A systematisation of legal-regulatory risks related to Central Bank Digital Currencies: A comparative analysis of the US, the UK and China

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Abstract

Central bank digital currencies (CBDCs) and their risks are a fast-growing topic among scholars, regulators, and policy makers. Due to privately issued cryptocurrencies in recent years and a decreasing trust in traditional currencies due to continued money printing and consequentially growing inflation, there has been an increasing pressure on central banks to create their own digital currencies, to avoid being left behind. Due to financial technologies (FinTech) rapidly evolving, the rise of cryptocurrencies, and the related risks that may come with them, governments are considering introducing CBDCs. This article focuses on the core principles of CBDCs and the type of models that may be introduced to the UK's financial system whilst comparing it to the ones in China and the United States. Based on our analysis, depending on the model design, different benefits and risks can be identified. To inform legislators and to contribute to the scholarly debate, this article focuses on systematising the potential threats CBDCs may pose to financial stability, individuals' privacy, and their impact on competition in the financial sector. The article concludes with some recommendations and that CBDCs would not eradicate risks, rather create significant, novel risks.

Keywords: central bank digital currency; CBDC; cryptocurrency; banking law; financial regulation, financial stability, central banking, monetary policy, blockchain, payment system

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Table of Contents

Introduction

The rapid growth of financial technology (FinTech) has introduced new forms of payments that are faster, digitalised and 'available for consumers for everyday transactions.'[2] The issuance of cryptocurrencies, Facebook's Diem and other stablecoins have raised concerns for policy makers and the market, which enhanced research into CBDCs and whether they should be implemented.[3] Recent articles by Radanliev, similar to our present article, employ a risk-focused approach, but rather on blockchain technologies and not specifically on CBDCs. Also, Radanliev's comparative jurisdictions include the US, the UK, and the EU (but not China).[4]

Central banks and governments worldwide have started testing and designing potential models of CBDCs, with China already conducting successful trials with its own digital currency, the e-CNY.[5] A few other jurisdictions, namely, Nigeria, The Bahamas, and Jamaica, have launched retail CBDCs (see in section 1.4).[6] A couple of others, Finland and Ecuador earlier implemented and later abandoned their CBDCs.[7] In spite of these mixed results and serious risks, international policy makers, in particular, the Bank for International Settlements (BIS) and the International Monetary Fund (IMF) have published various policy papers, notes, handbooks, and datasets in recent years.[8] And those policy papers, and the principles laid down in them (see section 1), recommend a careful yet clearly pro-adoption approach as to CBDCs.

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[2] Francesca Carapella and Jean Flemming, 'Central Bank Digital Currency: A literature review' (Federal Reserve 2020) <https://www.federalreserve.gov/econres/notes/fedsnotes/central-bank-digital-currency-a-literature-review-20201109.html> accessed 5 March 2025 (CBDC's effect on commercial banks).

[3] Ibid.

[4] Radanliev, P. 'Review and Comparison of US, EU, and UK Regulations on Cyber Risk/Security of the Current Blockchain Technologies: Viewpoint from 2023' Rev Socionetwork Strat 17, 105–129 (2023) <https://doi.org/10.1007/s12626-023-00139-x> accessed 5 March 2025; Radanliev, P. 'The rise and fall of cryptocurrencies: defining the economic and social values of blockchain technologies, assessing the opportunities, and defining the financial and cybersecurity risks of the Metaverse' Financ Innov 10, 1 (2024) <https://doi.org/10.1186/s40854-023-00537-8> accessed 5 March 2025.

[5] Marion Labourne and others, 'Cryptocurrencies and CBDC: The route ahead' (2021) Global Policy 12(5) <https://onlinelibrary.wiley.com/doi/full/10.1111/1758-5899.13017?saml_referrer> accessed 5 March 2025.

[6] Ananya Kumar, Alisha Chhangani & others, 'Central Bank Digital Currency Tracker' (Atlantic Council) < https://www.atlanticcouncil.org/cbdctracker/> accessed 5 March 2025.

[7] Dowd, K, 'So far, Central Bank Digital Currencies have failed' (2024) Economic Affairs, 44(1), 71–94. <https://doi.org/10.1111/ecaf.12621> accessed 5 March 2025.

[8] See IMF, Central Bank Digital Currency Virtual Handbook, Last Updated: November 2024, <https://www.imf.org/en/Topics/digital-money-and-fintech/central-bank-digital-currency/virtual-handbook> accessed 5 March 2025; IMF, Monetary and Capital Markets Department 'Central Bank Digital Currency: Progress And Further Considerations', Policy Papers 2024, 052 (2024) <https://doi.org/10.5089/9798400293252.007> accessed 5 March 2025; Bouis R, Gelos G, Nakamura F, Miettinen P A, Nier E, and Soderberg G. 'Central Bank Digital Currencies and Financial Stability: Balance Sheet Analysis and Policy Choices', IMF Working Papers 2024, 226 (2024), accessed March 7, 2025, <https://doi.org/10.5089/9798400290794.001> accessed 5 March 2025; Tunyathon Koonprasert T, Kanada S, Tsuda N, and Reshidi E, 'Central Bank Digital Currency Adoption: Inclusive Strategies for Intermediaries and Users' Fintech Notes 2024, 005 (2024), accessed March 7, 2025, <https://doi.org/10.5089/9798400289422.063> accessed 5 March 2025; IMF 'Central Bank Digital Currency—Initial Considerations' Policy Paper No.

Although CBDCs have been researched for many years and analysed by scholars, there might be individuals within society who may not know about this potential new form of money[9] possibly being implemented due to lack of availability to network, poor connectivity issues or simply not having enough access to gain such information.[10] Therefore, inferring that such a large movement should be made more accessible and spoken about to everybody so that persons can easily comprehend what CBDC is.

Most of the scholarly literature relies on the premise that the future introduction of CBDCs is inevitable, and that 'the risks associated with CBDC can be mitigated by an adequate design'.[11] Some authors warn regulators not to compromise systemic stability and strengthened regulation on the altar of global economic competitiveness and the related pressure on the UK.[12] But the fundamental questions of what existing issues CBDCs would solve, if any, and who would benefit from the introduction of CBDCs is rarely asked in the scholarly literature.[13] Therefore, to stimulate more debate about these important and under-researched questions, this article belongs to the part of literature that takes a more critical view of CBDCs and underscores the significant risks they involve mostly due to their added (even potentially AI-based) functions as compared to traditional central bank-issued currencies. We recommend a deeper debate about CBDCs regarding the risks analysed and systematised in this article. This article is relevant because there has been an international competition as to who would be the first

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2023/048 (November 14, 2023) <https://www.imf.org/en/Publications/Policy-Papers/Issues/2023/11/14/Central-Bank-Digital-Currency-Initial-Considerations-541466> accessed 5 March 2025; Kunaratskul T, Reslow A, and Singh M, 'Implications of Central Bank Digital Currency for Monetary Operations' Fintech Notes 2024, 007 (2024), <https://doi.org/10.5089/9798400289019.063> accessed 5 March 2025; Aurazo J, Banka H, Frost J, Kosse A, and Piveteau T, 'Central bank digital currencies and fast payment systems: rivals or partners?' BIS Papers No 151 (03 December 2024) <https://www.bis.org/publ/bppdf/bispap151.htm> accessed 5 March 2025; Di Iorio A, Kosse A, and Mattei I, 'Embracing diversity, advancing together - results of the 2023 BIS survey on central bank digital currencies and crypto' BIS Papers No 147 (14 June 2024) <https://www.bis.org/publ/bppdf/bispap147.htm> accessed 5 March 2025.

[9] Syngjoo Choi, Bongseob Kim, Young-Sik Kim, Ohik Kwon, Central Bank Digital Currency and Privacy: A Randomized Survey Experiment, BIS Working Papers, No 1147, Monetary and Economic Department (2023) 14-15 <https://www.bis.org/publ/work1147.pdf> accessed 5 March 2025.

[10] Antonella Cicchiello and others, 'Financial inclusion and development in the least developed countries in Asia and Africa' (2021) Journal of Innovation and Entrepreneurship 10(49) 2 <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731021-00190-4> accessed 5 March 2025.

[11] Bindseil U, 'The case for and against CBDC – five years later' (19 February 2022) <http://dx.doi.org/10.2139/ssrn.4038828> accessed 5 March 2025.

[12] Eilís Ferran, 'International Competitiveness and Financial Regulators' Mandates: Coming Around Again in the UK' (2023) 9 Journal of Financial Regulation 30–54.

[13] But see Nicholas Anthony and Norbert Michel, Who Really Benefits from CBDCs? It's Not the Public, Commentary, Cato Institute (17 April 2023), <https://www.cato.org/commentary/who-really-benefits-cbdcs-its-not-public> accessed 5 March 2025.
(This non-scholarly article pointing out these questions and indicating that mostly governments would benefit from the introduction of CBDCs and that the associated risks remain unresolved to date and the cost of abuse would be paid by the public.)

globally significant jurisdiction to introduce CBDCs successfully, and also, international policy makers have been pushing forward the agenda of the future introduction of CBDCs in spite of reports pointing out that there is no convincing case for why the UK would need a CBDC, in particular a retail CBDC.[14]

This article also aims at assisting individuals in developing a deeper understanding of the topic and the risks that may come with it. Firstly, the fundamental principles and models of CBDCs will be analysed and systematised with a focus on the similarities and differences across the selected jurisdictions; the UK, the US and China. Secondly, this article develops a systematisation of the CBDC-related risks by categorising them into high, medium and low risk categories. This systematisation is a major contribution of the article to the literature. Lastly, recommendations will be given as to what the UK could potentially do when and if implementing a CBDC. This article concludes that wholesale CBDC (used by financial institutions rather than by their customers) would be a better alternative for the UK than retails CBDC (used by the public), as it would allow for cash to be kept alongside it whilst avoiding the major risks of retail CBDC. Pilot programmes, like the pilots run by China and Singapore[15], can be helpful for regulators to learn about the functioning of CBDCs.

To analyse these complex issues, due to the time and space limits of the research, the authors have chosen three very different benchmark jurisdictions; the US, the UK, and China with a focus on the UK's CBDC-related plans and options. In other words, the authors seek to distil the learnings from the US and Chinese proposals and pilot projects for the UK. The chief advantage of choosing three very different jurisdictions is that, in line with the principles of comparative law, this way, the authors can identify universal and jurisdiction-specific principles. Also, the analysis may inform the international legal cooperation in this area.

The US has been selected because it is a benchmark jurisdiction in financial regulation and monetary policy. Further, the US has strong economic ties with the UK. Similarly to the UK, the US is also a common law jurisdiction. Both the US and the UK are globally significant developed economies, members of the Group of Seven (G7). On the other hand, the authors also observe the significant differences between the US and the UK in their analysis, such as the significant difference in terms of the domestic market size of these two economies as well

[14] Economic Affairs Committee, 'Central bank digital currencies: a solution in search of a problem?' (House of Lords Paper 131, 2022), 2 <https://publications.parliament.uk/pa/ld5802/ldselect/ldeconaf/131/131.pdf> accessed 5 March 2025.

[15] Chiang S, Singapore to pilot use of wholesale central bank digital currencies in 2024, CNBC (16 Nov 2023) <https://www.cnbc.com/2023/11/17/singapore-to-pilot-wholesale-central-bank-digital-currencies-in-2024.html> accessed 5 March 2025.

as the complexity (both federal and state-level) of the US financial regulatory framework as compared to a more uniform UK financial regulatory landscape. The other selected jurisdiction, China, is relevant for the purposes of this analysis because it is also a globally significant economy, member of the Group of Twenty (G20), its regulatory framework is highly centralised, primarily building upon civil law tradition, the recommendations of international policy makers. And China has advanced a lot with its own CBDC pilot project.[16] Having selected three very different jurisdictions allows the authors to map, compare, and systematise the different CBDC model options, their advantages, risks and the learnings for the UK.

This article is limited in terms of its above-mentioned geographical scope but also due to its focus on the chief dilemma the UK currently faces; whether to introduce a wholesale CBDC (used by financial institutions) or rather a retail CBDC (used by the public). The article makes a case against the introduction of a retail CBDC due to the risks identified, analysed and systematised in this article. A lot of regulatory effort went into strengthening financial stability following the 2008 Global Financial Crisis. CBDCs challenge the fundamentals of the current monetary system by enabling further and even less transparent money creation, leading to continued and harmful inflation, and due to their additional functions, CBDCs also diminish individuals' privacy. At the current level of technological development, the risks outweight the benefits and therefore, no retail CBDC should be introduced in the UK.

1. The UK's current legal framework on CBDC and its main principles

There is currently no specified in-depth definition of central bank digital currency (CBDC) due to the rapidly changing complexity of this concept and its diverse yet intertwined areas of 'computer science, cryptography, payment systems, banking, monetary policy and financial stability.'[17] A 2018 Staff Working Paper by the Bank of England (BoE) suggests the following CBDC definition: 'an electronic, fiat liability of a central bank that can be used to settle payments or as a store of value. It is in essence electronic central bank, or 'narrow', money.'[18] Yet, years later, in 2023, the BoE operates with a more general definition: it is a 'digital money

[16] People's Bank of China, Progress of Research & Development of E-CNY in China (16 July 2021) <www.pbc.gov.cn/en/3688110/3688172/4157443/4293696/2021071614584691871.pdf> accessed 5 March 2025.
[17] Jack Meaning, Ben Dyson and others, 'Broadening narrow money: monetary policy with a central bank digital currency' (2018) Bank of England Staff Working Paper No. 724, 4 <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2018/broadening-narrow-money-monetary-policy-with-a-central-bank-digital-currency.pdf> accessed 5 March 2025.
[18] Ibid.

that a country's central bank can issue.'[19] These examples illustrate the lack of a uniformly accepted definition even within the same jurisdiction. This causes far-reaching issues, when it comes to international cooperation in this particular area.

There have been developments and open discussions regarding CBDCs involving major central banks, including the BoE and the Board of Governors of the Federal Reserve, that acknowledge the potential issues with CBDCs (discussed later in this article).[20] In response to a growing number of CBDC projects by central banks globally, the Bank for International Settlements (BIS) published a report on CBDCs in 2020.[21] To tackle the risks, in that report, the BIS set up three principles that 'must be satisfied for any jurisdiction to consider proceeding with a CBDC.'[22] The three principles include 1) 'do not harm, 2) coexistence, and 3) innovation and efficiency.'[23] The following issues indicate that the BIS acknowledges that there are serious risks in consideration of CBDCs. Therefore, if implemented – and it can be argued that the BIS is wanting CBDCs to be implemented – the risks will need to be limited, and these principles are one way to do so, according to the BIS.[24]

Another internationally significant report worth mentioning was published by the EU Blockchain Observatory and Forum (an Initiative of the European Commission), in 2021. That report operates with the term, 'European Central Bank Digital Currency' also called as 'digital euro'.[25] This report states that CBDCs already exist in the form of the digital, compulsory reserves (cash and deposits) commercial banks must hold with central banks. The report however acknowledges that CBDCs can be something more than that and operates with two chief categories; wholesale CBDCs (reserved for selected financial institutions and central

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[19] Anon, 'What is CBDC?' (Bank of England, 7 February 2023) <https://www.bankofengland.co.uk/explainers/what-is-a-central-bank-digital-currency> accessed 5 March 2025.
[20] Roosebeke B and Defina R, 'Central Bank Digital Currencies: a review of operating models and design issues' (MPRA Paper No. 116240, 2023) <https://mpra.ub.uni-muenchen.de/116240/1/MPRA_paper_116240.pdf> accessed 5 March 2025.
[21] Bank for International Settlements, 'Central bank digital currencies: foundational principles and core features – Report no 1 in a series of collaborations from a group of central banks', BIS Papers, 2020, <https://www.bis.org/publ/othp33.pdf> accessed 5 March 2025.
[22] Ibid.
[23] BIS, 'Central bank digital currencies: foundational principles and core features' (Bank for International Settlements 2020) paras 3.1 <https://www.bis.org/publ/othp33.pdf> accessed 5 March 2025.
[24] Marc Jones, 'Central Bank digital currencies get full BIS backing' (2021, Reuters) <https://www.reuters.com/business/central-bank-digital-currencies-get-full-bis-backing2021-06-23/#:~:text=LONDON%2C%20June%2023%20(Reuters),not%20take%20control%20of%20 money.> accessed 5 March 2025.
[25] EU Blockchain Observatory and Forum (an Initiative of the European Commission), 'Central Bank Digital Currencies and a Euro for the Future', p. 7, 2021, <https://blockchain-observatory.ec.europa.eu/document/download/c31b292a-767c-4537-98a6-21b956055099_en?filename=EUBOF-report-on-a-Digital-Euro-2906.pdf>, accessed 5 March 2025.

banks) and retail CBDCs (used by the public).[26] As we will see in section 2, this definition, similar to the others referenced above, does not capture the technological options and variations of potential future CBDCs and therefore needs to be further developed.

1.1. Do no harm

The first principle identified by BIS infers that the central bank's new concept of digital money should still enclose the same core principles and objectives as the 'old' form of money.[27] Implying that financial stability is still a priority for central banks and that CBDC should still hold the 'uniformity of a currency.'[28] It should not 'intervene with or impede' the central bank's objectives regarding upkeeping financial stability.[29] Conversely, depending on the model chosen in relation to CBDC, whether wholesale or retail, it will pose uncertainty as to whether digital money will not have a negative impact on the financial market or its stability.

Financial policies and frameworks will have to aid in creating 'appropriate designs such as built-in safeguards', which, in consequence, would potentially limit the issues arising from implementing CBDC and its effect on central banks.[30] Thus, in theory, the risk of financial stability would cease to exist if the policies were created in such a way that would not create potential loopholes, and 'with the right provisions in place'.[31]

Yet, this seems highly unlikely due to how CBDC would work. The inclusion of artificial intelligence (AI) in certain aspects of CBDC will not allow for policies and frameworks to be constructed in a way that would limit meanings or wordings. As AI and FinTech rapidly develop, creating an ambiguous policy will further allow for them to develop.[32]

1.2. Coexistence

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[26] Ibid.
[27] BIS (no 22).
[28] Ibid.
[29] BIS (no 22).
[30] G7 Public Policy Principles for Retail Central Bank Digital Currencies (CBDCs) G7 United Kingdom (2021) <https://assets.publishing.service.gov.uk/media/616754e1d3bf7f55fa9269d8/G7_Public_Policy_Principles_for_Retail_CBDC_FINAL.pdf> accessed 5 March 2025.
[31] Cecilia Skingsley, 'Shaping the future financial system in the public interest' (BIS management speeches, 28 November 2023) <https://www.bis.org/speeches/sp231128.htm> accessed 5 March 2025.
[32] Laura Dobberstein, 'Use of AI to accelerate adoption of central bank digital currencies, says IMF head' (The Register, 16 November 2023) <https://www.theregister.com/2023/11/16/imf_head_ai_cbdc_call/> accessed 5 March 2025.

The second principle infers that the current form of money, such as 'cash, reserve or settlement accounts,' should complement the new form of money, CBDC.[33] Furthermore, it was stated that cash should still be provided to the public as long as there is 'sufficient demand.'[34] Although this factor should ease the potential worries concerning the issues surrounding CBDCs, one being a cashless society, it does the opposite. This approach seems to operate with creating a new type of central bank-issued money, adding it to the existing types of money, and creating a public, and modified, version of privately issued cryptocurrencies, pulling all the known and unknown risks of cryptocurrencies into the state's monetary system. This is in parallel with other ill-advised projects on covering cryptocurrencies by deposit insurance or deposit compensation schemes[35] and therewith causing significant threat to the financial system and its stability (ultimately perpetuating future public bank bailouts).[36]

In brief, the last sentence of the principle can be argued to be a type of prophecy that the financial systems are preparing to occur. Due to the rapidly evolving financial technology, it can be noted how society has slowly shifted from using cash to credit cards to making contactless payments via mobile phones over the years. Hence, this article questions the meaning of the term 'sufficient', as it can be argued that society has to keep up with the fast-changing financial technology rather than society not wanting cash.

The authors of this article acknowledge, that the introduction of CBDCs seems to be inevitable at this point due to international pressure, challenges the US dollar faces as the global reserve currency, and policy makers and regulators having failed to meet their fundamental objectives, such as keeping public spending, money creation and inflation within reasonable limits, and preventing systemic crises and related bank bailouts. Therefore, going forward, this article concentrates on the systematisation of risks rather than making a case against CBDCs.

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[33] Ibid 10.
[34] BIS (no 22).
[35] But, as to stablecoins, see also Wilmarth, A E, 'It's Time to Regulate Stablecoins as Deposits and Require Their Issuers to Be FDIC-Insured Banks' (16 December 2021) 41 Banking & Financial Services Policy Report No. 2 (Feb. 2022), at 1-20. , GWU Law School Public Law Research Paper No. 2022-01, GWU Legal Studies Research Paper No. 2022-01 <http://dx.doi.org/10.2139/ssrn.4000795> accessed 5 March 2025.
[36] See, for example, Steven Kelly, Jonathan Rose, Rushing to Judgment and the Banking Crisis of 2023, Working Papers, No. 2025-04, Federal Reserve Bank of Chicago (March 2025). <https://www.chicagofed.org/publications/working-papers/2025/2025-04> accessed 5 March 2025. (This paper points out, among others, the crypto sector's central role in triggering the 2023 US FinTech bank runs and failures leading again to bailout measures.); see also Wilmarth, Arthur E., 'We Must Protect Investors and Our Banking System from the Crypto Industry' (May 31, 2023). 101 Wash. U. L. Rev. 235-326 (2023), GWU Legal Studies Research Paper No. 2023-07, GWU Law School Public Law Research Paper No. 2023-07, <http://dx.doi.org/10.2139/ssrn.4360175> accessed 5 March 2025.

In addition to the above issues, an additional concern is that private individuals use will have drastically limited options to make cash transactions (see subsection 2.2.2 of this article).

1.3. Innovation and efficiency

It is proposed by the BIS, the chief international policy maker in this area, that if the given jurisdiction does not evolve with the new aspects of FinTech, then 'users may adopt other, less safe instruments or currencies.'[37] The main argument presented by BIS is that it would, consequently, lead to consumer harm and damage the monetary and financial stability. Ultimately, the entire idea of CBDC relies on competing with alternative, privately issues cryptocurrencies, and preventing them from gaining further popularity and growing stake in payments. But, can we really say based on the monetary policy outcomes following the 2008 Global Financial Crisis that central banks fulfilled their functions successfully? And, if the answer is no, is it really a sensible next step to equip them with additional responsibilities and functions? Or should we aim at more transparency and accountability as a first step?

Innovation and competition play a significant role within the financial system due to FinTech constantly evolving. It is argued that banking systems seem to 'lack innovation.'[38] Hence, the need for governments to implement CBDCs within their jurisdiction in order to not be left behind, and 'for a better optimisation of the payment's ecosystem, innovative implementations of novel technologies need to be introduced to the general public.'[39]

Conversely, rather than following the 'trend', assessing the given jurisdiction and how its financial system operates is more optimal to conclude whether such a new form of monetary payment will be beneficial. Moreover, the government is concerned with big tech companies creating their own digital currency, which would 'enable them to accrue excessive market power.'[40] Facebook's diem was an example of this, yet regulatory bodies have prevented it

[37] BIS (no 22).
[38] Vu Minh Ngo, Phuc Van Nguyen and others, 'Governance and monetary policy impacts on public acceptance of CBDC adoption' Research in International Business and Finance 64, 5.
[39] Andrei-Dragos Popescu, 'Central Banks Digital Currency – opportunities and innovation' (Academia, 2021) <https://www.academia.edu/51394472/Central_Banks_Digital_Currency_Opportunities_and_Innovation> accessed 5 March 2025.
[40] Economic Affairs Committee, 'Central bank digital currencies: a solution in search of a problem?' (House of Lords Paper 131, 2022), 9 <https://publications.parliament.uk/pa/ld5802/ldselect/ldeconaf/131/131.pdf> accessed 5 March 2025.

from developing further.[41] Thus, the argument for developing a digital currency to protect consumers and financial stability seems far-fetched.

1.4. CBDC models

As already mentioned above, there are two potential forms of CBDC which may be utilised if or when enforced: 1) wholesale (w-CBDC) and 2) retail (r-CBDC).[42] The design of the CBDC will depend on the intentions of each government, legislator, and central bank. However, the importance of international policy recommendations and the potential benefits of international harmonisation and cooperation cannot be underlined enough.

The idea of a wholesale CBDC is to be adopted by financial intermediaries regarding wholesale transactions.[43] The ideology behind the concept 'is to allow banks to extinguish debts between each other resulting from the build-up of credit risk between them.'[44] Inferring that blockchain will allow for real-time and atomic settlement, such as if one transfer does not happen, the other follows suit; both depending on each other.[45]

W-CBDC's narrative allows for a more 'business as usual' perspective, which infers from the three found prongs.[46] The first factor argues that central banks understand the notion of issuing digital liabilities.[47] However, current projects[48] regarding w-CBDC revolve around their rationale under distributed ledger technology (DLT) and its understanding in terms of 'domestic or cross-border interbank payments.'[49]

Thus, linking to the second perspective, due to w-CBDC focusing more on interrelations, the 'scope of its users is narrow.'[50] Therefore, it is argued that by keeping the

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[41] Anon, 'Facebook-funded cryptocurrency Diem winds down' (BBC, 1 February 2022) <https://www.bbc.co.uk/news/technology-60156682> accessed 5 March 2025.
[42] See, for example, Roosebeke and Defina (no 19). See also EU Blockchain Observatory and Forum (an Initiative of the European Commission), 'Central Bank Digital Currencies and a Euro for the Future', p. 7, 2021, <https://blockchain-observatory.ec.europa.eu/document/download/c31b292a-767c-4537-98a6-21b956055099_en?filename=EUBOF-report-on-a-Digital-Euro-2906.pdf>, accessed 5 March 2025.
[43] BIS (no 22) 5.
[44] George Calle and Daniel Eidan, 'Central Bank Digital Currency: an innovation in payments' (R3 White Paper, 2020) <https://cointhinktank.com/upload/CBDC%20-%20an%20innovation%20in%20payments.pdf> accessed 5 March 2025.
[45] Ibid.
[46] Phoebus L. Athanassiou, 'Wholesale central bank digital currencies: an overview of recent central bank initiatives and lessons learned' (ESCB Legal Conference, 2020) 191 <https://www.ecb.europa.eu/pub/pdf/other/ecb.escblegalconferenceproceedings2020~4c11842967.en.pdf#page=192> accessed 5 March 2025.
[47] Ibid.
[48] Athanassiou (no 45), see page 192 – Project Stella, Project Ubin, Project Jasper and Project Inthanon-LionRock.
[49] 33 Ibid.
[50] Athanassiou (no 45).

users for CBDC strictly for certain financial institutions (FI), its monetary policy would 'resemble central bank reserves.'[51] Hence, since the reserves were originally held digitally, the term 'business as usual' came into play, as hardly any difference will be noticeable for the FI. Yet, it is acknowledged that DLT is a rapidly evolving technology with many aspects of it to be yet understood. The appealing side of w-CBDC is to improve the existing wholesale financial system by making it 'faster, less costly and safer' rather than creating a 'radical alternative.'[52]

Lastly, due to the narrow scope of its users, the wholesale CBDC would be able to 'coexist with existing forms of legal tender money.'[53] Therefore, it is seen as an advantage due to the fewer risks it could pose compared to r-CBDC, such as 'settlement and reducing currency exchange risks.'[54] Henceforth, this article argues that when implementing a CBDC, it is best to choose the 'lesser evil', in this case, w-CBDC. However, it cannot be guaranteed that upon enforcing w-CBDC, central banks could grasp the DLT and would not want to open it to more users, the society.

Retail CBDC is less research-advanced when compared to w-CBDC.[55] Yet, it does not conclude that jurisdictions are not actively working on developing a structure for the development of r-CBDC, as will be seen further in this article regarding China's trials. The purpose of this CBDC has been compromised as follows, firstly, due to less demand and operation of cash, 'digital legal lender money' should be introduced.[56] Secondly, 'providing a backup system will improve the resilience of payments.'[57] Thirdly, to 'promote diversity and sovereignty in payment systems.'[58] Lastly, to 'enhance monetary policy.'[59]

Regarding the ethos of r-CBDC, this article argues that it creates misleading impressions. The reasoning is that financial technology and jurisdictions create the issues that need to be solved. The development of contactless payments has significantly reduced the need

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[51] Ibid.
[52] Athanassiou (no 45).
[53] Ibid.
[54] Athanassiou (no 45).
[55] Calle and Eidan (no 43), 6.
[56] Romain Baeriswyl &others, 'Retail CBDC purposes and risk transfers to the central bank' (2021, SNB Working Papers) <https://www.snb.ch/n/mmr/reference/working_paper_2021_19/source/working_paper_2021_19.n.pdf> accessed 5 March 2025.
[57] Ibid.
[58] Baeriswyl & others (no 55).
[59] Ibid. See also Yang J, Zhou G 'A study on the influence mechanism of CBDC on monetary policy: An analysis based on e-CNY' PLoS ONE 17(7): e0268471 (2022) <https://doi.org/10.1371/journal.pone.0268471> accessed 5 March 2025.

to use cash, and this was mainly seen during the Covid-19 Pandemic, where long periods of lockdowns and social distancing 'further accelerated the move away from cash.' [60] Many businesses have departed from accepting cash transactions, yet it can be argued that it is not because society has chosen not to pay via cash but rather due to new rules from 'higher-ups'. Thus, arguing that less demand for cash is being imposed on society.

Yet, few core principles have been found, constituting the 'foundation pillars' for r-CBDC. The first principle refers to 'co-existing with cash and other private monies.'[61] This principle is seen as one of the re-occurring risks within the literature, and rightfully so, as r-CBDC can pose the threat of eliminating cash. One proposed solution is to conform r-CBDC as a legal tender.[62] The outcome would allow digital money to be converted into cash, which would 'imply that it will have a stable value.'[63]

The second principle encompasses a 'public-private partnership to avoid harming innovation, efficiency and risk management in the provision of payment.'[64] Inferring that a new process will have to develop between the public and private actors to avoid many risks and potential consequences when handling r-CBDC. This can be seen in the KYC (know your customer) procedures and the 'division of labour between central and commercial banks.'[65]

Lastly, the r-CBDC 'must not interfere with the central bank mandates.'[66] Inferring that r-CBDC's new ledger technology should not negatively impact the central bank's monetary policy's primary objectives, such as stability and inflation. Yet, until the digital currency is implemented, it will be unclear whether financial stability can be impacted. Solutions in the form of 'secure, resilient and adaptable payment infrastructure' must be adhered to in order to limit potential risks.[67]

Therefore, risks and consequences will always depend on the model implemented within jurisdictions, whether wholesale or retail. However, it is crucial to comprehend that each jurisdiction may have different needs and policies. Henceforth, each CBDC may have a unique impact depending on the country. This article will examine three jurisdictions: the UK, the US and China, and their potential framework for CBDCs.

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[60] Anon, 'The impact of Covid-19 on cash' (UK Finance) <https://www.ukfinance.org.uk/news-and-insight/blogs/impact-covid-19-cash> accessed 5 March 2025.
[61] Raul Morales-Resendiz, Jorge Ponce & others, 'Implementing a retail CBDC: Lessons learned and key insights' (2021) Latin American Journal of Central Banking 2.
[62] Ibid.
[63] Morales-Resendiz & others (no 60).
[64] Ibid.
[65] Roosebeke and Defina (no 19) 6.
[66] Morales-Resendiz & others (no 60).
[67] 51 Ibid.

1.4.1. The UK's Legal Framework

It is agreed upon by the government and BoE that a digital pound may be needed due to 'current trends […] and its benefits.'[68] The proposed model encompasses wholesale and retail CBDC which is stated to be introduced due to the changes within payment methods.[69] Inferring that due to FinTech's rapid expansion and development, 'the majority of the money held and used by people in the UK today is not physical 'public money', issued by the state, but digital private money issued by commercial banks.'[70] This can be seen in the increase in the use of smartphones when making payments. Conversely, 'around 1.2 million UK adults still do not have a bank account and one-fifth of people name cash as their preferred payment.'[71]

Henceforth, it is stated that the UK authorities will still hold onto and distribute cash among the public. To protect the said access to cash, detailed provisions have been introduced to the Financial Services and Markets Act.[72] However, it was made clear within the BoE report that 'cash cannot be used in digital transactions […] and if current trends continue, the public's access to, or use of, central bank money will diminish.'[73]

When introducing the benefits of CBDC, which are stated to be in the form of 'innovation, promoting a focus on financial inclusion and better cross-border payments,' this article can deduct who this new form of payment is benefiting; the government and the banks.[74] Loopholes can already be detected regarding cash and whether CBDC will replace it entirely. It can be seen in the previous points and BoE reports which state that cash will be continued until there is no longer a need.[75] The 'but' aspect is a re-occurrence within the CBDC topic,

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[68] Bank of England, 'The digital pound – speech by Jon Cunliffe' (2023, BoE) <https://www.bankofengland.co.uk/speech/2023/february/jon-cunliffe-speech-at-uk-financeupdate-on-central-bank-digital-currency> accessed 5 March 2025; see also *The Virtual Currency Regulation Review*, Paul Anderson (ed.) (Law Business Research Ltd, UK, 6th ed, 2023) 315-340.
[69] Bank of England and HM Treasury, 'The digital pound: a new form of money for households and businesses?' (Consultation Paper, 2023) 11 <https://www.bankofengland.co.uk/-/media/boe/files/paper/2023/the-digital-poundconsultation-working-paper.pdf> accessed 5 March 2025.
[70] Bank of England, 'Do we need 'public money'? – speech by Jon Cunliffe' (2021, BoE) <https://www.bankofengland.co.uk/speech/2021/may/jon-cunliffe-omfif-digital-monetaryinstitute-meeting> accessed 5 March 2025.
[71] Ibid.
[72] Bank of England (no 69); Financial Services and Markets Act (2023 c. 29), Part 2: Access to Cash and Schedule 8-9.
[73] Ibid 10.
[74] Steve Browning, 'Central bank digital currencies: The digital pound' (2023, House of Commons, Research Briefing 9191) <https://researchbriefings.files.parliament.uk/documents/CBP-9191/CBP-9191.pdf> accessed 5 March 2025.
[75] See – Bank of England Digital Pound report and speeches made by Jon Cunliffe.

and this article acknowledges the inevitable that introducing r-CBDC will lead to a cashless society and other risks.

The proposed model for a digital pound states that the 'Bank will be the one to provide digital pound and the central infrastructure, including the core ledger.'[76] Whereas 'private sector companies […] would integrate into central digital pound infrastructure and provide the interface between the Bank and users.'[77] The users will be using 'wallets' in order to 'access' the digital pound, implying being able to make transactions and check their balance.[78] The BoE does acknowledge the potential risk of privacy and trust, which the users may encounter. Hence, it has been stated that the 'identity of users would only be known to their Payment Interface Provider, and neither the Government nor the Bank would have access to […] the user's data.'[79] An exception is attached to this statement, which entails law enforcement agencies being able to access the user's data 'under limited circumstances.'[80] Although it may seem rational and may be compared to the current form of payments and how certain authorities may gain access to an individual's bank accounts, this would differ. Currently, the circumstances of when access can be gained are unknown.

During the Covid-19 Pandemic, Canada threatened to close the bank accounts of truck drivers protesting against mandating vaccines.[81] This raises the question of if the government can close bank accounts and prevent individuals from accessing their money, to what extent would they have access to r-CBDC? Through the bank's core ledger and the new form of money being, potentially, strictly digital and no form of cash, the user could be subjected to the will and actions of the given government if an individual disagrees with them, as per the example of Canada.

Therefore, enhancing this article's chief argument that the 'but' is constantly occurring and may outweigh the so-called benefits.

1.4.2. The US legal framework

[76] Bank of England (no 69).
[77] Ibid.
[78] Bank of England (no 69).
[79] Ibid 12.
[80] Bank of England (no 69).
[81] Matthew Loh, 'Canada says it will freeze the bank accounts of 'Freedom Convoy' truckers who continue their anti-vaccine mandate blockades' (Business Insider, 2022) <https://www.businessinsider.com/trudeau-canada-freeze-bank-accounts-freedom-convoytruckers-2022-2?IR=T> accessed 5 March 2025.

According to the Board of Governors of the Federal Reserve System (Board), the main governing body of the central banking system of the United States (US), the concept of CBDC is seen 'as a new foundation for the payment system and a bridge between different payment services, both legacy and new.'[82] The new form of payment would entail using CBDC for basic purchases and transactions between and for users, businesses, and governments.[83] Inferring that America is striving for r-CBDC and w-CBDC models. On the other hand, political dividedness as to CBDCs is exemplified by a recent executive order by the President of the US prohibiting the promotion, creation, and issuance of CBDCs in the US to protect 'the stability of the financial system, individual privacy, and the sovereignty of the United States'.[84] This however, in line with US constitutional principles, does not prevent Congress from passing legislation that runs against the content of the executive order.

According to the Board, a US digital dollar would 'provide a safe foundation for private-sector innovations to meet current and future needs and demands for payment services'[85] due to CBDC being 'free from liquidity and credit risk.'[86] The statement made by the Board can be argued to be ambitious. Depending on the technology and the design of the CBDC, it is not certain whether digital currencies can be credit and liquidity risk-free.[87] According to the authors of this article, the Federal Reserve's paper also implies that the mechanisms meant to limit liquidity and credit risk related to stablecoins and cryptocurrencies are not yet mastered and may 'present risks to both individual users and the financial system as a whole.'[88]

The same can be argued for CBDC, irrespective of the statement made by the Board that digital currencies can mitigate some of the risks.[89] The aspect of financial stability and the

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[82] Board of Governors of the Federal Reserve System (hereinafter referred to as Federal Reserve), 'Money and Payments: The U.S. Dollar in the Age of Digital Transformation' (2022) 13 <https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf> accessed 5 March 2025.
[83] Ibid.
[84] The White House, Strengthening American Leadership in Digital Financial Technology, Executive Order (23 January 2025) sections 1 (a) (v) and section 5 <https://www.whitehouse.gov/presidential-actions/2025/01/strengthening-american-leadership-in-digital-financial-technology/> accessed 5 March 2025.
[85] Federal Reserve (no 81).
[86] Ibid.
[87] Carola Muller, 'The demand for safe liquid assets and the implications of issuing a Central Bank Digital Currency for bank funding instruments' (Norges Bank, 2020) <https://www.norges-bank.no/bankplassen/arkiv/2020/the-demand-for-safe-liquid-assetsand-the-implications-of-issuing-a-central-bank-digital-currency-for-bank-fundinginstruments/> accessed 5 March 2025.
[88] Federal Reserve (no 81) 14-15. See also Wilmarth, Arthur E., 'We Must Protect Investors and Our Banking System from the Crypto Industry' (May 31, 2023). 101 Wash. U. L. Rev. 235-326 (2023), GWU Legal Studies Research Paper No. 2023-07, GWU Law School Public Law Research Paper No. 2023-07, <http://dx.doi.org/10.2139/ssrn.4360175> accessed 5 March 2025.
[89] Ibid.

impact it may have on banks when CBDC is enforced is speculated among scholars. Studies show that bank profitability may decrease, and specific steps will have to be taken to keep banks from failing, such as increasing credit rates.[90] Henceforth, although it is unclear whether CBDC will directly impact financial stability, it can be argued that an, at least, indirect impact will occur.

The benefits outlined in the Board's paper, such as 'improvements to cross-border payments and financial inclusion' are the few alleged advantages of CBDCs.[91] Cross-border payments would allow for a more simplified way of distribution; however, the need for international cooperation will be needed.[92] Yet, it is acknowledged by the authors of this article that many countries have expressed willingness to implement w-CBDC. [93] Therefore, international cooperation could be achieved. Considering the latter benefit, lowering transaction costs for more vulnerable households who may not have access to 'traditional financial services' is one way to develop financial inclusion.[94] Per contra, it is difficult to comprehend how households, which do not operate regular Internet banking or even hold a bank account, will be able to understand and use something so complex as CBDC.

Overall, the US does acknowledge the risks that come with CBDC. This article briefly touched upon the safety and stability of the financial system, which the Board paper mentions as a concern, for example, due to the possibility of users converting 'other types of money into CBDC [that] could make runs on the financial system more severe.'[95] One of the solutions to limit that possibility is for a central bank to 'limit the amount of CBDC a user could hold […] or accumulate over short periods.'[96] The statement is a cause for concern, as recognising the power to limit or even withhold funds from a user could set a precedent for other potentially problematic areas. An example was given when analysing the UK's perspective on CBDC and how Canada shut down bank accounts (section 1.4.1). The power to limit the amount accessible of CBDC can be argued to be of similar, if not the same, nature.

Furthermore, problems may occur with monetary policy implementation. This article will go into larger depth in section 2, where the risks of CBDC will be more analysed. However,

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[90] BIS, 'Central bank digital currencies: financial stability implications' (BIS 2021) 6 <https://www.bis.org/publ/othp42_fin_stab.pdf> accessed 5 March 2025.
[91] Federal Reserve (no 81) 15.
[92] Ibid.
[93] Ananya Kumar, Alisha Chhangani & others, 'Central Bank Digital Currency Tracker' (Atlantic Council) <https://www.atlanticcouncil.org/cbdctracker/> accessed 5 March 2025. See – key findings: '130 countries, representing 98 per cent of global GDP, are exploring a CBDC.'
[94] Federal Reserve (no 81).
[95] Federal Reserve (no 81) 17.
[96] Ibid.

regarding the three jurisdictions this article is comparing, the issues seem repetitive. Hence, from the US' perspective, it is argued that CBDC -- whether on a decline which caused an increase in reserves, or an increase, which would have an adverse effect on the reserves -- would have 'little effect on the federal funds.'[97] That being the case, it creates an interesting standpoint, as the Board paper then encompasses the arguments of interest rates on CBDC and how that would complicate the implementation of monetary policy.[98]

In hindsight, the US is still deciphering the risks and benefits of CBDC and the type of design and model for the digital dollar to operate.[99] It has been noted that a UTXO (Unspent Transaction Outputs) data model could be used for CBDC, which would track the transactions and make it more manageable regarding 'facilitating more transactions'.[100] An advantage to this model is that more privacy will be enabled due to 'UTXOs being linked to unique keys.'[101] Henceforth, it would be more challenging to trace the transaction to a specific individual's account, which, if used, would limit the concerns regarding consumer privacy.

Per contra, if the second option of account balances is used for the CBDC model, privacy will decrease, as one person may use only one account for their transactions, allowing for easier traceability.[102] Conversely, 'global account states would make it easier to incorporate transaction programmability.'[103] Implying that the model of account balances would allow for more efficient programming of the CBDC compared to UTXO. Therefore, depending on the model used, it will be necessary to determine how to incorporate safety policies and consumer privacy, which the Federal Reserve has already been looking into.

1.4.3. China's legal framework

The People's Bank of China (PBoC)'s plans of issuing a digital currency date back to 2014.[104] In 2019, the State Council authorised research concerning CBDC; in 2020, a first glimpse of the e-CNY was presented.[105] Trials of the e-CNY have been conducted in four cities in

[97] Federal Reserve (no 81) 18.
[98] Ibid.
[99] The White House, 'Technical Evaluation for a U.S. Central Bank Digital Currency System' (Executive Order 14067, 2022) < https://www.whitehouse.gov/wp-content/uploads/2022/09/09-2022-Technical-EvaluationUS-CBDC-System.pdf> accessed 5 March 2025.
[100] Ibid.
[101] The White House (no 98).
[102] Ibid 33-34.
[103] Ibid.
[104] Jianguo Xu, 'Developments and Implications of Central Bank Digital Currency: The Case of China e-CNY' (2022) Asian Economic Policy Review 17; see also *The Virtual Currency Regulation Review*, Paul Anderson (ed.) (Law Business Research Ltd, UK, 6th ed, 2023) 70-85.
[105] Ibid.

preparation for the 2022 Winter Olympics in Beijing.[106] The trials could be deemed as successful as the usage of CBDC has reached 4 million, with other cities joining the trials and launching CBDC on services such as 'WeChat'.[107] Further success was seen during the Olympics, where a mobile application was launched, and payment cards or wristbands were provided to foreigners, who were also able to 'convert foreign bank notes to e-CNY at self-service machines.'[108]

The model of the CBDC in China is retail, and in order to protect the users, a 'newly revised version of the Law of the People's Bank of China' has been issued.[109] A new principle has been implemented: 'anonymity for small value and traceable for high value.'[110] It is unclear what high value entails for traceability to occur. Yet, it is apparent that compliance with laws and regulations must strictly occur in regard to CBDC.[111] Furthermore, 'safety and convenience' is a principle that ensures the effectiveness of the e-CNY and its swift efficiency in its operation.[112] 'Openness and compatibility' are another prong that ensures that FinTech's competition still occurs by 'evolving with the times.'[113] Hence, it implies that CBDC will still evolve alongside FinTech and its development, which has advantages and disadvantages. In brief, it can be argued that due to the complexity of CBDC, it is unclear which way it would progress and if it would be more beneficial for the people or if it would further divulge persons' privacy.

Yet, an advantage is seen in its compatibility with the current domestic electronic payment system in China. Digital wallets of e-CNY can connect to bank accounts, which can be useful when transferring money and the overall 'interoperability of payment instruments.'[114] Conversely, the connection to a bank account might be seen as a disadvantage as it can be easily accessible by the government and could be closed, as in the case of Canada.

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[106] Franklin Allen, Xian Gu and Julapa Jagtiani, 'Fintech, Cryptocurrencies, and CBDC: Financial Structural Transformation in China' (2022) Journal of International Money and Finance. See – 'CBDCs and China's experience in e-CNY'. Four cities include Shenzhen, Suzhou, Xiong'an and Chengdu.
[107] Ibid.
[108] Franklin Allen & others (no 105).
[109] Ibid.
[110] Franklin Allen & others (no 105).
[111] People's Bank of China, 'Progress of Research & Development of e-CNY in China' (2021, Working group of PBoC) <http://www.pbc.gov.cn/en/3688110/3688172/4157443/4293696/2021071614584691871.pdf> accessed 5 March 2025.
[112] BIS, 'e-CNY: main objectives, guiding principles and inclusion considerations' (BIS papers no 123) <https://www.bis.org/publ/bppdf/bispap123_e.pdf> accessed 5 March 2025.
[113] Ibid 46.
[114] BIS (no 111) 46.

The design of the e-CNY is based on a 'two-tier architecture' that encompasses the PBoC to be 'responsible for issuance and disposal, inter-institution connections and wallet ecosystem management.'[115] Furthermore, PBoC allocates certain commercial banks, whose 'strength is in capital and technology,' to provide e-CNY services.[116] This regime promotes financial stability by ensuring that 'the market plays a decisive role in resource allocation,' as well as through limiting the risk of a bank crisis, due to commercial banks having a significant role in CBDC services.[117]

The last point can be further seen in the BIS report's 'financial inclusion' section. It was acknowledged that individuals within rural areas with poor connectivity, services and lack of banks would still be able to apply for a wallet without needing a bank account.[118] A particular 'offline payment function' will allow people to enjoy still using the e-CNY even with a poor network.[119] Therefore expanding financial inclusion.

In addition, the prospect of e-CNY 'lowering costs and improving affordability […] reduces the burden on the real economy and optimises business environment.'[120] The PBoC has revealed that it will not charge 'authorised users or individual users' for exchange services.[121] Henceforth, encouraging people that e-CNY is a better alternative and should be fully adopted within society.

On the other hand, all the advantages may seem too good to be true. In relation to the wallet, terms such as 'quasi-account-based' and 'loosely coupled with bank accounts' have been used to describe the relationship 'between the owners of money and third-party gatekeepers.'[122] Inferring that the assets held in the wallets are, essentially, under the control of the 'gatekeeper' (also addressed as a financial custodian), who is the one in control of the mentioned assets.[123] The same issue arises regarding transactions, as it is unclear whether permission would be needed when making transactions from the custodian or if it would only be needed where the

[115] Ibid. See 'E-CNY Design' 46.
[116] BIS (no 111) 46.
[117] Ibid.
[118] BIS (no 111) 47.
[119] Ibid.
[120] BIS (no 111) 47.
[121] Ibid.
[122] Geoffrey Goodell and Hazem Danny Al Nakib, 'The development of Central Bank Digital Currency in China: An Analysis' (Systemic Risk Centre, 2021) 5 <https://www.systemicrisk.ac.uk/sites/default/files/2021-12/2108.05946.pdf> accessed 5 March 2025.
[123] Ibid.

transaction exceeds a certain amount.[124] That being the case, there is a clear distinction between cash and its ownership versus CBDC and its ownership.

Therefore, it can be argued that China is significantly ahead of other countries concerning CBDC and has conducted successful trials. Advantages of the e-CNY have been identified, and this article praises China for thinking forward and wanting to limit some of the risks and issues that CBDC pose. But other aspects create doubt and seem to have consequences of their own, which will be further analysed in section 2.

2. Systematisation of CBDC risks

In this section, the risks, which were briefly mentioned in the previous sections of this article, will be further developed and analysed. We develop a systemisation of those risks along the lines of the following three categories: 1) high risk, 2) medium risk, and 3) low risk.

Due to the time and space constraints of this article, only two risks per category will be studied. Under the 'high risk' category, we analyse the issues of financial systemic stability and privacy concerns. The selection of these two top risks is based on the existing literature (see section 2.1) as well as on recent events, namely, the 2023 US FinTech bank failures as well as concerns related to data security and data management.[125] Under the category, 'medium risk' we examine the different risks of implementing w-CBDC or r-CBDC models considering their technological design too, and how CBDC can potentially lead to a cashless society in the long run.[126] Under the category, 'low risk', we examine some more nuanced issues related to CBDCs, such as any potential impact on financial inclusion and competition. While this systematisation of CBDC-related risks is far from providing an exhaustive overview, it is helpful to inform both policy makers and the public of the undeniable and unresolved issues with CBDCs, a topic that should be discussed ex ante instead of being treated as something to be resolved later, already in the process of implementation.

The rapid development and increasing reliance on artificial intelligence (AI) has added a further dimension to the risk-mapping developed in this article. Last year, the EU AI Act was

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[124] Goodell and Al Nakib (no 121) 5.

[125] Radanliev, P. 'Review and Comparison of US, EU, and UK Regulations on Cyber Risk/Security of the Current Blockchain Technologies: Viewpoint from 2023' Rev Socionetwork Strat 17, 105–129 (2023) <https://doi.org/10.1007/s12626-023-00139-x > accessed 5 March 2025.

[126] Emilios Avgouleas, William Blair, 'A critical evaluation of Central Bank Digital Currencies (CBDCs): payments' final frontier?' Capital Markets Law Journal, Volume 19, Issue 2 (April 2024) 103-112 <https://doi.org/10.1093/cmlj/kmae002> accessed 5 March 2025 ('essentially CBDCs will act as a replacement of fiat money').

passed, and most probably, other jurisdictions will follow suit with similar statutory frameworks aiming at tackling AI-related risks.[127] While the EU is beyond the scope of this article, the EU AI Act is worth mentioning because, similarly to the approach in this article, it builds upon a categorisation of risks, namely 1) 'unacceptable risk, 2) high risk, 3) limited risk, and 4) low risk.'[128] The intended purpose for creating this legislation is set out in a few objectives, which revolve around safety within the market, ensuring EU laws and fundamental rights are protected and, overall, the trustworthiness of AI.[129] AI may occur within CBDCs too (for example, as to smart contracts) and raises further concerns in that context, which will be explained further in this section.[130]

The analysis and systematisation in this article excludes 'unacceptable risks' of CBDCs as those encompass an absolute prohibition of practices that pose a 'clear threat to people's safety, livelihoods and rights.'[131] Due to CBDCs being eventually implemented at some point, it would imply that the government does not infer CBDCs to pose such threats. Nevertheless, according to the authors, some of the risks are simply too high to run, not mentioning the unknown risks inherent to CBDCs as well as the additional non-inherent risks related to the potential abuse of CBDCs, which are beyond the scope of this article.

Finally, the authors acknowledge that CBDCs also raise issues as to monetary sovereignty. For example, just like in case of traditional fiat currencies, globally leading currencies may dictate the technological design of CBDCs (and the design of Distributed

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[127] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) ('EU AI Act') <https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng> accessed 5 March 2025; see The White House, Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence, Executive Order (30 October 2023) <https://www.federalregister.gov/documents/2023/11/01/2023-24283/safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence> accessed 5 March 2025; The White House, Advancing United States Leadership in Artificial Intelligence Infrastructure, Executive Order (14 January 2025) <https://bidenwhitehouse.archives.gov/briefing-room/presidential-actions/2025/01/14/executive-order-on-advancing-united-states-leadership-in-artificial-intelligence-infrastructure/> accessed 5 March 2025; see also state legislation in the US, such as, for example, Utah Artificial Intelligence Policy Act, Utah Code Section 13-2-12 (signed into law on March 13, 2024, and effective May 1, 2024); the UK does not have an AI act as of March 2025, but see UK Government, 'A pro-innovation approach to AI regulation', Policy Paper (3 August 2023) <https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach/white-paper> accessed 5 March 2025; China does not have an AI act but it has been regulating AI since 2021. See also Cyberspace Administration of China, 'Interim Measures for the Management of Generative Artificial Intelligence Services' (AI Measures), Administrative Regulation, People's Republic of China (15 August 2023) <https://www.cac.gov.cn/2023-07/13/c_1690898327029107.htm> accessed 5 March 2025.

[128] EU AI Act.

[129] Ibid 3.

[130] Debanjan Chatterjee, 'Role of A.I. in Central Bank Digital Currency' (The AI Journal, 2022) <https://aijourn.com/role-of-a-i-in-central-bank-digital-currency/> accessed 5 March 2025.

[131] EU AI Act.

Ledger Technology or DLT behind CBDCs) in the future. However, these issues are beyond the scope of the following analysis.

2.1. High risks

The high risks chosen for the purposes of our analysis coincide with the main concerns recurring in the existing literature related to CBDCs.[132] As explained above, we focus on financial stability-related risks and privacy-related concerns under this category.

2.1.1. Financial stability

Views vary regarding how CBDC might impact the stability of the financial sector of a given jurisdiction.[133] The ones with the positive outlook, such as Yang and Zhou argue that CBDC will 'improve the effectiveness of monetary policy' due to more efficient allocation as compared to cash as well as potential GDP growth.[134] Inferring from the scholars' arguments that if CBDC follows the existing rules, such as 'currency issuance,' there will be no detrimental effect on banks in relation to credit.[135] Andolfatto argues that CBDC may 'promote lending activity,' thus having no real threat to commercial banks.[136] India's 'experiment of non-monetization and CBDC' proved that financial stability is not negatively affected.[137]

Bindseil argues that CBDC could make the financial system safer due to 'settling directly in central bank money, [which] significantly reduces the concentration of liquidity and credit risk in payment systems.'[138] He also stated that the importance of larger banks would be

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[132] The White House Report (no 98); BIS (no 111); Urlich Bindseil, 'Central Bank Digital Currency: Financial System Implications and Control' (2020) International Journal of Political Economy 48(4) 307. See – section 2.3 'the impact of CBDC on the effectiveness of monetary policy'.
[133] See, for example, a concise summary of pros and cons of r-CBDCs in Zhang, T, New forms of digital money: Implications for monetary and financial stability (2021) <https://www.imf.org/en/News/Articles/2020/10/30/sp103020-new-forms-of-digital-money> accessed 5 March 2025.
[134] Yang J, Zhou G 'A study on the influence mechanism of CBDC on monetary policy: An analysis based on e-CNY' PLoS ONE 17(7): e0268471 (2022), section 2.3 <https://doi.org/10.1371/journal.pone.0268471> accessed 5 March 2025.
[135] Christian Pfister, 'Monetary Policy and Digital Currencies: Much Ado about Nothing? (2017) Bank of France, Working Paper 642 <https://publications.banquefrance.fr/sites/default/files/medias/documents/dt-642.pdf> accessed 5 March 2025.
[136] David Andolfatto, 'Assessing the impact of Central Bank Digital Currency on private banks' (2020) Federal Reserve Bank of St. Louis, Working Paper 2018-026B <https://s3.amazonaws.com/real.stlouisfed.org/wp/2018/2018-026.pdf> accessed 5 March 2025.
[137] Markus K. Brunnermeier and Dirk Niepelt, 'On the equivalence of private and public money' (2019) National Bureau of Economic Research, Working Paper 25877, 21 <https://www.nber.org/system/files/working_papers/w25877/w25877.pdf> accessed 5 March 2025.
[138] Bindseil (no 131).

limited, which would 'reduce negative externalities that the financial instabilities of banks have on society.'[139] Furthermore, CBDC could resolve the moral hazard issue from the financial system due to the risk-free aspect compared to bank deposits.

However, the risks outweigh the benefits. Upon analysing other academics' arguments, it can be proved to, in fact, have a negative effect on financial stability, as analysed by Bjerg and Nielsen.[140]

The first indication to support this viewpoint is potential bank runs. It is argued by Bindseil that 'during a systemic banking crisis, holding risk-free Central Bank-issued CBDCs could become vastly more attractive than bank deposits.'[141] Inferring that due to the nature of the CBDC and how it would operate, it would 'provide an easily accessible recourse to a safe asset', in consequence, increasing the risk of bank runs.[142] Implying that central banks would not have the time to prepare and 'provide ex-post interventions […] to tackle the crisis.'[143] In earlier years, when FinTech was not so developed, banks usually had a period of a week to limit the damage, as per the Japanese financial crisis.[144] Concluding that CBDC would potentially increase the damage that could be limited in the time of crisis.

More implications arise in the form of 'bank profitability, lending and overall provision of financial services.'[145] As CBDCs can be used as 'interest-bearing substitutes to commercial bank deposits,' the given banks would have to alternate deposit rates and terms of the loans.[146] Therefore, concerns were raised whether the banks' primary source of funding would be replaced, which would lead to a decrease in lending.[147] Hence, in the example of r-CBDC, if households and businesses would replace deposits with CBDC, a 'disintermediation of the banking sector' would occur.[148]

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[139] Ibid.
[140] Ole Bjerg and Rasmus Hougaard Nielsen, 'Who should make kroner? A review of Denmark's National Bank's analysis of CBDC' (2018) CBS, Working Paper <https://researchapi.cbs.dk/ws/portalfiles/portal/58521034/Who_should_make_kroner_CBS_Working_Paper_2018.pdf> accessed 5 March 2025.
[141] Bindseil (no 131) 318. See – 'Bank runs into CBDC'.
[142] BIS (no 89) 12.
[143] Ibid.
[144] BIS (no 89) 12. In the 1990s, Japanese bank deposits fell by 10%; in comparison, the Greek banks in 2010-2016 fell by around 30%.
[145] Ibid 6.
[146] Carapella and Flemming (no 2).
[147] Ibid.
[148] D. Priyadarshini & Sabyasachi Kar, 'Central Bank Digital Currency (CBDC): Critical Issues and the Indian Perspective' (2021) Institute of Economic Growth, Working Paper no. 44, 9 <https://iegindia.org/upload/publication/Workpap/wp444.pdf> accessed 5 March 2025.

Potential solutions to this problem entail 'refinancing itself via wholesale funding markets or by increasing longer-term deposits,' yet both are considered too costly.[149] Therefore, this article argues that the worst-case scenario would be for commercial banks to cease to operate. As CBDC would be operated by central banks, the high costs commercial banks may have to undertake may not be feasible in the long run. However, if the rest of the world follows China regarding commercial banks having CBDC services, it may solve the issue. Such approach may increase competition for funding too.

In consideration of w-CBDC, the prospect of 'seamless, faster, and cheaper cross-border payments'[150] is seen as one of the chief benefits of CBDCs. However, when also considering the risks to financial stability, this benefit becomes a problem, as one 'poorly designed CBDC issued in one jurisdiction could create financial stability issues in another jurisdiction.'[151] This issue could move to other jurisdictions and, consequently, lead to financial instability across borders.

2.1.2 Financial privacy

The second most high-risk factor in relation to CBDC is privacy. It is argued that the 'success or failure of CBDC adoption is not based on how great the technology is, but it is dependent on the delicate balance between perceived benefits and privacy concerns.'[152] The risk to individuals' privacy is primarily concerned with r-CBDC, as it would 'grant the Federal Reserve unprecedented access to personal information and financial data.'[153] In this case, it is the Federal Reserve; however, it can be implied that banks issuing r-CBDCs will have the same access.

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[149] Kilian Wenker, 'Retail Central Bank Digital Currencies (CBDC), Disintermediation and Financial Privacy: The case of the Bahamian Sand Dollar' (2022) FinTech Journal 1(4) 351 <https://www.mdpi.com/2674-1032/1/4/26> accessed 5 March 2025.

[150] See Emilios Avgouleas, William Blair, 'A critical evaluation of Central Bank Digital Currencies (CBDCs): payments' final frontier?' Capital Markets Law Journal, Volume 19, Issue 2 (April 2024) 103-112 <https://doi.org/10.1093/cmlj/kmae002> accessed 5 March 2025.

[151] Bank of England, 'New forms of digital money' (BoE Discussion Paper, 2021) <https://www.bankofengland.co.uk/paper/2021/new-forms-of-digital-money> accessed 5 March 2025. See – 'Box G' on 'implications for the international monetary and financial system'.

[152] Abdul Jabbar & others, 'Investigating individual privacy within CBDC: A privacy calculus perspective' (2023) Research in International Business and Finance 64, 2 <https://www.sciencedirect.com/science/article/pii/S0275531922002124?ref=pdf_download &fr=RR-2&rr=7f6b3c517c234889> accessed 5 March 2025.

[153] Nerenda N. Atako, 'Privacy Beyond Possession: Solving the Access Conundrum in Digital Dollars' (2021) The Vanderbilt Journal of Entertainment and Technology Law 23(4) 827 <https://scholarship.law.vanderbilt.edu/cgi/viewcontent.cgi?article=1049&context=jetlaw> accessed 5 March 2025.

Accessibility is a significant concern for the users of r-CBDC. Due to DLT, r-CBDC can become 'smart money', which is a programme incorporated into CBDC allowing for 'Federal Reserve (or other government entities) precise control over a retail CBDC.' [154] Therefore, opening the floodgate to many privacy issues. Governmental entities having the ability to access the accounts (wallets) of the users, data sharing, and smart contracts are just a few examples of what it could lead to.[155] All of which would have a detrimental effect on privacy. Smart contracts would introduce the characteristic of AI into CBDC, which would 'generate logic to solve a wide variety of problems.'[156] It has been stated that such technology can be used for 'functions typically carried out by a central bank.'[157] Henceforth, this article argues that not only are commercial banks' services being limited, but soon, there will no longer be a need for employees in central banks. As AI technology advances, even the role and functions of central banks might be challenged by it.

The point raised concerns, as allowing AI to make decisions based on algorithms can lead to 'risks of fundamental rights […] caused by flaws of the design.'[158] An example can be seen in the Tesla car, where the AI self-driving software has been scrutinised for allegedly causing accidents.[159] Thus, the potential use of smart contracts in CBDCs may further erode peoples' privacy. Hence, there is a need for a robust privacy protection framework, especially when considering the implementation of AI algorithms in CBDCs.[160]

There have been arguments where individuals specified that if CBDC brings the benefits of 'convenience, availability, ease of use and credibility,' privacy issues would be forgone.[161] Thus, inferring that many individuals may be satisfied with the development of CBDC if it will enhance their lives and make transactions even easier to use. Conversely, data could be leaked without a proper privacy framework in place, and more severe privacy concerns could arise. An example could be seen in the Facebook-Cambridge Analytica scandal, where persons' data was breached.[162]

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[154] Ibid 833.
[155] Atako (no 152) 833.
[156] Chatterjee (no 129).
[157] Ibid.
[158] European Commission, 'Artificial Intelligence – A European approach to excellence and trust' (White Paper, COM 65, 2020) ch 5, 12. See 'Risks for safety and the effective functioning of the liability regime'.
[159] Edward Helmore, 'Tesla's self-driving technology fails to detect children in the road, group claims' (The Guardian, 2022) <https://www.theguardian.com/technology/2022/aug/09/tesla-self-driving-technology-safetychildren> accessed 5 March 2025.
[160] See the EU AI Act.
[161] Jabbar and others (no 151).
[162] Carole Cadwalladr and Emma Graham-Harrison, 'Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach' (The Guardian, 2018)

A legal framework is needed to limit the government's control and access 'to personal information that invades individual privacy.'[163] This argument can already be attributed to the Federal Reserve report, encompassing the central bank limiting the number of CBDCs per user.[164] Henceforth, analysing the purpose of r-CBDC and how it could lead to a cashless society (seen in the following subsection), it can be concluded that the only payment option would be government-controlled r-CBDC. However, the UK government has publicised that it 'has no plans to program CBDC or restrict how money is spent.'[165]

Yet, the statement can be seen as contradictory, as the BoE has already introduced reports on introducing the digital pound.[166] Therefore, this article argues that a UK CBDC may not be implemented within the next few years, but it will eventually happen. Likewise, other major jurisdictions, such as the EU or China are also looking into implementing CBDC. This is concerning as it may lead to a race to the bottom from a regulatory perspective. Therefore, among the various priorities, minimising of the safety- and privacy-related risks should be prioritised.

A problem may be seen when comparing jurisdictions and what privacy means in a particular country. In China, 'lack of independent judiciary, arbitrary interference with privacy, […] pervasive and intrusive technical surveillance and monitoring, restrictions on internet freedom' are some of the examples of what has been recorded over the years.[167] Therefore, the question can be raised whether the rapid advancement of China's CBDC pilot projects and the consequential increase of government control will ultimately benefit the society. It would further enhance this article's argument that CBDCs' risks are major and should be limited by implementing legal reforms as to restricting the access governmental entities would have.

Overall, the interpretation, prioritisation, and regulatory responses to these serious issues depend on each society's and government's approach to privacy and governmental control. And in those respects, there are greater differences between the US and the UK versus China. And there might be a generational dimension to these issues too; younger generations

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<https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influenceus-election> accessed 5 March 2025; Toni Anhert and others, 'The digital economy, privacy, and CBDC' (2022) Working Paper No 2662, 2 < https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2662~fa8429a967.en.pdf> accessed 5 March 2025.

[163] Atako (no 152) 834.

[164] Federal Reserve (no 81) 17.

[165] UK Parliament, 'Government Response (Parliament petition, 2022) <https://petition.parliament.uk/petitions/624159#:~:text=The%20government%20has%20no%20plans,restrict%20how%20money%20is%20spent.> accessed 5 March 2025.

[166] Bank of England and HM Treasury (no 54).

[167] Nicola Newson, 'China: Allegations of human rights abuses' (House of Lords Library, 2022), Chapter 1 <https://lordslibrary.parliament.uk/china-allegations-of-human-rights-abuses/> accessed 5 March 2025.

who have been raised while being exposed to social media and the internet might be less sensitive to (and perhaps less knowledgeable about) privacy than previous generations.[168]

2.2 Medium risks

The subsequent risk category is classed as 'medium', implying that the following risks still hold great concern but have not been stated or repeated as such in the literature. This article acknowledges two medium risks: 1) the design and model of CBDC and 2) a cashless society.

2.2.1 Model and design of CBDC

The adaptation of CBDC and its model will, ultimately, depend on the central bank as well as the given jurisdiction's view of what the public may need and how this correlates with the overall competition.[169]

As seen in previous sections, there are two types of CBDC: retail and wholesale. Both have risks, which may intertwine with one another, as analysed in subsections 2.1.1 and 2.1.2. However, the concern arises with the design used for either of the models. Central banks will have to 'determine whether CBDC should be based on distributed ledger technology [DLT] or the traditional Central Bank infrastructure.'[170] The DLT-based CBDC is not yet developed within the UK or the US, and 'problems such as inconsistent technical standards and technical scalability issues' still occur.[171] Entailing that the 'system's ability to increase or decrease in performance and cost in response to changes in application and processing demands' is not working accurately.[172] Consequently, the DLT design will not be able to protect users' privacy if virtual wallets become hacked, inferring that 'asset loss may occur.'[173]

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[168] See Zhong, B., Sun, T., Zhou, Y., & Xie, L., 'Privacy matters: reexamining internet privacy concern among social media users in a cross-cultural setting' Atlantic Journal of Communication, 32(2) (2022) <https://doi.org/10.1080/15456870.2022.2099548> accessed 5 March 2025; see also Li, Y., Rho, E. H. R., & Kobsa, A., 'Cultural differences in the effects of contextual factors and privacy concerns on users' privacy decision on social networking sites' Behaviour & Information Technology, 41(3) (2020) <https://doi.org/10.1080/0144929X.2020.1831608> accessed 5 March 2025.

[169] Peterson Ozili, 'Central Bank Digital Currency research around the World: a review of literature' (2022) Journal of Money Laundering Control <https://mpra.ub.unimuenchen.de/111389/1/MPRA_paper_111389.pdf> accessed 5 March 2025. See chapter 3.4, 'The design of CBDC'.

[170] Ibid.

[171] David Lee and others, 'A global perspective on central bank digital currency' (2021) China Economic Journal (14)(1), 60 <https://www.tandfonline.com/doi/full/10.1080/17538963.2020.187027> accessed 5 March 2025.

[172] Anon, 'Scalability' (Gartner Glossary) <https://www.gartner.com/en/information-technology/glossary/scalability#:~:text=Scalability%20is%20the%20measure%20of,application%20and%20system%20processing%20demands.> accessed 5 March 2025.

[173] Lee and others (no 171).

Moreover, due to CBDC being a new form of money, there has yet to be a legal framework to accommodate CBDC or its principles. In relation to the UK, the BoE has released a report stating that 'the current regulatory framework may need adjustment.'[174] Therefore, current loopholes would need to be addressed and correspond with any legal privacy issues when creating the design of the CBDC. Due to the nature of DLT-based CBDC, the regulations would also need to be under constant review, especially if the model of CBDC is wholesale.[175] Due to w-CBDC being connected to other financial institutions internationally and on a possible global scale, the 'international dynamics [may] change the central bank digital currency landscape.'[176]

The US has analysed other options for the design of CBDC, namely, centralised ledger and not having a ledger.[177] The first option is argued to be the easiest in terms of efficiency and functionality due to its operation being similar to today's transactions, as per the White House report.[178] However, the similarity can also cause 'implications for payment innovations and consumer protection,' as it would not allow CBDCs' full potential due to its complex programmability.[179] Additionally, fraud is common in the banking sector; hence, having a comparable system for CBDC cannot be deemed as secure.

The second option entails not having a ledger, which would decrease privacy concerns due to there being 'fewer places where sensitive financial data could be accessed.'[180] Conversely, the few places in which the data would be stored are not specified and cannot be argued to be safe either. It can be speculated that the storage would be similar to the one's banks operate in today, yet it is unclear how it would work with CBDCs.

Further implications would occur without having a ledger, as CBDC users would not be able to access all of its features, creating difficulty in resolving any potential issues.[181] Likewise, distrust may arise in the early phases of CBDC and its efficiency in operating if there is a 'lack of any historical ledger directly tied to the core of CBDC system.'[182] Per contra, not

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[174] Bank of England, 'Central Bank Digital Currency: Opportunities, challenges and design' (Discussion Paper, 2020) 29 <https://www.bankofengland.co.uk/-/media/boe/files/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design.pdf > accessed 5 March 2025.
[175] Ozili (no 169).
[176] 152 Ibid.
[177] The White House, 'Technical design choices for a U.S. Central Bank Digital Currency' (Executive Order 14067, 2022) 28 <https://www.whitehouse.gov/wpcontent/uploads/2022/09/09-2022-Technical-Design-Choices-US-CBDC-System.pdf> accessed 5 March 2025.
[178] Ibid.
[179] The White House (no 177) 28.
[180] Ibid.
[181] Ibid.
[182] Ibid.

having a ledger would be a silver lining to the privacy issue and could 'increase adoption of a CBDC among the unbanked and underbanked.'[183] Yet, in the case of adopting a CBDC, this design option seems highly unlikely. In the light of things, r-CBDC is arguably implemented in order to control society financially due to the government's extensive control over it, which is 'not compatible with economic or political freedom.'[184]

In addition, the use of smart contracts, which would be an AI-operated system, also brings risks to the CBDC design. The algorithms could be utilised in 'regulation, politics, judiciary and law enforcement,' which creates an entirely separate risk of its own.[185] However, it is crucial to recognise how the potential algorithms can significantly impact the economy and the law in general. The issue would arise as to who would be held liable for potential financial crisis or any other flaws in the law.

Henceforth, this article argues that the design of CBDC largely impacts the overall functionality of CBDC and how it can have a domino effect on the risks. Depending on what type of model the governments will choose and the design of it, risks will slightly differ, but the majority of it will stay the same: privacy, financial instability and so forth. The situation that will most likely occur is that a DLT-based CBDC will be implemented in a few years' time with an amendment to the legal regulatory framework.

2.2.2 A Cashless society

A cashless society has been slowly introduced to the world over the past few years. However, the most radical changes could be seen during the COVID-19 Pandemic, where the use of cash has been limited due to the threat of disease transmission through cash. Hence, CBDC is seen as one way to tackle this issue if the threat ever repeats.[186] In light of today's society, the demand for physical cash is slowly deteriorating due to FinTech providing efficiency and convenience in making fast payment transactions. However, an 'entirely cashless society is not viable unless several barriers are addressed.'[187] The mentioned barriers can indicate how

[183] The White House (no 177) 28.
[184] Norbert Michel, 'Central Bank Digital Currencies are about control – They should be stopped' (Cato Institute, 2022) < https://www.cato.org/commentary/central-bank-digitalcurrencies-are-about-control-they-should-be-stopped> accessed 5 March 2025.
[185] Chatterjee (no 129). See – 'Algorithmic Governance'.
[186] Cigdem Yilmaz Ozsoy, 'Covid-19 Pandemic and central bank digital currency as the future of money' (2020) Journal of Economics and Public Finance Business 3(1) <https://dergipark.org.tr/en/download/article-file/1149340> accessed 5 March 2025.
[187] Kevin Rutter and Morten Wilhelm Winther, 'Is a Cashless Society Achievable?' (2019) Journal of Investing 28(3) 78

CBDC technology needs to be developed in order for it to prosper and possibly substitute cash one day.

However, the development of that technology is not something that society should look forward to. 'The elimination of cash […] would pose a challenge for Central Bank […] and may compromise privacy.'[188] The first factor implies risks already analysed in this article, such as having a negative impact on financial stability, whereas the latter infers that a cashless society may 'create an abusive police state.' [189] This article has already acknowledged circumstances in which this may be a possibility: see the Canadian example of closing bank accounts.

China's advance in FinTech and the introduction of e-CNY have changed the 'sociocultural dimensions of privacy and surveillance.'[190] But China's perspective on privacy was already very different from the UK or the US perspective, as it has been stated that the 'Chinese Communist Party knows everything,' therefore people might be less concerned whether the Government looks into their private data because nothing out of the ordinary or illegal would be found.[191] Previously conducted interviews indicate the different mindsets and arguments of people who may not see the problem with having no cash and privacy as long as convenience in transactions occurs.[192] Part of Europe experienced communism in the 20th Century, and related research confirms that in those societies individuals wanted to regain their privacy and take back control from the government.[193] This article argues that with the adoption of CBDCs, a cashless society will eventually occur, and people might lose control over their privacy. And that different societies and generation will not perceive this uniformly.

Per contra, literature has shown the benefits of eliminating cash. Financial crime is one of the major advantages of having CBDC: money laundering and tax evasion are just some

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<https://www.proquest.com/docview/2200714081?accountid=14664&forcedol=true&pqorigsite=primo&sourcetype=Trade%20Journals> accessed 5 March 2025.

[188] Sergio Alonso and others, 'Detection of financial inclusion vulnerable rural areas through access to cash index: Solutions based on the pharmacy network and a CBDC' (2020) Journal of Sustainability, Digital Transformation and Fintech: The new challenges of the banking industry 12(18) 4 <https://www.mdpi.com/2071-1050/12/18/7480> accessed 5 March 2025accessed 24 August 2023.

[189] David Warwick, Reducing Crime by Eliminating Cash, (National Council on Crime and Delinquency, 1st ed, 1993) 20.

[190] Gladys Pak Lei Chong, 'Cashless China: Securitization of everyday life through Alipay's social credit system – Sesame Credit' (2019) Chinese Journal of Communication 12(3) 301 <https://www.tandfonline.com/doi/full/10.1080/17544750.2019.1583261> accessed 5 March 2025.

[191] Ibid. 302.

[192] Chong (no 191).

[193] See Svenonius, O., & Björklund, F., 'Explaining attitudes to secret surveillance in post-communist societies' East European Politics, 34(2) (2018) <https://doi.org/10.1080/21599165.2018.1454314 > accessed 5 March 2025.

examples that can be resolved.[194] In addition, as a result of cryptocurrencies entering the market, governments have seen this as a potential threat, with some countries, like China, banning the use and trade of crypto.[195] Hence, many jurisdictions want to introduce CBDC in hopes that people will stray from trading in cryptocurrencies. Yet, the issue of privacy, governmental control and other risks that come with CBDC may have an adverse effect, with more individuals turning to crypto for anonymity.

2.3 Low risks

The presented low risks are the ones that have been identified to bear the least significance in the literature review for risks concerning CBDC, but ones that can be solved if monitored correctly or have a better adaptation system planned.

2.3.1 Financial inclusion in developing countries

Upon analysing the risk of financial inclusion in developing countries, it is crucial to comprehend the meaning of the term 'financial inclusion', which is described by the World Bank as 'access to useful and affordable financial products that meet the needs of the people (transactions, payments, savings, credit and insurance) and is provided in a responsible and sustainable manner.'[196] It is argued that FinTech is aiding in providing 'basic financial services […] to unbanked adults living in remote areas,' however, a type of digital device is still needed in order for it to work, such as a mobile phone.[197]

In relation to CBDC, it is stated that individuals without bank accounts will not necessarily need one, as a 'unique digital ID can be easily created,' which will allow unbanked persons to connect to the financial sector.[198] The ID relates to having digital access to a person's data rather than having a physical copy, which will then be linked with the CBDC wallet.[199] Digital ID brings its own risks, hence why not many countries have it. The UK has released a

[194] Alonso and others (no 189) 4.
[195] Ozili (no 169) 2.
[196] World Bank, 'Financial Inclusion' (World Bank, 2022) <https://www.worldbank.org/en/topic/financialinclusion/overview> accessed 5 March 2025.
[197] Ozili (no 169) 14.
[198] Ibid 16.
[199] Ozili (no 169) 16.

policy paper framework for digital ID because it is 'one of the crucial building blocks for CBDC.'[200]

Inferring that it may be soon implemented in order to enforce CBDC. Conversely, it is stated by the UK Government that this form of ID will not be mandatory. However, with CBDCs being planned to be introduced to society and for it to work, this article argues that it could easily change to compulsory.[201]

It is unclear how the above points are classed as financial inclusion, as it is hard for concepts of digital ID to be implemented in developed countries and seems to take time, as seen in the example of the UK. Therefore, introducing it to countries with low-to-no connectivity, with people who cannot afford basic living necessities yet must have a smartphone, seems too irrational. Moreover, it would not fit the criteria of financial inclusion. This can be seen in the 'Asian and African regions where the benefits of the digital age are not being shared equally.'[202] The disproportion is seen the most in rural areas when compared to that of other regions or even countries, as per the example of Nigeria, where the exclusion rate is 68 per cent even after enforcing the financial inclusion framework.[203] In addition, the poorer areas may experience issues with illiteracy. Therefore, it is unclear whether using something as complex as CBDC would be feasible and easily accessible.

This article argues that CBDC will not be easily accessible or adopted in developing economies, undermining the concept of bringing financial inclusion. Developed economies, such as the UK, are still working on aspects to make CBDC work; hence, it will be uncertain how it will be adopted in big cities with no connectivity issues. Therefore, this article scrutinises the idea of it succeeding in developing countries.

2.3.2 Financial competition and cooperation

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[200] David Birch, 'National Digital ID is a foundation for CBDC' (Forbes, 2023) <https://www.forbes.com/sites/davidbirch/2023/04/26/national-digital-id-is-a-foundation-for-cbdc/> accessed 5 March 2025; Department for Science, Innovation and Technology, 'UK Digital identity & attributes trust framework alpha v2 (0.2), (GOV, 2023) < https://www.gov.uk/government/publications/uk-digital-identity-attributes-trust-frameworkupdated-version/uk-digital-identity-and-attributes-trust-framework-alpha-version-2> accessed 5 March 2025.

[201] Department for Science, Innovation and Technology, 'Enabling the use of digital identities in the UK' Guidance (GOV, 2023) <https://www.gov.uk/guidance/digital-identity> accessed 5 March 2025.

[202] Cicchiello and others (no 9).

[203] Department for Science, Innovation and Technology, 'Enabling the use of digital identities in the UK' Guidance (GOV, 2023) <https://www.gov.uk/guidance/digital-identity> accessed 5 March 2025. But see also J Okoduwa and N Odiboh, 'Nigeria's Financial Inclusion: The Way Forward', KPMG (2021) <https://assets.kpmg.com/content/dam/kpmg/ng/pdf/nigerias-financial-inclusion-the-way-forward.pdf> accessed 5 March 2025.

The last risk that this article introduces is financial competition on a global scale, as well as the impact cryptocurrencies have had on creating CBDC. Competition in FinTech is generally observed as promising; however, it is argued to be a risk in this article.

Upon analysing bank reports on CBDC and why the governments are deciding to introduce this type of new money, the competition factor seemed to be repeating. It was stated that 'motivations for retail CBDC research and development are driven by global trends, but also by country-specific circumstances.'[204] Therefore, inferring that due to other countries, such as China, developing a CBDC and having successful trials, other countries do not want to fall behind. An advantage has been argued for this case, as encouraging competition 'may lead to better access to money, increase efficiency in payments, and in turn lower transaction costs.'[205] Hence, encouraging competition and further development of FinTech would allow for those specific advantages listed to potentially succeed.

On the other hand, this article has argued its case regarding the so-called benefits and how they can be debated to matter less when compared to the risks that come with them. Moreso when, cooperation between jurisdictions is needed for CBDC, such as the wholesale model, to work successfully. The reasoning for this is due to 'cross-border linkages in monetary and payment systems,' implying that if one CBDC failed in one jurisdiction, it could have a domino effect on others, causing market disruption.[206] Therefore, although competition is seen as an advantage, it needs to be treated with care, and each jurisdiction should first examine the demand for cash, its financial stability and monetary policy before implementing digital currencies.

Cryptocurrencies, as stated previously, have been one of the main reasons for CBDCs being potentially introduced across jurisdictions. The development of FinTech have had a significant impact on jurisdictions' monetary policy and financial infrastructure.[207] The rise of crypto was first seen after the 2008 financial crisis due to the failure of the 'trust-based models [which] relied on the Central Bank and other financial institutions' ability not to make the

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[204] BIS, 'Central bank digital currencies: motives, economic implications and the research frontier' (2021) BIS Working Paper no 976, 6 <https://www.bis.org/publ/work976.pdf> accessed 5 March 2025.
[205] Andrew Stanley, 'The ascent of CBDCs' (International Monetary Fund, September 2022) <https://www.imf.org/en/Publications/fandd/issues/2022/09/Picture-this-The-ascent-ofCBDCs> accessed 5 March 2025.
[206] Heng Wang and Simin Gao, 'The future of the international financial system: The emerging CBDC network and its impact on regulation' (2023) Regulation and Governance 22 <https://onlinelibrary.wiley.com/doi/full/10.1111/rego.12520> accessed 5 March 2025.
[207] Hardik Gupta, 'Cryptocurrency to CBDC: The transition of digital currency' (2021) Journal of WTO and International Business 23(4) 56 <http://publication.iift.ac.in/Articles/204.pdf> accessed 5 March 2025.

wrong decisions regarding several aspects of currency and transaction management.' [208] Therefore, cryptocurrencies were created for individuals to secure their money elsewhere rather than in government-held institutions (also being exposed to inflation more traditional currencies are exposed to). Governments have seen this as a form of threat and financial competition which has inspired more research into CBDCs.[209]

Due to many individuals turning to cryptocurrencies, governments have been considering the issuance of CBDCs to bring those persons back into traditional payment and investment frameworks.[210] Yet, the design and features of CBDCs can be dangerous too, as outlined in this article. This article argues that introducing CBDCs, with their significant privacy risks, to combat cryptocurrencies is not feasible.

3. Recommendations for the UK

The last section of this article will discuss potential recommendations for CBDCs in the UK and whether it is feasible to implement them. The focal points of these recommendations will be the design and model of CBDC, as well as how to navigate or limit the risks analysed in the previous sections by implementing the necessary policies and frameworks.

3.1. Recommendations for design and model

In relation to the models of CBDC, this article puts forward its first recommendation that the best option at the moment in time would be to implement wholesale CBDC rather than retail. The reasoning for this is due to the UK's economy and how its citizens operate daily transactions. It is stated that 'cash remains an important payment method in the UK and a critical means of payment for many people'.[211] Therefore, it can be inferred that r-CBDC would not be feasible for the UK at the beginning of implementing CBDC. Due to 'one in five' individuals preferring cash, r-CBDC would eventually remove that possibility of payment.[212]

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[208] See generally Gupta (no 208).
[209] Gupta (no 208), 58. See – Central Bank Digital Currencies, background: '86% of central banks have active research on the feasibility of CBDCs for their economy.'
[210] Radanliev, P. 'The rise and fall of cryptocurrencies: defining the economic and social values of blockchain technologies, assessing the opportunities, and defining the financial and cybersecurity risks of the Metaverse' Financ Innov 10, 1 (2024) <https://doi.org/10.1186/s40854-023-00537-8> accessed 5 March 2025.
[211] Ellen Caswell, 'Knocked down during lockdown: the return of cash' (Bank of England, 2022). See – 'cash remains an important form of money for many' <https://www.bankofengland.co.uk/quarterly-bulletin/2022/2022-q3/knocked-down-during-lockdown-the-return-of-cash> accessed 5 March 2025.
[212] Ibid.

It can be argued that monitoring the economy and the statistics of cash use is recommended, especially if the demand for cash decreases, as this can give the UK government the 'green light' to slowly introduce r-CBDC. Nonetheless, r-CBDC would not be practicable in the future for individuals and their privacy, as examined in section 2.

Yet, in the event that r-CBDC does get implemented, and this article argues to be of a large probability, framework and design are the key issues that would need to be efficiently formed.[213] It was suggested that 'running a pilot programme' would effectively introduce society to r-CBDC and allow the government the necessary information on the probability of implementing it thoroughly and how the market will react.[214] The China trials are the prime example of success in such a programme.[215] Therefore, it is recommended that the UK offer a similar idea to the public to first test out the r-CBDC.

Introducing w-CBDC would allow the UK to adopt a digital pound and use it for cross-border payments without limiting competition and financial innovation. Furthermore, w-CBDC would not restrict individuals' control over their money like in r-CBDC, preventing one of the major risks. For w-CBDC to work, the risks of its design will have to be thoroughly examined and developed in a way that would prevent them from occurring. The BoE has released a report specifying 'potential solutions or technologies' for achieving a w-CBDC, which consists of the system needing to be: 'transparent, available, efficient, atomic and accessible'.[216] Developing such a design will take time to perfect, and AI may be used to make it successful. Thus, raising another recommendation, which is to limit the usage of AI or have a human checking system for any decisions made by it regarding monetary policies or the overall market, as it can have a 'snowball effect on the global economy, akin to market crashes due to algorithmic trading.'[217]

Overall, in the authors' view, it would be better not to implement either of the CBDCs as the risks are too great. However, it is acknowledged that this would most likely not occur due to competition, FinTech and the amount of research already done. Hence, w-CBDC is recommended for the UK to adopt, with an efficient system design and a potential trial to ensure the risks are limited.

3.2. Policy recommendations

[213] Morales-Resendiz & others (no 60) 7.
[214] Ibid 7.
[215] Allen & others (no 105).
[216] Bank of England and HM Treasury (no 68) 63.
[217] Chatterjee (no 129). See – 'Risks of AI'.

Policy and legal frameworks are significant aspects of how CBDC will operate and affect people's daily lives, as seen by the analysed risks. Henceforth, in order to limit the potential risks, a necessary framework is needed.

CBDCs will be classed as a new form of money and payment, therefore, 'arrangement will need to be supported by a commonly agreed governance framework that determines the rules, rights and obligations of all parties.'[218] It is recommended that existing policies are either amended or an additional framework that focuses purely on CBDC is added. However, due to FinTech constantly developing, the policies and/or frameworks should not restrict the ability for that development and competition. Yet, with possible ambiguity, loopholes may be created, which could negatively affect society and their privacy or the government and its ability to govern efficiently.

Moreover, this article acknowledges the need for cooperation between financial institutions and the government for the best and safest adaptation of CBDC. Thus, it is recommended that 'financial and coordination efforts as part of the implementation strategy' should occur.[219] Inferring that 'Central Banks must be best prepared to appropriately respond' to any potential risks and that governmental framework and policies are adequately structured to aid in those circumstances, as per the example of the Covid-19 Pandemic where central banks were not adequately prepared.[220]

Therefore, 'developing rulebooks, contingency procedures and monitoring capabilities can help highlight these challenges.'[221] As stated previously, a trial could help indicate where the framework is weak and may need a more specified provision or an additional monitoring and/or checking system.

Concluding that with a safe model and design, adequate policy and legal framework, as well as cooperation between financial institutions and the government, which would create a basis for a monitoring system, CBDC could limit the major risks. However, until that is correctly established, no CBDC should be implemented in the UK.

Conclusion

[218] BIS, 'Using CBDCs across borders: lessons from practical experiments' (BIS, 2022) 13 <https://www.bis.org/publ/othp51.pdf> accessed 5 March 2025.
[219] Morales – Resendiz and others (no 60) 8.
[220] Central Bank Digital Currencies Working Group, 'Implementing a CBDC: Lessons Learnt and Key Insights Policy Report' (CEMLA, 2020) 25 <https://www.cemla.org/fintech/docs/2020-Implementing-CBDC.pdf> accessed 5 March 2025; Ibid 9.
[221] BIS (no 219) 13.

To conclude, this article has introduced the current legal, regulatory frameworks and potential future models of CBDCs in the selected jurisdictions, the UK, the US, and China. These three very different jurisdictions have developed a variety of approaches as to CBDCs over the past decade with China currently piloting while the US and the UK taking a more careful yet pro innovation approach. The article focused on the potential known and unknown risks CBDCs might create. Due to the rapid growth of FinTech, blockchain technology and privately issued cryptocurrencies, governments have been under growing pressure to issue their own digital currencies, partly, to tackle the risks that privately issued cryptocurrencies may pose to the financial sector's and payment systems' stability.

The article analysed the three major principles proposed by international policy makers, the BIS and the IMF, that need to be considered in the design of CBDCs before they can be implemented in any jurisdiction. Those principles include 1) do no harm, 2) coexistence, and 3) innovation and efficiency. The stated principles reflect a twofold objective: promoting innovation while also protecting the integrity and stability of the financial and monetary system.

The article then turned to the analysis of the two chief models of CBDC, 1) wholesale CBDC and 2) retail CBDC, from the point of view of a variety of selected risk factors. The first model regards wholesale transactions between financial intermediaries, thus promoting inter-relations and posing fewer risks to an individual's privacy. However, risks still occur with this model, as accurate design and framework need to be created and co-exist with this model in order not to disrupt financial markets, monetary and payment systems. The latter model relates to persons' daily transactions, and governmental access to those transactions and personal data. This model gives rise to known and unknown risks and privacy concerns which may be more significant in the US and the UK due to their legal, economic, and social traditions compared to China.

By analysing other jurisdictions and their views on CBDC, this article concludes that compared to the UK, it is crucial to look at the given country's political and economic system and social traditions, the way it operates and what legal concerns may emerge. For example, in China, the benefits of CBDC, such as efficiency and convenience, seem to outweight privacy concerns. Therefore, each of the selected jurisdictions seem to represent a distinct approach.

In consideration to the UK, this article has given its recommendations based on the analysis done. It is argued that CBDC will most likely be implemented within a few years in the UK. Yet, policy and framework need to be updated and upgraded to encompass all of the

relevant information on CBDC, and to keep up with exponential technological developments in this area. While this article has highlighted and systematised the main inherent risks of CBDCs, a major risk, the potential abuse of CBDC has not been analysed as that would deserve separate research.

Overall, this article recommends that, if implemented at all, a wholesale CBDC should be introduced in the UK first. This may reduce some of the risks mentioned in the article as well as privacy concerns. The article makes a case against the introduction of a retail CBDC and a cashless society in the UK at this point. The authors conclude that the literature remains in dept to explain the overwhelming benefits of the introduction of CBDCs. The known and unknown risks, in particular a potential loss of financial privacy, even a loss of agency over payment decisions in case of AI-based CBDC functions, clearly outweight the potential benefits. Yet, the authors do acknowledge the likelihood of CBDCs being adopted in the not-so-distant future in the UK. Hence, this article focused on a realistically achievable objective under the circumstances with the hope that it will generate more debate in the literature and that no CBDC, wholesale or retail, will be implemented *before* addressing the serious risks this concept entails.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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