

Digital currencies and distributed ledger technology

Beyond hype



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Across the last decade, payments have become increasingly digitised as new forms of emerging technology have enabled innovation within the financial services sector. Since their introduction, cryptoassets have formed an asset class of their own, and are now considered by many as one of the most renowned innovations in payments within the 21st century.

The crypto market has continued to make headlines, and as a result, the number of UK consumers investing in cryptoassets has grown¹. The increased use of privately issued cryptoassets has been a key driver for the development of Central Bank Digital Currencies (CBDCs) across the globe. Whilst research suggests consumers in developing countries are more likely to value a CBDC²; central banks, such as The Bank of England, continue to assess the case for a CBDC to address the decline in cash, and the rapid change in consumer payments.

Whilst private companies and cryptoasset firms have led innovation within the digital currencies space, global banks and economies have begun to harness new technologies and experiment with new forms of regulated digital money. As new technologies are being explored at pace, regulation is key to ensuring consumers are protected by the risks presented by cryptoassets. It will also be pivotal in driving innovation ensuring technology is designed in the right way to manage risks and ensure resilience.

Lloyds Bank is engaging with industry stakeholders including Bank of England and regulators to achieve effective regulation to protect UK consumers to ensure the wider payments ecosystem remains safe and secure.

Digital money 101

Cryptoassets are a digital representation of value or contractual rights, which uses codes and algorithms to allow transactions to be anonymous and without need for third party verification. Many cryptoassets such as exchange tokens, often referred to as 'cryptocurrencies'³, operate in an unregulated, decentralised structure, more commonly known as 'Decentralised Finance'. Decentralised Finance is a form of digital finance with no central authority, meaning it isn't controlled by a single entity or central source. Many cryptoassets determine their value by supply and demand, causing the currency to fluctuate quickly in value.

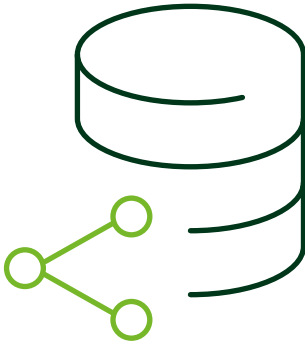
1 <https://www.fca.org.uk/publications/research/research-note-cryptoasset-consumer-research-2021#f-chapter-id-results-public-awareness>

2 <https://www.omfif.org/consumer-attitudes-to-cbdc/>

3 <https://www.fca.org.uk/consumers/cryptoassets>



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However, some forms of cryptoassets, such as stablecoins, were designed to maintain a stable value by linking to either assets or algorithms. Whilst stablecoins present as a secure alternative to volatile cryptoassets, the industry has begun to question the level of stability and safety different variations of stablecoins offer to users. In contrast, fiat currencies such as the GBP and USD, are regulated, controlled and issued by government bodies or central banks. Fiat currencies are not pegged to other assets, their value is determined by the issuing country's government bodies or central banks, ensuring the currency remains balanced⁴.

In the beginning, cryptoassets were developed outside of the existing financial market. Bitcoin was the first cryptoasset to launch in 2008, followed by a number of cryptoassets initially developed by the tech industry. As interest increased, industries including financial services began to harness the underlying technology of cryptoassets to simplify data tracking, streamline processes and enhance security, building more efficient platforms.

Alongside longstanding financial assets such as gold, oil, and other major currencies, digital money has formed an asset class of its own; piquing the interest of central banks and global economies as they begin to experiment with new forms of digital money.

Why have Digital Currencies received so much attention?

Volatility within the market

Cryptoassets were created largely in opposition to the existing financial system and typically operate a decentralised structure, determining their value by supply and demand causing the currency to fluctuate in value. Whilst these attributes pose risk, the number of UK consumers investing in cryptoassets has continued to rise, with approximately 2.3 million people estimated to have held a form of cryptoasset in 2021. Awareness has also grown, with 78% of UK adults having heard of cryptoassets in 2021, compared to 42% in 2019⁵.

But what warrants the attention given to these types of assets?

Whilst the volatility and unpredictability of some forms of cryptoassets could pose significant risk, it continues to be a key motivator for consumers investing in these types of cryptoassets. In a 2021 FCA study, when reviewing motivations behind investing in the crypto market, the most common reason users gave was 'as a gamble to make or lose money,' indicating some recognition of the risks involved⁵. Notably, whilst ownership of cryptoassets grew across 2020 to 2021, interest rates offered on current and savings accounts reached new lows.

As ownership of cryptoassets has increased, the crypto market has continued to evolve with cryptoassets now being used across other industries such as online gaming and in the art world through non-fungible tokens.

4 https://www.bis.org/publ/qtrpdf/r_qt1709f.pdf

5 <https://www.fca.org.uk/publications/research/research-note-cryptoasset-consumer-research-2021#f-chapter-id-results-public-awareness>



The ultimate influencer

Media coverage has played a leading role within the cryptoasset space, driving competition, and increasing awareness within the market. In a 2021 FCA study⁵, research indicated that almost half of the cryptoasset users had reported having seen or heard an advert relating to cryptoassets. Consequently, 31% of those felt led or encouraged to buy.

Social media has also become a powerful tool for influencing the cryptoasset market. In October 2021, it was reported that Elon Musk responded to a question asking how much of the ‘Shiba Inu’ cryptoassets he held. In response, Musk confirmed he held ‘None,’ which sent the cryptoasset spiralling, falling by 15% the following morning⁶.

As the media and social networking platforms have the ability to influence the cryptoasset market, regulators have considered how to ensure consumers are protected from misleading or ambiguous cryptoasset advertisements. In 2022, HM Treasury announced its intentions to legislate⁷, bringing qualifying cryptoassets into the scope of financial promotion regulations under the Financial Services and Markets Act 2000; ensuring advertisements and promotions for certain cryptoassets are regulated to safeguard consumers.

Headlines and crashes

May 2022, saw the crash of stablecoin TerraUSD and sister coin Luna. The crash of the algorithmic stablecoin saw thousands of retail consumers lose significant amounts of money and is now being compared to a small 2008 financial crisis within the cryptoasset community⁸. Stablecoins have been presented as a secure alternative to volatile forms of cryptoassets, however the backing of each stablecoin varies. Such algorithmic stablecoins do not hold the same stability as stablecoins backed by fiat currency, and since the collapse of TerraUSD and Luna, there

has been increased pressure to review consumer protections for different variations of stablecoins.

International insights

Global economies have continued to explore new opportunities to innovate and compete with the rapid creation of privately issued cryptoassets. The Bank of International Settlement (BIS) has been at the forefront of innovation, constructing sandbox environments, and building test platforms, to pilot new technology. This helps to generate learnings and validate use cases, to inform key policy decisions for central banks across the globe.

Today, many central banks and governments are considering the development of CBDCs at pace, with some central banks progressing faster than others.

International markets have pioneered the development of Central Bank Digital Currencies. In 2020, the Bahamas was the first country to officially launch a government backed Central Bank Digital Currency, branded the ‘sand dollar’⁹. Shortly after, Nigeria introduced its CBDC ‘e-Naira’, and the Eastern Caribbean Central Bank rolled out the first CBDC to be used in a monetary union across multiple member states. Whilst each Central Bank Digital Currency will have its own operating model, many CBDCs are being delivered on private versions of distributed ledger technology.

In collaboration with the German payments and technology company G+D, the Official Monetary and Financial Institutions Forum (OMFIF) commissioned a global survey¹⁰ to understand consumer attitudes towards CBDCs. The survey revealed consumers in developing countries are more likely to value a CBDC over those in more established economies. More than 90% of those surveyed in Nigeria, and 60% in Indonesia, said they were likely to use a CBDC.

6 <https://www.bloomberg.com/news/articles/2021-10-25/shiba-inu-crypto-falls-from-record-after-musk-damps-speculation>

7 <https://www.gov.uk/government/consultations/cryptoasset-promotions>

8 <https://www.euronews.com/next/2022/05/25/terra-luna-crash-what-are-stablecoins-and-how-stable-are-they-really>

9 <https://www.sanddollar.bs/about>

10 <https://www.omfif.org/consumer-attitudes-to-cbdc/>

In comparison, fewer than 25% of both German and US consumers said they could see the value in a retail CBDC. Research suggests CBDCs could provide emerging markets with greater access to more enhanced, real-time payments where schemes are less developed. Which in turn, has been a contributing factor to the rapid development of Central Bank Digital Currencies in evolving economies. In contrast, more mature markets are likely to already offer established payment systems and therefore have less of an incentive to adopt.

This may beg the question as to why developed countries are considering CBDC?

Interestingly, developed countries such as Sweden, where cash use is almost non-existent¹¹, have begun to develop Central Bank Digital Currencies at pace. Establishing a product to contend with private currency creation and offer new innovations, providing an alternative to the traditional banking infrastructure and ensuring resilience and financial stability for the wider eco-system, have been key drivers as to why some developed economies have been quick to develop.

Alongside the development of domestic CBDC schemes, many private institutions are exploring how both distributed ledger technology and Central Bank Digital Currencies could be used to enhance cross-border payments to achieve global interoperability. The development of a shared platform or smart contracts could reduce reliance on intermediaries and simplify the correspondent banking model, unlocking new opportunities for simpler and more transparent cross-border transactions.

UK Market

Central Bank Digital Currencies

In its 2020 discussion paper the Bank of England laid out seven motivations for a UK CBDC. Two years on, and motivations around addressing a decline in cash, avoiding private money creation, and supporting a resilient landscape are still very much alive¹².

In a 2022 Lloyds Banking Group consumer study¹³, research showed appeal of a Central Bank Digital Currency is low amongst the GB population. Over 1 in 3 (35%) consumers said the idea is unappealing, whilst 3 in 10 (31%) stated they didn't know or found the concept difficult to understand. Whilst research shows an initial lack of appetite, it's important to recognise that many use cases for a CBDC are yet to exist, and therefore it is challenging for consumers to conceptualise the potential benefits.



If I would have asked people what they wanted, they would have said faster horses.



Henry Ford
Founder of Ford Motor Company

Therefore, instead of why, has a UK CBDC become a question of when? If a decision is made to develop a UK CBDC, when considering its design, the government and Bank of England must carefully balance the benefits, risks and trade-offs, to ensure it provides overall benefit to the UK's economy and its citizens.

11 <https://sweden.se/life/society/a-cashless-society>

12 <https://www.bankofengland.co.uk/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design-discussion-paper>

13 Consumers were given a written definition of what a Central Bank Digital Currency is and asked via an online survey the following question – “How appealing, if at all, do you find the concept of a “Central bank digital currency (CBDC)””. Research was conducted via YouGov with a GB representative sample of 10,050 consumers completing an online survey during the following dates, 27 May – 9th June 2022

Could a CBDC replace cryptoassets?

Due to varying characteristics, value, and operating models, a CBDC is unlikely to directly compete or replace cryptoassets. Some of the key drivers that motivate consumers to buy cryptoassets are their volatility, decentralised and unregulated structure. Whilst a CBDC could allow consumers to take more control of their investments, for crypto users looking to invest outside of the traditional financial system, a CBDC is unlikely to provide an alternative to cryptoassets.

Stablecoins

Stablecoins are an evolution of cryptoassets, designed to maintain a stable value by linking to assets or algorithms. Since their introduction, stablecoins have begun to make their mark on the industry. Whilst we've seen an increase in awareness, understanding of stablecoins remains low. In a 2021 Financial Conduct Authority (FCA) study, only 36% of crypto users were able to correctly identify the definition of stablecoins, compared to 90% for cryptoassets¹⁴. Whilst consumers have displayed limited appetite for stablecoins, crypto firms continue to innovate in this space.

This year, the UK government published its intention to legislate, bringing fiat backed stablecoins into the regulatory perimeter via existing frameworks, by amending both the Electronic Money Regulations 2011 and Payment Service Regulations 2017. Making fiat backed stablecoins a recognised form of payment within the UK. In addition, the government plans to extend the applicability of Part 5 of the Banking Act 2009 to include stablecoin activities. This will apply in cases where the risks posed have the potential to be systemic, and therefore the threshold for Bank of England central bank supervision is met¹⁵.

As fiat backed stablecoins become regulated, we may see increased interest from both payment service providers and consumers in this space. Larger banks and payment service providers could begin to explore new opportunities, issuing private stablecoins as an alternative to current forms of regulated money.

Cryptoassets

Cryptoassets such as 'exchange tokens'¹⁶ currently operate in a largely unregulated market. As private currency creation persists, governments, regulators and central banks across the globe have begun to monitor cryptoasset activities more closely. This year, the Dutch Central Bank fined cryptoassets exchange firm 'Binance,' 3.3 million euros for offering its services in the Netherlands without registration¹⁷.

In parallel, regulatory bodies are likely to introduce further regulations for cryptoassets in years to come.

As UK regulations tighten, international regulators are assessing similar regulations for cryptoassets. The Basel Committee has issued a second consultation¹⁸ on the prudential treatment of cryptoasset exposures. The consultation focuses on "same risk, same activity, same treatment" suggesting international alignment for the regulation of both cryptoassets and stablecoins alike.

Distributed ledger technology: Finality

Distributed ledger technology (DLT)¹⁹ has the potential to transform industries. DLT refers to a digital system for recording transactions, shared across a network of participants. It's a new technological layer of infrastructure that enables simultaneous access, validation, and record updating in an immutable manner²⁰.

14 <https://www.fca.org.uk/publications/research/research-note-cryptoasset-consumer-research-2021#lf-chapter-id-results-public-awareness>

15 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1088774/O-S_Stablecoins_consultation_response.pdf

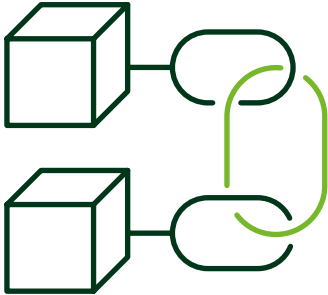
16 <https://www.fca.org.uk/consumers/cryptoassets>

17 https://www.finextra.com/newsarticle/40661/dutch-central-bank-fines-binance-eur33m?utm_medium=newsflash&utm_source=2022-7-18&member=138413

18 <https://www.bis.org/bcbs/publ/d533.pdf>

19 <https://www.investopedia.com/terms/d/distributed-ledger-technology-dlt.asp>

20 https://www.bis.org/publ/qtrpdf/r_qt1709f.pdf



For financial institutions, DLT is being utilised for use cases that can unlock new benefits whilst solving a host of challenges that banks face today. For example, we see today some complexities around liquidity due to the various currencies, time zones and actors involved when making an international payment. DLT has the potential to resolve some of these complexities by recreating those same entities on a distributed ledger. This in turn could promote trust between participants, reduces the number of processes and intermediaries in the journey to achieve an online, instantaneous payment method. Corollary to this, additional features such as programmability and smart contracts (e.g. self-executing code) are now being explored by financial institutions with digital money.

Like many financial institutions Lloyds Bank recognises the opportunity DLT provides, and in 2019 sought to explore this through an equity stake in Finality who are creating a new form of financial market infrastructure (FMI) that combines new technology alongside existing banking regulation.

Finality will support financial institutions making wholesale payments through tokenising balances at central bank reserve accounts, matching it digitally on a distributed ledger. This will enable instantaneous settlement between participants.

HM Treasury recently issued a Recognition Order to recognise the Sterling Finality Payment System as a systemically important payment system in the UK, thereby bringing the Sterling Finality Payment System into scope for the Bank of England's regulation, as well as enabling designation for regulation by the Payment Systems Regulator. This means the Sterling Finality Payment System is now the first distributed ledger technology (DLT) based, fully-regulated payment system in the world²¹.

In the not too distant future, Finality will be able to directly support LBG in making live domestic payments that will facilitate safe and simple settlement.

The future of digital currencies

Digital currencies are expected to continue to change the shape of the payments landscape by both inspiring and enabling innovation. Programmable money and smart contracts are only the beginning of understanding how innovative technologies can be harnessed to enhance payments and empower end-users. DLT will provide an underlying infrastructure for both central banks and private firms to innovate, and the creation of CBDCs could also unlock new opportunities within the UK market. Both DLT and CBDCs look to enable innovation and address longstanding challenges such as limited transparency in settlement.

Today, each central bank will hold its own ledger, with all parties documenting the flow of money to ensure entries have been recorded correctly. The duplication of entries creates a complex reconciliation process often subject to disputes. But how can new technology address this?

Distributed ledger technology, could be used to facilitate a single, yet distributed ledger for settlement. Corresponding balances could be tokenised to allow both central banks and authorised parties to create, remove and ultimately record transactions with a single version of the truth that is supported by a one ledger, eliminating the need for individual balance sheets and duplicate recording. A single, shared ledger could revolutionise settlement by enhancing transparency across the industry to enable faster and secure settlement. In parallel, Central Bank Digital Currencies will operate using the same technology, but settle in public digital money as opposed to commercial money used in settlement today.

21 https://www.linkedin.com/posts/finality-international_payments-settlement-dlt-activity-6970664849986965504-pGwQ

As global economies explore fresh opportunities new technology and currency creation brings. The UK market will need to consider if the drivers are strong enough to outweigh the potential challenges a UK CBDC could bring. Will a digital pound address the challenges presented by a decline in cash and how do we ensure a UK CBDC does not inhibit physical cash creation, excluding those who want, need and rely on cash? Will a UK CBDC mirror the provisions and protections in place for cash and how can the risks of commercial bank disintermediation be managed, so that businesses and consumers continue to have access to credit? Could exposing commercial money to distributed ledger technology provide the same level of innovation to revolutionise payments, as we face into the digital economy?

And how do we ensure centralised use of technology does not pose carbon challenges seen in some forms of decentralised finance today?

As global markets grapple with these big questions, it's both an exciting and revolutionary time for payments.

As we look to the future, Lloyds Bank are at the forefront of a new era of payments. We continue to actively engage with industry stakeholders ensuring effective regulation and exploring new opportunities by partnering with innovators as modern technology unlocks new opportunities within payments.

Defined terms



Digital currency

Digital currency is a form of currency that is available only in digital or electronic form.^A

Cryptoasset

Cryptoassets are cryptographically secured digital representations of value or contractual rights that use some type of distributed ledger technology (DLT) and can be transferred, stored or traded electronically.^B

Stablecoin

Stablecoins are an evolution of cryptoassets, which are designed to minimise volatility in value. There are two types of stablecoin:

Asset backed

Backed by collateral in the form of an asset, or a basket of assets, such as gold or a fiat currency.

Algorithmic

Programmed to regulate issuance and redemption to match supply and demand.^C

CBDC

A Central Bank Digital Currency (CBDC) would be an electronic form of central bank money that could be used by households and businesses to make payments and store value.^D

A <https://www.investopedia.com/terms/d/digital-currency.asp>

B <https://www.fca.org.uk/firms/cryptoassets>

C https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950206/HM_Treasury_Cryptoasset_and_Stablecoin_consultation.pdf

D <https://www.bankofengland.co.uk/-/media/boe/files/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design.pdf>

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