank's regulatory remit, in line with its responsibilities for systemic payments systems under the Banking Act 2009. This is outlined in HMT's recent consultation on the UK regulatory approach to cryptoassets and stablecoins.[61] The legislative changes to be made by Parliament in order to implement the outcomes of this consultation are vital to ensure the Bank and other UK authorities have the necessary remit and powers to fully regulate stablecoins both in line with the risks they pose and under the principle of 'same risk – same regulatory outcome'.

The regulatory approach to Central Bank Digital Currencies (CBDCs), including whether any payment system element requires appropriate supervision by the Bank, will be covered in future work by the Bank with other authorities on the possible development of a UK CBDC (Box D).

Stablecoins have the potential to offer both a new means of payment and a new way of storing wealth. The regulatory framework needs to be designed to support both functions.
There are a number of aspects to appropriate regulation of stablecoins:

- If stablecoins are used to facilitate retail payments, regulation of payment services and critical payment system infrastructure would need to apply to ensure consumer protection and the overall resilience of the network of systems involved – referred to as the payments 'ecosystem' or 'chain'.
- Stablecoins could also offer a new way of storing wealth. This means customers would need to have similar confidence in stablecoins as with other forms of money. Given commercial bank money is the primary form of private money, a natural starting point for designing regulation is the current banking regime and its main features. This includes prudential regulation to ensure losses can be absorbed and there is sufficient liquidity to deal with outflows. It includes access to liquidity support from the central bank when needed. And it includes arrangements to ensure critical services can continue, or that customers get their money back if the bank does fail.

- Importantly, while the banking regime provides a starting point, given the different business models of stablecoins it may not provide a full template. In applying it to a stablecoin, it may therefore be possible to tailor or rebalance its main features. This would depend on the business model of the stablecoin and the risks it takes, particularly the assets used to back its liabilities – referred to as 'backing models'.

This section considers the regulatory approach to stablecoins. The discussion is rooted in the outcomes that should be achieved in order to meet the FPC's expectations. In order to achieve these outcomes, any regulatory model will need to address both payments-related, and money-creation and storage risks. This section outlines options for regulatory models that do so, drawing on key features of existing payments and banking regimes. Also considered is the possibility of imposing precautionary limits during a transition to new forms of digital money, either stablecoins or CBDC. This aims to address the significant uncertainty as to how new forms of digital money might emerge, highlighted in Section 3, and the implications for macroeconomic stability discussed in Section 4.

The Bank will consider responses to this Discussion Paper and then will work with other relevant authorities to consider what legislation might need to be introduced. The specific regulatory framework that will apply to stablecoins will be the subject of a future Bank consultation, pending the conclusion of HMT's legislative process (Box H).

5.1: The FPC's first stablecoin expectation

The FPC's first stablecoin expectation relates to the principles and expectations that payment regulation should aim to achieve.

The FPC's first expectation recognises that stablecoins have the potential to become widely used as a means of retail payment. Since this would likely present similar risks to traditional payment chains and firms, the expectation states that equivalent regulation should apply:

- Payment chains that use stablecoins should be regulated to standards equivalent to those applied to traditional payment chains. Firms in stablecoin-based systemic payment chains that are critical to their functioning should be regulated accordingly.

This builds on previous work by the FPC to consider the changing payments landscape. In 2019 Q3, the Committee outlined a number of principles and expectations that payment regulation should aim to achieve. [62] According to the FPC's first stablecoin expectation, these should also apply to stablecoins:

- Payments regulation should reflect the financial stability risk, rather than the legal form, of payments activities.
- Regulation should ensure end-to-end operational and financial resilience across systemic payment chains that are critical for the smooth functioning of the economy.
- And sufficient information from payments firms should allow monitoring of emerging risks to financial stability.

UK authorities are already consulting on the regulatory framework for payments, including in response to (systemic and non-systemic) stablecoins.

To help achieve the Bank's and the FPC's aims in relation to payments regulation, including support for innovation, the UK authorities have progressed a number of regulatory measures. Box H summarises the main initiatives on (systemic and non-systemic) stablecoins and payments currently being proposed by HMT, to which the Bank is actively contributing.

If implemented through legislation, HMT's proposed regulatory approach to (systemic and non-systemic) stablecoins would – as a starting point – seek to apply the key elements of current regimes for existing payments systems and firms. These include current regimes of the Bank, the Financial Conduct Authority (FCA) and the Payment Systems Regulator. These regimes would then be adapted and aligned as necessary.

The Bank considers its existing approach to payment system regulation could ensure that the payments-related risks of stablecoins are appropriately addressed.

Systemic payment systems can present risks to financial stability when there is disruption to the ability of households, businesses and financial institutions to make the payments on which the economy and financial system rely. To address these risks, the Bank regulates systemic payment systems in the UK under the Banking Act 2009. It does so with a supervisory regime that focuses heavily on addressing operational risks and ensuring the resilience of the payments ecosystem. A stablecoin that was similarly used widely for payments would need to be subject to the same regulatory oversight and standards.

Box I presents the Bank's existing approach to the regulation of systemic payment system operators. This approach is based on the CPMI-IOSCO Principles for Financial Market Infrastructure (PFMIs). In applying its approach to stablecoins, the Bank would consider if any modifications, or changes in focus, are required. These could reflect the unique design, or technological features, of stablecoins.

But systemic risks may not exist purely within the core payment system operator, in which case, critical links in the payment process should also be regulated by the Bank.

The FPC's first stablecoin expectation further recognises that systemic risks may not just exist within the core payment system operator. As traditional payment chains and functions of money have become 'unbundled', a range of firms provide services at each stage of the payment process. In relation to stablecoins, the functions of issuance and redemption, payments infrastructure, and store of value could become fragmented across different entities. This Discussion Paper focuses on requirements on the issuer/operator of the stablecoin, but requirements may need to apply to various entities depending on the functions they perform. To support a common approach to considering such functions, and to help ensure consistency in understanding, the main functions involved in a stablecoin arrangement are listed below:[63]

- Governance: the rules governing the stablecoin arrangement, including which entities can be involved in the arrangement and the mechanisms for validating transactions and stabilising the value of the stablecoin.
- Issuance and redemption: the process by which stablecoins are created or destroyed.
- Managing reserve assets: ensuring that backing assets fully cover the outstanding coin issuance at all times. This would also cover custody arrangements and segregation of assets.
- Stabilisation: the mechanism by which the value of coins is stabilised, to maintain a fixed exchange rate between the coin and the underlying fiat currency.
- Transfer of coins: the mechanism for transferring coins from one holder to another, including the mechanism for validating transactions on the ledger used by stablecoins – or 'blockchain'.[64]
- Interaction with users: including wallets that would provide the main interface between end-users and the stablecoin, allowing users to make payments and store funds.

It is possible that any firm in the payment process could ultimately become a critical link in a systemically important payment chain. For example, this could be based on the volume and value of transactions it processes or the degree to which its services are substitutable in a timely way. These critical links could cause systemic risks outside the core payment system operator.

In this instance, the Bank views it as necessary to seek to extend its regulation to some other entities in the stablecoin chain where they become systemic and so pose a risk to financial stability. This could include applying to those entities the regulatory expectations and models outlined in this Discussion Paper. This would depend on the necessary changes being made to legislation to expand the regulatory perimeter.

5.2: The FPC's second stablecoin expectation

The FPC's second expectation relates to the use of stablecoin as money.

The FPC's second stablecoin expectation recognises that the Bank's payments regime alone would not be sufficient to ensure the safety of a new form of digital money. For example, it is largely based on the assumption that payments on a large scale use existing forms of money. The FPC's second expectation states that:

- Where stablecoins are used in systemic payment chains as money-like instruments they should meet standards equivalent to those expected of commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat.[65]

This is essential for safeguarding financial stability. It seeks to ensure that the public should be able to trust the reliability and stability of the money it uses every day, regardless of its form.

Certain key features of the banking regime would need to be reflected in any regulatory model meeting the FPC's second stablecoin expectation.

To meet the FPC's second stablecoin expectation, the Bank considers that a core set of features of the current banking regime need to be reflected in any regulatory model for stablecoins. This is to ensure equivalent standards to those of commercial bank money. The core set of features are:

- **Legal claim** – Holders of commercial bank money in the form of deposit accounts have a robust legal claim that allows prompt redemption of their deposits for fiat currency in normal times and in a stress. This should be for the original amount deposited and should be at no loss of value to the depositor.
- **Capital requirements** – These are imposed to lower the risk of insolvency of the bank. Capital requirements are based on the nature of the risks, including credit, operational and market risks.
- **Liquidity requirements and support** – Liquidity requirements are imposed to ensure the bank can meet redemptions of deposits in most circumstances. These are supported by arrangements by which banks can access central bank reserves and obtain liquidity support from the Bank. This is important for ensuring liquidity problems do not result in failure.
- **A backstop to compensate depositors** – A backstop is in place to ensure that depositors can access their deposits and that vital payment services are maintained. For banks, this includes the Financial Services Compensation Scheme (FSCS) deposit guarantee scheme. Resolution arrangements further ensure customer funds can be promptly returned in the event of failure.

The regulatory model for stablecoins could include different applications of the above features – as long as, taken as a whole, it offers equivalent protections as those for commercial bank money.

As part of this, a key requirement will be to ensure that, unless the stablecoin is operating as a bank, the backing assets for stablecoins cover the outstanding coin issuance at all times.

A key requirement for stablecoins will be robust reserve management. This should ensure that, unless the stablecoin is operating as a bank, the backing assets cover the outstanding coin issuance at all times. Backing assets are the primary mitigant to the risk of failure or a shortfall in funds to meet customer redemptions. It follows that the primary risk faced by stablecoins is that the backing assets may be insufficient or insufficiently liquid to meet customer redemptions. In this regard, different backing models will imply different levels of credit and market risks that impact the ability of a stablecoin issuer to meet redemptions. But importantly, however they are backed, stablecoins could be exposed to operational risk – such as fraud or error – that could result in reserves that are insufficient to meet depositor outflows.

Reflecting this, reserve management would be a key area of focus as part of the future supervision and regulation of stablecoins. The need for a backstop is further covered in Box J.

5.3: Stylised regulatory models

A range of regulatory models could potentially meet the FPC's second stablecoin expectation, and prudential requirements would vary in line with risks.

A range of potential regulatory models could meet the FPC's expectations. All models require the stablecoin arrangement to give the coinholder a robust legal claim to redeem the coin in fiat, at par and 'on sight'. All models require a backstop mechanism. The main difference between the models is in the nature of the backing assets. The Bank will consult on its proposals for a regulatory model in due course. Implementation of regulatory models (except the bank model described below) will depend on the Bank being given the necessary powers by HMT. The interaction with other parts of the framework (including the FCA's role in relation to consumer protection) will also need to be considered (Box J).

This section considers four illustrative examples. The models differ mainly in terms of the assets used to back the stablecoin's liabilities. As a result, there are variations across the models in how the key features of the banking regime set out above would be reflected.

As a starting point, stablecoins could seek to be authorised as banks (bank model). This regime meets the FPC's second expectation as it is the way in which banks assure stability for the commercial bank money they create. Two further models are considered, which have tighter restrictions on the backing assets. The first is the high-quality liquid assets (HQLA) model, in which stablecoins would be backed with highly liquid assets. The second is the central bank liability (CBL) model, in which stablecoins would be backed with central bank reserves. Another type of model, which is quite different to the bank model but similar to the current e-money regime, is the deposit-backed model, where stablecoins would be backed by deposits placed at commercial banks.

The models discussed are intended as illustrations and other combinations or variants of these models may be possible. In designing the final framework, as well as ensuring the FPC's expectations are met, the Bank will take into account the need to support future innovation and to be transparent about the requirements that will apply.

5.3.1: The bank model

One option is for a stablecoin issuer to be subject to the current banking regime.

It could be possible to regulate a stablecoin within the existing banking regime. Other payments-focused firms with similar business models to stablecoins are already authorised as banks. The existing banking regime could therefore be a basis for regulation of issuers of stablecoins.[66]

Broadly speaking, firms authorised as banks are permitted to back their liabilities with three types of assets: (i) non-liquid assets like loans; (ii) liquid assets such as government bonds and certain types of highly liquid corporate securities; and (iii) reserves held at the central bank. Banks are able to choose the mixture of these three elements, within the limits set by liquidity regulation (Box F).

The bank model, supported by the necessary payments regulation, would meet the FPC's second stablecoin expectation. The banking regime is flexible and risk sensitive and would adapt to reflect the risks of stablecoins.[67] However, since bank regulation is focused on the risks of the mismatch between short-term deposits and longer-term loans – known as maturity transformation – it may not be the best fit for firms such as stablecoin issuers that do not lend. For example, it may incentivise stablecoin issuers to focus on those risks that are proportionately smaller for them, given their operating model compared to a bank. Hence, there may be a case for offering an alternative model, restricting the assets that stablecoin issuers can use to back their liabilities. This would rebalance the focus of both the regulator and the stablecoin issuer towards those risks most relevant to the stablecoin. These risks include operational and outsourcing risks. The following regulatory models set out these variations in backing asset model.

Summary assessment of bank model: The bank model would meet the FPC's expectations, given all elements of the bank framework that protect depositors would apply. However, it may not be the best fit for the risks posed by a stablecoin.

5.3.2: The HQLA model

A model that restricts stablecoins to holding liquid assets could allow a regulatory approach that is more aligned to their risks.

Requirements in the bank model could be adapted to restrict stablecoins to hold only HQLA. These would be similar to those assets banks are required to hold under existing liquidity regulation for banks.[68] HQLA would be either highly liquid bonds or central bank reserves (ii. and iii. in the bank model respectively). These have less liquidity risk than the other types of assets banks also typically hold, such as loans and more illiquid securities. They could be converted into cash promptly, at little or no loss of value, to allow the stablecoin to meet deposit outflows. During times of stress, however, this might not be possible, for example, for bonds. Hence, the need for access to Bank liquidity insurance facilities, as outlined in Section 5.4.

Since the bank regime is risk sensitive, capital and liquidity requirements may not actually be very different in nature between the bank model and the HQLA model. Some elements of the bank model and its calibration could be tailored to reflect the lower risk of the backing assets. The advantage of the HQLA model is that it could offer a more proportionate way for stablecoins to meet the FPC expectations than being authorised as banks.

Capital requirements: These would need to cover credit and market risks associated with the backing assets. This is to reduce the probability that the stablecoin cannot meet redemptions following a shock. Operational risk would also need to be captured.

Liquidity requirements: Stablecoins would be required to fully back coins with liquid assets, including highly liquid bonds and central bank reserves. Additional liquidity requirements may be necessary, for example, to reflect risks incurred intraday. Stablecoins would also need access to Bank liquidity insurance facilities.

Backstop: Arrangements would be needed to ensure coinholders can continue to access their funds if the stablecoin failed – for example, for operational or reputational reasons – and that vital payment services are maintained. This could involve a combination of resolution arrangements and a guarantee scheme to compensate coinholders. Box J discusses the challenges in funding such a guarantee.

Summary assessment of HQLA model: The HQLA model could offer a regulatory approach more aligned to the risks of a stablecoin. The stablecoin under this model would still be exposed to market and liquidity risk. For the FPC's expectations to be met, access to the Bank's lending facilities and backstop arrangements are required. Funding a guarantee for coin holders would be challenging. The impact on the financial system would be in line with the analysis set out in Sections 1, 3 and 4.

5.3.3: Central bank liability (CBL) reserve backing

A model in which liabilities are backed by central bank reserves would eliminate many risks for coinholders, but still expose stablecoins to operational risk.

The CBL model would further restrict backing assets to central bank liabilities equivalent to reserves (iii. in the bank model). Backing in central bank reserves removes credit, market and liquidity risk from the asset side of the stablecoin issuer's balance sheet that would be remaining in the HQLA model. This is because reserves are a claim on the central bank and so, along with banknotes, are the most liquid, risk-free asset in the economy. But the stablecoin would still be exposed to operational risk as is the case with the other models, for example, the risk that reserves are insufficient to meet deposit outflows.

Such a regime would most closely reflect Principle 9 of PFMIs.[69] This expects financial market infrastructure firms to settle in central bank money, where practical and available. Economically, this option is close to a CBDC. This is because a central bank liability is used to back the stablecoin. Indeed, such proposals have been labelled 'synthetic CBDCs'. Crucially, however the coins would not be a liability of the central bank.

The model has some similarities with the Scottish and Northern Ireland banknotes regime (S&NI Regime).[70] The S&NI Regime allows certain banks in Scotland and Northern Ireland to issue their own banknotes, as long as the issuing banks hold backing assets against these notes at all times. The backing assets can be a combination of Bank of England banknotes, UK coins, and funds held in a 'designated backing account' at the Bank to ensure they are available to pay out noteholders in the event of insolvency.

Importantly, any shortfall in backing assets must be without recourse to the Bank. The Bank would not take on any liability to 'make good' any shortfall in backing assets in this, or any other, model. This would be an important point for consumer messaging, so that the nature and limits of central bank liability backing are understood.

Capital requirements: These would be required to protect the stablecoin from losses resulting from operational risks.

Liquidity requirements: Stablecoin liabilities would need to be at least 100% backed with central bank reserves at all times. An additional liquidity buffer may be required to protect against the risk of shortfalls. Access to Bank liquidity insurance facilities would not be required in this model.

Backstop: As with the other models, a backstop would be needed to protect coinholders if the stablecoin fails and could include resolution and guarantee elements. In this case, the backing assets are lower risk, so the backstop elements could reflect this. Backstops are discussed further in Box J. Requirements could be further enhanced, as in the S&NI regime, by placing backing assets in a ring-fenced account, so they are carved-out in the event of insolvency and can only be used to pay out coinholders.

Summary assessment of CBL model: This model represents the lowest risk of the backing assets, and is economically similar to a CBDC. A strict regulatory regime would be required to ensure that the backing liabilities are sufficient at all times to meet deposit outflows. Some form of backstop is still likely to be required. The impact on the financial system would be similar to the HQLA model. That said, there may be implications for competition that would need to be considered.

5.3.4: The deposit-backed (DB) model

A model in which liabilities are backed by commercial bank deposits would lead to greater tiering in the banking system.

The HQLA and CBL models are both variants of the bank model. A different type of model could be considered in which stablecoins would be fully backed with deposits placed with commercial bank(s). The commercial bank(s) would safeguard these deposits by holding them in a trust (on behalf of the stablecoin customers) in its reserves account or other highly liquid assets. The key difference between this model and the Bank, HQLA and CBL models is that the stablecoin issuer would have no direct relationship with the central bank. Instead, it would benefit indirectly from the custodian banks' liquidity and access to the Bank's facilities.

This would be similar to the backing model that is primarily used by e-money firms in the UK and EU.[71] Indeed, some stablecoin issuers currently operate as e-money institutions. The current e-money regime (or a comparable regime applied to stablecoins) does not meet the FPC's expectations and would need enhancements. These would include ensuring a sufficient public backstop (Box J). Enhanced safe-guarding and record keeping requirements would also be needed to reduce the risks of shortfalls and support prompt payout. Additional prudential requirements would also be needed to address risks while the stablecoin remains in operation – referred to as 'going concern' risks.[72]

The FCA is considering whether changes may be needed to the e-money regime (as well as to the payment services regulations). The FCA is also considering the overlap and alignment with a future stablecoin regime as proposed by HMT in its consultation.

This model would resolve the liquidity and market risks of the HQLA model by transferring those risks to the custody bank. It also has the advantage of facilitating a smooth transition between the e-money regime and the regime for stablecoins.

The disadvantage of the deposit-backed model is that the fate of the stablecoins and their custodian banks would be closely intertwined. The stablecoin would be exposed to the credit risk of the custodian. And the failure of a custodian bank holding a large portion of a stablecoin's backing funds would likely threaten its ability to continue to operate. Conversely, a deposit run on, or operational failure of, a stablecoin could have knock-on impacts on the custodian banks holding the backing fund. This would be especially true where a stablecoin held a high concentration of funds at a few banks. This kind of symbiotic relationship, known as 'tiering', can result in higher financial stability risks due to the interconnectedness between systemically important firms. Tiering is already common in e-money as well as in indirect access to payment systems. But the financial stability risks posed would be much greater in the case of stablecoins given the potential exposures that could arise if deposit flows were of a similar magnitude to those in the illustrative scenario in Section 3. Reflecting this, the regulatory regime would look to ensure firms diversified their exposures to other financial institutions.

Capital requirements: These would need to reflect credit risk of the custodian, and operational risks.

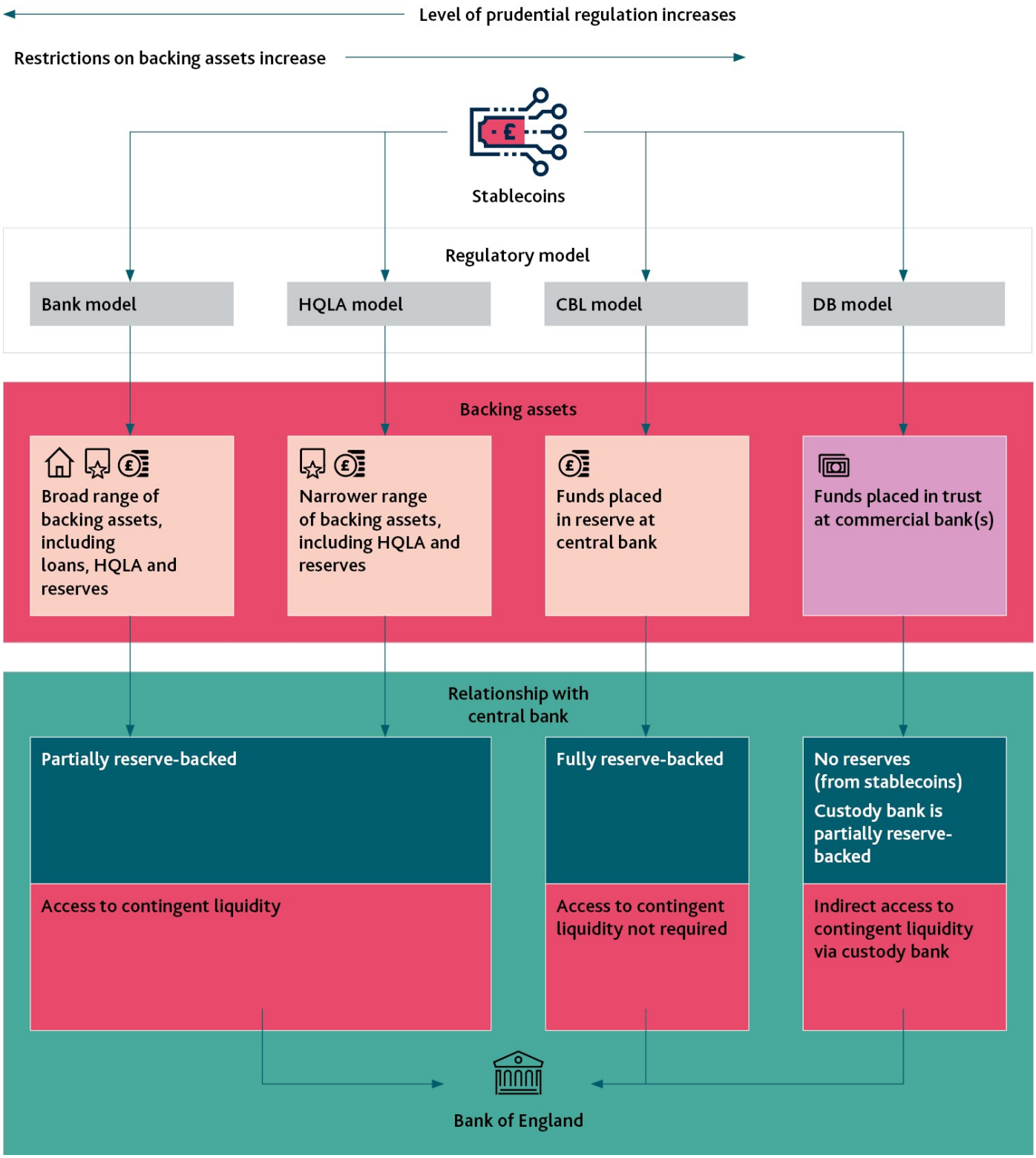
Liquidity requirements: The stablecoin would be 100% backed with deposits at a commercial bank(s). Additional liquidity buffer may be necessary to mitigate the risk of shortfalls. The stablecoin would not require access to central bank liquidity insurance facilities, but would benefit from indirect access given the custodian bank would be able to draw on these facilities in the event of customer flows out of the stablecoin.

Backstop: A backstop would be required as for the other models to reflect the risk that the reserve is insufficient to return customers' funds if the stablecoin fails. Coinholders may have an indirect claim on the FSCS via the commercial bank holding the deposits, if FSCS were able to 'look through' the stablecoin to the underlying coinholders. But this would not protect the stablecoin itself which may still be vulnerable to failure of the custodian (Box J).

Summary assessment of deposit-backed model: The model would enable a smoother transition between the regimes for e-money and systemic stablecoins. It would also reduce liquidity risk and market risk of the backing assets versus the bank and HQLA models. However, the symbiotic relationship between stablecoins and their custodian banks would expose them to credit risk. And it could increase financial stability risks due to tiering. The impact on the financial system would be similar in the nature to the HQLA and CBL models. But as described in Section 3, it would mean that banks hold more HQLA than otherwise. At the margin, this could increase any impact on bank lending rates.

Figure 5.1 provides a high-level stylised visual overview of the structure of the regulatory models. This includes key elements of the backing assets allowed under each model, and the relationship of the systemic stablecoin issuer with the central bank. This relationship is further characterised in two ways – whether reserves would be held with the central bank (in green); and any access to contingent liquidity (in red).

Figure 5.1: Overview of the structure of the regulatory models



5.3.5: Further context for the regulatory model

The regulatory model for stablecoins would also need to consider the wider regulatory context. Implementation of any models to achieve the FPC's expectations would aim to maintain a payments landscape where users can substitute between different forms of money, without consequence for their level of protection. Regulation should further be proportionate and risk-based, and not based on technological or legal form.

The Bank and other UK authorities recognise the need to consider the potential implications of developing different regimes for non-systemic versus systemic stablecoins. These include clarity of regulatory expectations for industry, the

need for minimum standards across all stablecoins used for payments, impacts on competition and innovation, and how to ensure a smooth transition between future regimes for non-systemic and systemic stablecoins. Were a stablecoin to grow to be systemic over time, the need to manage any so-called 'cliff-edge' effects between regimes would need to be considered, for example, if different backing model requirements were to exist under each regime. The Bank is working closely with the FCA and HMT to consider future regulatory requirements for stablecoins, and these aspects will be considered.

The regulatory approach developed for stablecoins should also be considered for any other emerging new forms of digital money. One example could be e-money if it became widely used. While currently relatively small in terms of overall UK deposits or payments, the e-money sector could in future present systemic risks. It is also possible that stablecoins could seek authorisation under the e-money regime. As noted in the previous section, the UK authorities, through HMT's consultation on the regulatory approach to cryptoassets and stablecoins are considering changes to the regulatory framework to establish a new stablecoins regime based on principles of 'same risk – same regulatory outcome'. This will include considering the potential risk of an uneven playing field, and opportunities for regulatory arbitrage, between different regulatory regimes for similar payments functions.

5.4: Access to the Bank's balance sheet

Access to the Bank's balance sheet would depend on the backing model and would be subject to suitable criteria.

Each of the models under consideration have implications for the use of the Bank's balance sheet. Under the bank and HQLA models, a stablecoin issuer might seek, if permitted, to draw on central bank lending facilities in order to access contingency liquidity in the event of severe market disruption.[73] Under the DB model, the stablecoin issuer itself would not need to access any central bank facilities. However, the services provided to the stablecoin issuer by its custodian bank is likely to affect the custodian's liquidity profile – and hence its potential demand on the Bank's liquidity facilities. Under a model where the stablecoin issuer's only assets are central bank liabilities, it would not possess the collateral required for contingent access to liquidity facilities at the central bank, nor should it require such access. A central bank liquidity facility could not increase the liquidity of its existing assets.

The Bank regularly reviews its access criteria to ensure they remain fit for purpose and that the use of our balance sheet continues to support the Bank's mission. Most recently, in November 2019, the Bank published a call for evidence, aiming to explore demand for additional services that the Bank could offer to payments firms (Box K). Although this exercise focused on non-systemic firms, there are a number of parallels to the Bank's thinking on systemic stablecoin backing models – most notably highlighting the critical relationship between appropriate regulation and access to central bank facilities, and ensuring that all the Bank's counterparties are regulated to a comparable yet proportionate standard.

If a stablecoin was backed by central bank liabilities, the Bank would need to take into account the interaction of these liabilities and reserve balances in the management of its future balance sheet.

In the event that a stablecoin is backed wholly by central back liabilities, or the Bank introduces a CBDC, the Bank would need to take into account the interaction of these liabilities and reserve balances in the management of its future balance sheet.

As customers move funds out of commercial bank deposits and into either a CBL backed stablecoin, or a CBDC, banks would either pay reserves into the stablecoin issuer's deposit account at the Bank or into the customer's CBDC account. This would reduce the quantity of reserves available to be freely allocated amongst commercial banks.

As noted in Section 4, there is currently an ample supply of reserves on the Bank's balance sheet. However, at the point at which the MPC decides to unwind the Bank's stock of asset purchases under quantitative easing (QE), the quantity of reserves on the Bank's balance sheet will start to fall. And over time, it may fall to such a level that, if it were to reduce further, reserves would become scarce. At that point, the Bank would stand ready to meet demand for additional reserves from the commercial banks in the Bank's repo open market operations (or 'OMOs').

Some new forms of digital money might also be able to create reserves in OMOs, if they are able to hold the appropriate collateral. But this will not be the case where the stablecoin is wholly backed by central bank reserves – or is itself a

central bank liability, as in the case of a CBDC. In that case, the task of creating additional reserves, including to support liquidity of the wider financial system, falls solely on the commercial banks. And this imposes costs. For example, banks assume market risk on the collateral they post into OMOs. This means that part of the cost of the assets backing new forms of digital money could end up being borne by the banking sector.

As part of its ongoing consideration of its future framework, the Bank will need to take into account how it provides access to its liabilities.

5.5: Use of limits

There is a strong case for considering the value of precautionary transitional arrangements that aim to ensure that new forms of digital money can emerge without threatening monetary and financial stability.
Section 4 concluded that the most significant risk arises from the potential for stablecoins in particular to undermine confidence in money and payments, and hence in the wider financial system. However, it further noted that, during a transitional phase, other risks may also emerge. The banking sector could prove unprepared to withstand large outflows of deposits, non-banks may not be willing or able to replace bank lending to some borrowers should that be required, and sterling money markets may be disrupted. And it concluded that, in the short to medium-term, it would be prudent to recognise these risks and make arrangements accordingly.

As Section 3 highlighted, there is a large range of uncertainty around the potential demand for new forms of digital money. Equally, it is impossible to say with certainty what impact they would have on macroeconomic stability. This strengthens the case for transitional arrangements to ensure that new forms of digital money can emerge in an orderly way, and without threatening monetary and financial stability.

Any such arrangements would seek to balance the potential opportunities and risks arising from new forms of digital money. The Bank has not yet made a decision on what arrangements would be appropriate and seeks to understand how effective they would be at achieving its objectives. Any transitional arrangements would be considered as part of the wider UK regulatory approach, and in discussion with the relevant authorities.

To manage the uncertainty around the impact of new digital forms of money, the Bank is considering the need for the use of limits during any transition period.
Limits on the use of new forms of digital money during a transition period are one possible option. These could be used to control the amount or speed of outflows of bank deposits into new forms of digital money. Or they could be used to control who is able to access them. They would be used not to preserve the status quo, but to allow banks, markets and non-banks to adjust.

Limits could be used in a number of ways (Figure 5.2):

- Aggregate holdings – The total amount of new forms of digital money an individual could hold. This would reduce the overall amount of deposits that leave the banking system.
- Transactions – Limits on individual/daily transaction amounts in new forms of digital money. This would reduce sudden outflows and ensure use remains retail focused.
- Access eligibility – Restrictions of types of users able to transact in new forms of digital money. Again, this would ensure use remains retail focused.
- Remuneration – Different remuneration rates for new forms of digital money versus commercial bank deposits. This could be tiered, for example, so that the interest paid on digital money balances above a threshold would decrease. It would be used as an incentive to reduce the overall amount of deposits that leave the banking system.

The Bank is open to the idea of limits such as these during a transition period. It is also possible that such limits could be considered on a longer-term basis for new forms of digital money. This could be appropriate where risks to monetary and financial stability turn out to be greater than outlined in this Paper or where new risks emerge. The Bank will do more work to decide if such limits are necessary and how they would fit with other objectives.

Figure 5.2: Examples of hard and soft limits that could be used for new forms of digital money

Questions for discussion:

Do respondents think there are any other features of the banking regime that need to be reflected in the regulatory model for stablecoins?

Do respondents agree with the Bank's assessment of the four possible regulatory models for stablecoins? Are there other models the Bank should consider?

Given the large uncertainty around a new steady state and risks identified during any transition to new forms of digital money, are there any other reasons for imposing limits? How should such potential limits be structured?

Box H: Key legislative initiatives on stablecoins and payments innovation in the UK

HMT's Consultation and Call for Evidence regarding cryptoassets and stablecoins.
In January 2021, HMT published its 'UK regulatory approach to cryptoassets and stablecoins: consultation and call for evidence'. The consultation closed on 21 March 2021.

HMT's consultation set out objectives for a UK regime for cryptoassets. These included: protecting financial stability; ensuring consumer protections; and promoting competition and innovation. The consultation outlined HMT's proposed approach for an overarching framework to bring cryptoassets into the scope of activities that are regulated – the 'regulatory perimeter'. Focusing on (systemic and non-systemic) stablecoins used as a means of payment, it left the UK's regulators for payments (the Bank, the FCA, and the PSR) to consult later on rules and detailed firm requirements. It was proposed that the Bank would regulate issuers or system operators of 'systemic stable token arrangements' in addition to FCA and PSR oversight. All single-currency and other-asset linked stablecoins would be subject to FCA authorisation and regulation, based on corresponding payments and investment regulation.

The proposals in this Discussion Paper build on HMT's framework but also outline further issues not covered in that consultation. These include the potential application of a banking model and banking-like requirements to stablecoins, and the possible need for limits during a transitional phase.

The Bank will consult on its proposals for a regulatory model for stablecoins in due course, pending completion of HMT's legislative process, responses to this Discussion Paper, and further feasibility and cost/benefit analysis of the options outlined in this paper.

HMT's Payments Landscape Review (PLR)
HMT will, in due course, issue a response to its Call for Evidence as part of the PLR. The call for evidence was published in July 2020. It presented the Government's aims for UK payment networks, assessed the existing system against these aims, and asked questions about the gaps, opportunities and risks that need to be addressed to achieve its aims.

The Bank is currently assessing the need for reforms to the perimeter of payments regulation. The main area of focus is ensuring that regulation is appropriate to address the financial stability risks of critical firms in systemic payment chains, including those that are based on stablecoins. The Bank will look to ensure any regulatory requirements for stablecoins are consistent with requirements for the wider set of payment firms. This is based on the principle of 'same risk – same regulatory outcome'.

International regulatory response
As outlined in Box C, a number of international efforts are underway to ensure a co-ordinated global response to the regulation of stablecoins. This Discussion Paper focuses on a single-currency denominated systemic stablecoin and primarily seeks views on how the UK regulatory regime should be developed. In reality, stablecoins are likely to operate on a global scale. Issues around consistency of regulation and interoperability of designs across borders will therefore need to be considered.

Box I: The Bank's approach to systemic payment system regulation

The Banking Act 2009 outlines a process for HMT to recognise systemic payment systems for regulation by the Bank. This is based on risks to the UK financial stability from their disruption. Once a payment system is recognised, the legislation gives the Bank broad supervisory powers. The Bank discharges its supervisory responsibilities through a variety of routes.

First, the Bank has used its powers under the Banking Act to require recognised payment systems to have regard to the CPMI-IOSCO Principles for Financial Market Infrastructure (PFMI). The PFMI provide a comprehensive framework for addressing risks in Financial Market Infrastructures (FMIs), including in payment systems. For example, it sets out that FMIs should have a two-hour recovery time objective – that is, no critical functions should be out of action for more than two hours.

Second, the Bank can issue Codes of Practice to which recognised payment systems must adhere. To date, the Bank has published two Codes of Practice around effective governance requirements and recently on operational resilience.[74]

Third, the Bank runs a comprehensive supervisory programme of regular meetings with Board Directors and senior Executives and 'deep dive' supervisory reviews into relevant areas of risk. For recognised payment systems, these supervisory reviews focus on issues such as governance, effectiveness of three lines of defence, IT infrastructure resilience, cyber resilience, management of outsourcing partners, business continuity planning, settlement risk management and ecosystem risk management.

Fourth, the Bank expects recognised payment systems to seek the Bank's non-objection before making significant changes to the payment system's rules or risk management, significant product launches or appointments to the most senior roles on the Board and executive.

Finally, the Bank has a variety of other powers and sanctions that it can use as appropriate. For example, it can direct a system to take a specific action; or require it to establish or change the system's own rules. In terms of sanctions, the Bank can issue fines, publish any compliance failure or require the closure of the system.

Box J: Designing a backstop for stablecoins

Across all the regulatory models, a backstop would be required to ensure that customers have continued access to their funds and important payment services and/or that funds are promptly returned to them in the event of firm failure. Such arrangements exist under the current banking and payments regimes. These include a resolution regime for banks, FSCS depositor protection, and the Financial Market Infrastructure Special Administration Regime.

For banks, the backstop has two main elements:

- **FSCS depositor protection.** The FSCS ensures that, if bail-in is insufficient to protect depositors, or a bank is subject to the Banking Insolvency Procedure, depositors are compensated for their eligible deposits. It provides 100% protection for eligible bank deposits up to £85,000 per eligible customer per institution, with the aim of prompt pay-out within seven days. It is funded by a levy on surviving banks, with credit lines and access to the Government's National Loan Fund as a backstop to the levy. There are other forms of FSCS protection that may be relevant, including protection for investors in the event of loss and potential for FSCS to 'look through' to underlying customers of an e-money institution in the event of the failure of a custodian bank.
- **A resolution regime**. The Bank's approach to resolution is set out in The Bank of England's Approach to Resolution.[75] As this document notes, large banks are subject to a bail-in strategy. This restores the solvency of a failed firm, enabling it to continue providing, without interruption, functions that are critical for the UK economy. It also enables firms to undertake an orderly restructuring of the business to address the underlying causes of failure. Smaller banks are subject to the Banking Insolvency Procedure.

In order to deliver the FPC's second expectation, arrangements would need to be put in place for stablecoins to achieve equivalent outcomes.

Under the HQLA, CBL or DB models, stablecoins would likely need a separate guarantee scheme from banks to return funds to users in the event of stablecoin failure. Under the mutual insurance model used for banks, the banking industry collectively funds compensation when one bank fails. The Bank's view is that applying a similar scheme to stablecoins is likely to be challenging, as there may only be a small number of stablecoins and hence limited ability to pool risk. And a public backstop – that is, where the state covers any shortfall – would not be acceptable as it would be contrary to the aims of the current payments and banking regimes. These seek to address the problem of firms being 'too-big-to-fail' and preclude the Government having to provide a taxpayer-funded bail-out in the event of firm failure.

If stablecoins were added to the same FSCS class as banks, risk would be pooled with banks. This may, however, place an unreasonable burden on banks whose profitability may have changed as a result of flows to stablecoins. It is also unclear whether stablecoins' business models would be able to afford the levies for bank/stablecoin failures that occur within the class.

Further work will be required to consider the resolution arrangements for systemic stablecoins. And further work will also be needed on any changes to FSCS protection, in discussion with other authorities and as part of any wider regulatory review.

Box K: Access to balance sheet review

In November 2019, the Bank published a Call for Evidence, aiming to explore demand for additional services that the Bank could offer to payments firms, notably access to overnight deposit facilities.

The Bank received responses from, and met with, a diverse range of stakeholders, including bank and non-bank payment service providers, payment system operators, and other authorities. These responses noted that allowing payments firms to hold their customers' money directly with the Bank could bring benefits. First, it would further reduce the reliance of non-bank payment firms on the commercial banking sector, improving competition and potentially increasing the resilience of the system. Second, it could help to safeguard outcomes for customers by ensuring that they are not exposed to any risk associated with a failure of the institution where their money is held. Together, these benefits could help to support a more diverse, competitive and innovative payment landscape.

Respondents also highlighted a number of risks associated with granting wider access to overnight deposit accounts with the Bank, most notably the risks associated with a disorderly failure of a non-bank payments firm. Some respondents noted that the current e-money payment services regulations may not adequately mitigate the risks posed by these firms, in particular, if central bank access allows them to grow quickly, or to operate new business models and offer new products.

These risks must be appropriately mitigated, including through a strengthening of the Electronic Money and Payment Services Regimes, in order for the Bank to be comfortable with holding client money directly. Specifically, the Bank has identified three key areas to ensure these regimes deliver a comparable standard with regulation applied to existing Bank counterparties: Customer money must not only be 1-for-1 backed at all times, appropriate buffers and/or capital requirements should be in place to absorb unexpected losses.Protections for customers should be in place to guarantee that all funds will be returned promptly in the event of the firm's failure.Formal wind-down plans should be maintained to reduce the risk of disorderly failure.

The Bank will work closely with the FCA and HMT to consider how best to address these issues.

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1. Central bank digital currency: opportunities, challenges and design.
2. Financial Stability Report, December 2019.
3. HM Treasury, 7 January 2021, 'UK regulatory approach to cryptoassets and stablecoins: consultation and call for evidence'.
4. This does not, however, preclude private issuers from being regulated like or as commercial banks.
5. Bank of England Weekly Report 12 May 2021.
6. For a detailed description as to how money is created, see McLeay et al (2014), 'Money creation in the modern economy'.
7. This is based on the amount of cash held by the public as a share of total cash and sight deposits. See Part V of 'A millennium of macroeconomic data', Research dataset, Bank of England.
8. See UK Finance Press Release, 'Cards used for half of payments for first time last year'.
9. See 'Compensation limits'. Deposit insurance applies to eligible deposits only.
10. See 'What is Open Banking?'.
11. This includes both magnetically and account-based schemes.
12. One high-profile example of a stablecoin proposal is Diem.

13. HM Treasury referred to criteria for systemic payment systems in 'UK regulatory approach to cryptoassets and stablecoins: consultation and call for evidence'. This noted that criteria under the Banking Act 2009 'includes consideration of their ability to disrupt the UK financial system and businesses based on current or likely volume and value of transactions, nature of transactions and links to other systems, as well as substitutability and use by the Bank of England in its role as monetary authority'. It further noted that 'The government's proposal is that these criteria should also extend to stable tokens arrangements that perform a retail or wholesale payment system function. This would mean that a stable token with significant potential to be systemic at launch would need to be captured from launch by such regulation.'.
14. This is often referred to as the 'economies of scope' that exist in banking. It means it is efficient for banks to provide loans and transaction deposits jointly. For example, banks may have expertise in managing liquidity risk, and this is what enables them to offer both overdraft facilities and deposit services to customers (Kashyap et al (1999)).
15. See, for example, Rachel and Smith (2015) and Box 6 of the August 2018 Inflation Report.
16. This box is largely taken from McLeay et al (2014), 'Money creation in the modern economy'.
17. See Caswell et al (2020), 'Cash in the time of Covid'.
18. See LINK News and media contact, 'Coronavirus Crisis means cash use down but UK still withdrawing £1billion from ATMs each week'.
19. See LINK, 'Statistics and trends'.
20. See UK Finance, 'Christmas shopping moves online amid Covid-19 restrictions to reach record December levels'.
21. See FCA (2021), 'Financial Lives 2020 survey: the impact of coronavirus'.
22. Financial Stability Report, Financial Policy Committee Record and stress testing results - December 2019.
23. Of course, cash can be stolen or lost, so it is not entirely 'risk-free'.
24. Explored in more detail in: 'Do we need 'public money'?' – speech by Jon Cunliffe'.
25. See 'RTGS Renewal Programme' for more detail.
26. See Committee on Payments and Market Infrastructures (2020), 'Enhancing cross-border payments: building blocks of a global roadmap'.
27. See FCA Financial Lives 2020 survey: the impact of coronavirus.
28. The Bank is a member of the Joint Authorities Cash Strategy (JACS) Group. This was set up by HM Treasury to ensure that the UK's cash infrastructure remains resilient, cost effective, sustainable, and can meet the needs of users, particularly in a future environment of lower cash usage. A key focus for the Bank in meeting this aim is the future of the UK's Wholesale Cash Distribution Model (see Consultation on the Future of the UK's Wholesale Cash Distribution Model).
29. See HM Treasury (2000), 'Review of Banking Services in the UK'.
30. See G7 Finance Ministers and Central Bank Governors' Statement on Digital Payments.
31. See FSB (2020), Enhancing Cross-border Payments.
32. See FSB (2020), Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements.
33. See Central bank digital currencies: foundational principles and core features.
34. See Global Stablecoin Initiatives.
35. For more detail, see 'Bank of England statement on Central Bank Digital Currency'.
36. The drivers and headwinds are not perfectly additive. For example, a depositor that migrates due to safety is not also counted as migrating due to convenience.
37. Inferred based on how individuals invest their wealth, for example, by spreading deposits across multiple bank accounts, and whether they agree with statements such as 'it is better to play safe with savings'.
38. See 'Market review into the supply of card-acquiring services: Interim report'.
39. Which deposits this 30% figure refers to is inferred based on the propensity of the depositor to use online banking and their age, where age is strongly correlated with use of social media.
40. Financial sophistication is inferred using multiple proxies, such as the method an individual uses to check their bank account balance.
41. Since UK banks predominantly issue debt in foreign currencies, a large proportion of these non-bank investors could be overseas. Asset managers are particularly active in the primary market for bank debt.

42. The effect of this regime on commercial banks would be similar to the issuance of a CBDC.
43. Weights on each funding source are based on their share of the overall stock of bank liabilities. In the past, commercial banks have been assumed to price loans according to the cost of wholesale funding only. More recently, evidence suggests that UK banks are increasingly using non-wholesale measures of funding to price loans. See the February 2019 Inflation Report.
44. This estimate is based on a model whereby new forms of digital money are backed by central bank reserves. Increases in funding costs and lending rates for other backing models are estimated to be of a similar magnitude.
45. For example, investment funds that would have otherwise bought more bank debt could buy instead residential mortgage-backed securities issued by specialist mortgage providers.
46. Raising finance in bond markets, for example, often requires borrowers to pay fees to investment banks, rating agencies and lawyers in order to arrange the bond issuance.
47. Calculated as number of users reported by Open Banking as of January 2021 as a share of total UK adult population as reported by the Office for National Statistics.
48. For more information, see 'Central Bank Digital Currency: opportunities, challenges and design'.
49. UK resident groups of major UK banks. Data at end-2020.
50. The Indexed Long-Term Repo (ILTR) allows market participants to borrow central bank reserves for a six-month period in exchange for other, less liquid assets. For more information see the Market Operations Guide.
51. For more information see 'Eligible collateral'.
52. For more information on risks associated with asset encumbrance see BIS (2013), 'Asset encumbrance, financial reform and the demand for collateral assets' and PRA PS18/20 'Asset encumbrance'.
53. See 'The Future of Finance – our response'.
54. See 'Working Group to facilitate investment in productive finance'.
55. See, for example, BIS (1999), 'Mr Meyer's remarks on market discipline as a component of banking supervision and regulation'.
56. See the May 2020 interim Financial Stability Report for a detailed description of the 'dash for cash'.
57. Based on London Clearing House total volume of cleared overnight indexed swaps during 2020.
58. In addition, various other policy tools have expanded the supply of reserves since 2008. For details of the asset purchases and funding schemes on the Bank's balance sheet, see 'Results and usage data'.
59. See MPC's June 2018 minutes.
60. Financial Stability Report, Financial Policy Committee Record and stress testing results - December 2019.
61. HM Treasury, 7 January 2021, 'UK regulatory approach to cryptoassets and stablecoins: consultation and call for evidence'.
62. Record of the Financial Policy Committee, October 2019.
63. This list draws on FSB (2020), 'Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements'.
64. 'A blockchain is a type of distributed ledger which enables an agreed record of transactions (or other data) to be maintained and replicated across multiple participants, without the need for any central authority operating the system.' For further details, see Bank Underground (2019), 'Building blocks: the useful elements of blockchain'.
65. Financial Stability Report, Financial Policy Committee Record and stress testing results - December 2019.
66. Depending on how the stablecoin is structured, this may be possible within the current banking regime, although the authorisation decision by the Prudential Regulation Authority (PRA) and FCA would depend on the specifics of the business model and legal arrangements. It would also involve an assessment against things like the capital and liquidity position of the stablecoin – referred to as 'threshold conditions'.
67. For example, the PRA already supervises as banks several firms fully specialised in custody services, with bespoke methodologies.
68. See PRA SS24/15 'The PRA's approach to supervising liquidity and funding risks'.
69. Principle 9, of the Principles for financial market infrastructures (FMIs) states: 'An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money'.
70. See 'Scottish and Northern Ireland banknotes'.

71. See FCA (2017), 'Payment Services and Electronic Money – Our Approach'.
72. The UK authorities have already taken steps to address some of these issues, with the FCA issuing enhanced safe-guarding guidance, and HMT extending the special administration regime to e-money firms.
73. As with existing counterparties, this lending would be against eligible collateral and subject to appropriate haircuts.
74. See 'Financial market infrastructure supervision', and 'Operational Resilience: Recognised Payment System Operators and Specified Service Providers'.
75. The Bank of England's approach to resolution.