TOKENIZED FINANCE AND MONETARY LAW; THE EVOLVING ROLE OF THE CENTRAL BANK IN THE AGE OF DIGITAL CURRENCY

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ABSTRACT

This thesis attempts to examine the motivations of the central bank and the state in the adoption of a sovereign backed Central Bank Digital Currency (CBDC). We sought to answer the question- what central bank roles will be mostly affected by the adoption of a sovereign backed digital currency. Since any motivations for the adoption of this new form of currency are sure to reflect in its eventual design, we argue that without the intervention of the law at this **crucial** design stage, any such currency is very likely to be unfavourable to the money users. We justify this by investigating the role played by the law in guiding the evolutionary trajectory of the central bank and monetary affairs generally. Our investigation revealed that money and the law evolved alongside economic development and the inherent complexities in trade and exchange. Our investigation also revealed that the concept of monetary sovereignty is more flexible and dynamic than originally imagined as the sovereign has from time to time, been known to increase or decrease the sphere of influence of its monetary sovereignty as the case requires.

To analyze the motivations of the central bank, we take our legal vantage point from the field of monetary law and examine the different theories of money and assign these theories to the different participants in the monetary affairs within a state, to wit: the money users (the citizens and household), the money managers (the financial intermediaries and banks) and the money makers (the government and the central bank). Our analysis revealed that the different participants in the monetary affairs within the state have different motivations, concerns and uses for money. However, the current architecture of the monetary and payment system tends to favour the money managers disproportionately. Our analysis revealed further that the Societary theory of money, which favours the money users, is not given enough recognition in the current design of money and currency. We conclude that the option to adopt a CBDC provides a unique opportunity for the state to overhaul the current monetary and payment system and replace the same with a system that recognises the empirical legitimacy of money that we conveniently describe as the "democratization of monetary policy". This is particularly important at a point in time where we are gradually moving away from legacy monetary infrastructure and where private virtual currencies are gaining notoriety. We believe that a re-evaluation of the current architecture of money and the payment systems will lead to the emergence of new roles for the central bank as distinctions between certain traditional roles become blurry and new roles emerge.

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CHAPTER 1: Introduction

1.1. Background to the Study

A couple of years ago, it was 'quiet' here in Canada. It was so quiet that it was relatively easy to perceive the essence of central banking and monetary laws. Perhaps, it was not until the series of market reactions following the emerging developments in the '*Crypto-sphere'* that we perceived the faintest hints of a revolution against our understanding of monetary law. More so, the recent announcement by the Bank of Canada on the point that- '*Canada is exploring options for launching its own digital currency'* has generated a 'clamour' for the appropriate legal/regulatory framework for the issuance of digital currency through the Bank of Canada.

This request for an appropriate regulatory response reverberated globally and multiple approaches and proposals have been developed on the best ways of adopting a digital currency that is backed by the sovereign government. Some proposals are even being tested at the moment.[1] Presently, the legal and regulatory approaches that are likely to be adopted will be tied closely to the design of the Central Bank Digital Currency (CBDC) that is to be adopted. The options being reviewed presently include Token or Account based CBDC, Wholesale or Retail/General Purpose CBDC, and Direct/1-tier or Indirect/2-tier CBDC. Regardless of what option is selected, it is believed that any set of CBDC designs will require a re-imagination of the current statutory roles and policy directives of the traditional central bank.[2]

For example, adopting a token-based retail CBDC might require granting public access to the central bank's books. A privilege which hitherto was left to an exclusive list of commercial banks,

[1] E.g., China has developed a pilot test for the issuance of its digital currency known as the Digital Currency Electronic Payment (DCEP). For more on this, see: RT News "China to give away over $6mn in digital currency during Lunar New Year in massive e-yuan trials" (18th February 2021) online: RT News https://www.rt.com/business/514875-digital-yuan-lunar-year-tests/.

[2] The Federal Reserve Bank has indicated that operating under the current monetary policy framework, 'the introduction of a CBDC could impact monetary policy implementation and interest rate control by changing the supply of reserves in the banking system, and the potential for substantial foreign demand for CBDC could further complicate monetary policy implementation; changes in interest rates and other market factors could also affect public demand for a CBDC over time'. See research report by the Board of Governors of the Federal Reserve Systems, "Money and payments: the US Dollar in the Age of Digital Transformation" (2022) Research and Analysis. Online (pdf): https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf.

other financial institutions (both popularly known as financial intermediaries) and state/provincial authorities. This situation is also strange to central banking law as nowhere is it reflected in any case law, statutory provision, or central bank regulation/directive in Canada or elsewhere; that the central bank is allowed to deal 'directly' with the public in executing its monetary policy objectives. More so, it is also possible that through digitalisation of currency and monetary policy, the central bank as an institution might be reduced to a mere database comprising of the central bank's balance sheet and numerous ledgers. If this radical change to the operations of the central bank is the future of central banking in a digital age, it automatically means that any central bank that intends to hold on tightly to its traditional roles and responsibilities would either need to evolve to remain relevant or become superfluous. This begs the question, what happens to monetary sovereignty if the central bank becomes obsolete? Before this question can be answered, it is important to understand why monetary sovereignty is so important.

1.2. Identifying the Role that the Law Plays in the Evolution of Money; Is the Law an Active Tool for Monetary Advancement or is it just Catalogue for Monetary Innovation?

Is it fair to state that it all begins with monetary sovereignty? When we think about money, the first thing that comes to mind is cash or 'paper alchemy'- paper money possessing a pictorial or symbolic representation of sovereign might and authority. However, before the advent of paper money and even *fiat* money, there existed acceptable items of exchange. These items ranged from precious metals like gold or silver to valuable commodities such as tea leaves, seashells, alcohol, silk and other fabrics, food crops, cowries etc. and were exchanged on the collectively accepted value bestowed upon these commodities by the communities within which they are used. The recognition of value during exchanges was based on human nature and our ability to differentiate between fair and unfair exchange/trade.[3] The problem with these commodities was the lack of uniformity and standardisation in a period where the trading landscape was also beginning to expand. The implication of this was that as trade continued to expand, the basket of acceptable commodities began to expand as well, and it became difficult to keep track of how these acceptable commodities would be valued in exchange for other commodities. In essence, it was a typical case of comparing apples to oranges.[4]

[3] Adam Smith identifies the importance of human nature on the emergence of money arguing that "nobody ever saw a dog make a fair and deliberate exchange of one bone for another with another dog." See A. Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations.* Reprint ed (Oxford: Oxford University Press, 2008), at 36-39, at 21.
[4] This will be discussed in more detail in Chapter 2 of this thesis.

The solution to the above problem was to limit the basket of acceptable commodities to precious metals such as gold and silver or to standardize the commodities acceptable for exchange and trade. We believe that this standardisation must have been executed by some form of sovereign decree such that, even without knowing it (i.e. without knowing it at this point in time), monetary sovereignty was being exercised.[5] In the decades to follow, governments began exercising control over monetary affairs within their territory by standardising and nominalising money through the issuance of currency- sovereign backed bank notes and coins. Thus, money became the first nationalised industry. In the words of Thomas Hobbes:

> For gold silver, being, as it happens, almost in all countries of the world highly valued, is a commodious measure of the value of all things else between nations; add money, of what matter so ever coined by the sovereign of the Commonwealth, is a sufficient measure of the value of all things else between the subjects of that Commonwealth…[6]

Thus, the imposition of sovereign might on monetary affairs serves as an example of one of the earliest forms of nationalisation. This period also witnessed its fair share of currency wars and burned through a few monetary standards from gold to fiat currency although most of the world eventually settled on the latter. As fiat currency has no intrinsic value, the sovereign was able to issue and regulate fiat currency at little to no cost and to an extent, the sovereign was even able to regulate transactions involving fiat currency through a combination of commercial law (such as the Sale of goods Act (SOGA[7]) and other legislations) and legal tender or currency laws that ascribe legal tender status to currencies. Case in point, for a contract to fall within the SOGA, said contract must involve a transfer of goods 'to the buyer for a money consideration, called the

[5] In fact, standardisation might have predated monetary sovereignty. For example, historical records show that in Mesopotamia and Mesoamerica, the sovereign entities or authorities were not initially concerned about the standardisation and public supply of commodities used for exchange and trade which, at this point were pure forms of "inside money". However, as taxation and sovereign treasuries and revenue collection became more organised the diversity of these goods and the value exchange asymmetries, they provided forced the sovereign to enter the arena of private money and standardization of money became important. See Charles Goodhart, "The Two Concepts of Money. Implications for the Analysis of Optimal Currency Areas." (1998) 14 European Journal of Political Economy 407-432, at 412.

[6] Thomas Hobbes, *Leviathan* (1962) (Toronto: Simon and Schuster Publications, Touchstone publications Limited 2008) at page 195. Thomas Hobbes also plays a role in our recommendations concerning the "smart social contract" to address programmable money in chapter 4 of this thesis.

[7] *Sale of Goods Act*, RSO 1990, c S.1

price'.[8] Where the consideration that is transferred from the buyer is not 'money' (particularly fiat currency), then according to the Act, the contract is one of barter, which does not fall under the scope of the SOGA. By so doing, the law seeks apply a different degree of protection to said transactions and opposed to the mere exchange of goods or barter.

In the above case, the law served as both an active tool for monetary advancement through the SOGA and a catalogue of monetary innovation through the Legal Tender Act. The law has continued to occupy this dual role as a tool and as a catalogue in many arrangements. For example, certain jurisdictions have currency laws that describe the unit and designation of money. As we shall see in the subsequent chapter, most jurisdictions also have bills of exchange, payments, clearing and settlement laws intended to govern all interbank and international payment and settlement activities as well as the clearing and settlements systems utilised in the financial markets.

Simultaneously with the advancements made possible by the above statutory instruments, were the advancements made by the Courts in the interpretation of the above laws to resolve commercial and trade disputes and to broaden the definition of money in such a manner that expands the boarders of monetary sovereignty to include as many monetary or proto-monetary instruments as possible. In the celebrated case of *Perrin v Morgan*[9], Lord Chancellor Viscount Simon, in an attempt to capture all facets of money, including the grey areas left uncovered by statute, opined that:

> … the word 'money' has not got one natural or usual meaning. It has several meanings, each of which in appropriate circumstances may be regarded as natural. In its original sense, which is also its narrowest sense, the word means 'coin.' Moneta was an appellation of Juno, and the Temple of Moneta at Rome was the mint. Phrases like 'false money' or 'clipped money' show the original use in English, but the conception very quickly broadens into the equivalent of 'cash' of any sort. The question: 'Have you any money in your purse?' refers presumably to bank notes or Treasury notes, as well as to shillings and pence. A further extension would include not only coin and currency in the possession of an individual, but debts owing to him, and cheques which he could pay into his banking account, or postal orders, or the like… Sums on deposit, whether with a bank or otherwise, may be included by a further extension, but this is by no means the limit to the senses in which the word 'money' is frequently and quite naturally used in English speech. The statement: 'I have my money invested on mortgage, or in debentures, or in

[8] *Ibid* at section 2.
[9] [1943], A.C. 399 HL (UK), at 406-407.

> stocks and shares, or in saving certificates,' is not an illegitimate use of the word 'money' on which the courts are bound to frown, though it is a great extension from its original meaning to interpret it as covering securities, and, in considering the various meanings of the word 'money' in common speech, one must go even further, as any dictionary will show…

By broadening the definition of money to include negotiable instruments, accounts receivables and securities, Lord Viscount Simon attempted to project the accounting definition of both long- and short-term assets into an expanded definition of money. It is interesting yet unclear where Lord Viscount Simmons got the idea of expanding the definition of money in this manner. Perhaps we can conclude that Lord Simmons was probably inspired by the tenets of the Modern Monetary Theory and state theory of money and also influenced by Keynesian Economics which was gathering steam at that point in time. Whether or not broadening the definition of money in this manner is justified is unknown and may be unknowable. What is known however, is that thus far, it has been impossible to successfully define money and any attempts at defining money might indeed be a futile endeavour. The recommended approach is to define the uses/functions of money, a task which lawyers are not equipped to handle and is better suited to economists who have better success than any other discipline to define this familiar, yet elusive notion called money. Generally, economists define money based on its function: as a medium of exchange, a store of value or wealth and as a unit of account. We will discuss these essential functions of money in Chapter 2. The challenges faced by scholars in arriving at the definition of money did not deter the sovereign from defining its powers over the monetary affairs within its territory.

At some point, it became difficult for the sovereign to monitor the internal monetary affairs within its territory. Monetary affairs became more complicated, and to establish more control over the monetary affairs within its territory, the sovereign began to define its powers to print and circulate money within the State's territory. The sovereign's revenue collection also became organised as revenue became denominated in the sovereign currency (a foundation of modern-day fiscal policy). Institutional minting and coinage of money was developed (the modern-day currency mint) and this minting and circulation of currency became the bedrock of modern monetary policy. As new monetary innovations were being developed such as the issuance, minting/printing and retirement of currency, monetary policy became much more important. However, monetary policy was becoming increasingly complicated and increasingly more so during an economic downturn. During such times, the sovereign, due to desperation may become tempted to exercise powers

beyond its mandate thus disrupting the entire monetary system within the state. Two things became crucial at that point- firstly, it became necessary to be able to challenge the arbitrary exercise of monetary sovereignty through the courts of law. Secondly, it became necessary to ensure that the exercise of monetary sovereignty remained unaffected by political risks.[10]

An example that illustrates the importance of checks and balances in the exercise of monetary sovereignty was during the US Civil War. A time before which the bank notes in circulation were printed by private commercial banks. To fund the Civil War without increasing taxes for tax smoothing purposes[11], a Legal Tender Act was passed, which authorised the issuance $150 million in United States bank notes.[12] This was a strange strategy by the US Government at the time as nothing similar had ever been done before. The Act was challenged in court subsequently.[13] It was only a few decades after that the federal reserve system was adopted in the US. It was also during this period that States where attempting to delegate their monetary sovereignty to an institution called the central bank.

We are currently at a stage where monetary affairs and monetary policy, regardless of inherent complexities, are easier to manage, as monetary sovereignty has been delegated to an institution in charge of managing and regulating monetary policy. Without monetary policy, there would be no standardisation of money and currency. It would also become very difficult to manage interest rates, exchange rates, inflation and liquidity in the financial markets as presently constituted. Monetary sovereignty is also important for government financing. If a state has no exclusive legal control over its currency, it would be impossible for the state to finance its expenses by lending as most states do. The importance of monetary sovereignty cannot be overemphasised as such any threats to monetary sovereignty is never trifled with by the state.

1.3. Central bank Mandate and Monetary Sovereignty; Is Monetary Sovereignty Under Attack?

[10] Save for a few instances where state intervention may be permissible for welfare purposes.
[11] Tax smoothing is an economic theory that analyses the effect of randomly determined tax rates and how this affects the welfare of citizens as well as the productivity of firms.
[12] HR 240, Legal Tender Act, February 25, 1862
[13] *Hepburn v Griswold*, 75 U.S. 603 (1870) this case will be discussed in more detail in the subsequent chapter 2

Contemporaneously with the evolution of money was the evolution of the institution responsible for creating money and managing monetary affairs under sovereign authority known as the central bank. As discussed in the preceding section, the idea of a central bank was an innovation by the sovereign to institutionalise its monetary sovereignty by defining and delegating its powers over the monetary affairs within its territory to a separate institution. The evolution of the central bank is marked with numerous attempts at regulating oversight responsibility over banking operations. This period witnessed the bifurcation of money into central bank money (CBM) and commercial bank money (BM). According to Patricia Pollard, the former includes money created by the central bank under sovereign authority and includes cash in circulation, such as bank notes and coins and central bank book money (reserves) while the latter represents most of the money in circulation in the economy and is usually of two types. One is the money created by the private/commercial banks from the purchase of government securities, proceeds of which are deposited in the central bank. The other is interest bearing loans issued by the commercial bank.[14] Ole Bjerg on the other hand believes that this bifurcation of money is responsible for the arm's length relationship presently in existence between the central bank and citizens.[15] This is discussed in more detail in Chapters 2 and 3.

The relationship between central banking and money can be traced back to the seventeenth century, to the founding of the first recognized central bank known as the Swedish Riksbank. The Riksbank was established in 1668 and was chartered to aid with government financing whilst also serving as a clearing house for intragovernmental transactions. The Bank of England was founded subsequently as an institution whose main responsibility was to purchase outstanding government

[14] Patricia Pollard, "A Look Inside Two Central Banks: The European Central Bank and the Federal Reserve" (2003) 85:2 Economic Research, Federal Reserve Bank of St. Louis, online (pdf): https://files.stlouisfed.org/files/htdocs/publications/review/03/01/Pollard.pdf . For a simplified understanding of central bank and commercial bank money, see speech by Thomas J. Jordan (Chairman of the Governing Board of the Swiss National Bank Zurich) titled "How money is created by the central bank and the banking system" (2018) online (pdf.):
https://www.bis.org/review/r180118c.pdf

[15] See Will Bateman, & Jason Allen, "The Law of Central Bank Reserve Creation" Mod Law Rev, online: <https://onlinelibrary.wiley.com/doi/abs/10.1111/1468-2230.12688>. Hirschberg, E, "Modern Problems of Monetary Law Shorter Articles, Notes and Comments" (1973) 6:2 Comp Int Law J South Afr 272–281, online: <https://heinonline.org/HOL/P?h=hein.journals/ciminsfri6&i=282>. see also, Max Raskin & David Yermack, "Digital currencies, decentralized ledgers and the future of central banking" (2018) Res Handb Cent Bank, online: <https://www.elgaronline.com/view/edcoll/9781784719210/9781784719210.00028.xml>. Bjerg, Ole, *Designing New Money - The Policy Trilemma of Central Bank Digital Currency*, SSRN Scholarly Paper, by Ole Bjerg, papers.ssrn.com, SSRN Scholarly Paper ID 2985381 (Rochester, NY: Social Science Research Network, 2017).

debt securities. The rest of Europe followed suit even though some of these European banks operated under separate mandates. For example, the Banque de France was established in the seventeenth century to stabilize the franc, which was suffering from hyperinflation because of the French revolution.[16] These early central banks (which were mostly incorporated as private companies) issued exclusive private notes which served as currency, and often had a monopoly over such note issue. A monopoly which in most cases was backed and facilitated by the law.[17] This serves as another example of where the law was used as a tool for regulating and controlling monetary affairs.[18]

It is clear from the above that monetary sovereignty and the idea of money existed long before the existence of the modern-day central bank. The modern central bank was established as the institution tasked with the exclusive powers to exercise monetary sovereignty in an increasingly complicated world. It would be difficult if not impossible for the sovereign to both monitor and control the monetary affairs within its territory whilst also actively managing other financial issues like taxation and government spending also known as fiscal policy. As a matter of fact, the separation of fiscal and monetary policy can be traced to the sovereign's need to manage government revenue and government spending without having to concern itself with the additional burden of managing monetary policy which in most cases, and as seen in the preceding chapter, requires a certain degree of independent judgement.[19]

More so, the central bank's independence is firmly rooted in the assumption that economic activities can essentially be divided into two parts: economic cycles and trends. Economists abide by the theoretical beliefs that monetary policy is responsible for stabilizing economic cycles and

[16] Banque de France was established by Napoleon in 1800 to stabilize the currency after the hyperinflation of paper money during the French Revolution, as well as to aid in government finance. See W. Roberds and F.R. Velde, "The Descent of Central Banks (1400-1815)." in M.D. Bordo; et al. (eds), *Central Banks at a Crossroads.*(New York: Cambridge University Press) 18-61, see also R. Edvinsson, T. Jacobson and D. Waldenström, "Introduction" in R. Edvinsson, T. Jacobson and D. Waldenström (eds), *Sveriges Riksbank and the History of Central Banking.* (2018, Cambridge: Cambridge University Press) 1-25, at 8-17.

[17] It should be note that in the U.S in the early 20th century, the regulators arrived at a decision to stop relying on private monetary arrangements ., it was decided in the early 20th century that relying on s is a bad idea. The argument, enshrined in the Federal Reserve Act of 1913, is that, in the absence of a central bank, the financial sector would be unstable and would be insufficiently responsive to fluctuations in the need for financial intermediation.

[18] Micheal Bordo, "A Brief History of Central Banks". (2007) online: Federal reserve bank of Cleveland https://www.clevelandfed.org/en/newsroom-and-events/publications/economic-commentary/economic-commentary-archives/2007-economic-commentaries/ec-20071201-a-brief-history-of-central-banks.aspx

[19] We discuss fiscal and monetary policy at length subsequently in chapters 3 and 4

that fiscal policy is better suited to influencing the trends in government revenues and government spending.[20] Once again, this separation of fiscal and monetary policy was actualised through operation of law, by making use of legal mechanics and statutory instruments to establish and define the roles of the central bank as well as those of the department/ministry of finance/revenue/taxation or any other government agency responsible for government revenue and expenditure.

It is important to note that while the central bank continues to manage monetary policy, a few occurrences have made this responsibility an uphill task in recent times. These occurrences have forced the central bank to evolve and develop innovative solutions to address complex problems. A good example of an uphill task faced by the central bank in exercising monetary sovereignty and controlling monetary affairs occurred during the financial crisis of 2008. This period really tested the existing monetary control tools available to the central bank and also represents an era of increasing central bank responsibilities. During this period, the central bank was forced to evolve and develop new tools to manage monetary policy such as a new form of Quantitative Easing (QE) with a broader focus on ensuring financial stability.[21] According to Benjamin Geva, the most important recent event in the evolutionary trajectory of the central bank is the central bank's responsibility for maintaining financial stability and (systemic) risk management. Both of which emerged at the twilight of the financial crisis of 2008.[22] This crisis stretched monetary regulations thin and once again serves as another example of an instance where monetary affairs were engineered to suit extraordinary circumstances.

[20] Romain Duval, Jørgen Elmeskov and Lukas Vogel "Structural Policies And Economic Resilience To Shocks" (2007), online: OECD Economics department working papers, online (pdf): https://www.oecd.org/economy/growth/38717819.pdf

[21] Quantitative Easing (QE) had been used previously in Japan by the Bank of Japan (BOJ). Under this policy by the Bank of Japan purchased government securities (bonds and treasury securities) as well as other asset backed securities, and equities. By so doing, the Japanese commercial banks were flooded with excess liquidity to promote private lending, leaving them with large stocks of excess reserves thereby countering the risk of subsequent liquidity shortages. It has been argued however that the reason QE was not as effective in Japan 'derives from the habitual tendency by policy makers using QE to buy securities from banks instead of from nonbank private-sector entities (such as nonbank financial firms, nonfinancial firms, households, or foreigners)'. For more on this point see John Greenwood "The Japanese Experience with QE and QQE" (2017) Vol. 37, No. 1 Cato Journal at p. 18., online (pdf): https://www.cato.org/sites/cato.org/files/serials/files/cato-journal/2017/2/cj-v37n1-2.pdf

[22] Benjamin Geva "Systemic Risk and Financial Stability: The Evolving Role of the Central Bank" (2013) 10 Journal of International Banking Law and Regulation 403-417 at 413

Bjerg on the other hand believes that the 'transmission mechanisms' of QE displays the centrail bank's unyielding loyalty to financial intermediaries[23]. Bjerg believes that monetary sovereignty is not actually exercised by the central bank but rather, it is exercised through financial intermediation by the combined activities of the commercial banks (who are involved in money creation), clearing and settling houses and other huge players in the financial markets.[24] In Bjerg's opinion, the moral hazard in the banking sector which contributed to the financial crisis of 2008 exposed the sovereign's unyielding support for private financial intermediaries as a few of these intermediaries were deemed too big to fail. Bjerg believes that there was an opportunity for huge monetary reform in the wake of the 2008 crisis.[25] However, the government issued huge bailouts to erring banks. These bailouts functioned by using CBM to purchase the 'toxic assets' amongst other securities of the ailing banks through a somewhat novel form of Quantitative Easing (QE). Bjerg argues this form of QE is problematic because it transfers the deficit created from the QE expenses to citizens and taxpayers.[26]

In times of crisis, rational investors turn to stable securities like government bonds and commodities such as gold and silver or currencies like the US Dollar. Unfortunately, the crisis of 2008 caused a lot of volatility in the financial markets leaving few places to turn. It was also during this period that the faintest whispers of an emerging virtual currency were perceived.[27] The rationale behind the emergence of this virtual currency was to circumvent both financial intermediation and premiums on payment and settlement services and also the improve on the QE transmission mechanisms by relying on private money arrangements (effectuated through virtual and digital currencies and certain private or open 'ecosystems') and without the intervention of the central bank and financial intermediaries. The reaction by regulators to this development was initially accommodating as they saw no immediate threats to monetary authority and sovereignty. Regulators thought that the increased interest in virtual currency was a sign of investor optimism

[23] Bjerg, *supra* note 14. A **transmission mechanism** is the manner in which QE and other forms of monetary policy are applied to stimulate the economy. Typically, the QE transmission mechanism is engineered to boost the economy in the following ways: portfolio rebalancing, policy signalling, market liquidity and an increased value of financial asset prices. This is discussed in more detail in Chapter 2.

[24] *Ibid.* The commercial banking activities that indirectly empower commercial banks to create money will be discussed in detail in Chapter 2

[25] *Ibid* at 9-12

[26] *Ibid* at p 10

[27] For example, Bitcoin was introduced to the public through a whitepaper in 2008. At the peak of the financial crisis. See Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System." (2008), *Bitcoin.org* online (pdf): https://bitcoin.org/bitcoin.pdf, (accessed on 3 January, 2022).

as a natural progression of the QE that was previously applied. A clear sign that the monetary policy measures were effective. As a consequence of this supposition, virtual currencies remained unregulated to maintain this high sense of investor optimism. Little did regulators know that virtual currencies were one day going to attack the idea of monetary sovereignty and stability.[28]

The first attack came to monetary stability. As the regulated financial markets shrunk, the unregulated crypto and virtual currency markets flourished. This was primarily due to the advantages of transaction ease arising from financial disintermediation. What followed was an increased financial traffic in crypto assets as a lot of fiat currency was being used to purchase crypto assets negatively affecting fiat currencies and monetary stability. Though the volatility of these virtual currencies increased, liquidity was still a problem. Since liquidity was important to counteract volatility, certain ecosystems emerged, which promised more liquidity. Payment efficiency was also facilitated using decentralised ledgers. The attack on monetary sovereignty came subsequently albeit in an indistinct manner.

At first, the attack on monetary sovereignty was not easily identifiable. The attack was subsumed under the attack to monetary stability and exposed how monetary affairs, particularly the exercise of monetary sovereignty relied heavily on financial intermediation. According to Bateman and Allen, the existing legal framework of central bank reserve creation relies heavily on the presumption of financial intermediation. In other words, though the exercise of monetary authority over monetary affairs in a state had been delegated by the state to the central bank, said monetary authority cannot be exercised without transactions between said central banks and financial intermediaries (including commercial and investment banks) in the financial market.[29] The obvious import from this is that legally, the exercise of monetary sovereignty relies heavily on financial intermediation and any threat to financial intermediation is a threat to monetary sovereignty. In essence, the increased appetite for virtual currencies that side stepped financial intermediation was seen as an attack on monetary sovereignty.

[28] It can be argued that even before the threats posed by virtual and digital currency to the idea of monetary sovereignty, monetary sovereignty has been and continues to be challenged by foreign currencies and by certain international and regional organisations responsible for maintaining uniform rules and standards for international monetary economics such as the European Union (EU), International Monetary Fund (IMF) and the Bank for International Settlement (BIS). It may even be said that full monetary sovereignty exists only in those few countries that are not members of the IMF or any other regional or international monetary organisation.

[29] Will Bateman *supra* note 14

Because of the above, governments have begun to explore ways of tackling these threats to their monetary sovereignty (and financial intermediation). Some jurisdictions have begun an aggressive regulatory approach to discourage crypto mining operations.[30] Others are focusing on the adoption of national digital currencies backed by the sovereign government. However, most jurisdictions are doing both i.e., they place heavy regulations on virtual currencies whilst preparing to adopt a national digital currency known as CBDC (this is referred to subsequently in this work as the reverse-reactionary approach to regulation.[31] Numerous governments have touted the potential of adopting CBDC. According to Jack Meaning, notable praises for CBDC range from the obvious, such as the advantages of CBDC over cash, to the more salient benefits such as how CBDC could help with more monetary policy controls particularly in times of crises (through QE to the people and helicopter money).[32] The problem with these advantages according to Bateman and Allen is that the central bank cannot take advantage of these benefits without experiencing a significant change to its core mandates which would have a detrimental effect on the idea of monetary sovereignty as currently understood.[33] More so, Raskin and Yermack believe that the adoption of CBDC will narrow financial intermediation because according to them, CBDC will require public access to the central bank's books, and with this comes the *Gresham's law* problem which is the preference for CBM over BM.[34] Once again, we are faced with another Irony in the form of the central bank's inability to escape financial intermediation.

Geva on the other hand, disagrees with Raskin and Yermack on the narrowing effect of CBDC on financial intermediation. Geva believes that regardless of the challenges that digitisation poses to financial intermediation, commercial banking remains well positioned to take advantage of

[30] John Alun, Samuel Shen and Tom Wilson "China's top regulators ban crypto trading and mining, sending bitcoin tumbling" (24 September 2021), online: *Reuters.com* https://www.reuters.com/world/china/china-central-bank-vows-crackdown-cryptocurrency-trading-2021-09-24/.

[31] A reverse-reactionary approach to regulation occurs where the regulators place extreme regulations in an industry to nationalise said industry. For example, if the government places strict regulations over the telecommunications industry in an attempt to take over the communications industry.

[32] Jack Meaning et al, "Broadening Narrow Money: Monetary Policy with a Central Bank Digital Currency" (2021) 17: 2 Intl J Central Banking 1-42 at 34, online (pdf): https://www.ijcb.org/journal/ijcb21q2a1.pdf.

[33] Will Bateman *supra* note 14 & 27. The various state motivations for CBDC are discussed in more detail in Chapter 3 of this thesis.

[34] Max Raskin & David Yermack, "Digital currencies, decentralized ledgers and the future of central banking" (2018) Res Handb Cent Bank, 474-486 at 482 online: <https://www.elgaronline.com/view/edcoll/9781784719210/9781784719210.00028.xml>.

digitisation in improving the infrastructure deficit of the national payment systems and by so doing, will be able to maintain relevance.[35] Geva also argues that the only change commercial banks might experience from CBDC is the relinquishment of their money creation responsibilities.[36] In our opinion, the above seems more like Geva and Raskin and Yermack are viewing the same concepts from different angles and less like a disagreement between them.

Our justification as to why both Geva and Raskin and Yermack are correct on the above issue is premised on the fact that any differences in their opinions can be traced to their diverse vantage points. While Geva's remarks above come from an in-depth understanding of payment systems and payment laws, Raskin and Yermack's remarks on the narrowing effect of CBDC can be traced to an understanding of monetary law and the workings of monetary economics as applied by the central bank. In monetary law parlance, any narrowing effect of commercial banking activity from the adoption of CBDC will be closely tied to the loss of money creation responsibilities of the commercial banks. We can recall that this is in strong agreement with Ben Geva's remarks on commercial banks and money creation. We believe the narrowing of financial intermediation and commercial banking activity will elicit the commercial bank's inability to create money. This is because money creation and financial intermediation are inextricably linked.

To put the mandate of the central bank in perspective, sometime in November 2021, the Banque de France published results and key findings on the organization's Wholesale CBDC experiments. The report presents Banque de France's key findings in its trial run of wholesale CBDC. The report presented two key legal issues. The first being the legality of the simulated tokenized finance that served as a substitute for CBDC in the experiment.[37] The second being the legal aspects of facilitating payments between CBDC's in different jurisdictions.[38]. Around the same time, the World Economic Forum (WEF) released a **Digital Currency Governance Consortium White**

[35] Benjamin Geva, "Disintermediating Electronic Payments: Digital Cash and Virtual Currencies" (2017) 37:13 Osgoode Hall Law J Research Paper at p 7 note 66, online (pdf): https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2958869.
[36] Benjamin Geva, "Banking in the Digital Age - Who is Afraid of Payment Disintermediation?" (2018), 23 EBI Working Paper Series 1-55 at 55, online (pdf): https://ssrn.com/abstract=3153760.
[37] Banque De France, Eurostème, "Wholesale Central Bank Digital Currency Experiments With The Banque De France results and key findings" (2021) at 7, par 2 online (pdf): https://www.banque-france.fr/sites/default/files/media/2021/11/09/821338_rapport_mnbc-04.pdf.
[38] *Ibid* at 13 par 1.

Paper Series, which offered the WEF's insights on CBDC and stablecoin governance issues. This paper identifies the "pre-existing statutory or policy constraints that might prevent the central bank from allowing reserve access to non-bank institutions" as a legal issue to be addressed globally.[39] Another way of describing this issue is-the problem of public access to the books of the central bank. The issues identified by the Banque De France and WEF can be categorised into two:

I. the internal legal and policy restrictions faced by the central bank in utilising tokenised finance as a form of monetary control
II. the external legal and policy restrictions faced by central banks in facilitating international payments and settlements of multiple CBDC's.

Both issues are strongly impacted by the central bank's core mandates.

Let us briefly revisit the mandate of the central bank. According to Bjerg, the central bank is the custodian of a nation's monetary sovereignty and as discussed above, monetary sovereignty is an important pillar of statehood/nationhood.[40] Through monetary sovereignty, central banks exercise control over monetary policy and foreign exchange, and it is through a combination of the fiscal/monetary policy tools that states develop targeted social welfare policies/social safety nets to cater to its citizens. It is ironic then that despite this mandate, the central bank continues to maintain an **arm's-length relationship** with the citizens of the state whose monetary affairs it administers.

In addition, through monetary policy, the demand and supply of money is controlled by the central bank. In Hirschberg's opinion, changes to the demand and supply of money affect the value of money which then affects the ability to meet payment obligations entered prior to a change in the value of money.[41] This happens to serve as a clear example of where the central bank's mandate could affect personal legal obligations. At the same time, financial institutions need CBM and BM to meet their obligations to each other and to the central bank. In this way, the central bank can

[39] World Economic Forum, "Digital Currency Governance Consortium White Paper Series Compendium Report" (2021) at 22 Table 3, online (pdf): https://www3.weforum.org/docs/WEF_Digital_Currency_Governance_Consortium_White_Paper_Series_2021.pdf.
[40] Bjerg *supra* note 14.
[41] E Hirschberg, "Modern Problems of Monetary Law Shorter Articles, Notes and Comments" (1973) 6:2 Comp Int Law J South Afr 272–281 at 279, online (pdf): <https://heinonline.org/HOL/P?h=hein.journals/ciminsfri6&i=282>.

protect its interests because there exists a direct relationship between the central bank and commercial banks. A relationship that does not exist between the central bank and the citizens. This estranged relationship between the central bank and the citizens is responsible for the misaligned objectives between the institutional interests of the central bank and the individual interests of the citizens. This forces the central bank to pick sides which would be against the central bank's mandate. W discuss these misaligned objectives in detail in chapter 4 of this thesis.

Another important mandate of the central bank is to ensure that there is parity of value between CBM and BM. This mandate is recognised by the law. In the words of G.F Knapp, money is created by law; law, therefore, provides what its value is.[42] If money and its value are determined by the law, what happens when there is a change or alteration to the 'form' or appearance of money in a manner unanticipated by law? What happens if this new form of money (CBDC) challenges the existence of another form of money (CBM/fiat)? Will the central bank have to discontinue its arm's length relationship with the people? How will this affect monetary sovereignty? These and more are some of the other questions that this I hope to answer in this research.

1.4. Research questions and sub questions

As we have observed, the background provided above on the nature of monetary sovereignty and the ensuing attacks to monetary sovereignty by digital and virtual currencies opens numerous conversations on the mandates on the central bank and we are privy to ongoing discussions concerning the mandate or changing mandate of the central bank almost every day. There is also no shortage of reading, watching, and listening materials concerning the recent developments in the 'crypto-sphere' most of which discuss the volatility and some regulatory aggression towards these cryptocurrencies. Most of these conversations have topics that range from determining the mandate of the central bank to ensuring the privacy of digital transactions whilst also ensuring that essential KYC and AML requirements are met. As tempting as these topics are, the aim of this research is to ascertain the proper regulatory perspectives and approaches for designing CBDC by taking account of the diverse motivations of the money users, money managers and the money

[42] G.F. Knapp, "The State Theory of Money" (1924), London: Macmillan & Company Limited).

makers.[43] By focusing on the regulatory perspectives, we hope to build upon the fact that money, being a sociolegal innovation continues to evolve and this evolution will be expedited through the aid of technology. Any attempts to curb this development (particularly through the reverse-reactionary regulatory approach as indicated earlier) might in fact lead to the development of a new monetary order.

Unfortunately, with different 'uses' of money comes a myriad of considerations in any design of money further compounding the misaligned objectives of the different money users. This misaligned perspective tends to shift from three distinct perspectives to two perspectives, the money user (the citizens, firms and households) and the money manager (the banks and other financial intermediaries) with one perspective, the money maker (the central bank) serving as an umpire of sorts by attempting to select the essential features of each vantage point and develop a unified framework for money. Historically, the so-called "umpire" (the central bank) has tended to side with the money managers to varying degrees of success.[44] We might be witnessing a situation where the "umpire" is compelled to choose a side once again.

With the above considerations in mind, this research is not attempting to determine the morality or otherwise of the misaligned objectives but rather to ascertain what role the central bank should play as an umpire in aligning the diverse objectives of the money users and the money managers. For this purpose, this thesis has been designed around the efforts of the author to answer the following research question: **In what ways will the adoption of CBDC affect the 'traditional' (or statutory) roles and policy objectives of the central bank and will any such changes affect our understanding of monetary law**? To answer this question in a way that allows the arguments flow throughout this thesis, we have introduced one secondary question that will be answered in this thesis. The secondary question is:

[43] For more on the categories of the uses of money as well as the functional definition of money see Bjerg *supra* note 14. This is not to say that the privacy issues surrounding CBDC and the mandate of the central bank will not be discussed in this thesis. Rather, we are saying that we will not spender longer than necessary discussing these issues. In essence, they will be discussed as the need arises.

[44] An example of this was the collapse of the Bretton Woods system where international institutions such as the world bank, International Monetary Fund and the Bank for International settlement responsible for global monetary affairs were favoured over an arrangement or agreement between participating nations over the asset base requirement (gold) that determined the value of currencies. Another example of this was the financial crisis of 2007/2008 discussed earlier.

What are the key motivations of the State that inform the adoption of CBDC and how might said motivations inform the design elements of a potential CBDC?

1.5. Clarification of Terminologies

In this section, we discuss the salient differences in the use of the terms *monetary sovereignty, monetary policy, and monetary affairs.* We will also distinguish between the use of v*irtual or digital currency electronic cash, crypto currency, CBDC* as well as distinguish between *central bank money (CBM)* and *commercial bank money (BM)*. This clarification is important as the use of these terms has implications for the conceptualization of the role that monetary law plays in the evolution of money from barter, proto-monetary commodities, fiat money to CBDC as well as the role the law plays in framing the roles and objectives of the central bank.

Monetary sovereignty can be defined as the unlimited power of the state over the monetary affairs within its territory. More specifically, in the words of François Gianviti, monetary sovereignty includes the exercise of three exclusive rights by a state:

I. the exclusive state right to issue currency and determine the form of said currency, i.e., coins, banknotes, book/account balances or other forms of currency that are legal tender within the state's territory.
II. the exclusive state right to determine and change the value of that currency and determine the mechanism (reference mechanism) for ascertaining the value of said currency; and
III. the right to regulate and monitor the use of that currency, or any other currency, within its territory.[45]

I and III above represent money as a means of payment. II represents money as a unit of account and as a store of value. We will discuss the functional definition of money in the subsequent chapter.

Monetary policy can be defined as any economic activity performed by the government (mostly through a designated institution, the central bank) to exploit the control over the supply of certain

[45] François Gianviti, "Current Legal Aspects of Monetary Sovereignty" in IMF (ed), *Current Developments in Monetary and Financial Law* (2005) vol 4, online (pdf): https://www.imf.org/external/pubs/nft/2006/cdmf/ch1law.pdf

claims against the government (precisely, the central bank). these activities are performed to enable the state's businesses and citizens perform their day to day financial and economic activities.[46]

Monetary affairs mean any issues, activity or combination of activities related to money or currency within the state. This is a broad definition and includes activities related to both monetary sovereignty and monetary policy.

Digital currency as used in this research denotes any kind of currency that is in a digital format and only accessible by making use of a computer device. Digital currencies are separate from any electronic representation of national currency (electronic money) which is a reflection of the financial position of an account holder's bank account balance that can be recorded and manipulated electronically. For a more comprehensive definition of digital/virtual currency, we shall rely on the definition provided by the US Internal Revenue Service (IRS). The IRS defines digital/virtual currency as follows:

> Virtual currency is a digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value. In some environments, it operates like "real" currency—i.e., the coin and paper money of the United States or of any other country that is designated as legal tender, circulates, and is customarily used and accepted as a medium of exchange in the country of issuance—but it does not have legal tender status in any jurisdiction. Virtual currency that has an equivalent value in real currency, or that acts as a substitute for real currency, is referred to as "convertible" virtual currency. Bitcoin is one example of a convertible virtual currency.[47]

Cryptocurrency on the other hand denotes "a digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the execution of payment transactions on a decentralized network."[48] In essence, all cryptocurrencies are digital currencies but not all digital currencies are cryptocurrency. Bitcoin remains the best example of both a virtual currency and a cryptocurrency.

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[46] Benjamin M. Friedman "Monetary Policy" (2000). Working paper 8057 NBER Paper Series, nber.org, online (pdf): https://www.nber.org/system/files/working_papers/w8057/w8057.pdf.
[47] I.R.S., Notice 2014-21 (17 January 2016), irs.gov, online (pdf): https://www.irs.gov/pub/irs-drop/n-14-21.pdf [https://perma.cc/D6GEZSX8].
[48] Benjamin Geva *supra* note 34 at P. 31.

If a digital currency is a "digital representation of monetary value" then CBDC can be defined as: "a digital form of **central bank money [CBM]** that may be accessible to the public (general-purpose or retail CBDC), or to a select set of licensed participants such as financial organizations (wholesale CBDC). CBDC is denominated in the national unit of account. It is issued by and is a direct liability of the central bank."[49]

CBM is the money created by the central bank under sovereign authority and includes cash in circulation, such as bank notes and coins and central bank book money (bank reserves).[50] BM represents most of the money in circulation in the economy. It is usually of two types. One is the money created by the private/commercial banks from the purchase of government securities proceeds of which are deposited in the central bank and reflecting in double entries in both the books of the central bank and the account of the state maintained by the central bank. The other is interest bearing loans issued by the commercial banks.[51]

1.6. Methodology and the Theories of Money

As indicated in the title of this thesis, the main goal of this research is to determine the legal implication of tokenized finance as a new tool for managing monetary policy as well as how this new tool can be integrated with the current traditional role of the central bank. This will require a multidisciplinary approach as the law by itself is not sufficient to perform this task. An attempt to rely exclusively on the law will only lend further abstraction to the abstract concept called money.

To achieve this, it is necessary of course, to understand a state's motivations behind its decision to issue CBDC with sovereign backing. The task of outlining the diverse state motivations for digital currency proved to be a difficult task by itself and it became necessary to rely on press releases, as well as some economic journals to determine these diverse motivations.

Some of the key motivations behind the issuance of CBDC can be gleaned from the speech by Timothy Lane, the deputy governor of the Bank of Canada to the effect that:

[49] World Economic Forum, *supra* note 37.
[50] Bjerg, Ole, *Supra* note 14 at 7. Also this is an incomprehensive definition. We will continue to expand on the more technical features of CBM in the course of this thesis.
[51] *Ibid* at 5.

> "It has been said that in the digital economy, data is the new oil. Many technology companies follow a business model in which they use their customers' data to refine and expand the range of products and services they offer to the public. This, in turn, pulls more and more business onto their platform, which generates more data, and so on.
>
> If that business model were used as a foundation for the dominant method of payment in the economy, the issuer would gain control over an enormous range of data—bringing with it overwhelming market power. In effect, a technology company could become the gatekeeper of the entire economy, with concerning implications for privacy, competition and inclusion.
>
> Let's compare this with a central bank digital currency. A central bank—with no commercial motivation to harvest data—is uniquely positioned to build in safeguards for privacy, while at the same time defending against criminal uses. Privacy is clearly important to Canadians, and it's also in the public interest to protect some degree of privacy."

The need to ensure privacy and data protection is a key motivation for CBDC according to Timothy Lane. Other motivations have been highlighted by the WEF and the BIS.[52] These would be referred to in subsequent chapters discussing and analysing the key motivations for CBDC.

Once these motivations have been highlighted it becomes necessary to analyse and categorize said motivations according to the weight (importance) that ought to be given to each motivation by the regulators responsible for designing a CBDC. To achieve this, it is necessary to ask how any categories would be defined in a way that takes account of the design elements of CBDC and how well these design elements and accompanying theoretical leanings fit into the existing legal structures in place for the exercise of monetary policy (through monetary law) and the payment system.

[52] The major motivations as outlined by the WEF and BIS include amongst other motivations: financial inclusion, digital trade, payment efficiency and increased payment diversity and cross border payment and platform interoperability, access to safe central bank money in an era of dwindling cash usage, protection of monetary sovereignty, economic/monetary/financial stability and monetary resilience, enhanced monetary policy tools, continued access to risk free central bank money, encouraging financial inclusion, privacy and data protection, facilitating fiscal transfers during times of crisis or economic recession. These diverse and in some cases similar motivations will be addressed in detail in subsequent chapters.

To answer the above question, we will be discussing four economic theories of money to wit: the Mengerian/Metallist theory of money[53], the State/Chartalist theory of money[54], the Societary theory[55] and the institutional theory of money[56]. A key focus while discussing these theories is to determine the nexus between the identified theories and the categorised motivations. We will proceed with this by scrutinising the mentioned categories and theories under the clouded lens of the misaligned perspectives between the libertarianism of banking institutions and the utilitarianism of the citizens. These theories will be used to further evaluate the sovereign's response to the current changes being experienced in the nature of currency as well as the overarching challenges posed by private virtual and digital currencies to monetary sovereignty. To conduct this analysis, we will be analysing peculiar instances whereby the sovereign government of multiple jurisdictions such as Canada, the US, and Nigeria had to intervene into monetary affairs and force certain changes to the "appearance", regulations or behaviour of money.

In addition to the above, we would also be conducting an analysis into how technology (precisely DLT such as blockchain technology) could replicate the roles and functions of the central bank. We will recommend approaches similar to the decentralised corporate governance platforms that have been adopted by private businesses to avoid the regulatory and financial hurdles of a central location. By performing this analysis, this research aims to advocate mediums by which the State, the central bank and national treasuries can make use of legal concepts, structures, and institutions to reinforce monetary sovereignty as one of the pillars of sovereignty.

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[53] The Mengerian theory argues that money emerged through the use of different commodities as means of exchange before their respective adoption and regulation, and it can be identified in the work of authors, such as Marcel Mauss and Karl Menger. See M. Mauss, "The Gift" (2002, London: Routledge Classics); K. Menger, "On the Origin of Money*"* (1892) 2 *The Economic Journal* 239-255.

[54] The State/Chartalist theory states that money is a legal creation of a sovereign stakeholder, and one can find it reflected in the work of authors like Georg F. Knapp and Christine A. Desan. See C.A. Desan, "Money as a Legal Institution" in D. Fox and W. Ernst (eds), *Money in the Western Legal Tradition. Middle Ages to Bretton Woods.* (2016, Oxford: Oxford University Press) 18-35; G.F. Knapp, *The State Theory of Money.* (1924, London: Macmillan & Company Limited).

[55] This theory argues that we can define money based on what in practice is widely accepted as such, independently of the legal framework for its issue and use. See Frederick A Mann, *The Legal Aspect of Money*, (Oxford: Clarendon Press, 1992) 5th ed 461 and the version revised and completed by Charleds Proctor- *Mann on the Legal Aspect of Money*, (Oxford: Oxford University Press 2012) 7th ed, C. Proctor and V. Dixon, *Goode on Payment Obligations in Commercial and Financial Transactions.* (2016, London: Thomson Reuters), at 5.

[56] The institutional theory of money argues that from a legal standpoint, money consists primarily of a claim against the issuing central bank (i.e. cash), but also the credit balance of sight deposits held by the public in commercial banks. The institutional theory of money also posits that money is no more than credit against an obligor and 'no longer a chattel, but a transferrable credit. For more on the institutional theory, see: Antonio Sáinz de Vicuña, "An Institutional Theory of Money", in Mario Giovanoli et al. (eds.), "International Monetary and Financial Law: The Global Crisis, Oxford 2010, para. 25.18. Quoted as well in Charles Proctor, op.cit., para.1.34.

To prepare a foundation for the four theories of money discussed above, we will commence by engaging in a socioeconomic debate on money by reflecting on the works of scholars including Nobuhiro Kiyotaki, Randall Wright[57] and Leon Walras[58] to provide an overview of the evolution of money from proto-monetary commodities to the modern-day monetary instruments we have today. Following from this, we shall trace the evolution of money by emphasizing the focal points in history where the law was utilized to exercise control over monetary affairs. These focal points will be discussed under the light of the work of Fray Bernardino de Sahagún[59], the Sennacherib's claim[60], and the cases of *Burton v Davy*[61] and the Canadian case of *Reference re Alberta Statutes.*[62]

1.7. Structure of the Thesis

The opening chapter (Chapter 2) kicks off with a socio-legal and economic analysis of money. We commence by discussing money from a legal perspective. The main objective of this chapter is to establish a nexus between monetary law and monetary policy. Of course, the best place to start would be to provide an overview of the definition of money. On the definition of money, we will be relying on the extensive definition provided by the Canadian case of *Reference re Alberta Statutes*[63]. The celebrated English case of *Carr v Carr*[64] will be relied on to explain the legal definition given to payment systems as well as the gradual process of integrating electronic payment systems into the legal framework for money through case law when statutory instruments had no provisions accommodating electronic payments. On this point we will focus on the case of *Suffel v Bank of England*[65]. Following from this, we will discuss the usual evolutionary trajectory of money from private or inside money, how inside money spreads across a given community up until this private money is accepted and recognised by the sovereign through *Lex Monetae* (done by a process called currency nationalisation in this thesis).

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[57] N. Kiyotaki and R. Wright, "On Money as a Medium of Exchange." (1989) 97 *Journal of Political Economy* 927-954, at 950.
[58] L. Walras, *Elements of Pure Economics.* (1926, Illinois: Richard D. Irwin).
[59] B. Sahagun, Historia General de las Cosas de la Nueva España. (2003, Madrid: Dastin), at 791.
[60] P. Vargyas, "Sennacherib's Alleged Half-Shekel Coins." (2002) 61 *Journal of Near Eastern Studies* 111-115.
[61]Reported in H. Hall, Select Cases Concerning the Law Merchant AD 1251-1779. Vol III. (1932, London: Selden Society), at 117-119.
[62] Three Bills Passed by the Legislative Assembly of the Province of Alberta at the 1937 (Third Session) [1938] SCR (3rd) 100.
[63] *Ibid.*
[64] J.H. Merivale, *Reports of Cases Argued and Determined in the High Court of Chancery. Vol. 1.* (1817, London: Joseph Butterworth and Son), at 543.
[65] [1882], 9 Q.B.D. 555 (UK), at 563.

As can be gleaned from this introductory chapter (Chapter 1), a recurring theme in this thesis is the identification of unique instances in history where money has been utilised by the state to meet its needs in extraordinary circumstances. We will discuss these instances in detail as well as the state's motivations, aims and objectives during such times and analyse the regulatory approaches used by the state and the central bank during these times. It is understood that such instances vary, and the regulatory responses to said instances are numerous. Thus, for the purpose of this thesis we will restrict these occurrences to times of war and economic crises/recession. In the concluding portion of this chapter, we will discuss the traditional role of the central bank, the concepts of minting and seignorage and attempt to trace the legal origin of the central bank's power or authority to conduct monetary sovereignty. On this point we argue that the statutory provisions on the role of central bank allows a lot of flexibility in the way monetary policy is controlled and administered by the central bank. We conclude that the exercise of monetary policy within a state is wholly dependent on the 'deemed existence' of financial markets. To buttress this point, we will focus on the relevant sections of the Bank of Canada Act and rely on said sections to portray how the statutory exercise of monetary policy is dependent on and assumes the existence of certain financial market infrastructure. We will round up this chapter by attempting to make a case for financial disintermediation by focusing on the institutional theory of money as postulated by Antonio Sáinz de Vicuña.[66]

We commence Chapter 3 with a discussion on tokenized finance by attempting to categorise the various motivations for CBDC as well as the design options being examined currently. We will be primarily relying on the discussion papers and white papers by private and international organisations including the WEF, the BIS and the IMF. Our primary focus will be on the choices between a token and account-based CBDC and retail and wholesale CBDC. We argue that an account based CBDC already exists in the form of CBM. We justify this by revisiting the legal, accounting, and economic definition of CBM and attempt to justify recent arguments about the mischaracterisation of CBM as a liability based on its accounting treatment. To achieve this, we reconcile the economic definition of CBM with the legal analysis of CBM as an 'obligation' of the central bank. We concede from this analysis that a tokenized CBDC would be preferrable to an account based CBDC. We also argue that a wholesale CBDC would be preferred to a retail CBDC

[66] Antonio Sáinz de Vicuña *supra* at note 54.

for two reasons, one being that a token-based retail CBDC does not meet the 'general use' requirement for currency. The other is that it inverts the evolutionary trajectory of money by restricting currency to retail interbank payment and settlement thus moving away from the Societary theory of money and aligning with the institutional theory of money as a means of institutional payment and settlement.

To close chapter 3, we introduce Distributed Ledger Technology (DLT) and the role of the central bank. We introduce DLT through ongoing debates on smart contracts and the law. We attempt to use current analysis on smart contracts/DLT and corporate governance issues as a benchmark to fragment the central bank into its major governance components and ascertain if said roles can be performed by Smart contracts and DLT. Our aim here is to go deeper into the central bank's personal motivations for CBDC by attempting to see if DLT/smart contracts pose an institutional threat to the existence of the Central Bank particularly through tokenised finance. By so doing we will develop further arguments for and against the denationalisation and depoliticization of money.[67] We conclude this chapter by introducing CBDC's and international monetary affairs and international monetary law through multiple CBDC (mCBDC) bridge for cross border payments and settlement. The idea of mCBDC's poses different legal challenges including data protection and privacy as well as the problem of currency substitution. These challenges will only be hinted at and will not be discussed in detail as it exceeds the scope of this thesis. However, the ways in which these challenges affect monetary policy would be alluded to in this thesis.

In the fourth and final chapter, we continue our discussion on the democratisation of monetary policy. We argue that the law can serve as a tool for the democratisation of monetary policy through CBDC. As a preliminary point, we attempt to explain concepts such as the monetary policy trilemma and *Greshams Law* in a way that would be easy for legal scholars and practitioners to digest. We then proceed to certain projected outcomes that may emerge due to conducting monetary policy through tokenized finance as well as through CBDC such as the conflation of monetary and fiscal policy. We argue that merging fiscal and monetary policy might affect the independence of the central bank and eventually affect the existence of the central bank as an institution. The analysis that goes into ensuring the independence of the central bank is complex and well documented. The independence of the central bank is amongst its core mandates, and we

[67] This also serves as an introduction to the democratisation of monetary policy developed in chapter 4. For more on the denationalisation of money please see Chapter 4 of this thesis.

argue that this mandate could be protected by adding additional insulations within the central bank protecting its independence using a Chinese wall separating the fiscal policy makers from the monetary policy makers. The department/ministry of finance could also be insulated from short-term political pressures. We expand on this argument by revisiting mCBDC's from chapter 3 and discuss the additional monetary control mechanisms that will be provided using CBDC and how this would affect international monetary regulations. To justify this international angle of CBDC/mCBDC, we argue in favour of the central bank's participation in international monetary and financial negotiations i.e., granting the central bank more powers and responsibilities to negotiate international treaties affecting municipal and international monetary affairs.

Finally, we present our conclusions and recommendations through a brief discussion of the main findings of this research. We also present the foundation upon which future work that can be developed from some of the ideas in this thesis. The ability to build on the foundations established in this thesis will be based on the certainty that the process of innovation in financial and monetary affairs will continue. Case in point, the issue of stablecoins and the threats and opportunities they provide in the economy. We discuss the recent issues surrounding the regulation of stablecoins and compare stable coins to CBDC with particular focus on how monetary policy can be controlled using stablecoins.[68] Accordingly, this work closes on the point that there are numerous advantages to the adoption of digital currency and these advantages could even be amplified by the interoduction of technologies like Machine Learning, 5G, new generation of DLT protocols, and quantum computing. Some important issues to consider now are how soon the authorities will be ready to adopt digital currencies if at all they decide to adopt same and what adjustments, allowances, considerations and trade-offs are the authorities willing to make in a digital age.

[68] It is believed that stablecoins possess high natural velocity, which means they create liquidity without using leverage. This is beneficial to monetary policy because with increased leverage comes an expanded central bank (liability side) balance sheet in order to generate liquidity. It is predicted that this will not be the same with stablecoins thus making liquidity easier and cheaper to manage by the central bank. this will be discussed in more detail in chapter 3 of this thesis.

CHAPTER 2: The Relationship Between Monetary Law and Monetary Policy

2.1. Introduction

A recurring theme in the previous chapter was the manner in which the law engineers monetary affairs within a state to suit the needs of the sovereign. In this chapter, we attempt to trace the history of the sometimes-complex relationship between the law and monetary affairs. Finding the connection between monetary law and monetary policy is important because any attempts to apply monetary policy through tokenized finance, will require an understanding of monetary policy including money creation and the traditional roles of the central bank. Developing a legal regime for tokenized finance would also require an understanding of contemporary monetary law and the laws governing central banking activity. It is upon this prior understanding that we subsequently attempt to build an argument for or against financial disintermediation.

Due to the delegation of monetary sovereignty by the state to the central bank, money creation (not including minting and printing of bank notes) through monetary policy has been governed mostly by soft law provisions. While this enables flexibility in the conduct of monetary policy, it mystifies the idea of central bank money creation (or reserve creation) and muddles up monetary policy with a plethora of complicated rules and elusive principles that are enough to confound even economic scholars.[69] This should not deter us as our role as legal scholars is to advocate for proper regulations within the most obscure disciplines.

Why is it important to understand that monetary policy is a product of the law? Simply put, because monetary policy is an antecedent of monetary sovereignty and the nexus between monetary policy and the law is not as clear as the nexus between monetary sovereignty and the law. Some might think that no connection exists at all, and this would be wrong. This connection was established as far back as the 12th century when Nicolas Oresme, the Bishop of Lisieux and adviser to Charles V, the king of France, indicated that money including monetary policy and the law are complementary and both should be equally stable for the economy to function optimally. In his

[69] Claudio Borio "Back to the future: intellectual challenges for monetary policy" (2021), speech delivered (virtually) at the David Finch Lecture, University of Melbourn, online (pdf): https://www.bis.org/speeches/sp210902a.pdf.

words (as translated by Charles Johnson), "[n]ow it is the case, that the course and value of money in the realm should be, as it were, a law and a fixed ordinance. Another translation states that- "[m]oney must be as solid as a law, as stable as a law of nature".[70] Every strong economy relies on the interaction between (strong) laws, (reliable) instruments, (generally accepted) standards and of course (robust) institutions. These instruments and institutions are created by the law and are subject to the rule of law. The cycle doesn't end here as the law itself is constantly under the scrutiny of the rule of law.

The rule of law is responsible for individual agency which in turn is responsible for the individual/household or firm's need for trade and exchange. This in turn leads to the demand for instruments of exchange. The demand for standardisation of these instruments of exchange leads to the creation of institutions responsible for administering, controlling, and sometimes 'creating' said instruments and defining the participants in the exchange and the nature of the exchange. Another way to answer the question- why it is important to understand that monetary policy is a product of the law is by saying - because it is important to understand the roots of monetary policy vis monetary sovereignty. As societies develop and their institutions and instruments of exchange continue to evolve, it becomes easy to forget their origins, foundations and even first principles. When we lose the connection between these new institutions and the law it becomes difficult to establish a regulatory framework for these continuously evolving instruments. Thus, it is important for the law to occupy an important role within these institutions. It is necessary that the law determines the boundaries and limits of monetary policy and that it checks the excesses of monetary sovereignty. It would be impossible to do this if the law has lost touch or has lost connection with the instruments and institutions it is supposed to govern.

To achieve the task of presenting the connection between monetary policy, and the law, we will be exploring the evolution of money from commodity exchange (barter) and the first coins and instruments of exchange to the current day bank note, repurchase agreements and electronic payment, clearing and settlement systems and attempt to answer the question why standardisation

[70] Nicolas Oresme "Moneta debt esse quasi quaedam lex et quaedam ordinacio firma". Traité de la première invention des monnaies" *Treatise on Coins* La Manufacture, (1335) University of Lyon-II, 1989, trans. English editions A Treatise on the Origin, Nature Law and Alterations of Money translated by Charles Johnson, at 13, online (pdf): https://people.bu.edu/chamley/HSFref/DeMoneta-E.pdf.

of money is so important and how the standardisation of money is tied to monetary policy and monetary sovereignty. We will merge this with our discussion on the legal structures in place to ensure the legitimacy of the three main uses of money hinted at in Chapter 1 to wit: money as a medium of exchange, money as a store of value and money as a unit of account.

We then discuss the ways the law has been used in to guide monetary affairs during times of crises when monetary sovereignty is threatened or when monetary sovereignty needs to be expanded. From this point, we discuss the essential theories of money that are responsible the misaligned perspectives of the money users and the money managers and the role the law could play in this interaction. To strengthen our arguments on the law's role in these misaligned perspectives, we will be attempting to outline the key (traditional) roles of the central bank and identifying the specific roles of the central bank that encourage or discourage the misaligned perspectives of the money users and the money managers. We close the chapter with a discussion on the legal roots and origin of the central bank's power to manage monetary policy. we will be emphasising on the central bank's control of monetary policy through reserve creation before attempting to build a case for the importance of financial intermediation in monetary affairs within a state.

2.2. The evolution of money and the legal structures ensuring the legitimacy of money

The instrument we call money has seen different iterations and been through different stages of evolution. We have hinted at the different stages in the evolution of money in the preceding chapter. In this section, we will go into more detail by emphasising the four theories of money also mentioned in passing in the preceding chapter to wit: the Mengerian/Metallist theory of money, the State/Chartalist theory of money, the Societary theory and the institutional theory of money. These theories will be discussed under the light of the legal structures in place recognising the essential functions of money which were made popular by the English economist, William Stanley Jevons (William Jevons). In his classic treatise titled: "Money and the Mechanism of Exchange"[71]. Jevons identifies four main uses of money, and they are:

1. Money as a means of exchange
2. Money as a unit of account
3. Money as a standard of value
4. Money as a store of value

[71] Stanley Jevons *Money and the Mechanism of Exchange*. (D. Appleton and Company, 1875) at 14-16.

Building on Jevons functional definition above, economists have refined the above into 3 essential uses/functions of money by excluding the function that money provides as a standard of value.[72] The argument for this exclusion is that money as a standard of value does not occupy a mutually exclusive function alongside the other functions of money. More so, the function of money as a standard of value can be incorporated into the two distinct functions of money as a unit of account and as a store of value. Any other uniqueness possessed by the function of money as a standard of value such as money's use for deferring payments can also be incorporated by the role that money plays as a medium of exchange (depending on how the exchange or trade is negotiated). We will subsequently justify the significance of this particular function of money.

These three essential functions of money themselves can provide a genealogy on the evolution of money and will be referred to subsequently in this thesis as the functional definition of money. This is because historically, as societies continued to evolve, and trade continued to grow the functions of money continued to expand as well. Therefore, in this thesis, rather than narrate the historical evolution of money we will be incorporating the evolution of money into the specific structures in place for money based on the popular use(s) of money during a particular point in history. For example, we can argue that the first function of money and the actual reason behind the creation of monetary instruments and exchange commodities was primarily to facilitate exchange and trade. When trade is facilitated by exchange of whatever form, it becomes necessary to store the accumulated wealth earned from trading, hence the function of money as a store of value. For the sake of uniformity and standardisation of the accumulated wealth (as well as for taxation, accounting and other fiscal/financial purposes) it becomes necessary to have money function as a unit of account.

Now while the above genealogical analysis of money is neither watertight nor is it a perfect overview of the evolution of money, we make use of this analysis for two main reasons. Firstly, merging the history and the functions of money in this way provides a clear representation of the

[72] See for example Mankiw, N. Gregory (2007). *Macroeconomics* (6th ed.). New York: Worth Publishers. pp. 22–32. ISBN 978-0-7167-6213-3, Paul Krugman, Robin Wells, *Economics*, Worth Publishers, New York (2006), see also Andrew Abel, Bernake Ben (2005). *Macroeconomics* (5th ed.). Pearson. pp. 266–269. ISBN 978-0-201-32789-2.

points in history where certain perspectives on the functions of money began to shift and vary due to an affected participant's role in the monetary affairs of a state.[73] Secondly, this approach allows us to conveniently add the selected theories of money into the analysis. Thus, we will be providing a historical analysis on the evolution of money by focusing on the structures in place to ensure that the three major functions of money are possible, protected and recognised institutionally.

2.2.1. Structures in Place for Money as a Medium of Exchange

The human need to interact and exchange knowledge also birthed the need to trade and exchange goods and services.[74] This need to exchange, and trade was achieved originally by barter where goods and/or services were exchanged for other goods and services. This from of trade transitioned over time into the use of a select group of popular commodities as proto-monetary commodities that were acceptable in exchange for other goods, commodities, and services. It is difficult to pinpoint the exact time in history when barter was replaced with money as we know it today, but it is a fair assessment to say that there was a slow and gradual progression into the form of monetary standardisation that we are familiar with today. In truth, attempts at standardisation did not begin with the introduction of coins but with barter. Merchants realising the complexities involved in the barter system decided to standardise the items or commodities used for exchange. Some merchants such as the Mesopotamian and Mesoamerican traders attempted to develop an exchange or conversion scale for commodities of exchange. This scale was subsequently standardised under some sovereign authority into something known as the Mendoza Codex which was a compilation of commodities and respective value which is computed based on comparable commodities with which they could be exchanged.[75]

We can observe the Societary theory at play in the emergence of barter as a means of exchange. The Societary theory of money argues that it is the confidence of the people (households, firms and merchants) that determines the usage of money in commercial activities.[76] What this means in

[73] By "affected participants" we mean the money users which include households and firms (including merchants), the money managers (financial intermediaries, financial institutions, and banks) and the money maker (the state) identified in section 1.4. of Chapter 1 of this Thesis.
[74] Adam Smith *supra* note 3.
[75] P. Baron, "Making Money in Mesoamerica: Currency Production and Procurement in the Classic Maya Financial System.*"* (2018) 5 Economic Anthropology 210-223, at 213; C. Eagleton and J. Williams, *Money. A History.* (2013, London: The British Museum Press), at 19; Goodhart (a), at 412.
[76] See Frederick A. Mann 5th ed, *supra* note 53 at 12-14.

essence is that it is the general acceptance by the household and firms of a medium of exchange that makes said means of an exchange an empirically legitimate instrument and not the standardisation by the state (otherwise known as normative legitimacy which is usually imposed by operation of law or by some form of political authority or power). The main theme of the Societary theory of money was captured in the decision of the Supreme Court of Canada in the Matter of Three Bills Passed by the Legislative Assembly of the Province of Alberta at the 1937 (Third Session)[77], where the court held:

> "but money as commonly understood is not necessarily legal tender. Any medium which by practice fulfils the function of money and which everybody will accept in payment of debt is money in the ordinary sense of the words even although it may not be legal tender; and this statute envisages a form of credit which will ultimately, in Alberta, acquire such a degree of confidence as to be generally acceptable, in the sense that bank credit is now acceptable; and will serve as a substitute therefor".

The Societary theory fits into barter's regime of monetary pre-standardisation because the Societary theory posits that trade and the exchange of goods and services are not within the purview of the sovereign but are firmly under the control of the merchants, firms and the household thus no legal tender laws are necessary in order for money as a medium of exchange to exist. It also ties into the Laissez-faire doctrine on free trade without any form of external intervention even from the sovereign save for enforcement of contracts and recognition of property rights.[78] Since economists believe in the efficient market hypothesis, it would not come as a shock to find out that this kind of arrangement where exchange is free and devoid of sovereign intervention works well for economist.[79] This arrangement does not work legally as the conditions for normative legitimacy cannot be met without the sovereign's intervention.

The standardisation of money as a means of exchange follows a gradual process that culminates in the creation of a list of potential currencies in line with the Mengerian/Metallist theory of money. The reasons behind this convergence on a few acceptable items are twofold, both of which originate from an economic dilemma known as the double coincidence of wants.[80] The first reason is that barter is mostly demand driven and depends on the availability of a willing exchange partner

[77] Three Bills Passed by the Legislative Assembly of the Province of Alberta, *supra* note 60.
[78] Jacob Viner, "An Intellectual History of Laissez-Faire" (1960). 3 J. Law & Econ. 45, 45.
[79] Malkiel, Burton G. "Efficient Market Hypothesis," (1987), The New Palgrave: A Dictionary of Economics, v. 2, at. 120–123.
[80] Stanley Jevons *supra* note 3.

at a particular point in time (double coincidence). With numerous participants wanting to trade their own unique commodities for another unique commodity they need at a particular time, trade becomes dependent on happenstance. This slows down trade and when trade slows down, liquidity logically follow suit. This arrangement is further complicated by the distinction between utility and cost. By this we mean that the utility derived from a particular commodity will not reflect in the barter cost of said commodity.[81]

The second reason is the information asymmetry that exists between the participants in the exchange. This means that the party with the most information on the commodities is the party that owns the commodity and intends to exchange this commodity for another. As expected, every participant is aware of the information asymmetry in favour of the other party, and this drives the cost of the exchange upwards as a risk premium cost or dishonesty cost is placed on the exchange of the commodities. This premium on the additional value of the commodities leads to inflation as the nominal value of the commodities for exchange will exceed their intrinsic values.[82] The natural progression of monetary standardisation is sure to solve this problem particularly when a few commodities with known intrinsic value are settled upon as the standardised group of commodities of exchange or proto-monetary commodities. This can be done by introducing the Mengerian/Metallist theory of money through precious metals (such as gold and silver) with generally accepted intrinsic value as exchange commodities.

It becomes apparent from the above that there are diverse motivations for households and merchants in utilising money as a medium of exchange. The Societary theory favours the household (money users) because members of the household require a generally accepted arrangement to serve as a medium of exchange such as the barter system. When further complications emerged with the barter system of exchange due to the difficulties suffered from slow trade and liquidity risk led to standardisation of the commodities of exchange by the merchants. The problems with the Mengerian/Metallist theory of money as it affects the Societary theory of money are- firstly, the selected commodities are finite and scarce. A scarcity of any or all of these commodities will lead to inflation unless economic growth can outpace the rate at

[81] *Ibid.*
[82] See See G.A. Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." (1970) 84 The Quarterly Journal of Economics 488-500.

which these scarce commodities are produced.[83] Secondly, because the prices of the other commodities of exchange are dependent on the price of a select group of commodities, it is possible that the value of these commodities will be determined by the goods and services they are exchanged for (the extrinsic value) as opposed to the intrinsic value of these commodities.

An example of the above was evident in the decision to end the gold standard. In a lecture given by the then-Federal Reserve Board Chair Ben Bernanke, four fundamental problems of the gold standard reminiscent of the above problems with the Mengerian/Metallist theory were identified. They include the following:

- "When the central bank fixes the dollar price of gold, rather than the price of goods we consume, fluctuations in the dollar price of goods replace fluctuations in the market price of gold.
- Since prices are tied to the amount of money in the economy, which is linked to the supply of gold, inflation depends on the rate that gold is mined.
- When the gold standard is used at home and abroad, it is an exchange rate policy in which international transactions must be settled in gold.
- Digging gold out of one hole in the ground (a mine) to put it into another hole in the ground (a vault) wastes resources."[84]

The gold standard negatively affected the household welfare through inflation. When inflation sets in, we can expect that money with a low purchasing power will be rejected by households and firms. This is also applicable to the barter system.

Though the barter system might have its flaws, its subsequent evolution into proto-monetary instruments in accordance with the Mengerian/Metallist theory was able to provide some control to merchants by ensuring that they are able to determine the value of their products based on the acceptable and standardised proto-monetary instruments. The introduction of standardisation can be seen as sign of progress in monetary affairs. However, we argue that standardisation of

[83] Schulze, Günther G."Reasons behind barter reconsidered, Diskussionsbeiträge" (1990) Serie II, No. 103, Universität Konstanz, Sonderforschungsbereich 178 - Internationalisierung der Wirtschaft, Konstanz.

[84] Ben Bernanke "The Federal Reserve And Financial Crisis" (2012) available: https://www.federalreserve.gov/newsevents/files/bernanke-lecture-one-20120320.pdf also see summary of lecture by moneyandbanking.com titled "why the gold standard was a bad idea' December 19 2016, available at: https://www.moneyandbanking.com/commentary/2016/12/14/why-a-gold-standard-is-a-very-bad-idea.

commodities in line with the Mengerian/Metallist theory of money clearly favoured the merchants over the household. Thus, the responsibility fell on the sovereign to align the objectives of the merchants and household by further standardization of money. This is usually achieved by the state through legal mechanisms such as legal tender and currency laws- lex monetae.[85] Ordinarily, it is the sovereign's intervention in monetary affairs that serves as a foundation for payments and settlement systems which is a more modern structure put in place for money as a medium of exchange.[86]

2.2.2. Structures in Place for Money as a Unit of Account

Money as a unit of account represents the function of money as a standardised unit of measurement of the value of goods and services within the economy.[87] This function of money logically succeeds the function of money as a medium of exchange. Earlier on, we discussed the foundations of monetary standardisation by relying on the combined effects of the Societary and Mengerian/Metallist theories of money and concluded that the best way to circumvent the problems posed by monetary standardization imposed by the merchants is the intervention of the state or the sovereign to further standardize the monetary commodities by adopting the State theory of money, particularly through lex-monetae and the universally accepted notion known as the nominalism of money[88]. This requires a hands-on approach by the state to designate a particular commodity or instrument as a unit of account and to also define the denomination of monetary instruments.

How is the sovereign able to achieve this level of control over the monetary affairs within its territory such that it is capable of standardising money to this extent? According to Mann, the mechanics of the state's involvement in monetary affairs can be described in three key steps. They are:

1. First the commodity or instrument intended by the state to be used a money must first be Issued under the authority of the law in force within the State of issue;

[85] This can be described as a transition from proto-lex monetae commodities to lex monetae.
[86] This is discussed subsequently in section 2.5. We will also discuss in chapters 3 and 4 how the Societary theory of money can be used as an argument against the adoption of a sovereign backed digital currency and to support the adoption of popular virtual currencies.
[87] See Stanley Jevons *Supra* note 3.
[88] Nominalisation of money refers to the face value of a monetary instrument as opposed to the intrinsic value of the instrument.

2. Second, said legal authority, statutory instrument or other form of law must define the denomination of the money by reference to a unit of account.
3. Third, under the terms of that law, said commodity must be made to serve as the universal means of exchange within the State of issue.[89]

Consequently, it becomes apparent that in order to standardise money, not only must the state utilize the law to create monetary units and denominations, but the state must also place the governance and control over money and monetary affairs within its exclusive purview. Placing monetary control within the exclusive control of the state is so fundamental to monetary sovereignty that it is sometimes reflected in the Constituion or other *grundorm* of most jurisdictions. In most statutory provisions, the state's exclusive control over monetary affairs is achieved through a combination of lex-monetae and nominalism. The State theory of money also serves as the foundation to the nationalization of money and bringing money through currency, under the protection of the sovereign through a form of social contract between the firms/merchants/households and the state. the case of *Suffel v Bank of England*[90] is highly instructive on this point, particularly where Sir George Jessel MR stated that:

> "A Bank of England note is not an ordinary commercial contract to pay money. It is in one sense a promissory note in terms, but no one can describe it as simply a promissory note. It is part of the currency of the country… It is protected in a way no other instrument is protected, against alteration or mutilation, and its preservation in a pure state, to use a term as applied to deeds by some learned judges, is certainly a matter of the utmost importance."

For the state to reap the benefits of the social contract that is crucial to the State theory of money, both lex-monetae and nominalism must be applied together. Where nominalism is applied alone, we have a situation like the Mengerian/Metallist theories of money. Case in point, a combination of lex-monetae and nominalisation allows items such as gift cards/vouchers, tokens, and similar items to be used in exchange for goods and services, though they do not meet the requirements of the statutory description of 'money'. This is because said items lack the support and backing from the state. the same can be said of promissory notes issued by a corporation even though these

[89] See Frederick A. Mann 5th ed, *Supra* note 53.
[90] [1882], 9 Q.B.D. 555 (UK), at 563.

promissory notes can circulate within the community. To put the effect of combining lex monetae with nominalism in perspective, let us look at Sections 3, 7, 12 and 13 (1) of the Canadian Currency Act[91] which provides thus:

> 3. (1) The monetary unit of Canada is the dollar.
> (2) The denominations of money in the currency of Canada are dollars and cents, the cent being one hundredth of a dollar.
>
> 7.(1) A coin is current for the amount of its denomination in the currency of Canada if it was issued under the authority of
> (a) the Royal Canadian Mint Act: or
> (b) the Crown in any province of Canada before it became part of Canada and if the coin was, immediately before October 15, 1952, current and legal tender in Canada.
> (2) No coin that is bent, mutilated or defaced, or that has been reduced in weight
> 7.1 A note is current for the amount of its denomination in the currency of Canada if it was issued under the authority of the Bank of Canada Act.
>
> 12. All public accounts established or maintained in Canada shall be in the currency of Canada, and any reference to money or monetary value in any indictment or other legal proceedings shall be stated in the currency of Canada.
>
> 13.(1) Every contract, sale, payment, bill, note, instrument and security for money and every transaction, dealing, matter and thing relating to money or involving the payment of or the liability to pay money shall be made, executed, entered, done or carried out in the currency of Canada, unless it is made, executed, entered into, done or carried out in
> (a) the currency of a country other than Canada; or
> (b) a unit of account that is defined in terms of the currencies of two or more countries.

A combined reading of Sections 3 and 7 of the Currency Act represents the principle of nominalism and is to the effect that a monetary unit of the dollar will always be equal to itself at any point in time.[92] On the other hand, a combined reading of Sections 12 and 13 of the Currency Act represents the principle of lex-monetae which is to the effect that any obligations expressed in dollars must be met in the dollar subject to a few exemptions. By standardizing the monetary unit in this manner, the state theory of money reduces the dishonesty costs that were prevalent in the Societary theory of money. Standardisation of the monetary unit also makes it easier to administer taxation and other fiscal matters. Standardisation is also responsible for making it possible to develop, monitor

[91] RSC, 1985, c. C-52

[92] We will later get to see that this is fictitious as inflation does not allow the nominal value of a currency to stay the same at every point in time.

and administer payments and settlements systems and serves as the underlying philosophy behind the global transition from gold standard to *fiat-currency.* A transition which is by itself responsible for the Bretton Woods system monetary system.

Although the state theory of money reinforces the idea that money that serves as a unit of account and allows the sovereign to retain control over monetary affairs, there is a cost associated with the exercise of sovereign power in this manner. This cost accrues to the state (through the central bank) from the activities performed by the state to regulate the reserve requirements for commercial banks, regulate balance of (international)l trade, managing the discount rate and window, and controlling the interest on reserves. The State also faces an additional cost in the form of inflation if it fails to perform the afore mentioned duties. While the state has to meet these considerations on the monetary control side, the state also has to juggle managing government spending and earnings on the fiscal side. Due to the complexity and expenses involved in managing monetary affairs, the state is forced to rely on financial intermediation to reduce the policy costs thus monetary policy is often channelled through financial intermediaries. We shall discuss the implication of introducing financial intermediaries into monetary affairs in the next section of this chapter.

A failure by the state and its agents (including the central bank) to ensure monetary stability by avoiding inflation and protecting the nominal value of the monetary unit could also lead to a reversal of the state theory of money and re-emergence of the Societary theory of money. This occurs through the empirical legitimacy that is associated with the Societary theory of money. In such a situation, monetary stability and nominalism will usually have been plagued by hyperinflation to the extent that the households refuse to accept a particular currency as legal tender for the fulfilment of existing obligations because the currency is less valuable than the goods it is used to purchase.

A similar situation occurred a few years after the first world war in the Weimar Republic (Germany) in the 1920's where the *papiermark* was afflicted with severe hyperinflation between 1921 and 1923[93]. This hyperinflation was so dire that in 1923, 1 gold mark was equivalent to

[93] For more information on the hyperinflation in the Weimar Republic, see Gregori Galofré-Vilà, "The Costs of Hyperinflation: Germany 1923" (2021) Universidad Pública de Navarra & INARBE Working Paper D.T. 2101, online (pdf): https://www2.unavarra.es/gesadj/CyD5/depEconomia/documentos-trabajo/2021/WP2101.pdf.

1,000,000,000,000 (one trillion) Papiermark compared to 1918 where 1 gold mark hovered slightly above 1 Papiermark. During this period, it was commonplace to see abandoned paper notes laying in the streets and it has been said that "It was cheaper to light [a] fire with paper money than with [a] newspaper". As a consequence of the hyperinflation, most Germans reverted to barter as a means of exchange in line with the Societary theory of money.[94]

Another problem with the State theory of money when discussing money as a unit of account is the problem that arises where the value of the commodity being used as money (assume gold coins as an example) exceeds the nominal value of the money. For example, where a gold coin worth over $10 is used to denominate a 1 cent coin. Where such a situation occurs, the interplay of microeconomics factors come into the frame through what economists describe as Gresham's law where bad money drives out good money. This occurs through a combination of demand and supply, laxed monetary policy (particularly concerning the circulation of money in the economy), liberal exchange and monetary control regulations and laws and trade. Gresham's law operates in the following ways:

1. Let us stick to the earlier example of the gold coin valued at $10 with a nominal value of 1 cent. We will call this gold coin - coin A.
2. Let us also imagine that before coin A enters circulation, there was another coin with nominal value of 1 cent in circulation, but this coin is a bronze or copper coin with value roughly equivalent to or less than the nominal value of the coin. Let us call this coin B.
3. Coin A joins circulation through monetary policy mechanisms channelled through financial intermediaries (commercial banks) and circulates through the economy to firms and merchants when wholesale trade takes place or when they attempt to make withdrawals from the banks to meet existing obligations.
4. Coin A is now about to reach the household through retail trade, wages, earnings as well as through payment for goods and services.

[94] During this period, "Bartering became more and more widespread . . . A haircut cost a couple of eggs . . . A student I knew . . . had sold his gallery ticket . . . at the State Opera for one dollar to an American; he could live on that money quite well for a whole week. The most dramatic changes in Berlin's outward appearance were the masses of beggars in the streets . . . The hard core of the street markets were the petty black-marketeers ..." Egon Larsen, a German journalist, remembering this incident in 1976. (Slidedoc.com) https://slidetodoc.com/the-german-hyperinflation-of-1923-hyperinflation-the-drop/.

5. The merchants, traders and consumers immediately notice that Coin A is made of gold and its intrinsic value is greater than its nominal value thus it is undervalued. The same individuals also notice that Coin B which is also in circulation has its intrinsic value equal to or less than the nominal value of the coin. Thus, coin B is overvalued.
6. Something interesting begins to occur at this realisation by firms and households. It is a standard principle in finance and investment that investors dispose of undervalued assets and securities and hold onto overvalued securities.
7. Applying the above principle to the dynamics between coins A and B, we may begin to observe that people would prefer to hold on to Coin A whilst spending coin B. This refusal to spend coin A will have the effect of taking coin A (good money) out of circulation and putting more of coin B (bad money) into circulation.

The Gresham's law problem winds up in the removal of the good money (coin A) from circulation as the good money will continue to be hoarded, disposed or sold in a market that recognises the intrinsic value of the coin A (this disposal will usually take place beyond the territory of the state usually internationally within another jurisdiction). A somewhat similar situation occurred in the United States during the period between 1792 and 1834 where the United States maintained an exchange ratio between silver and gold at 15:1, i.e 15 units of silver for 1 unit of gold. Whereas the ratios in Europe ranged between 15.5:1 and 16.06:1.[95] These different exchange ratios created an arbitrage opportunity where people had the opportunity to sell their gold in exchange for silver in Europe because gold was comparatively more expensive in Europe. After selling their gold in Europe, they could then use their silver to purchase gold in the US at a cheaper price and save between 0.5 and 1.06 units of silver from the purchase of gold from the US mint. This eventually led to a point where the amount of gold in circulation in the US was almost at trace levels as silver had driven gold out of circulation. We are witnessing a similar situation with bitcoin and other virtual currencies.[96]

[95]Encyclopedia Britannica, "Gresham's law". Encyclopedia Britannica, 7 Dec. 2015, https://www.britannica.com/topic/Greshams-law. Accessed 4 March 2022.

[96] It has been said that even though DLT makes bitcoin beneficial for payment and exchange, it is also exhibiting traits of 'good money' in the Gresham's law analysis as most people hold on to bitcoin as an undervalued currency or asset in the hopes that the intrinsic value of bitcoin (compared to the dollar) will rise, and the holders/investors want to hold on to it until the intrinsic value is realised. We shall discuss more on this in chapters 3 and 4.

How does the state address these two major challenges of inflation and Gresham's law? Inflation is always a tough problem for the state to tackle and may remain so complicated for the foreseeable future. Usually, the central bank tasked with managing inflation performs its responsibility through price control, reducing the money supply by utilising contractionary monetary policy (including interest rate hikes) and reserve requirement control.[97] The Gresham's law problem can be solved by the same monetary controls used to combat inflation with the addition of foreign exchange controls to prevent currency speculators from taking advantage of arbitrage opportunities. In the current age, Gresham's law usually operates in reverse particularly where there is little to no enforcement of legal tender and currency laws. When this happens, instead of bad money chasing out good money, bad money will be chased out of circulation by good money. This happens because members of the household- traders, merchants and consumers relying on the poor enforcement of legal tender laws will be at liberty to reject bad money and insist on being paid in good money. Regardless of whether it is Gresham's law or reverse Gresham's law that is in effect, this problem can be avoided if the following conditions are applicable:

- If the good money is full-bodied legal tender whose face value equals its intrinsic value,
- if the public is prepared to accept and circulate bad money,
- and if the total money in circulation, (M1, M2 AND M3) including, both good and bad money, exceeds the actual monetary demand of the public.[98]

If the above conditions are applicable, then then the problems associated with Gresham's law can be avoided.

To close out this section it is important to indicate that the problems faced by the money users, which so happen to be evident in the weaknesses and challenges of the Societary theory of money were supposed to be solved by the state theory of money. Inflation is a problem that transcends both the Societary and state theory of money. Thus, it could be argued that the ensuing complexities of money were brought about as natural responses to inflation. Inflation and its threat to monetary stability has forced monetary systems to evolve innovative solutions to prevent money from losing its purchasing power. It is within this goal of combatting inflation that the state's

[97] Peter Ireland, N., "Monetary Transmission Mechanism," The New Palgrave Dictionary of Economics, 2nd ed., ed. by Steven N. Durlauf and Lawrence E. Blume (Houndmills, United Kingdom: Palgrave MacMillan 2008).
[98] Fetter, F.W. "Some Neglected Aspects of Gresham's Law." (1932) The Quarterly Journal of Economics, Vol. 46, No. 3, May, pp. 480-495, at 487.

motivation lies, yet inflation persists.[99] While the household's motivation is to ensure that there are available commodities or items to serve as an efficient means of exchange, the State's motivation is to standardise the items of exchange and ensure currency or monetary unit is protected from inflation as much as possible. Try as the state might to control these issues, inflation still finds a way to rear its head, forcing the State to continue to search for innovative solutions such as the delegation of authority to a government institution to govern monetary affairs and to protect the accumulated wealth of the individuals within the state. This leads us to the third function of money as a store of value.

2.2.3. Structures in Place for Money as a Store of Value

The function of money as a store of value is used to highlight the peculiar role that money plays as a crystalized representation of purchasing power that is capable of being preserved for future use. Under this function of money, a monetary unit is not only useful as a scale by which goods and services are valued but can also be used as a representation of the materialised form of value that enables money to be saved in its "current" state which can be retrieved at a future date. This function of money allows money to serve as a means of exchange and as a commodity whose value can be predictably ascertained based on its uses in trade and exchange for goods and services. In other words, money as a store of value involves the features of money that makes it possible to represent in monetary terms, a snapshot of financial position at a particular time, a representation as a unit of account which can be saved, borrowed, loaned and modified by subsequent savings. It is this function of money that allows money to be borrowed and loaned.[100]

In order for this function of money to be possible, monetary value must be quantifiable. It must be capable of being measured, invested, saved and protected from value loss. The State in recognition of this important function of money established the central bank which in turn developed the "institutional framework that ensures preservation of purchasing capacity, ie price stability" using the Institutional theory of money.[101] This institutional theory of money makes it possible for money to be described as a "dematerialized commodity" produced and managed by central banks which

[99] Canada's inflation rate as at April 2022 had jumped to a new 31-year high of 6.7%. see statistics Canada: https://www.statcan.gc.ca/en/subjects-start/prices_and_price_indexes/consumer_price_indexes.
[100] Stanley Jevons Supra note 3.
[101] See Antonio Sáinz de Vicuña, *supra* note 54.

serves the function of a store of value".[102] In the same vein, the institutional theory of money also "describe[s] the fact that currently, money consists primarily of a claim against the issuing central bank (i.e. cash, BM), but also the credit balance of deposits held by the public in commercial banks.[103] This is to ensure that the purchasing power and the monetary value of money is preserved.

Two monetary institutions can be identified as representing the structures in place to recognise money as a store of value from the Institutional theory of money. They are the central bank and the financial intermediaries (specifically the commercial banks). These institutions are responsible for ensuring that the purchasing power parity of money is protected. These institutions also play a combined role in ensuring that complex monetary policy strategies are effectuated. The formation of these institutions is performed by a combination of political power and the operation of law and in most cases is achieved through the interplay of statutory instruments. In most jurisdictions there are central banking laws as well as laws that govern both commercial banking activities and the activities of other financial intermediaries. For example, in Canada, we have the Bank of Canada Act[104] as well as the Bank Act[105]. The Bank of Canada Act empowers the Bank of Canada to control monetary policy, issue, redeem and retire bank notes and to monitor and supervise commercial banks and other financial institutions. All of these duties are to be performed with the sole aim of maintaining financial and monetary stability.

The Bank Act provides for the governance of banks and other financial institutions and includes conditions to be met by commercial banks such as the capital adequacy requirements as well as the reserve requirements to be met by all commercial banks as they manage the accounts of their customers. It is for this reason that commercial banks as well as some other financial intermediaries are described as money managers in this thesis. The concerns of the money managers are completely different from the concerns of the state and the money users (households and firms). The money managers are concerned about profits made from banking operations, account management fees and the banking business model which involves making profits from granting loans. These distinct motivations tend to pit the motivations of money managers against that of the

[102] *Ibid* at para 25.18.
[103] *Ibid.*
[104] RSC, 1985, C. B-2.
[105] SC 1991, C. 46.

money users (whose major concerns are that money can be used as an acceptable medium of exchange and that money has its purchasing powers preserved as much as possible).

The contrast between the motivations of the money users and the money managers arises from the fact that the money users are more concerned about what money can do in the exchange of goods and services and how best to keep their money safe (which in most cases is done by depositing their money in commercial banks). The money managers on the other hand are concerned about how best to make profit from a business model that gives them custody of the money belonging to the money users. In other words, the money users need money for exchange and the money managers need the money users to keep their money in the custody of the money managers irrespective of the value eroding effects that inflation has on savings and deposits.

Regardless of these differing motivations, both the money users and the money managers are equally concerned about the value eroding effects of inflation, and it is at this juncture that the motivation of the State emerges. It can be said that by having a motivation that involves preventing inflation, the state attempts to bridge the gap between the money users and the money managers. The state does this by determining the discount rate or benchmark interest rate which is defined as the rate of return on the reserves and bank deposits that is enough to counteract the rate of inflation. In essence there are two interest rates that are of importance here. The first being the rate that is charged by the money managers to the class of money users such as merchants and corporations who need capital for their business activities. The second being the rate charged by another class of money users who have deposited their money in banks (in current accounts) to protect/invest their money in interest yielding accounts to counteract the effects of inflation.[106] The money managers being profit oriented in their business, are empowered by law to benefit from the difference between the interest rate on loans (RL) and the interest rate on deposit (RD). This difference is called the net interest margin (NIM).[107] For the money manager to remain a going concern, RL must be greater than RD and RL must be greater than or equal to the benchmark rate

[106] Some banks offer high-yield savings account that charge interest significantly above the inflation rate.
[107] James Nguyen, "The relationship between net interest margin and noninterest income using a system estimation approach" (2012) Journal of Banking & Finance 36 2429–2437 at 2432, online (pdf): https://www.sciencedirect.com/science/article/pii/S037842661200115X.

(or discount rate/overnight rate/policy rate) which is usually set by the state and is usually the spread placed on the risk-free rate which is charged on treasury securities.[108]

We argue that the interest rate arrangement above is encouraged by the state through the central bank to facilitate the execution of monetary policy. It is fair to state that without the financial intermediaries, it would be difficult to manage and control monetary policy. More precisely, it would be difficult to control the interest rates and inflation without financial intermediaries to act as the medium through which the inflation control mechanisms for monetary policy are applied. The combined effect of the institutional and the state theory of money is responsible for the sophistication of modern-day monetary policy. The institutional theory of money also makes it possible for reserves held by the central bank to be defined as a liability of the central bank and an asset of the commercial bank i.e. "reserve balances seem to represent a claim on the central bank to supply legal tender on demand".[109]

In addition to the above, the institutional theory of money also makes it possible for the commercial banks and other financial intermediaries to loan and transact between one another. Many jurisdictions have interbank lending markets where participant banks lend money to each for a specified period (usually overnight). These interbank markets usually lend at the interbank offer rate which can be calculated as a small spread on the benchmark rate. The opportunity to borrow and lend at this low rate is a privilege that is enjoyed exclusively by commercial banks and other financial intermediaries. Where the banks do not want to borrow from one another, they have another privilege that the commercial banks enjoy exclusively. This is the privilege to borrow money from the central bank using repurchase agreements (repo). Under a repo agreement with the central bank, the bank sells some of its securities (usually government securities) to the central bank under an arrangement where the bank can buy back the securities from the central bank later at the price of the security at that future date. The difference between the sale price at the earlier date and the purchase price at the later date is known as the repo rate. The interbank clearing and

[108] for more information on interest rates, see the Bank of Canada policy rate page: https://www.bankofcanada.ca/2021/04/understanding-policy-interest-rate/.

[109] For more on the accounting treatment of commercial bank reserves see Garreth Rule "Understanding the central bank balance sheet" (2015) Centre for Central Banking Studies, Bank of England, ISSN: 1756-7270, Online (pdf): https://www.bankofengland.co.uk/-/media/boe/files/ccbs/resources/understanding-the-central-bank-balance-sheet.pdf. We shall discuss this idea of reserves as liabilities of the central bank in more detail in chapter 4 of this thesis.

settlement system is monitored and controlled by the central bank and serves as a platform to control the reserve requirements and monetary policy.

Another innovation made possible through the application of the institutional theory of money are the domestic and international platforms for international payments. These platforms exist to connect commercial banks, payment service providers and other financial intermediaries to each other and facilitate the international transfer of funds from one individual to another. With automation and digitisation, these platforms have developed protocols that ensure that the communication between participant banking institutions are efficient, and the transfer of funds is almost immediate. Some platforms function as an extension for countries to enforce their international political positions and extend their monetary sovereignty to cover some issues around international monetary affairs.[110]

Although the above measures make it easier to control monetary policy and retain monetary sovereignty, inflation continues to emerge. And the misaligned motivations and objectives of the money users, money managers and the State do not make inflation and monetary policy easy to manage. For the state to control monetary policy, the financial intermediaries are needed to transfer the policy to the money users. For the intermediaries to make this transfer, there needs to be an existing opportunity for financial intermediaries to make profit from said transfer of monetary policy. This in turn leads to some value loss (in the form of policy cost) because of the transmission mechanism required to ensure that monetary policy has the desired effect on the households and the economy. The transmission mechanism has the effect of making monetary policy easier and efficient but more expensive to manage.[111] The cost of the central bank's preferred transmission mechanism does not go unnoticed by the central bank. The central bank may remain tied to this

[110] For example the Society for Worldwide Interbank Financial Communications (SWIFT) an international payment system which operates as a platform for domestic and international payments and transfer is being overseen by the central banks of members of the G-10 which includes Belgium, Canada, France, Germany, Italy, Japan, The Netherlands, United Kingdom, United States, Switzerland, and Sweden), as well as the European Central Bank, with its lead overseer being the National Bank of Belgium. Swift has been known to disconnect countries from it's platform for sanctions purposes. Iran was disconnected pursuant to EU Regulation 267/2012 which prohibits specialised financial messaging providers, such as SWIFT, from providing services to EU-sanctioned Iranian banks. More recently, as of 1st of March, 2022, there are ongoing discussions to disconnect the Russian federation from the SWIFT network for the hostilities in Ukraine. This will be discussed in more detail in chapter 4 and 5.

[111] For more information, see detailed discussion in Section 2.8 below.

option for now and for the known future until perhaps, a more efficient and cheaper transmission mechanism becomes available to it.[112]

Table 1 below summarises the four theories of money identified above as well as their associated "affected participants" alongside their identified motivations and related function of money. The table attempts to capture the key motivations of participants in the monetary affairs within a state.

Table 1

Theory of money	**Relevant participant in monetary affairs**	**Relevant classification based on functional definition of money**	**Identified motivations and major concerns over money**
Societary theory of money	Money users: Households, Firms	Money as a means of exchange	- The need to trade and exchange - To protect purchasing power of money
Mengerian/Metallist theory of money	Money users: particularly the merchants		
State theory of money	Money maker: The Sovereign, state, central bank	Money as a unit of account	- Standardisation of money - Taxation, revenue, and fiscal policy measures - To prevent and/or control inflation
Institutional theory of money	Central bank and financial intermediaries particularly the commercial banks (money managers)	Money as a store/standard of value	- Profit from operations - positive net interest margin - Incremental deposits from other participants - Financial risk management (including inflation control)

Beyond inflation, other threats to monetary sovereignty exist and new threats continue to evolve alongside economic activities. Indicatively, significant threats exist to monetary sovereignty during times of war and during economic crises. In the following section we will discuss the usual innovative ways that the state through the central bank responds to threats to monetary sovereignty during economic crises and during times of war.

[112] Perhaps through tokenized finance as a form of transmission mechanism for monetary policy. We discuss this in chapters 3 and 4 of this thesis.

2.3. Monetary Policy as a Governance Tool in Exceptional Circumstances

In this section we will attempt to analyse the innovative actions usually taken by key actors to reclaim monetary sovereignty during times of war and to administer monetary policy during financial crises. It must be acknowledged that in some cases, a financial crisis can be triggered by a war. However, for the benefit of this section, we will be treating recessions brought about as a result of a financial crises separately from a recession brought about as a result of a war. It must also be acknowledged that although "recessions associated with financial crises tend to be unusually severe and that recoveries from such recessions are typically slow"[113], the central bank is usually faced with the same challenge and goal both during a financial crisis and in times of war. This challenge is usually in the form of encouraging output growth whilst managing inflation. The mechanism through which this goal is achieved depends on a combination of factors including how much the state is willing to deploy aggressive and novel monetary policy mechanisms and how much the governmental cheques and balances allow the expansion of the boundaries of monetary sovereignty during times of financial crises and war. We will be exploring these options to show how the usual reactions of the sovereign when its monetary sovereignty is under threat.

2.3.1. Monetary Policy and Economic Crises

During a financial crisis, monetary policy measures are usually deployed to control one or all the following: credit, asset prices, uncertainty, and consumer confidence.[114] Though the actual monetary policy mix that guarantees the desired result is unknown, in most cases, the central bank can figure out the appropriate transmission mechanism for a chosen policy mix.[115] That being said, the combination of the uncertainty surrounding the appropriate policy mix, coupled with the additional uncertainty from the public/ money users' reactions to a particular monetary policy transmission mechanism makes it important that the central bank conducts an investigation into the likely outcomes or effect of a particular policy strategy. By so doing, the central bank will be better prepared if certain strategies are deemed less effective during a crisis. Where this is the case, the central bank should be better prepared to apply another combination of monetary policy options

[113] See Nils Jannsen, Galina Potjagailo & Maik H Wolters, "Monetary Policy during Financial Crises: Is the Transmission Mechanism Impaired?" (2019) 15:4 Int J Cent Bank 46 at P. 81., online (pdf): https://www.ijcb.org/journal/ijcb19q4a3.pdf.
[114] *Ibid.*
[115] In chapter 1, we briefly discussed the transmission mechanisms for QE under section 3.0. Central bank Mandate and Monetary Sovereignty; Is Monetary Sovereignty Under Attack?

and other alternatives (for example, where the central bank is aware that a combination of fiscal and monetary policy controls ought to be applied simultaneously) to achieve a particular policy objective.

Now, while the central bank is attempting to stimulate the economy through expansive monetary policy mechanisms, the central bank must pay particular attention to the transmission mechanism being used to convey the monetary policy, and to ascertain if said transmission mechanism is unaffected by the crisis. To serve as a frame of reference for how a crisis can affect a transmission mechanism; extreme macroeconomic volatility, investor uncertainty and low confidence as well as significant balance sheet adjustments could lead to extremely distressed financial markets which may in turn affect the monetary policy transmission mechanism through financial intermediaries and financial market participants. For example, commercial banks might be unwilling or reluctant to extend credit facilities during a recession because they are worried about the increased liquidity and credit/default risk during a recession and because they need to adjust their balance sheets by increasing the balance sheet 'provisions for bad debts' and adjusting the accounts receivables accordingly.[116] In such a case, it will not be advisable for the central bank to apply monetary policy indirectly by relying on the financial intermediaries.[117] Rather, the central bank will look for a more direct approach as was done by the bank of Canada in the below example.

On the 10th of December 1975, the federal government of Canada passed the Anti-Inflation Act. The Act was passed to combat the "stagflation crisis" of the 1970s and contained extensive powers granted to the federal government through the minister for finance and the bank of Canada to control profit margins, prices, dividends, benefits, and wages in Canada. the act also contained a proviso excluding the Act's application to provincial matters, except where said province choses to be brought under the purview of the inflation control mechanisms present in the Act. This Act sought to control inflation using a transmission mechanism that mostly (negatively) affected the money users. The Act was seen as an unnecessary inconvenience that directly affected the personal rights and obligations of the money users and as such was challenged in Court in Re: Anti-Inflation Act.[118] The Act as passed by parliament was challenged on the grounds that the act was ultra vires

[116] Bouis, R et al. "The Effectiveness of Monetary Policy since the Onset of the Financial Crisis." (2013) OECD Economics Department Working Paper No. 1081., see also Valencia, F. "Aggregate Uncertainty and the Supply of Credit." (2017) Journal of Banking and Finance 81 (August): 150–65.
[117] As was done in the financial crisis of 2008 where quantitative easing was applied indirectly by central banks through the financial markets. see Chapter 1 *supra* note 37.
[118] [1976] 2 SCR. 373.

the Parliament as said act covers topics exclusively under provincial jurisdiction. In a majority decision of the Supreme Court, the Act was determined to be intra vires the Parliament of Canada

The above represents an example of how monetary policy is deployed directly from the policy maker to the money users and skipping the financial intermediaries during a financial crisis or an economic recession. It is possible that the transmission mechanism is ineffective for combatting the recession. Where this is the case, the state can decide to combine fiscal policy controls alongside the monetary policy controls to achieve desired results.[119] The importance of fiscal and monetary policy working together is also recognised by law.[120] The use of fiscal policy to alleviate the economic pressures during a recession is not independent as in most cases, it is necessary to apply fiscal policy only after some monetary policy tools have been applied to boost investor optimism and confidence. Better results are sure to be realised when fiscal policy that promotes government spending preceded monetary policy that boosts investor optimism.

Regardless of the monetary policy mechanisms used during a recession or an economic crisis, be it a direct transmission mechanism that bypasses the financial intermediaries, an indirect mechanism that is channelled through financial intermediaries, or a combination of both direct and indirect methods through the inclusion of fiscal policy, the goal of the central bank remains to increase output whilst putting inflation in check. For the central bank, the decision to bypass financial intermediation would depend on cost-benefit analysis between the cost of financial intermediation and the benefit of the policy mechanism to the money user, firms, and households. We shall now see if the same conditions are applicable to monetary policy during times of war.

2.3.2. Monetary Policy and Monetary Sovereignty during times of war

During times of war, monetary policy mechanisms are usually deployed either to retain control over monetary sovereignty or to expand the reach of a state's monetary sovereignty. Most of the time, this is done by operation of law and is done to ensure that the boundaries of monetary sovereignty are malleable and can be expanded to suit the peculiar needs of the state during times of war. this is usually achieved in one or more of the following ways:

I. By using the law to alter or change the "appearance" or "form" of a particular currency

[119] Nils Jannsen *Supra* note 110.
[120] See section 14 (1) and (2) of the Bank of Canada Act.

II. By weaponizing inflation against an enemy territory.

III. By engineering the law to expand the money creation mandate of the central bank to fund wartime expenses.

IV. By using the law to retroactively recognise de jure currency that was spent by an enemy territory during wartime.

V. By using international law, treaties, international agreements and conventions to enforce economic sanctions that target an enemy territory's monetary affairs.

I. Using the law to alter or change the "appearance" or "form" of a particular currency Through the Introduction of New Money

Let us imagine a scenario where there is a Civil war between two factions A and B with both factions having the same currency ~~B~~. If faction B wants to cripple the economy of faction A, it can change the form and appearance of its currency by operation of law. This was done in Federal republic of Nigeria in 1967 during the Biafran wars.[121] During this period the Biafrans came into possession of a huge sum of Nigerian pounds and were converting and redeeming same in British pounds then subsequently converting same into the Biafran pound.[122] As soon as the Nigerian authorities became aware of this foreign exchange arrangement, they attempted to curb the outward flow of Nigerian pounds to England by issuing a military decree sometime in June 1967 to the effect that any Nigerian currency exported from Nigeria (including the rebel held South Eastern region) after 21 August 1967, would not be redeemed by the Nigerian Government.[123]

In addition to the steps taken to stop the outward flow of Nigerian pounds and the inward flow of Biafran pounds, the Federal government was also taking crucial steps to change the appearance of the Nigerian pound note by issuing new notes with a different design. As soon as these new notes were introduced, the Federal Government stopped redeeming notes of their current issue thus rendering Biafran holdings (in the old Nigerian pound notes) worthless by demonetising the old notes. As a result of this, the Biafrans were forced to negotiate a new exchange rate for converting

[121] The Biafran war was a Civil war between Nigeria and Biafra (a region in the southeast of Nigeria that threatened to secede from the rest of the Federal Republic of Nigeria in 1967.
[122] The war made it very difficult if not almost impossible to covert the Nigerian pound to the Biafran pound.
[123] This was done by way of a military Decree issued sometime in 1967.

the Biafran pound to the Nigerian pound such that the Biafran holdings were forced to be sold in exchange for the Nigerian pounds at a discount.[124]

When monetary policy is used in this manner, the sate employing such policy measures attempts to recover its monetary sovereignty from another state or territory during a war. in the example above, the currency was changed from one form to another to serve as a form of foreign exchange control during a time of war. it must be noted that changing the look or appearance of the currency was not enough. Said change had to be accompanied by operation of law in the form of a military decree which had the effect of preventing the outward flow of the currency.

In Oresme's opinion, the form or appearance of money should only be altered in two ways:

1. By altering the currency without demonetising the old money such as where a new sovereign takes power and inscribes his likeness on new notes. Oresme believes that this is not a significant alteration.
2. By creating new money demonetising the old note.[125]

The second form of alteration is what was done in the Nigerian example above. Oresme believes that this kind of alteration can only be made for one of two reasons:

I. If a foreign government or sovereign maliciously copies or counterfeits the moulds or dies used in printing the notes and said counterfeit notes are found within the state.[126]

II. if the old money is dated and has been damaged by the passage of time.[127]

Oresme, opined that the sovereign should be mindful of any such alterations that has the effect of demonetising the old money as such change would in his words:

> " …[S]uch a change would otherwise be unnecessary, scandalous and to the damage of the community. Nor does it appear that the prince [sovereign] could be induced

[124] See Peter Symes, "The Bank Notes of Biafra" (1997), First published in the *International Bank Note Society Journal Volume 36, No.4, 1997* "It was generally reported that the notes were being sold at discounts of over 40% their face value. There were of course many stories of enterprising Nigerians who were buying the Biafran holdings in Europe at a discounted rate and shipping them back to Nigeria where their full value could be obtained. Intermittent reports continued to appear in the international press in late 1967 and early 1968 of foreign nationals attempting to smuggle Nigerian currency into Nigeria." See also Olly Owen, "Biafran Pound Notes" (2009) 79:4 Africa: Journal of the International African Institute, pp. 570-594.
[125] Nicholas Oresme *supra* note 68.
[126] This is also applicable to the weaponised inflation example in (II) below.
[127] *Ibid.*

> to make such a change but for one of two reasons: either because he wishes to have no other name than his own inscribed on the coins, which is a slight to his predecessors, and empty ambition; or because he wants to get a larger profit by coining more money… and that is covetousness and to the prejudice and loss of the whole community.

While Oresme did not consider if it is permissible to alter the appearance of money during times of war, (II) above is applicable to the earlier Nigerian example because the Biafran rebels that had set up a shadow government could be seen as a foreign government in line with the above. Thus, justifying the alteration to the currency. Will Oresme's principles also apply to an alteration in the form of money from paper currency to digital currency in line with (II) above. Could we argue that a change from paper or book money to digital currency is akin to a change due to technological advancement? More so, in line with the excerpt of Oresme's quote above, will the state or central bank be wrong to adopt digital currency and demonetize other forms of money like cash and BM?

To answer the questions above, we would argue that the excerpt of Oresme's quote above is also applicable to digital currencies and would be more so applicable if the state/central bank adopts digital currency and does not demonetise the other forms of money such as cash/bank notes and BM. Why we cannot tell if all of Oresme's postulations on money are applicable to digital currencies, one thing remains clear, Oresme believes that when there is a change in the appearance of a particular currency, it is the motivation of the state and other stakeholders in such alteration that matters. Oresme believes that any motivation that is not outward looking by the State, i.e seeking to improve the quality of living of the citizens, is deemed as covetousness on the part of the State.

See the images below for a pictorial representation of the Nigerian £5 note before and after the change as well as the Biafran £5 note.

The Nigerian £5 note before the war:[128]

[128] Images culled from: https://en.numista.com/catalogue/note242164.html.

The Nigerian £5 note as changed in 1968:[129]

The Biafran £5 note:[130]

II. By weaponizing inflation against an enemy territory.

Under certain circumstances, it is possible to sabotage the monetary affairs of an enemy state during times of war. This can be done by creating artificial supply of the enemy territory's currency. Unlike the first example this is usually achieved by extralegal means through economic sabotage where the enemy territory covertly prints and circulates the bank notes belonging to the enemy state.

This was the case between 1861 and 1865 during the US Civil war. During this period, the Confederacy issued its own currency to millions of Southerners (a currency that was different from the dollar notes issued by the Union), under the belief that a confederate victory will allow easy

[129] *Ibid*
[130] *Ibid*

redemption of the Confederate currency. To counteract this, the Union forces counterfeited the Confederate currency and made sure to circulate same within the territories of the confederacy. This led to hyperinflation as there was too much Confederate currency in circulation. Towards the end of the war, the Confederacy's currency had lost so much value that merchants reverted to barter as a medium of exchange.[131]

As with the earlier example of monetary policy during times of crisis, this example focuses on the attempts by the sovereign to recover its monetary sovereignty albeit through unconventional means. It also agrees with Oresme's principles. Regardless, the effect is the same. Inflation is weaponised to cripple the economy of an enemy state.

III. By Engineering the Law to Expand the Money Creation Mandate of the Central Bank to Fund Wartime Expenses.

The law can be engineered to expand the powers of the central bank beyond the existing scope of its powers. Just as in (I) above, this is achieved through the operation of law in a manner not so different from the process utilised by the state in the direct approach to transmitting monetary policy discussed in section 2.3.1 above.

As with (II) above, this was also the situation during the US Civil War. To fund the Civil War without raising taxes, Congress passed the Legal Tender Act of 1862, which authorized the issuance of $150 million in United States notes by the union. The Act also declared that this money was to be lawful money to be legally accepted for payment of all outstanding obligations owed by the Union forthwith within the territory of the US. This legislation was to have the effect of increasing the number of US dollars in circulation and was identified to be inflationary in nature. The legislation was challenged in court and was initially declared unconstitutional by the Supreme Court.[132] This decision was eventually reversed in the following year.[133]

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[131] See George L Anderson, "The South and Problems of Post-Civil War Finance" (1943) 9:2 J South Hist 181–195, online: <https://www.jstor.org/stable/2191797>.

[132] *Hepburn v Griswold*, *Supra* note 12 Chief Justice Salmon P Chase held that forcing parties to accept depreciated currency violated the Constitution's prohibition against governmental taking of property without due process of law. The Chief Justice found no distinction between the Legal Tender Act 'and an act compelling all citizens to accept, in satisfaction of all contracts for money, half or three-quarters or any other proportion less than the whole of the value due, according to their terms.

[133] In a pair of 5:4 decisions that were supported by two new Justices who were appointed by President Grant on the same day that *Hepburn* was decided in the lower court.

As seen in the example above, administering monetary policy in this way opens said policy to checks and balances from the other arms of government. This is due to the economic significance of such a policy (it becomes more significant when this policy is contained in a statute) and the fact that this policy negatively affects both private rights and public law. It affects the private rights of the citizens and households because it has the effect of eroding monetary value from private assets and obligations. It affects public law in that it might raise questions on the powers of the state and its agents to make decisions affecting the monetary value of the domestic currency.[134] More so, existing legal tender laws ought to indicate the valuation mechanism for a particular currency. Any attempts to affect the valuation mechanism might raise serious constitutional issues as the new law containing this policy may be deemed contrary to the constitution or the existing legal tender laws. It is no surprise at all that this legislation was challenged. However, in exceptional circumstances such as was the case (being a period of war) this was permitted.

IV. By Using the Law to Retroactively Recognise De Jure Currency that was Spent by an Enemy Territory During Wartime.

Relying on the example provided in (I) above, let us imagine that during the Civil War, it was necessary to exchange goods and services within territory A with currency ~~A~~ as legal tender. if this exchange takes place during a period of war and a dispute arises after the war where territory B emerges as the winner of the war and currency ~~B~~ is recognised as legal tender both within territory A and B. If said dispute concerned the validity of currency ~~A~~ after the war has come to an end, the court can recognise the validity of currency ~~A~~ if said exchange took place within territory A under the usual course of business within territory A. This is because at the point where the trade/exchange took place currency ~~A~~ was the de jure currency that was accepted as a medium of exchange within said territory.

The above also occurred during the US Civil war in 1864 as seen in the celebrated case of **Thorington v. Smith[135],** Thorington, who was the owner of a parcel of land and resident in Montgomery (in Alabama which was a member of the Confederacy) and who sold said land to Smith and Hartley also residents of Montgomery. At the time of this sale, the Civil war was still

[134] As was the case in the Canadian Inflation Act above.
[135] 75 U.S. 8 Wall. 1 1 (1868).

ongoing and had been ongoing for more than three years. It is important to note that Alabama, or the part of it where this transaction took place, was at the time under the occupation of the military and Civil authorities of the Confederacy and the Union government exercised no authority there. There was no gold or silver coin in use nor any notes of the United States in circulation in the confederacy at this time. The only currency in use and which was in circulation then were treasury notes of the Confederate States and the price agreed to be paid by Smith and Hartley for the land was the sum of $45,000. Out of this sum, $35,000 was paid in Confederate States treasury notes, and for the residue, a promissory note was executed to the tune of "$10,000". After the war ended in 1865, the confederate treasury notes became worthless and thus Thorington commenced an action in court against the purchasers to enforce the promissory note.

The purchasers argued that the negotiation for the purchase of the land took place in Montgomery which was under the Confederacy and that the note in controversy was made at Montgomery, in the State of Alabama, where all the parties resided, in November, 1864, at which time the authority of the United States was excluded from that portion of the state and the only currency in use consisted of Confederate Treasury notes, issued and put in circulation by the persons exercising the ruling power of the states in rebellion, known as the Confederate government.[136]

The US Supreme Court held: "A contract for the payment of Confederate States Treasury notes, made between parties residing within the so-called Confederate States, can be enforced in the courts of the United States, the contract having been made on a sale of property in the usual course of business, and not for the purpose of giving currency to the notes or otherwise aiding the rebellion".[137]

The above can only be achieved through operation of law by judicial interpretation or through statutory instrument that retroactively recognises all transactions made in the usual course of dealings within a particular territory.

[136] *Ibid* at P. 75 US 4.
[137] *Ibid.*

V. By using international law, treaties, international agreements, and conventions to enforce economic sanctions that target an enemy territory's monetary affairs.

This has been discussed briefly in Section 2.2.3.[138] Under this monetary policy mechanism, a state makes use of the international law institutions and process to extend the reach of its monetary sovereignty such that it can directly affect the monetary affairs of another state. this can be achieved by a consortium of states or by an individual state. Often, these states would have to be members of international payment systems,[139] and a fellow member state would be in breach of an international law, treaty or convention in a manner that attracts sanctions. Where this occurs, the state(s) can extend their monetary sovereignty such that sanctions can be collectively applied to the erring state. These sanctions could have the effect of disconnecting the erring state from the international payment system which would have a significant effect on the monetary affairs of the erring state by causing liquidity shortages and limit the erring state's ability to access it's credit lines with the International Monetary Fund and the Bank for International Settlements.[140]

We have discussed a few ways that monetary policy is deployed during times of economic recession/financial crises and during times of war. we have highlighted the above strategies for administering policy to show the control measures that can be taken when monetary sovereignty is threatened. The analysis we have conducted above has shown us that during extraordinary times, monetary policy remains relevant even though its mechanisms may be affected by war or crises. Regardless of whether the extraordinary times are caused directly by the threat to monetary sovereignty or whether the threat to monetary sovereignty is an outcome of another threat, the state responds accordingly to protect its monetary sovereignty or extend the influence of monetary sovereignty during such times. Of course, this is done with the aid of the central bank which is tasked with protecting monetary sovereignty from municipal and international threats. We have highlighted one major role of the central bank to protect monetary sovereignty, we shall now proceed to discuss the other traditional roles of the central bank.

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[138] See also Note 33.
[139] Such as SWIFT, CIPS, SFMS, SPFS and INSTEX.
[140] Arshad Mohammed, "SWIFT Says Suspending Some Iranian Banks' Access to Messaging System," Reuters, November 5, 2018. See also John Irish and Riham Alkousaa, "Skirting U.S. Sanctions, Europeans Open New Trade Channel to Iran," Reuters, January 31, 2019.

2.4. The Traditional Roles of the Central Bank

What do we mean by the traditional roles of the central bank? It is almost impossible to outline every single role that the central bank plays in the economy. It is also difficult to create watertight categories that clearly separate one role from another particularly if said roles involve the administration of monetary policy. This is because in practice there is no clear end or beginning to these roles when they are being performed by the central bank. For example, the central bank is responsible for defining and implementing monetary policy, it is also responsible for promoting the smooth operation of the payment system within the state. it is difficult to separate these two roles from each other as they are not always mutually exclusive. By this we mean that the central bank's attempts to implement monetary policy may require the central bank to also promote the smooth operation of the national payment system.

We will not be deterred by the difficulty of setting clear boundaries separating one role from the other. To achieve this task, we will attempt to avoid situations where one role seems all too similar to another role by focusing on the original or primary roles of the central bank. We will also identify a few secondary roles that do not fit squarely into the traditional roles. For the benefit of this thesis, we will be categorising the traditional roles of the central bank into five groups: to define and implement monetary policy, currency management, to promote stability of the financial and payments system and infrastructure, management of government funds and accounts, to protect the welfare of firms and households.

1. To define and implement monetary policy

Of all the known roles of the central bank, this role is perhaps the most well recognised. It can be said to be the most important role of the central bank. we have discussed previously the extent to which this role is inextricably linked to monetary sovereignty. As a matter of fact this role is usually presented as a statutory responsibility in the enabling statutes of most central banks. In order to perform this role, the central bank uses different levers such as reserve requirements, the discount rate or interest rate, and open market operations. In some cases, the central bank uses exchange controls to govern foreign exchange activities. In other cases, the central bank uses the reserve requirements to control money supply through the commercial banks and makes use of the discount rate to control inflation. Due to the complexities inherent in administering monetary

policy, these control measures are not governed or spelled out in black letter law, rather they are governed by soft law provisions.

Since monetary policy is not always a national affair, and because inflation could emerge as a result of a deficit and imbalance in international trade it becomes necessary to have international rules and standards to govern international monetary affairs. Without these standards it becomes very likely for individual states to play under different sets of rules. For example, if the exercise of monetary policy within a state continues to go unchecked it is possible for some states to manipulate their currency in a manner that unfairly favours a state and to the determent of other states in international trade. Due to this, it became necessary to have international organisations responsible for overseeing and regulation national central banks at an international level. For this reason, we have international organisations like the IMF and the BIS, both of which require active participation by the national central banks.

2. Currency Management

Currency management involves the designing, issuance, circulation, replacement, and redemption of a national currency. The central bank is responsible for the currency management within the state. what this means is that the central bank is responsible for ensuring the security, functionality, and usability of currency. This includes establishing the useability requirements for cash machines and cash only vending machines. The central bank is responsible for ensuring that the currency in the form of bank notes is recognisable, distinguishable, and accessible to both firms and households. An important consideration by the central bank in designing and issuing currency is to ensure that the currency aesthetically (through, inscriptions, pictures, or symbols) represents the nation under whose authority said currency is issued.

Of course, the act of printing and circulating currency comes at a cost to the central bank and it is for this reason that seignorage exists. At this juncture, it is important to discuss the significance of seignorage and interest-bearing bank notes. Seignorage can be defined as the earnings made by the government from printing and circulating currency. How does seignorage work? It works by deducting the cost of producing a bank note from the interest earned from the bank note. Bank notes are interest earning because there needs to be an exchange between the central bank that prints the money and the commercial banks that circulate the bank notes. the interest on the bank notes is ascertained by charging a percentage rate (this rate is usually a small rate of about 2%)

over the face value of a currency.[141] The cost of printing the bank note is ascertained by the actual cost of producing a bank note. For example, if it costs 10 cents to print a $5 bank note, seignorage can be calculated by deducting the cost of 10 cents from the interest on the banknote. This sum is paid by the commercial banks to the central bank, and it is reflected in the central bank's books as an asset because same is used to purchase government debt securities. We will discuss this in detail in section 2.5 below.

The role of the central bank in currency management goes beyond the designing, issuance, and circulation of currency. The currency management role of the central bank extends to the distribution of currency to the financial institutions. Beyond this role, the central bank is also responsible for controlling and monitoring the quality of the notes already in circulation. The bank determines when to retire certain notes from circulation and when to issue fresh new notes into circulation. A huge portion of this role is achieved by the central bank working alongside the commercial banks and other financial intermediaries and regulators. A question that will be asked and hopefully answered in this thesis is whether by introducing a new form of money in the form of a sovereign digital currency, the central bank is performing it's currency management role or its monetary policy role. This question is pertinent because as the topic of this thesis indicates, we are attempting to identify possible roles of the central bank that are likely/prone to change as a result of digitisation of currency.

3. Promote stability of the financial and payments system

We hinted earlier on in Chapter 1 of this thesis that some scholars are of the opinion that the most significant development in the evolutionary trajectory of the central bank in recent years is the evolution of the central bank as an institution responsible for maintaining financial stability.[142] What makes this responsibility unique is the fact that scholarly attention merely began to fall on this 'new' responsibility of the central bank in the wake of the 2008 financial crisis where in order to ensure financial stability in the banking sector, the central bank had to enter the arena of dynamic financial regulation originally left under the control of the financial market regulators. This role as performed by the central bank continues to grow in significance as the central bank continues to regulate the activities of banks and credit unions who are active participants in the financial

[141] A $5 dollar bill will have interest of about 2% of the face value of the note which is $5.
[142] Benjamin Geva *supra* note 20.

markets. The central bank also maintains and provides liquidity facilities by acting as lender of last resort and oversees and regulates critical financial market infrastructure. The central bank also conducts market research and analysis including stress testing of financial infrastructure.

The central bank is also responsible for managing the national payment, clearing and settlement systems and regulates the activities of payment service providers including payment processors, aggregators, digital wallets, currency transfer services, and other payment technology companies. The central bank enforces statutory and regulatory filing and compliance requirements for these companies and ensures that operational risk and illicit activities (such as money laundering and terrorism financing) are controlled.

4. Management of Government Funds

The central bank is responsible for managing the government's bank account and is also responsible for providing or assisting with procuring sources of government financing by acting as a fiscal agent to the government. In most jurisdictions, the central bank is responsible for managing the national debt profile of the state. The central bank also maintains exclusive responsibility over issuing and redeeming government debt securities (government bonds and treasury bills). It is also through a combination of fiscal and monetary policy controls that the government financing and government spending is achieved. The central bank is also responsible for determining the source of government financing and is expected to decide when to source funds domestically or internationally and whether to source funds from individual or institutional investors.

5. Responsibility for the welfare of Firms and Households

This is another important role of the central bank. the central bank is responsible for collecting and interpreting statistical data on the welfare status of households and firms within the state. these macroeconomic data are important for policy decisions. In some jurisdictions, this role is deemed sensitive such that in order to avoid bias in the compiled statistical data, said data is either collected or generated by a separate government agency and then delivered to the central bank for its interpretation.[143] In addition to this, the central bank also works on national development projects.

[143] Some jurisdictions have a Bureau of Statistics. In Canada the Department of Statistics (statistics Canada) is responsible for compiling data on the consumer price index, gross domestic product, employment rate, immigration, health, income, pension, spending and wealth and many other subjects.

The WB/International Bank for Reconstruction and Development as well as the IMF have been known to collaborate with numerous national central banks to work on the national development goals. of different nations. The central bank also ensures that consumer protection laws are enforced. Particularly the consumer protection laws for financial products and instruments.

The central bank is also the institution responsible for conveying targeted welfare payments to firms and households. It is through the central bank that the government can convey its fiscal policy and government spending mechanisms such as benefit payments, tax refunds and stimulus payments and incentives to households and firms.

The importance of the central bank cannot be overemphasized and as indicated earlier; it is almost impossible to provide an exhaustive outline of all the important roles of the central bank. therefore, for the purpose of this thesis, any reference to the traditional roles of the central bank should be seen as a reference to the above roles. Now it is time to focus on a particular secondary role of the central bank that was hinted at in (3) above- to Promote stability of the financial and payments system. We will be emphasising on the framework for the national payment and settlement system network by acknowledging the position and statutory role the central bank plays in a national payment system.

2.5. Viewing Payment Clearing and Settlement Systems Through the Lens of Central Banking Law

In this section we will be relying on the Canadian payments and settlement systems and the responsibility of the central bank in said system. However, before we engage in this task, it is important to explain why the payment and settlement system is of such importance. The idea of a payment system reinforces the concept of money as a means of exchange. However, it goes beyond the idea of money as a mere chattel in circulation within an economy and extends to the intricate and dynamic processes and platforms put in place to ensure that financial traffic flows seamlessly within the economy. Perhaps it is for this reason that English authorities in cases such as, *Carr v Carr*[144], *Folley v Hill*[145] and *Libyan Arab Foreign Bank v Bankers Trust Co*[146], highlight the fact that money keeps evolving as a *reified* claim throughout a set of infrastructures known as payment

[144] Merivale, *supra* note 62.
[145] [1848] 2 HLC 28 (UK), at 36.
[146] [1989] Q.B. 728 (UK), at 748.

systems. These payment systems are responsible for the numerous transactions that take place at lightning speed across the globe.

Most countries with an institutional central bank operate a national payment and settlement system. This system is a tool used by the central bank to control monetary policy. The system is also responsible for facilitating, approving, verifying and disbursing payments from a payment initiator to the payment beneficiary. If money is going to be digitised, the payment and settlement system needs to be organised in such a way that accommodates the digitised currency. More so, any changes to the design or framework of the national payment system arising because of digitisation of currency is sure to affect the traditional role of the central bank. Since it is impossible to separate monetary policy and currency matters from the payment and settlement system, it is important to have a working understanding of the national payment and settlement system. In this section we will be focusing on the Canadian Payments Act[147] and the Payment Clearing and Settlement Act[148]. We will discuss the roles of the Canadian Payments Association (CPA) as well as the retail batch Payment Systems such as: the Automated Clearing Settlement System (ACSS) & United States Bulk Exchange Application (USBE) and the Large Value Transfer Systems (LVTS) also known as Lynx.

The Canadian Payments Act is the legislation that governs the payment system within Canada. The Act establishes the CPA which comprises of the Bank of Canada, every commercial bank operating in Canada including authorized foreign banks, cooperative credit associations, loan or trust companies that are designated as bridge institutions under the Canada Deposit Insurance Corporation Act; membership is also open to other persons, institutions or corporations who apply to be members by showing their entitlement to membership.[149]

In addition to the membership requirements, the Act spells out the roles, responsibilities, and powers of the Minister of Finance over the Canadian payment systems.[150] According to the Act, the Minister of Finance has oversight responsibilities over the workings and operations of the CPA and the entire payments system and infrastructure.[151] The CPA has a Board of Directors

[147] RSC., 1985, c. C-21.
[148] SC 1996, c. 6, Sch.
[149] Section 4 (d) of the CPA.
[150] Sections 4(4), 15 (2), (3), 19.2 (1), (2), (3), 19.3(1), (2), 19.4, 19.5. 21.2(1), 23(1), 23(2)(f), 37, 39 and 40 of the CPA.
[151] Sections 36-42 of the CPA.

empowered to create by-laws and is subject to the approval of the Governor in Council.[152] The Board is also empowered to make procedural rules and standards governing the day-to-day operations of the participants in the national clearing and settlement systems including standards and procedures for the clearing of payments and the subsequent settlement of cleared payments as well as establishing the rights and responsibilities of member institutions.[153]

The CPA is responsible for managing the ACSS which is a form of "deferred net settlement system that clears retail payments, including paper-based payment items (mostly cheques), pre-authorized debits and credits, as well as small-value electronic payment items, such as point-of-sale debit card or automated banking machine transactions."[154] The CPA also oversees the LVTS which is "a real-time electronic system for handling large-value payments and is an integral component of the country's financial system".[155] The LVTS also regulates participants on the procedures for "participant default, exceeds the risk-containment requirements of the international Core Principles for Systemically Important Payments Systems" (such as the USBE).[156]

On the other hand**,** The Payment Clearing and Settlement Act was passed into law for the specific purpose of regulating controlling and managing systemic risk.[157] The Act grants powers and responsibilities to the Bank of Canada (subject to approval of the Minister of Finance) to oversee payment and other clearing and settlement systems in Canada that have been identified as being sensitive, prone to or likely to cause systemic risk in the financial system. The Bank is responsible for identifying certain payments, clearing and settlement systems with the potential to create systemic risk and is responsible for bringing the identified systems within the range of its oversight responsibilities contained in the Act.[158] The Act contains specific insolvency remote provisions

[152] Section 18 (2) of the CPA.
[153] Section 29 of the CPA.
[154] Culled from:bankofcanada.ca https://www.bankofcanada.ca/core-functions/financial-system/canadas-major-paymentssystems/#:~:text=The%20ACSS%20is%20a%20deferred,or%20automated%20banking%20machine%20transactios.
[155] Culled from Neville Arjani and Darcey McVanel "A Primer on Canada's Large Value Transfer System by Bank Of Canada" accessed on 4th March, 2022, online (pdf): https://www.bankofcanada.ca/wp-content/uploads/2010/05/lvts_neville.pdf.
[156] *Ibid.* in addition, "the LVTS offers a more cost-efficient means of sending payments relative to standard Real-time Gross Settlement arrangements. This is facilitated by the availability of several liquidity-saving features, each of which is described. The paper also discusses the linkage between the LVTS and the daily implementation of Canadian monetary policy. Details of LVTS ownership and participation are also outlined".
[157] Section 6 of the PCSA.
[158] Section 4 of the PCSA.

that ensure that payment and settlement operations are unaffected by legal proceedings and other administrative and judicial proceedings.[159]

The payment and settlement system complements monetary policy because the central bank acts as the main settlement system for interbank payments. This enables the central bank to control monetary policy by using the interbank payment system as an avenue to control monetary policy. it is on this basis that the central bank can ensure that monetary policy is transferred to the real sector of the economy. This enables the central bank to bridge the gap between the settlement system (which is a system set up for interbank settlements and payments) and the payment system (which is a payment system for households and firms to make and clear their payments to one another).[160] This is not the only way that monetary policy is passed through financial intermediaries. Another way is through the transactions between the central bank and the financial intermediaries in the financial markets. We will look at both forms of monetary policy channelled through financial intermediaries in the next section.

2.6. Tracing the Legal Authority of the Central Bank to Conduct Monetary Policy

It should not be out of place to expect central banking laws to contain clear and express provisions on conducting monetary policy. while central banking laws usually have provisions that indicate monetary policy as a mandate of the central bank, in reality, the provisions concerning monetary policy in some central banking laws are not as clear and express as expected. The Bank of Canada Act[161] for example makes no mention of monetary sovereignty. As a matter of fact, monetary policy only appears in the act 4 times and is never explained or defined. This is deliberate as it would be an uphill task to define or describe the different monetary policy mechanics and tools available to the central bank. Perhaps it is for this reason that some scholars have opined that monetary policy is guided by soft law provisions as opposed to black letter law.[162] This is to allow for some flexibility in how monetary policy is conducted.

The above is not to say the legal origins of monetary policy cannot be traced in the law but rather, that the law actually provides for the manner monetary policy can be conducted by the central

[159] Section 11.07 of the PCSA.
[160] Benjamin Geva *supra* note 20.
[161] *Supra* note 101.
[162] William Bateman *supra* note 14.

bank. To illustrate this, let us look at the Bank of Canada Act once again. Section 18(g) of the Act provides thus:

> (g) for the purposes of conducting monetary policy or promoting the stability of the Canadian financial system, [the Bank of Canada can]
> (i) buy and sell from or to any person securities and any other financial instruments — other than instruments that evidence an ownership interest or right in or to an entity — that comply with the policy established by the Governor under subsection 18.1(1), and
> (ii) if the Governor is of the opinion that there is a severe and unusual stress on a financial market or the financial system, buy and sell from or to any person any securities and any other financial instruments, to the extent determined necessary by the Governor;

The above provisions create a nexus between monetary policy and the buying and selling of financial instruments in the financial markets[163]. Section 18(g) (ii) creates some flexibility in the exercise of the governor's powers to control monetary policy by making the decision to buy and/or sell financial instruments and securities subject to the opinion of the governor on the existence or potential for unusual stress in the financial system. In order to interpret the above provision in detail as well as how such provision enables the central bank monitor and control monetary policy, it is important to understand the legal and accounting relationship between what we have called CBM and the government securities that are bought and sold by the central bank.

2.6.1. The Legal Relationship Between Central Bank Money (CBM) and Government Securities (exploring the legal recognition and balance sheet treatment of CBM and government securities in the central bank's books)

In section 2.4(2) above, we discussed how seignorage works by deducting the cost of printing a bank note from the interest on the face value on the bank note. What we omitted to mention at that point is that the banknotes are provided at face value to financial institutions and the financial institutions pay the face value of the bank notes to the central bank through electronic transfer. Thus, no actual cash or other instrument is sought by the central bank in exchange for the bank

[163] It is important to note that this section was amended in 2008 (as a result of the financial crisis of 2008) to contain 'for the purpose of conducting monetary policy or promoting the stability of the Canadian financial system'. More so, prior to 2008, the list of financial instruments that the central bank could purchase was limited to securities, treasury bills, obligations, bills of exchange and promissory notes. this was amended by removing the list of financial instrument and replacing with 'securities and any other financial instruments' and financial instruments' as a blanket term to cover all securities granting more options to the central bank. the amendment also makes it such that the governor pursuant to section 18.1 (1) can make policies to determine if securities or instruments that evidence ownership interest or right in an entity can be bought or sold by the central bank.

notes. The proceeds earned by the central bank from the sale of bank notes to financial intermediaries is an example of what we have described as CBM and is used to purchase government securities through open market operations. This is the first representation of CBM being used to purchase government securities.[164]

At first, it seems counterintuitive that banknotes are bought by financial intermediaries and sold by the central bank, forcing us to ask the question how said transactions are rationalized. In order to provide a frame of reference for how money is used to purchase 'money', let us take a look at the accounting treatment of this transaction from the central bank's vantage point. Firstly, the commercial banks in need of liquidity informs the central bank that it needs banknotes. The central bank then decides based on its reserve requirements and its estimation of how much money should is required to be in circulation, sells bank notes to the commercial bank. the proceeds of which are used to purchase government securities. The transaction to sell banknotes is recorded as an increase in the liability as the bank's reserves will increase[165]. Contrariwise, the use of the proceeds from the sale of bank notes is used to purchase government securities and this is recorded as an increase in the assets of the central bank.

The use of CBM to purchase government securities is one of the methods used by the central bank to control money supply in the economy. The central bank relying on reports and statistical analysis can determine when money supplied needs to be reduced and increased. To increase the money supply within the economy, the central bank buys back government securities. To reduce the money supply, the central bank sells government securities. The accounting treatment of this transaction also reflects in the governments account managed by the central bank. In the government's books, liabilities will increase because the government securities in the form of bonds and treasury bills are debt liabilities to the government. On the other side, government assets will increase because the government gets more cash in exchange for selling government securities.

It is crucial to understand the mechanics of money demand and supply before we can understand how tokenised finance would work particularly if a digital currency will be restricted to wholesale CBDC. If tokenised finance is to be applied to a wholesale CBDC then the interbank clearing and

[164] In Canada this is done pursuant to the provisions of section 18(c) of the Bank of Canada Act.
[165] Reserves are described as liabilities of the central bank and are also a form of CBM.

settlement systems and the transactions between the central bank and the financial institutions need to be adjusted to allow for wholesale token CBDC. This would mean that broad money (particularly the less liquid types of broad money) as opposed to narrow money would be the area for regulators to direct their attention.[166]

2.6.2. Commercial Bank Money

CBM does not represent all the money in circulation and thus the sale and purchase of government securities is not sufficient to manage all aspects of monetary policy. This leads us to commercial bank money which constitutes a huge percentage of the money in circulation and whose value is prone to significant change as withdrawals and deposits are made from time to time. Any such changes because of deposits or withdrawals will also change the money supply in the economy. Thus, it is important to understand how these changes to the bank deposits (BM) change and contribute to money creation. We have explored the business models of commercial banks in section (2.2.3) of this chapter. It is necessary to revisit this business model as it is responsible for most of the money creation and money supply within a given economy. Commercial banks are driven by profit and this motivation makes them borrow funds belonging to depositors and lend these funds to firms and households in need of capital. The commercial banks take advantage of the NIM in their operations and this additional profit is responsible for the earnings of the bank which is put back into circulation in the economy.

As a risk management mechanism, the central bank, in exercising its oversight responsibilities sets reserve requirements to prevent the commercial banks from loaning out all the deposits received. The reserve requirements are a way for the central bank to control the amount of money in circulation and to ensure that the commercial banks have sufficient liquidity to meet their day-to-day operations. The reserve banking system and the commercial banks' business model constitutes a huge portion of the available money in an economy (not to be confused with money in circulation). The reserves of the commercial bank serve as the most important link between the central bank and the real economy. However, without the financial intermediaries, it would be

[166] Narrow money includes money that is highly liquid and can be easily accessible and available for immediate spending. Broad money on the other hand includes narrow money as well as other less liquid forms of money that need to be converted into cash to be spent. Not all forms of broad money have the same rate of liquidity. For example, broad money includes narrow money like cash which is very liquid. It also includes money in savings accounts and securities like treasury bills which are also liquid but not as liquid as cash.

difficult for the central bank to have such access. This is precisely why the contemporary economic arrangement is so reliant on BM and financial intermediaries.

2.7. Conclusion- Is there a case for financial disintermediation?

Considering all that we have discussed above, it may begin to seem like an exceedingly difficult task to develop an argument for financial disintermediation. Afterall, the global economy as currently constituted relies more on BM than CBM. More so, we have shown that central banks believe that financial intermediation is crucial to maintaining monetary sovereignty.[167] However, an argument could be made that financial intermediation (amongst other issues) has contributed to the erosion of monetary sovereignty.

The influence of globalisation and technological advancement has significantly affected transactions in the financial markets as well as banking and financial services operations. Makler and Ness believe that "technological change and the liberalization of restrictions on financial transactions result in the reduction of costs to domestic and international transactions and the financial services sector".[168] Makler and Ness also opine that the changes that result from globalisation and liberalization create "economic pressures" that have had the effect of altering "domestic financial structure" in a manner that remains unaffected by the nations international activities.[169] This means that the pressures from financial intermediation which are also enabled by liberalization and globalisation have led to an increased rate of international transactions which has put immense pressures on the structures in place that protect monetary sovereignty.

Another way that globalisation and liberalization enable the erosion of monetary sovereignty as identified by Makler and Ness is the concentration of banking activities which creates some form of "private power" that is in competition with sovereign might. When the benefit of technological advancement is added into the mix, it leads to a regime of reduced variable costs and innovative new financial products and services. This in turn serves as a fertile ground for competition and growth in the banking sector. When this happens, we are led to a situation where the boundaries between large commercial banks begin to blur as these banks become aware of the synergies that

[167] See our discussion in section 1.3. of Chapter 1 of this thesis.
[168] Harry M Makler & Walter L Ness, "How financial intermediation challenges national sovereignty in emerging markets" (2002) 42:5 Q Rev Econ Finance 827–851, at 830-831online (pdf): <https://www.sciencedirect.com/science/article/pii/S1062976902001412>.
[169] *Ibid.*

are available from mergers and acquisitions. This situation was responsible for the moral hazard that was prevalent amongst the banks and other financial institutions during the financial crisis of 2008.

With the above in mind, why then is financial intermediation seen as essential for the protection of monetary sovereignty? The answer to this question can be found in the cost benefit analysis of monetary policy. It is relatively cheaper for the central bank to administer monetary policy through financial intermediaries. This is the cheaper and easier alternative to having monetary policy. the central bank clearly is aware of this and continues to rely on financial intermediation to channel monetary policy. Since the economy is built around financial intermediation, complex legal structures and frameworks have been developed to sustain monetary policy in this manner. This framework for monetary policy has become so ingrained on the economy that it is hard to imagine an economic system without financial intermediation. Unless of course a cheaper and more efficient alternative is available that is. Could a retail token CBDC be a preferred option? Could tokenised finance serve as a better avenue, utilised by the central bank to control monetary policy? we will answer these questions in the subsequent chapters.

CHAPTER 3: Legal and Economic Analysis of CBDC and Tokenized Finance

3.1. Introduction

While administering monetary policy, the central bank usually develops a set of goals it needs achieve or outcomes it wants to control or prevent. However, as we have discussed in the previous chapter, the administration of monetary policy is a costly affair. Monetary policy usually involves a trade-off between the efforts made by the central bank to ensure price stability and the efforts to protect financial stability.[170] The costs associated with traditional monetary policy coupled with the external pressures placed on national currencies by crypto currencies and other virtual currencies have made numerous jurisdictions explore pother efficient and cheaper alternatives to managing monetary policy.[171]

What makes monetary policy an expensive venture to the state and the central bank? A huge percentage of the costs associated with monetary policy arise from the choice of transmission mechanisms related to a particular policy combination. For example, a transmission mechanism that affects asset prices directly may be costlier than a policy that seeks to affect the exchange rate.[172] More so, the efficacy of transmission mechanisms has recently been affected by financial innovation such as "securitization, shifts between sources of financing for residential investment, or changes in the strength of wealth effects".[173] These traditional means of controlling and employing monetary policy can sometimes be unpredictable and some economists have even recognised this uncertainty by arguing that employing the traditional monetary policy mechanism

[170] Malik Shukayev and Alexander Ueberfeldt, "Monetary Policy Trade-offs Between Financial Stability and Price Stability" Bank of Canada Staff Working Paper 2016-49 November 2016 online (pdf) https://publications.gc.ca/collections/collection_2016/banque-bank-canada/FB3-5-2016-49-eng.pdf.

[171] See speech by Mr. Hyun Song Shin, Economic Adviser and Head of Research of the BIS, on the occasion of the Bank's Annual General Meeting, Basel, 29 June 2021, online (pdf): https://www.bis.org/speeches/sp210629b.pdf.

[172] By cost of transmission mechanism, we mean the costs associated with the time lag between the time the policy is deployed by the central bank and when the effects of the policy are detected in the economy. For more on the monetary policy transmission delay see: Tomas Havraneka and Marek Rusnak, "Transmission Lags of Monetary Policy: A Meta-Analysis" (2013) 9:4 Int J Cent Bank 39 at 79-80, online (pdf) https://www.ijcb.org/journal/ijcb13q4a2.pdf.

[173] The changes in the strength of wealth refers to "the change in spending that accompanies a change in perceived wealth". In most cases, where the wealth effect is positive, spending changes in the same direction as perceived wealth. See: Marvin J. Barth III and Valerie A. Ramey, "The Cost Channel of Monetary Transmission" (2002) 16 NBER Macroeconomics Annual 199 at 245 online: http://www.nber.org/books/bern02-1 online (pdf): https://www.nber.org/system/files/chapters/c11066/c11066.pdf.

of increasing interest rates to combat inflation as akin to "throwing gasoline on fire".[174] These costs as well as the problems caused by innovation, also force the state to be on the lookout for cheaper and more efficient alternatives to administer monetary policy.

The central bank may find a cheaper alternative by following the example of digital currencies like cryptocurrencies (particularly bitcoin and stablecoin) also known as crypto assets. These crypto assets derive their market value from their potential to be exchanged for other currencies. They can sometimes be used as a medium of exchange as well as for making payments while serving as a store of value. However, crypto assets/cryptocurrencies differ from fiat currencies because cryptocurrencies are not underpinned by monetary policy and *lex monetae.* Rather, cryptocurrencies derive their value from the confidence and belief that users have in a similar manner as posited by the Societary theory of money. As we shall soon see, the reliance on the communal acceptance and belief/confidence in cryptocurrencies is not a perfect system on which a modern-day monetary policy framework can be built. This is because confidence can be capricious as seen in our earlier discussion on the problems with the barter system vis the Societary theory of money.[175] The difference between the uncertainty created from the communal belief/confidence in cryptocurrencies and the uncertainty created by the reliance on communal belief/confidence in the barter is that barter creates liquidity shortages through double coincidence of want, while cryptocurrencies are plagued by excessive volatility.

Stablecoins have been touted as being the solution to this volatility problem. Stablecoins are a type of cryptocurrency whose value is determined by reference to *fiat currency* as opposed to other forms of crypto assets. Stablecoins provide promising avenues for experimentation by the state in that they integrate the numerous advantages provided by DLT and are tied to fiat currencies. This is the reason why the President's Working Group on Financial Markets (PWG)[176] alongside the Federal Deposit Insurance Corporation (FDIC) and the Office of the Comptroller of the Currency

[174] Marvin J. Barth III *Supra* note 173, referring to: Mark Watson, "Sources of business cycle fluctuations" (1988) NBER 240 - EVANS Macroeconomics Annual 1988. Cambridge, MA: National Bureau of Economic Research, pp. 111-148 also referring to Matthew Shapiro, "Identification and estimation of the 'Wright Patman Effect'." (1981). Unpublished manuscript.
[175] See Section 2.2.1 of Chapter 2.
[176] The PWG was created in the US through Executive Order 12631 of March 18, 1988 (Working Group on Financial Markets) established the US President's Working Group on Financial Markets, which is chaired by the Secretary of the Treasury, or their designee, and includes the Chair of the Board of Governors of the Federal Reserve System, the Chair of the Securities and Exchange Commission, and the Chair of the Commodity Futures Trading Commission, or their designees.

(OCC), recently indicated in a report on payment stablecoins that: a "well-designed and appropriately regulated stablecoins could potentially support faster, more efficient, and more inclusive payment"[177]. However, stablecoins are not perfect as the same PWG report identifies the following risks with stablecoins:[178]

1. Loss of Value: Risks to Stablecoin Users and Stablecoin Runs
2. Payment System Risks (including operational risk, settlement risk and liquidity risk)
3. Risks of Scale: Systemic Risk and Concentration of Economic Power
4. Risks from Regulatory Gaps
5. Illicit Finance Risk

These risks are not unique to stablecoins and affect all private digital currencies as well. However, these risks as they affect stable coins or so-called synthetic CBDCs are the reasons why stablecoins or synthetic CBDCs do not meet the requirements of CBDC.[179] Regardless, we will discuss all or most of the above risks in this chapter. Some of the legal and regulatory solutions to address the above risks will also be identified. The problems with private virtual currencies including the ensuing threats they pose to monetary sovereignty as well as the data protection and privacy concerns have led to the development of different frameworks for CBDC that attempt to circumvent some of these issues.

The privacy and data protection concerns have led to the development of a different set of standards such as the NIST framework[180], the ISO 20022 standards[181], and the CPMI-IOSCO guidance for cyber-resilience of financial market infrastructures[182], amongst other standards. It is unclear if these standards will be adhered to by the sovereign in its design of a CBDC particularly considering the sovereign's motivation to prevent illicit financing transactions. Certainly, CBDC's are an interesting project that may materialise a new form of *digital lex mercatoria*/*monetae* as any legal framework would be sui generis and is likely take consideration of the unique nature of financial innovation, cyber security, micro and macroeconomics, policy and regulations for institutional

[177] Board of Governors of the Federal Reserve System, "Money and Payments: The U.S.Dollar in the Age of Digital Transformation" (2022) at 11. For full report, See President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency, Report on Stablecoins, (2021) online (pdf): https://home.treasury.gov/system/files/136/ StableCoinReport_Nov1_508.pdf.
[178] *Ibid* at 12-18.
[179] This will be discussed in more detail in section 3.3 of this chapter.
[180] See https://www.nist.gov/cyberframework.
[181] See https://www.iso20022.org/.
[182] Bank for International Settlements and International Organization of Securities Commissions, "Guidance for Cyber-Resilience of Financial Market Infrastructures." (2016), available at https://www.bis.org/cpmi/publ/d146.pdf (accessed on 22 October, 2018).

design. The attempts to bridge the gap between these diverse disciplines has been the aim of most of the academic and regulatory efforts that have tried to find a solution to the challenges posed by this innovation. However, for the purposes of this chapter, our primary analysis of CBDC's will be based on the interplay of the legal and economic considerations with the aim of providing a strong foundation for tokenized and decentralized finance (DeFi) that form the foundation for the proposal(s) and recommendations contained in Chapter 4 of this thesis.

3.2. Various State Motivations for Adopting CBDC

There is a plethora of motivations for adopting CBDC. Some of these motivations have been identified in passing earlier on in chapters 1 and 2 of this thesis. We have also hinted at the inflationary concerns of the central bank, the exorbitant costs incurred from employing traditional monetary policy as well as the state's concerns over monetary sovereignty in previous sections of this thesis. It is important to note that no two states will have the same motivations for adopting digital currency. These motivations vary depending on the needs and requirements of the state at any point in time. A state's motivations for adopting CBDC are important because these motivations will have a direct effect on the selected design elements of CBDC. A country whose currency is being eroded by devaluation because of foreign exchange is bound to adopt design elements that protect its economy from the negative effects of foreign exchange. Similarly, a country like El Salvador whose major concerns are currency substitution, reducing transactions costs, attracting foreign investment, or boosting domestic consumption"[183] is bound to adopt design elements that achieve these goals or better still, adopt a synthetic CBDC or a private virtual digital currency like bitcoin which can be used as a neutral store of value for savings.

While the El Salvador example provides a unique avenue for exploring state motivations for adopting digital currency, it is beyond the scope of this section and perhaps this thesis because bitcoin is a private digital currency and is not designed by the state or sovereign. Neither is it a private virtual currency that is tied to fiat currency like a synthetic CBDC linked stablecoin. This section deals with the motivations of a state that may affect the state's decision to develop and

[183] M. Martínez Euklidiadas, "Living With Bitcoin as a Currency: The Case Of El Salvador" (7th September, 2021) TOMMOROW CITY online: https://tomorrow.city/a/el-salvador-bitcoin-legal-tender#:~:text=The%20reasons%20for%20El%20Salvador,investment%20or%20boosting%20domestic%20consumption. Visited on 13th March, 2022.

design its own digital currency to suit it's peculiar socio-economic and political needs. The identified motivations are primarily based on those contained in the reports by the BIS and WEF. We identify the relevant reports where necessary. It is important to point out that the motivations identified by the BIS, WEF and even the IMF are to an extent inexhaustive and repetitive. For these reasons, we have identified the following motivations for the adoption of CBDC by various states:

1. Welfare motivations and financial inclusion
2. Preservation of monetary sovereignty
3. Anti-money laundering and the prevention of illicit financing opportunities
4. Sophisticated monetary policy controls

3.2.1. Welfare Motivations and Financial Inclusion

A major concern of the state since the time of barter and the development of the Mengerian/Metallist theory of money has been the welfare of households and firms. In most jurisdictions, it is a statutory responsibility of the central bank to protect the welfare of the households. For ease of reference, the preamble to the Bank of Canada Act provides thus:

> WHEREAS it is desirable to establish a central bank in Canada to regulate credit and currency in the best interests of the economic life of the nation, to control and protect the external value of the national monetary unit and to mitigate by its influence fluctuations in the general level of production, trade, prices and employment, so far as may be possible within the scope of monetary action, and generally to promote the **economic and financial welfare of Canada**.[184]

According to the above preamble, the adoption of CBDC by the state to protect Canada's economic welfare can be done in the following ways: to regulate credit and currency, to control and protect the external value (by reference to the dollar) of the national monetary unit and to ensure its stability in the general level of production, trade, prices and employment. The preamble envisages that both microeconomic and macroeconomic considerations can be employed to cater for the economic and financial welfare of Canada. We will interpret Canada as being coterminous with Canadians.

[184] See preamble to the Bank of Canada Act *supra* note 101.

How can CBDC protect the economic welfare of the household? According to Stephen Williamson, CBDC can contribute to household welfare by introducing an alternative to the private banking arrangements whereby assets are migrated from the private banking sector to a narrow banking facility that is provided by the central bank. In Williamson's opinion, the incentive problem which emerges because of the government guarantee of bank deposits and the originate-to-distribute model encourages commercial banks to engage in operations with little to no regard for the needs of their depositors/customers. Williamson believes that due to the migration of assets in the form of deposits from the private banks to the central bank, the central bank would be better able to manage the deposits with the goal of improving the economy and household welfare. This is because the central bank does not operate under the same incentives as the commercial banks and with the removal of the insurance liabilities owed to the commercial banks from the books of the central bank there would be more assets at the disposal of the central bank. In Williamson's words:

> "Because of incentive problems in private banking – which are serious enough in practice that bank regulators constrain banks to mitigate such problems – the central bank can potentially make more efficient use of the stock of safe assets than can the private sector. Therefore, if consumers substitute CBDC for private bank liabilities as means of payment, then safe assets migrate from the private banking sector to the asset side of the central bank's balance sheet, increasing the effective stock of collateral in the economy, and potentially increasing welfare".[185]

There are arguments that a highly accessible CBDC will promote financial inclusion.[186] This inclusion could be a natural result of the welfare improvement that CBDC provides or due to CBDC's ability to reach the most remote areas and the unbanked through the efficient payment mechanisms it provides. An example of the latter can be seen in is the live CBDC that has been adopted in the Bahamas known as the "Sand Dollar" and which was "introduced to help facilitate financial inclusion in this nation with a population of just about 390,000 people spread across 30 inhabited islands, many of them remote".[187] The adoption of CBDC to promote financial inclusion is premised on the fact that emerging economies need to capture as many households as possible

[185] Stephen Williamson, "Central Bank Digital Currency: Welfare and Policy Implications", (2019) Society for Economic Dynamics 2019 Meeting Papers at 3 online (pdf): https://ideas.repec.org/p/red/sed019/386.html.
[186] Anton N. Didenko and Ross P. Buckley, "Central Bank Digital Currencies a Potential Response to the Financial Inclusion Challenges of the Pacific" (2021) Issues in Pacific Development No. 3 at 7 online (pdf): https://www.adb.org/sites/default/files/publication/720016/central-bank-digital-currencies-pacific.pdf.
[187] Codruta Boar and Andreas Wehrli, "Ready, steady, go? – Results of the third BIS survey on central bank digital currency" (2021) BIS Papers No 114 Monetary and Economic Department at 7, online (pdf): https://www.bis.org/publ/bppdf/bispap114.pdf.

under the monetary control of the state. By so doing, the emerging economies will shrink the informal sector and boost the formal economy thus improving the aggregate household welfare.

We believe that the above assumption that CBDC will help with financial inclusion is somewhat flawed. Our reasoning is premised on the fact that access to CBDC requires costly infrastructure and facilities including access to power/electricity and the internet. Not to talk of the expenses that users of CBDC would be expected to incur on devices that will grant access to digital currencies such as smart phones or other mobile devices and/or computer devices. The fact that these infrastructures, facilities, and devices cost a significant amount of money skews the cost benefit of adopting CBDC in a way that may discourage state authorities in said emerging economies. Regardless of this minor setback, the benefits of adopting digital currency to the economic welfare of a state cannot be overemphasised. It is for this reason that many jurisdictions happen to be working towards adopting CBDC.

3.2.2. Preservation of Monetary Sovereignty

We have previously discussed that monetary sovereignty is under attack from both currency substitution and by private virtual digital currencies.[188] For ease of reference, we will reiterate how these threats occur. The threat of currency substitution can emerge in two ways, to wit:

1. As a threat from foreign digital currencies whereby households prefer a foreign currency because said foreign currency possesses a higher nominal value than the domestic currency.
2. As a potential threat from a foreign private digital currencies whereby foreign sovereign digital currencies possesses certain design elements that make them more valuable than their domestic counterpart. This could occur where, for example, a foreign sovereign digital currency possesses certain design elements that possess more privacy and data protection qualities than the domestic digital currency and as a result, domestic households develop a preference for transacting in the foreign state's sovereign digital currency- a *digital currency substitution.*

In both cases above, the state would be forced to employ measures to protect its monetary sovereignty. In (1) above, the state can protect its monetary sovereignty by employing conventional monetary controls through foreign exchange avenues and through the regulatory

[188] See Section 1.3 of Chapter 1 and Section 2.2.2. of Chapter 2.

oversight of the central bank. However, (2) above might be fraught with a lot of problems that conventional monetary sovereignty might be ill-equipped to handle. The complications in the problem present in (2) originate from the lack of public trust that the domestic central bank can maintain a stable value of the domestic (digital) currency. Often, a mistrust or lack of confidence in a domestic currency is usually predated by a history of high inflation or little to no economic development or activities.[189] To prevent this from happening it might be necessary to mix conventional monetary policy with innovative regulatory solutions. A way to prevent this could be by designing an account-based CBDC[190] which requires comprehensive individual identification similar to or greater than the regular Know Your Customer (KYC) requirement and multilayered verification used by banks to open customer accounts.[191]

Alongside the above KYC requirements, the central bank could be encouraged to enter a bilateral agreement with the foreign central bank on the appropriate rate or quota of cross border use of the foreign (digital) currency. By so doing, the central banks of multiple jurisdictions would be able to mitigate and control the threat of digital currency substitution.[192]

Barring any regulatory restrictions, the adoption of CBDC could be the lynchpin upon which a new global reserve currency is based. This may serve as the preamble to a new global framework for reserve arrangements in international payments and settlement. On this point, the BIS opines that the likelihood of migrating to a new framework for international reserve currency is low and will not be dependent on any artificial and deliberate efforts put in place by the international community. Rather, the choice of an international reserve currency is dependent on traits such as the depth and attractiveness of a nation's capital/financial markets to foreign investors. "With a large availability of safe assets and hedging capabilities; trust in the long-term value of the currency and soundness of the legal and regulatory system; and use in international trade, particularly for invoicing" a nation is able to attract investment funds which in turn makes the municipal currency more popular.[193] Thus, it is unlikely that any advantage would be gained by

[189] See our discussion on the hyperinflation in Germany in section 2.2.2 of Chapter 2.
[190] Account-based CBDC's are discussed in detail in Section 3.3. of this thesis below.
[191] Raphael Auer et al. "Central Bank Digital Currencies: Motives, Economic Implications and the Research Frontier" (2021) BIS Working Papers No 976 Monetary and Economic Department online: https://www.bis.org/publ/work976.pdf.
[192] *Ibid* at 9 we will discuss other options available to the central bank such as an mCBDC bridge in the next chapter on the Democratisation of Monetary Policy.
[193] *Ibid* at 10.

any advanced economy that is able to develop a sovereign digital currency. (Save for privacy concerns which as we shall see subsequently, is emerging as a huge concern in cross border/international transactions).[194] Thus, it is far more likely that any interests in CBDC are fueled by national concerns and the intention to protect national monetary sovereignty as opposed to a global rush to arrive at a new digital reserve currency (by expanding the influence of a nation's monetary sovereignty).[195]

Adopting a CBDC at a regional level is also an important factor to be considered when it comes to protecting monetary sovereignty. For example, if the European Union (EU) adopts a digital Euro, the effects of this adoption on the monetary sovereignty could be threefold. Firstly, it could negatively affect the monetary sovereignty of the member states[196]. Secondly, the fact that the economies of the member states of the EU are all tied together could allow the contagion from one state effect affect the currencies of other member state as it happened in Greece in the wake of the crisis of 2009 which not only affected Greece but most of Europe since 2009 (particularly Portugal, Ireland, Italy, Greece, Spain popularly known as P.I.I.G.S).[197] the contagion effects could be amplified by sovereign digital currencies if not properly managed. Thirdly, the EU being one of the largest and most integrated trading blocs could have its digital currency threaten currency substitution in other jurisdictions and have the digital currencies of member states threaten each other.

It becomes obvious from the above analysis that most attempts by a state to protect its monetary sovereignty could negatively affect the monetary sovereignty of another state. This begs the question- is monetary sovereignty a zero-sum game? Scholars of International Political Economy (IPE) and International Monetary Law would say otherwise. These scholars tend to see the current global political economy from a *Westphalian* sense i.e., *Westphalian* sovereignty that advances the

[194] Martin Chorzempa, "China, the United States, and central bank digital currencies: how important is it to be first?"(2021), China Economic Journal, DOI: 10.1080/17538963.2020.1870278, online (pdf): https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3765709.

[195] We discussed how a state can expand the influence of it's monetary sovereignty in exceptional circumstances such as when monetary sovereignty is threatened during times of war and economic crisis in section 2.3 of Chapter 2.

[196] Although it can also be argued that the monetary sovereignty of the member states had been transferred to the EU (the Economic and Monetary Union of the European Union) through the Treaty on Stability Coordination and Governance in the Economic and Monetary Union (TSCG) thus there is no requirement for member states to defend their monetary sovereignty.

[197] For more on the Greek debt crisis see: Rebecca M. Nelson, Paul Belkin, James K. Jackson "The Greek Debt Crisis: Overview and Implications for the United States", (2017) Congressional Research Service 7-5700 www.crs.gov R44155 online: https://sgp.fas.org/crs/row/R44155.pdf.

idea that the extent of a state's political influence does not extend beyond the borders of its territory.[198] However, new scholarship on the monetary system believes that the global monetary system could indeed be a zero-sum game which challenges the idea of a nation-state-centric focus of the Westphalian conception of monetary sovereignty. Collectively, these scholars believe that today's global monetary system is shaped by currency competition and is a "marginal" zero-sum game.[199] These modern IPE scholars agree that states directly and indirectly compete internationally to promote the widespread usage of instruments denominated in their national currency.

Direct competition takes place when a state enforces its legal tender laws such that it is almost impossible for domestic transactions to take place in another currency. For states with deep economies with a lot of international trade, foreign currencies are forcefully converted into domestic currencies. The foreign state observing the large numbers of transactions taking place, may restrict foreign exchange through regulated channels in order to control the demand of the foreign currency. When this happens, the households search for alternatives and costlier options, and some even hold on to the foreign state's currency. This leads to the existence of foreign money (that is subject to foreign laws and rules) within the state's territory consequently breaching monetary sovereignty.

The direct competition between states originates from what is known as "critical micro-finance".[200] Under this arrangement, money denominated in a foreign currency is created by financial intermediaries through balance sheet expansion and the advancement of credit facilities (such as

[198] For opinions of Central Banking and Economics scholarship favouring the pro Westphalian view on monetary sovereignty, see: De Grauwe Paul, *Economics of Monetary Union*. 9th ed. Oxford (Oxford University Press 2012) at 13. Mervyn King, *The End of Alchemy: Banking, the Global Economy and the Future of Money*. (Little, Brown Book Group Limited 2016) at 27. For scholarship on Modern Monetary Theory (MMT) and international Political economy (IPE), see: Stephanie Kelton. 2020. *The Deficit Myth: Modern Monetary Theory and the Birth of the People's Economy*. (New York: Hachette). For Scholarship on International Monetary Law, See Rosa Lastra, *International Financial and Monetary Law* (Oxford, United Kingdom: Oxford University Press). Proctor *supra* note 53 and Claus Zimmermann, *A Contemporary Concept of Monetary Sovereignty*. (Oxford: Oxford University Press 2013).

[199] See: Susan Strange, *Sterling and British Policy. A Political Study of an International Currency in Decline*. (London and New York: Oxford University Press 1971), Benjamin J. Cohen, 1998. *The Geography of Money*. Ithaca and London (Cornell University Press 1998), Benjamin J. Cohen. *Currency Power: Understanding Monetary Rivalry* (Princeton University Press 2015).

[200] See: Sahil J. Dutta et al, "Critical MacroFinance: An Introduction." (2020) 6:1 Finance and Society at 34–44, online (pdf): https://doi.org/10.2218/finsoc.v6i1.4407, Daniela Gabor and Cornel Ban, "Banking on Bonds. The New Links Between States and Markets." (2016) 54:3 J. Common Mark. Stud 617–35.

overdraft facilities, lines of credit and foreign currency accounts)[201] denominated in foreign currencies such as the US dollar. The BIS has acknowledged the gradual erosion of monetary sovereignty in this way by bringing an end to the 'triple coincidence' in international financing.[202] The triple coincidence was in line with the Westphalian idea of monetary sovereignty and ensured that monetary area, economic area, and decision-making area all coexist within with a state's territory.[203]

The adoption of CBDC could exponentially increase the effects of both direct and indirect currency competition if a digital currency is integrated with a sophisticated payment system. In addition to this, other threats are posed to the idea of monetary sovereignty where different foreign currencies possess different design elements that make a particular currency preferred as a store of value and another currency preferred as a unit of account. This is likely to throw a wrench into the traditional understanding and definition of money. The effect of this unbundling of the functions of money was succinctly described by Brooks thus:

> "Highly differentiated currencies, combined with low switching costs, may lead to an unbundling of currency functions where, for example, some currencies are used as stores of value while others as mediums of exchange or units of account… Such unbundling could further heighten competition— as currencies compete to dominate specific roles—and increase the odds of a currency being partially substituted for one or more of its core functions."[204]

It is important for regulators to consider the threats from both private digital currencies and public digital currencies of other jurisdictions when designing their CBDC's. These threats could have far-reaching effects beyond currency substitution and could have the effect of unbundling money into its component functions thus affecting the monetary affairs within the state's territory. While it remains unclear if adopting a CBDC is the appropriate way to prevent these threats to monetary

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[201] The balance sheet expansion of commercial banks is not to be confused with the balance sheet expansion of the central bank for the creation of CBM through the creation of additional central bank liabilities. We address balance sheet expansion of the central bank subsequently.

[202] Through these analytical moves, the recent scholarship acknowledges what the Bank for International Settlement (BIS) has called the end of the 'triple coincidence' when the monetary area, economic area, and decision-making area all coincided with a state's territory. See: Stefan Avdjiev, Robert McCauley and Hyun Song Shin. "Breaking Free of the Triple Coincidence in International Finance." (2015). BIS Working Papers No. 524, online (pdf) https://www.bis.org/publ/work524.pdf.

[203] *Ibid* at page 5.

[204] Skylar Brooks, "Revisiting the Monetary Sovereignty Rationale for CBDCs" (2021) Bank of Canada Staff Discussion Paper/Document-2021-17 at page 4 Online (pdf): https://www.bankofcanada.ca/wp-content/uploads/2021/12/sdp2021-17.pdf.

sovereignty and currency substitution, it is important to understand that currency competition between sovereign and/or private currencies is a zero-sum game. A game that is promoted by globalisation and technological innovation which the state and central bank have no other choice but to play. With globalisation, the sphere of control for territorial sovereignty has increased to the point where territorial borders have become blurry. The best way to defend monetary sovereignty is to also take advantage of globalisation and technological innovation. It is necessary for the regulators to consider these issues in their CBDC designs.

3.2.3. Anti-money Laundering and the Prevention of Illicit Financing Opportunities

Recently, digital currencies have become the payment instrument of choice for individuals with a strong preference for privacy, data security cheaper and more efficient means of payment that is neither channelled through financial intermediaries nor subject to the oversight responsibility of regulators. On their own, wanting these requirements in a means of payment should raise no eyebrows. However, these same requirements happen to be the same qualities required by individuals engaged in illicit financial transactions. These illicit activities and the preference for private digital currencies pose a significant threat to the entire financial and monetary infrastructure in place to prevent money laundering, terrorism financing and other illicit activities.

The above is not to say that the regular means of payments that require comprehensive KYC requirements or oversight of regulators are not prone to being used for illicit activities. Rather we are saying here that digital currencies without anti-money laundering (AML)/combatting the financing of terrorism (CFT) stipulations, are open to being used for illicit activities if not properly monitored. A recent report from India revealed that that the Delhi Police Special Cell discovered a terrorist financing module using Cryptocurrencies linked to *Al-Qassam brigades* which happens to be the military wing of the terrorist group *Hamas*.[205] Another report by a blockchain data company called "Chainalysis" alleges that cryptocurrency valued at a total sum of $8.6 billion dollars was laundered in 2021 which was a 30% increase from the previous year.[206]

[205] V. Balasubramaniyan, "Terrorist Financing And Cryptocurrencies In India: Need For A New Direction? – Analysis" (18th February, 2022) online: *Eurasia review* https://www.eurasiareview.com/18022022-terrorist-financing-and-cryptocurrencies-in-india-need-for-a-new-direction-analysis/

[206] British Broadcasting Commission, "Crypto money laundering rises 30%, report finds" (26th January 2022) online: *BBC News* https://www.bbc.com/news/technology-60072195

Of major concern in the use of private digital currencies is the use of stablecoins for illicit financing. This is concerning to states and regulators because as previously mentioned, stablecoins are backed or tied to the value of an underlying fiat currency like the US dollar. What this means is that unlike bitcoin whose redemption is uncertain, stablecoins have a reserve of fiat currency or government securities denominated in fiat currency set aside for redemption purposes. Hence, there is a reasonable guarantee that any funds intended to be transferred or laundered for illicit purposes have a higher chance of being redeemed and used for illicit purposes.

While the above threats of illicit financing are better addressed with the use of specific regulations targeted at these stable coins and other private virtual digital currencies, CBDCs have a lot to learn from their private counterparts otherwise CBDCs face the same threats of being used for illicit purposes as well. In a statement issued by President Biden on ensuring the responsible development of digital assets, the President requested that:

> "The Chairman of the Federal Reserve, and the heads of other relevant agencies, shall submit to the President a technical evaluation of the technological infrastructure, capacity, and expertise that would be necessary at relevant agencies to facilitate and support the introduction of a CBDC system should one be proposed...The evaluation should also include any reflections or recommendations on how the inclusion of digital assets in Federal processes may affect the work of the United States Government and the provision of Government services, including risks and benefits to cybersecurity…"[207]

In order for President Biden's concerns to be addressed, it is necessary to ensure that "international standards for the regulation and supervision of service providers associated with stablecoins and other digital assets are effectively implemented worldwide".[208] This is because in order to compete with the rapid increase in the cross border transactions that have been enabled as a result of private digital currencies, countries need to harmonise their respective international AML/CFT standards. Of course, the role of the US in regulating and enforcing AML/CFT obligations for covered service providers cannot be overemphasised. Regardless of the above, the state remains the best authority to ensure that CBDCs are designed with sophisticated identity management infrastructure.

[207] See Executive Order on Ensuring Responsible Development of Digital Assets MARCH 09, 2022 PRESIDENTIAL ACTIONS, The White House Briefing room. Available online: https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/09/executive-order-on-ensuring-responsible-development-of-digital-assets/.
[208] President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation and the Office of the Comptroler of the Currency online: https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf.

Effective identification systems are essential to every payment system. Strong identification systems guarantee the payment system's viability by placing measures in place to prevent fraud and to counter money laundering and other illicit activities. Sound identification processes are further required to ensure equal access for all users. Case in point, promote the structural integrity and to ensure access to the payment systems currently used in today's financial system, commercial banks, and other financial intermediaries and payment service providers need to verify the identity of their customers and end users. When customers open an account, banks and payment service providers require physical documents to serve as proof of identification, from national identity cards to international passports. When small transactions are performed, they are usually done anonymously and are largely unregulated (although numerous suspicious small transactions can be flagged for review). This is because it would be relatively difficult and impractical to monitor the large number of small transactions that take place on a day-to-day basis. Large transactions on the other hand are usually scrutinised and put under AML/CFT scrutiny.[209]

Regardless of all the controls in place, illicit activities still occur. It is because of these reasons that the CBDC designs with little to no anonymity such as token-based CBDC's are being frowned at because of their tendency to facilitate illicit activities, regardless of their obvious benefits.[210] The alternative is to have an account based CBDC design. It is fair to say that identity is central to any CBDC design. Thus, it may be optimal to have a combination of the KYC requirements of bank accounts and the strong data protection requirements of privacy laws in both public and private digital currencies. Surely, it will be difficult to strike a balance. However, it would be easy to seamlessly integrate the digital identification of customers into a KYC requirement of an account based CBDC. The BIS acknowledges this when it posits that:

> "A digital identity scheme, which could combine information from a variety of sources to circumvent the need for paper-based documentation, will thus play an important role in such an account-based design. By drawing on information from national registries and from other public and private sources, such as education certificates, tax and benefits records, property registries etc., a digital ID serves to establish individual identities online. It opens up access to a range of digital services, for example when opening a transaction account or online shopping and protects against fraud and identity theft. Assuming that CBDCs are to be account-

[209] We discuss this in more detail under the section on design elements of CBDC in section 3.3 below.
[210] We discuss token based CBDC's in section 3.3. below.

based, an important question is who should verify the identity of an individual seeking to join the network of CBDC".[211]

As we shall soon see, an account-based CBDC is not without its unique flaws, and neither is a token-based CBDC. Whatever CBDC design choice faces unique trade-offs between convenience and security. That being said, if an account-based CBDC is adopted it may be necessary to engage private contractors to ascertain the digital identification of the users.[212] The problem with this private-public partnership is that it might affect the interoperability of multiple CBDCc and cross-border payments. It may also require a common governance framework and proper institutional design to be viable.

There are numerous benefits from CBDC's to preventing illicit activities but there will be a trade-off between the security concerns of the state to prevent illicit activities and the privacy and data protection concerns of the users. In the grand scheme of things, this will be a fine line for the regulators to walk. If regulators of multiple jurisdictions do not work together on standardising the governance requirements for the privacy and data protection requirements, it may come to harm the monetary sovereignty of states with weaker data protection i.e states that sacrificed privacy on the altar of preventing illicit activities. In the absence of any global governance standards, states will be at liberty to arbitrarily fix their data and privacy requirements depending on their preferences and this could further contribute to the unbundling of money as the currency with better data protection could be used more as a medium of exchange while the currency with weak data protection and more KYC requirements may be better suited as a store of value or unit of account.

3.2.4. Sophisticated Monetary Policy Controls

This is perhaps the most important motivation for adopting CBDC. The widely accepted belief is that a digital currency integrated with DLT will allow for "programmable" monetary policy.[213]

[211] BIS Annual Economic Report, "CBDCs: An Opportunity for the Monetary System. (23rd June 2021) online: *bis.org* online(pdf): https://www.bis.org/publ/arpdf/ar2021e3.pdf.
[212] *Ibid.*
[213] The BIS describes programmable monetary policy as transfers of funds to households "with an "expiry date" or conditional on being spent on certain goods)" As we shall see below under our discussions on the design elements of CBDC, we believe that programmable monetary policy can only be achieved using smart contracts. However, the BIS also believes that "a key challenge for these transfers is identifying recipients and their accounts". See Central Bank Digital Currencies: Foundational Principles And Core Features, Report no 1 in a series of collaborations from a group of Central Banks including: European Central Bank, Bank of Japan, Sveriges Riksbank, Swiss National Bank, Bank

Programmable monetary policy or programmable money provides a lot of controls to the central bank to control monetary policy. The benefits of programmable money are compounded when new technology like artificial intelligence and quantum computing are included into the mix.[214]

The basic goal of the central bank in administering monetary policy is to control the demand and supply of money. This is not only done by expanding the central bank's balance sheet but can also be achieved by controlling the reserve requirements and by determining the policy rate within a state. As the defender/protector off monetary sovereignty, the central bank is expected to explore new avenues for controlling monetary policy in a manner that improves the aggregate economic welfare of the household and firms within the state. The policy levers that the administration of monetary policy using programmable monetary policy will be more dynamic and may become augmented. For example, traditional monetary policy is applied in the same manner across a state regardless of the peculiar needs of the different territories, provinces, and regions within the state. Adopting a CBDC with programmable monetary policy mechanisms can allow monetary policy to be applied heterogeneously across the state. Thus, the state can apply a policy that is suited to the unique economic needs of its sub regions and territories.[215]

In addition to the heterogeneous application of monetary policy, monetary policy could work hand in hand with the KYC requirements available from designing an account-based CBDC to promote welfare and safety nets of the household. This is due to the fact that an account-based CBDC will ensure that the there is a direct connection or link between the central bank and members of the household. With the KYC and data of these individuals in the (hopefully safe and secure)

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of England, Board of Governors Federal Reserve System, the Bank of Canada and the Bank for International Settlements, online: https://www.bis.org/publ/othp33.pdf.

A huge concern from this approach to administering monetary policy is the fear that the lines between monetary and fiscal policy may begin to blur as a result of direct government spending for welfare reasons. A currency that increases the demand of money even momentarily whilst also increasing government spending is sure to merge the roles of the central bank and department for finance within a state. This would be a problem to administrative law and may even be considered *ultra vires* the role of the Central bank.

[214] The benefits of harnessing the computing power of quantum computers were identified as being of major importance in Executive Order Issued by President Biden *supra* note 204 wherein the President indicated that:

> "Within 180 days of the date of this order, the Director of the Office of Science and Technology Policy and the Chief Technology Officer of the United States, in consultation with the Secretary of the Treasury, the Chairman of the Federal Reserve, and the heads of other relevant agencies, shall submit to the President a technical evaluation of the technological infrastructure, capacity, and expertise that would be necessary at relevant agencies to facilitate and support the introduction of a CBDC system should one be proposed. The evaluation should specifically address the technical risks of the various designs, including with respect to emerging and future technological developments, such as quantum computing."

[215] Central bank digital currencies: foundational principles and core features *supra* note 210 at page 8-9.

possession of the central bank, the central bank will be better able to disburse stimulus and welfare payments to individuals.[216] These disbursements of programmable money can be designed to be used to purchase only specific goods at specific locations and can be designed to only be capable of being spent within a particular period.[217] More so, we have previously discussed that one of the mechanisms used by the central bank during an economic crisis or a recession is to employ measures to boost output. To do this, the central bank needs to exert monetary policy in a way that boosts aggregate demand. CBDC may be capable of boosting aggregate demand through disbursement of funds through safety nets and helicopter money.

The above means of disbursing benefits and welfare payments are not without complications. The first complication arises from the tendency of this form of fiscal stimulus to conflate fiscal and monetary policy. Such a conflation of roles is likely to have legal, administrative, and regulatory implications. We will address the legal implications of merging fiscal and monetary policy subsequently in Chapter 4 of this thesis.

Further complications arise from the account-based design of CBDC. We have discussed the risk of unbundling money into its separate functions in section 3.2.4 above. This same risk exists in the administration of monetary policy through programmable money. This risk appears in the form of the additional costs to the household from their use of account-based CBDC. Members of the household operating under the belief that due to the rigorous KYC requirements and the fact that there is now a direct relationship between them and the central bank which puts them under the direct oversight of the central bank may fear that their transactions are being monitored. Thus, in order to avoid the scrutiny of the central bank, these individuals in an attempt to ensure their anonymity, might turn to other alternatives like cash. However, where CBDC coexists with cash, the welfare benefits of CBDC are likely to be greatly reduced because- "it is unlikely that deeply negative interest rates would prevail, or that CBDC would materially change the effective lower bound on monetary policy rates".[218]

With the inherent advantages from the above, monetary policy becomes more transparent. the effect of monetary policy can be observed in almost real time, and the central bank is able to further

[216] *Ibid* at page 8.
[217] This is similar to food stamps with expiry dates and other benefits payable to eligible individuals within the state.
[218] CBDCs: an opportunity for the monetary system *supra* note 211 at 81.

tweak the effects of certain policy combinations effectively. Coupled with this is the more efficient transmission mechanisms that programmable monetary policy would provide. The central bank may be afforded the opportunity to transmit policies targeted at countering inflation through interest-bearing CBDCs which serves as an additional instrument for steering real activity and inflation. The existence of a direct relationship between the household and firms will allow a unique relationship to be established between the central bank and payment service providers (PSP) where the central bank and PSP's can work together to facilitate wholesale payments, further expediting the monetary policy transmission mechanisms. This real time monitoring of the payment system will also make the statutory responsibility of the Governor of the central bank as provided for under section 4 of the Payment and Settlement Act easy to perform since a relationship will be established between the central bank and the payment service providers. A relationship that creates an avenue whereby the central bank can monitor the entire payment system infrastructure and identify areas prone to systemic risk.[219]

We have previously discussed the fact that no control measures put in place by the central bank has been able to manage inflation effectively. The race between the inflation rate and the policy race remains a tightly contested one, and the central bank must step in periodically to adjust interest rates or reduce money supply to control inflation. These approaches provide varying results which has a negative effect on the statutory mandate of the central bank to promote economic welfare. Economists have opined that CBDC's may be better able to control inflation because of the benefits of CBDC to policy transmission mechanisms.[220] It is believed that adjusting the policy rate will be directly passed through CBDC remuneration in the economy.[221] This will further strengthen monetary transmission and ensure that the effects of adjusting the policy rate are felt quicker in the real-economy and that the policy rate will continue to outpace the inflation rate. Conducting monetary policy in this manner is clearly in line with the preamble to the Bank of Canada Act.[222]

Regarding the conduct of monetary policy through the open market operations (OMO) by the central bank, a token-based CBDC can be applied to deploy monetary policy in the financial

[219] See Section 4 of the PCSA *supra* note 158.
[220] Jack Meaning, Ben Dyson, James Barker and Emily Clayton *supra* note 32.
[221] This is due to the direct relationship between the central bank and the household.
[222] Preamble to the Bank of Canada Act supra note 101.

markets. In order for this to be done, government securities on the asset side of the central bank's balance sheet (government bonds and treasury bills) will need to be tokenized and placed on blockchain for trading for redemption in CBDC. This process will typically follow the usual process used in the issuance of government bonds from the formalities and legal requirements for the issuance of government bonds to the subscription by several actors, and coupon payment involving a conversion into another currency. The only significant difference between conducting monetary policy through tokenized finance and through the traditional governments security issuance through OMO are the benefits accruing from integrating DLT such as the "integration of processes and straight-through-processing of securities settlement), while continuing to provide safe settlement in central bank money, in line with central banks' mandates and the pivotal role of CBM for interbank settlement".[223] We will discuss the legal aspects of DLT and tokenized finance subsequently.

3.3. Legal Aspects of Smart Contracts, Distributed Ledger Technology (DLT) and Central Bank Governance.

3.3.1. Introduction To Smart Contracts and DLT

It is instructive that deployment of information technology to corporate governance and compliance recently became an area of interest to researchers and corporate governance experts. In our subsequent discussions on the application of smart contracts and DLT to the governance of the central bank, we will be relying on the work that has been done by corporate governance scholars and borrowing from their analysis and attempting to apply same to the governance of the central bank.

In order to justify the intervention of information technology in corporate governance, Burns highlights a major challenge to corporate practice that constitute the bane of company collapses. The challenges are that whereas shareholders' interest is to maximize profit of the company, the board of directors tend to devote their time to less than optimal endeavours maximize profit and their personal earnings otherwise known as moral hazard. Thus, it becomes necessary to have an

[223] For example, the Banque De France successfully conducted its experiment on interbank government securities issuance and settlements in Central Bank Digital Currency (CBDC) in March 2020. This final experiment was jointly conducted with a group of private actors led by HSBC. The experiment consisted in the issuance of a digital bond on a Blockchain and its subscription with a settlement in CBDC. for more on this see: Banque de France, Eurostéme Press Release dated 16th December 2021, online: https://www.banque-france.fr/sites/default/files/medias/documents/cp_hsbc_en.pdf.

effective platform to enforce existing corporate governance codes, standards or obligations.[224] To that end, Fenwick and Vermeulen,[225] argued that in going digital, corporate governance has a lot to gain from the innovative ways technology can assist with enforcing corporate governance codes. While similar concerns do not exist for central bank governance, central bank mandates need to be enforced in a similar manner.

Fenwick and Vermeulen identified the usefulness and value of technology in the aspects of blockchain, crypto, and artificial intelligence. They observed and rightly too, that certain theoretical assumptions that endear corporate governance efficiency and effectiveness to technology viz., "amplification effects," "decentralization and disintermediation," "retrofitting," and "community-driven corporate organization and governance."[226] Of the four theoretical assumptions, we will be relying on "retrofitting," because it involves adding technological solutions to traditional ways of doing things within an institution or corporate entity with a view to proofing future innovative dynamics, save costs, promote transparency and remove the additional complexities from financial intermediation; all of which constitute the main focus of this thesis.[227]

Before we proceed into our analysis, it is important to define a DLT and blockchain technology. DLT, as the name implies is a network of digital ledgers through which peer to peer transactions and payments occur directly and are also recorded. All transactions occurring on a DLT are maintained and confirmed by the whole network of peers who have access to the ledgers/records of all transactions that have taken place in the network. These records are immutable and are distributed across the network in real time and are updated every time new transactions take place. A DLT also ensures that all transactions are pseudonymous, thus ensuring privacy of transactions and guaranteeing a level of trust in the system.[228] A popular type of DLT is blockchain technology.

[224] Thomas Burns, "Implications of Information Technology on Corporate Governance" (2001) 9:1 Int'l JL & Info Tech 21-38. Online (pdf): https://doi.org/10.1093/ijlit/9.1.21.
[225] M Fenwick and E P M Vermeulen, 'Technology and Corporate Governance: Blockchain, Crypto, and Artificial Intelligence' (2019) 48:1 Tex J Bus L 1-15, online (pdf): https://www.texasbusinesslaw.org/resources/texas-business-law-journal/volume-48-issue-no-1-spring-2019/2019-spring-tjbl-files/5-technology-and-corporate-governance.pdf.
[226] *Ibid* at. 2-3.
[227] *Ibid.*
[228] Karim Sultan, Umar Ruhi, and Rubina Lakhani, "Conceptualizing Blockchains: Characteristics & Applications" (2018) 11th IADIS International Conference Information Systems 2018 ISBN: 978-989-8533-74-6 49-47 at 53-54.

Simply put, blockchain technology is an innovative smart contract protocol[229]. It involves contractual steps between parties using ledgers situated in multiple servers at a time. Once an agreement is reached between parties, said agreement can no longer be modified or reversed by the parties. Besides being unalterable by the parties, no third party can amend it. Thus, it can be a trusted platform which may exclude disputes and reduce the quantity of contractual agreements and other paperwork. On one hand, a smart contract ensures the legal integrity and sanctity of contracts by preventing breach of contract by making the contract available to multiple servers and ignoring some privacy concerns in the process. On the other hand, it can also be seen as the most secure technology platform for transferring payments today because it ensures anonymity and protects the privacy of the parties to said contract.

Applying DLT and blockchain technology to the governance of the central bank through a decentralised ledger system might make the conduct of monetary policy and risk management by the central bank more difficult or impossible if controls and records are open to the public. This amount of transparency might contribute to systemic risk as investors and members of the household might begin to panic if they are aware of certain metrics and data on which economic decisions are base. Sophisticated investors may take advantage of such a situation to the disadvantage of the markets. To avoid such a situation, a permissioned as opposed to a permissionless DLT mechanism can be used. The difference between a permissioned and permissionless system is that a permissionless system is an open network available for anyone to interact and participate in consensus validation. On the other hand, a permissioned system is a closed and partially decentralised network, where only designated parties interact and participate in consensus validation. In the context of central bank governance, a permissioned system would

[229] A smart contract can simply be defined as a blockchain that is programmed to be automatically executed and enforced. Automatic execution is not to be confused with electronic or digital execution. Automatic execution in this sense means that the contract is executed by two or more computers in the network. This automatic execution is often performed through running a computer code that has translated legal prose into an executable program. For a discussion of this translation process see Tom Hvitved, "Contract Formalisation and Modular Implementation of Domain-Specific Languages" (2012) (unpublished Ph.D. thesis, University of Copenhagen) online (pdf): https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.724.7779&rep=rep1&type=pdf. See also Max Raskin, "The Law And Legality Of Smart Contracts" (2017) 1 Geo. L. Tech. Rev. 305, online (pdf): https://perma.cc/673G-3ANE. See also Christopher D. Clack et al., "Smart Contract Templates: Foundations, Design Landscape and Research Directions" (2016) (unpublished manuscript) online (pdf): http://arxiv.org/pdf/1608.00771v2.pdf. Clack defines smart contract as "an agreement whose execution is both automatable and enforceable. Automatable by computer, although some parts may require human input and control. Enforceable by either legal enforcement of rights and obligations or tamper-proof execution."). See also Josh Stark, Making Sense of Blockchain Smart Contracts, COINDESK (June 4, 2016, 18:36 GMT), http://www.coindesk.com/making-sensesmart-contracts/ [https://perma.cc/37QL-6TCN].

be the better option to be utilised by the central bank to protect some of its traditional monetary control mechanisms.[230]

DLT can be adopted to make secure payments at the national and global levels of interbank payments and settlement. However, to fully reap the benefit of this technology on a global scale, every participant jurisdiction in a designated international settlement and payment infrastructure needs to automate, digitise, and integrate their systems. Such that if country A intends to utilise blockchain technology for payment purposes to Country B, it is necessary for the relevant data, rules and protocols and payment instructions to be fully automated and integrated into a similar DLT as country B. By so doing, both country A and B can have their payments facilitated through blockchain technology. Both countries can also agree on the KYC requirements, payment laws, compliance and set foreign exchange limits and quotas to prevent currency substitution.

3.3.2. The Legal Application of Smart Contracts to the Governance of the Central Bank

In Legal parlance, Clack's definition of smart contracts can best be adopted for the purposes of this section.[231] Clack actually proposes a description that fits the application of smart contracts to the governance of the central bank. Clack's description focuses on the enforcement of smart contracts. In doing this, Clack divides smart contracts into two branches based on the relative strengths of enforcing said contracts. He describes these methods as traditional and non-traditional methods of enforcement.[232] It becomes clear, right off the bat, that the important distinguishing factor when it comes to smart contracts is how said contracts are enforced. According to Clack, a traditional means of enforcement includes enforcement through popular dispute resolution mechanisms as arbitration and the courts of law. Non-traditional methods do not require formal dispute resolution mechanisms.[233]

Raskin supplements Clack by identifying that- smart contracts relying on traditional methods of enforcement are best described as weak smart contracts, because the costs to change or revoke the contract are not high enough to proscribe courts or arbitrators from doing so.[234] Contrariwise, Raskin defines Clack's non-traditional means of enforcement as those contracts that are

[230] Karim Sultan et al. *supra* note 228.
[231] Clack et al., *supra* note 229.
[232] *Ibid.*
[233] *Ibid.*
[234] Max Raskin et. al Supra note 28 at 310.

enforceable through "tamper-proof" technology and "with the assumption that in a perfect implementation of the system wrong-performance or non-performance become impossible." As would be expected, these are known as strong smart contracts.

Why is it important to emphasize on the enforcement of smart contract? Unlike regular contracts, (strong) smart contracts are self-executing, self-amending/verifying and self-executing. The implication of this is that a smart contract can be self-determining. They are capable of defining the rules and the laws determining validity and enforce their terms accordingly without little or no human intervention. They are programmable to enforce terms and conditions amongst participants and determine the protocols and parameters of said terms and conditions, greatly reducing administrative costs and promoting transactional efficiency. It is particularly due to these advantages that in June 2016, the Banque de France initiated project MADRE, a project that utilizes blockchain technology to improve the interbank payment system to enable the exchange of Single Euro Payments Area (SEPA) creditor identifiers between SEPA Direct Debit (SDD) scheme participants. Project MADRE has fully replaced the Banque de France's "centralized process for the provisioning and sharing of SEPA Credit Identifiers (SCIs) with a decentralized, blockchain-based solution".[235] The project began because the Banque de France wanted to investigate the applications of DLT to "the automation and digitization of a manual and time-intensive process that requires coordination and information sharing with multiple banks".[236]

In order to initiate Project MADRE, the Banque de France needed to decentralise the SCI management system and credit management process by making use of smart contract protocols within existing blockchain platforms (such as Ethereum) that "enable automatic transactions among participants using predetermined terms".[237] As of the time of writing this thesis, "a private Ethereum implementation with smart contracts is used to issue 100% of the SCIs in the system".[238] This represents one of the first examples of public-private partnership within a national payment and settlement infrastructure utilising smart contracts. The Bank de France recognises the success

[235]Stéphane Kunesch, "MADRE: a Banque de France blockchain project" (2019) European Payments Council, news and insights, online (pdf): https://www.europeanpaymentscouncil.eu/news-insights/insight/madre-banque-de-france-blockchain-project.
[236] Michael Aaron, Mark Ebeling and Nicholas Drury, "Central Banks and Digital Ledger Technology Governance" (2017) IBM Institute for Business Value, online (pdf): https://www.ibm.com/downloads/cas/VBGLZDNK.
[237] WEF white paper, "Central Banks and Distributed Ledger Technology: How are Central Banks Exploring Blockchain Today?" (2019) online (pdf): https://www3.weforum.org/docs/WEF_Central_Bank_Activity_in_Blockchain_DLT.pdf.
[238] *Ibid* at 6.

of project MADRE and identifies certain advantages of smart contract protocols to the governance of the central bank including greater time efficiency, process auditability, disaster recovery and greater accountability for commercial banks within the process.[239]

3.3.3. "Retrofitting" Smart Contracts to fit the governance of central banks (by Code or Structure)

In this section, we will attempt to fragment the essential features of a smart contract as well as the essential governance tools typically used by the central bank and attempt to justify the adoption of smart contracts as provided through a DLT. We will try to ascertain if smart contracts are capable of replicating or replacing the governance decisions and tools used by the central bank. For the purposes of this section, the relevant features of smart contracts include:[240]

i) They are programable to be: Self amending, Self-executing. Self-interpreting and Self-enforcing.
ii) They are circulated on a distributed ledger system.
iii) Smart contracts offer event-driven functionality—when triggered by external data (which may or may not require human input), smart contracts will modify other data;
iv) External data can be supplied by "oracles"—trusted data sources that send information to smart contracts (but not all smart contracts rely on oracles);
v) By acting on information provided by oracles, smart contracts can, "enforce a functional implementation of a particular requirement, and can show proof that certain conditions were met or not met";[241] these oracles can also take the appearance of a regulator vis the inclusion of a "regulatory node" for risk assessment and management responsibilities. This is of particular importance to the central bank as the introduction of a regulatory node will help facilitate a full audit trail of certain transactions that have been appended to the blockchain. This can also ensure that the regulator actively manages potential risks of that application of blockchain technology. In the context of central bank governance, active participation requires the central bank to perform (or block) transactions primarily to manage systemic risk or to deploy monetary policy mechanisms.

[239] *Ibid.*
[240] For more on the properties of smart contracts and the law, see: J. Dax Hansen, Laurie Rosini and Carla L. Reyes, "More Legal Aspects of Smart Contract Applications; Token Sales, Capital Markets, Supply Chain Management, Government and Smart Cities, Real Estate Registries, and Enabling Self-Sovereign Identity" (2018) Perkins Coie LLP at page 5 online (pdf): https://www.perkinscoie.com/images/content/1/9/v3/199672/2018-More-Legal-Aspects-of-Smart-Contract-Applications-White-Pa.pdf.
[241] Clack et al., *supra* note 229.

vi) Smart contracts can track changes in "state" over time;[242]

vii) Smart contracts are not the same thing as Ricardian contracts, which are digitized versions of natural language contracts that are linked to an automated function;[243]

viii) Smart contracts are autonomous[244]

ix) Once executed, smart contracts may be self-sufficient[245];

x) Smart contracts reduce transactional costs which include:

- indirect agency costs which include contract enforcement costs
- direct agency costs which include monitoring and bonding costs to reduce residual losses.

To aid our analysis of the governance of the central bank, we will be relying on the traditional roles of the central bank as identified earlier on in section 2.4 of Chapter 2 of this thesis. We will conduct our analysis by attempting to determine the applicability of smart contracts to the identified governance roles of the central bank. For ease of reference, we will be discussing the applicability of DLT and smart contracts to the following two groups of the roles of the central bank:

1. The applicability of smart contracts and DLT to define and implement monetary policy, to Promote Stability of the Financial and Payments System and to manage the welfare of firms and households.
2. The applicability of smart contracts and DLT to Currency Management and to the management of government funds.

[242] As Vitalik Buterin explains, "[a]ll blockchains have a notion of a history—the set of all previous transactions and blocks and the order in which they took place—and the state—'currently relevant' data that determines whether or not a given transaction is valid and what the state after processing a transaction will be. Blockchain protocols also have a notion of a "state" transition rule: given what the state was before and given a particular transaction, (i) is the transaction valid, and (ii) what will the state be after the transaction?" Vitalik Buterin, "Ethereum: Platform Review, Opportunities and Challenges for Private and Consortium Blockchains 1 (2015), R^3.com https://static1.squarespace.com/static/55f73743e4b051cfcc0b02cf/t/57506f387da24ff6bdecb3c1/1464889147417/Ethereum_Paper.pdf.

[243] William Mougayar, "9 Myths Surrounding Blockchain Smart Contracts", COINDESK (Mar. 23, 2016), www.coindesk.com/smart-contract-myths-blockchain/. According to Mougayar, Ricardian contracts are "semantic representations that can track the liability of an actual agreement between parties." For example, a Ricardian contract might represent the legal conditions of a digitized bond. Id. (citing Ian Grigg, "The Ricardian Contract" (2004), http://iang.org/papers/ricardian_contract.html).

[244] i.e the software developer who created them need not actively maintain, monitor, or even be in contact with them while they operate. See also Mougayar, *ibid.*

[245] i.e. they can be programmed to "marshal resources—that is, raising funds by providing services or issuing equity, and spending them on needed resources, such as processing power or storage.

1. The Applicability of Smart Contracts and DLT to Define and Implement Monetary Policy, to Promote Stability of the Financial and Payments System and to manage the welfare of firms and households.

We have previously discussed the benefits of programmable money to monetary policy. We identified that programmable money with embedded smart contracts can allow for the application of a variety of monetary controls and that smart contract can be built into CBDC's to allow the central bank some form of flexibility with monetary policy. Monetary policy by itself can also be automated and programmed to control the demand and supply of money.

Smart contracts could also ensure that OMO by the central bank takes place in an effective manner. In addition to this, it would become easier for the central bank to monitor economic activities as they occur and manage risks and prevent crisis by programming instructions on the effective policy rate and likely trigger events for monetary controls to be put in place during a crisis. Smart contracts could also expedite the decision-making process on policy measures to be put in place between the central bank and the ministry of finance. Case in point, the essential statutory requirements of members of the board of directors as well as the Executive Committee of the central bank as well as the qualifications and procedure for removal as contained in could be programmed into smart contracts.[246] That being said, it is important to note that depending on the design elements, if a CBDC is interest bearing, the central bank may be affected by the lengthy decision making process of the different stakeholders in charge of determining the appropriate policy/interest rate. As a result of the ease in deploying policy mechanisms, the stakeholders may be tempted to set arbitrary interest rates or differential rates (this would be easier for account-based CBDC and more difficult for a token-based CBDC). While an account-based CBDC possesses numerous advantages when it comes to adjusting the policy rates, It could lead to arbitrage from differential interest rates, such as where different rates apply to households and firms.[247]

The above internal governance procedures can be replicated using smart contracts in a manner similar to corporate governance that is being programmed using smart contracts. An example of a firm that utilizes smart-contract technology to execute its corporate-governance rules and decisions

[246] For provisions on the management and executive committee of the Bank of Canada, please see: Sections 5-13 of the Bank of Canada Act.
[247] Benoît Cœuré and Jacqueline Loh "Central bank digital currencies" (2018) Committee on Payments and Market Infrastructures Markets Committee at 15 online: https://www.bis.org/cpmi/publ/d174.pdf.

is a decentralized autonomous organization ("DAO"). One way of thinking of a DAO is that it is an organization where the rules of management are predetermined and run-on computer programs using smart contracts. The first DAO was launched in May 2016 by employing the "retrofitting" theoretical approach, to set up a corporate-type organization without using a conventional corporate structure. The DAO had a governance structure that was entirely built on software, code, and smart contracts that happened to run on the public decentralized blockchain platform - Ethereum. Since it was a solely based upon computer code, it had no physical address and thus no single jurisdiction could claim jurisdiction/control over it. In addition, it was not set up as an organization with a traditional hierarchy as is common with most corporate organisations. The DAO did not use a traditional top-down corporate structure and did not require the formal authority of directors or a board to effectuate shareholder decisions nor did it need managers and members of staff to run day-to-day business operations. Principally, all the duties that were performed by individuals with a fiduciary or agency relationship with the corporation were all performed by the computer program and smart contracts.[248]

Of particular importance in the application of smart contracts to monetary policy is Section 14 of the Bank of Canada Act. This section provides for Government directive and the consultation between the Minister for Finance and the Central bank and the significance of the minister's directive on monetary policy issues. Section 14(1) of the Bank of Canada Act provides that the Minister and the governor of the central bank "shall consult regularly on monetary policy and on its relation to general economic policy". The consultation between the minister and the governor of the central bank can be facilitated through smart contracts by integrating the numerous control measures put in place from programmable money. More so, the ability of the minister to veto any monetary or economic policy decisions as provided for in Section 14(2) of the Bank of Canada Act can also be programmed into a smart contract. This is sure to reduce both direct and indirect costs ordinarily borne by the central bank in making said policy decisions. It may also come at a cost to manpower as it will reduce the human capital requirement and require a new set of IT skills for the few human capital involved in this novel endeavour.

[248] Wulf A. Kaal, 'Blockchain-Based Corporate Governance', (2019) Max Planck Institute Luxembourg for Procedural Law, Electronic copy available at: https://ssrn.com/abstract=3441904.

2. The applicability of smart contracts and DLT to Currency Management and to the Management of Government Funds.

As with (1) above, the applicability of smart contracts to currency management can be achieved by the issuance of programmable money. However, it is important to discuss the significance of seignorage once more. We can recall that in the preceding chapter we arrive at seignorage by deducting the cost of printing a bank note from the interest on the face value on the bank note. Seignorage on a CBDC might not operate in the same way as this time the currency is not printed on paper thus it would be difficult to ascertain the cost of creating or 'mining' a CBDC.[249]

The design features of a potential CBDC would have a significant effect on seignorage, particularly with determining how much of the value of seigniorage accrues to commercial banks and to the central bank. If it happens that the interest rate attached to a CBDC makes said digital currency more attractive than cash, it might result in a situation where seignorage value accrues in favour of the central bank due to the incremental demand for CBDC as opposed to BM through bank deposits. According to the BIS, there are two ways through which seigniorage value may change due to CBDC:

I. Because CBDC affects the total value of the money issuing and creation function of the central bank, the operational and overhead costs related to printing, storage and transportation of banknotes, as well as settlement costs will reduce significantly. Thus, there will be a huge initial investment and a significant amount of sunk costs for putting the necessary IT infrastructure in place. However, the marginal cost will decline in upcoming years.
II. Where CBDC is seen as 'good money' with high intrinsic value, it may serve as a substitute for other non-deposit financial assets such as money market instruments. The increased appetite for CBDC may cause an increase in the amount of money in circulation and "broadening the overall seignorage base".[250]

Since the broad value of seignorage in an economy depends on the amount of currency in circulation and the difference between the rate of return on central bank assets and the cost of printing money, the introduction of CBDC will clearly have an effect on both the amount of money in circulation and the currency liabilities. On this point, the BIS also opines that "any CBDC-driven expansion of the balance sheet has a positive effect because most the funding cost equals

[249] Mining will be a better description for a token-based CBDC since it may attempt to replicate the addition of additional nodes to a blockchain as is usually the case in a private virtual currency system.
[250] Benoît Cœuré and Jacqueline Loh *Supra* note 247 at page 26.

the policy rate (i.e. the risk-free rate)".[251] Thus, any asset acquired, issued as loans or managed in any manner by the central bank will have a premium placed on its rate of return at a rate greater than the risk free rate.

The rational conclusion from the above is that any increase in government funding through balance sheet expansion by the central bank, which also arises out of the central bank's activities to create CBDC's will affect the amount of retail deposits at commercial banks. This leads to an inverse relationship between the seignorage value due to the central bank from said balance sheet expansion and that due to the commercial banks and other money market issuers in the financial markets from their money creating functions. This could be controlled by the central bank by constantly monitoring the interest rates on CBDCs in such a way that the CBDC remuneration is constantly regulated to ensure that the seignorage accruing to the central bank is not too little to affect its ability to recapitalize during a crisis and not so much as to narrow financial intermediation. This amount of control may initially appear difficult to master by the central bank. Thus, in order not to put monetary policy and financial stability goals at risk and for the central bank to be in line with the provisions of the preamble to the Bank of Canada Act, we posit that the central bank may need to employ smart contracts and programmable money to exercise its control over the policy/interest rates.

3.4. CBDC Frameworks and Proposals

In this section we will discuss a variety of design elements, frameworks, and design options for CBDCs. Our intention here is to explore the options available at the time of writing this thesis. It is important to consider these frameworks and options because they will have a strong implication on notable concerns including privacy and data protection. They will also determine the extent of the oversight and regulatory control over CBDCs. Some options will also affect the extent to which monetary policy controls can be deployed. In this section, we will also identify the design elements that are mutually exclusive and inclusive where necessary. Beyond these options, we shall also analyze some other combinations of design elements that don't fit the regular 'mould' of CBDC design elements that we have identified previously.

In this thesis, we will be discussing the following CBDC design elements:

[251] *Ibid* at 26.

1. Token-based CBDC
2. Account-based CBDC
3. Wholesale and Retail-CBDC
4. Single-tier and two-tier CBDC design
5. Synthetic CBDC

1. Token-based CBDC

A token-based CBDC is a form of CBDC that most tries to replicate the features of private digital currencies. A private digital token is a form of private digital currency that represents a specific quantity of digital resources that can be owned by an individual, assign to another, or redeem later. It is a digital representation of a unique and identifiable asset or security that are evidenced on and can be electronically received and stored using a DLT.[252] Therefore, a token-based CBDC is a digital representation of a currency that has a face (or intrinsic) value attached to it and can be electronically stored, transferred, received and redeemed later on (in cash or other form of book/account money).

A token-based CBDC just like cash, has the full backing and guarantee of the sovereign government, it also possesses the benefits of providing anonymity to its users in a manner similar to cash. It also shares the following qualities with cash: it is available and accessible at any time, it can allow for peer-to-peer transfers without the intervention of a financial intermediary. It also possesses additional benefits that are not available to cash such as: it can be programed to be interest bearing (this interest rate can be set by the central bank) and could be programmed to impose restrictions or limits on usage and maximum holdings or possession.

Regardless of the above, certain problems could arise with the use of a token-based CBDC. For example, tokens can be hacked, stolen, lost (because of forgotten passwords to wallets or computer hardware damage or malfunction). They can be vulnerable to internet fraud and cyber risks from viruses and malware. There is also a likelihood of facing the problem of double spending with digital tokens. It is due to the vulnerability of tokens to fraud that like cash, a transaction involving

[252] Token Alliance, "Understanding Digital Tokens: Market Overviews and Proposed Guidelines for Policymakers and Practitioners" (2018) Prepared by - Token Alliance an Industry Initiative of the Chamber Of Digital Commerce, online (pdf) https://lowellmilkeninstitute.law.ucla.edu/wp-content/uploads/2018/08/Understanding-Digital-Tokens.pdf.

a token-based CBDC is not concerned about the identity of the party to a transaction, rather the concern is on the validity of the token.

Since tokens are unique and identifiable, it may be necessary to place an additional level of security on them. It is for this reason that we propose that the equitable doctrine of tracing be available to tokens. Since tokens on a DLT have the privilege of incorporating smart contracts, the central bank can take up the additional responsibility of tracing misappropriated or converted funds from the digital wallet of the erring parties. A smart contract that is binding on all users of token-based CBDC's could enforce itself by ensuring misappropriated funds are traced and recovered thus reducing the incidences of fraud.

We will be using the British Columbia Supreme Court case of ***Copytrack Pte Ltd. v. Wall***[253] as a point of reference to the application of the equitable doctrine for tracing digital tokens. In this case, the British Columbia Supreme Court considered the legal nature of a digital token (cryptocurrency) particularly what remedies were available to a plaintiff who mistakenly transferred digital tokens to the defendant. The Court held that a digital token including cryptocurrency is "property" that can be the subject of tracing orders when mistakenly transferred to third parties. However, the Court left the question of whether digital tokens can be considered "goods" that could be subject to claims in conversion and wrongful detention unanswered.

We also argue that a token-based CBDC will imbibe all the core tenets of the Societary theory of money. Our argument is fundamentally based on the assumption that a token-based design will satisfy the major needs of the money users- the household, as a convenient and popularly accepted means of exchange. We have discussed previously how a key motivation for CBDC is to protect monetary sovereignty. If CBDC is to be successful at defending monetary sovereignty from the threats faced by private digital currency, then it needs to be capable of competing with digital currencies. Since the recent popularity of private virtual currencies is due to certain features possessed by these virtual currencies such as anonymity and their presence on DLT, then it is advisable that CBDC's at best adopts some of these features into their design.

[253] 2018 BCSC 1709.

A token-based CBDC that provides the above mentioned features with the additional benefits of sovereign guarantee including additional security and remedial measures will be a viable way to defend monetary sovereignty from the threats posed by private virtual currencies. It seems many countries around the world are aware of the advantage of a token-based design as many countries have adopted same and integrated their choice of token-based CBDC on a DLT[254]. It is also important to identify that a token-based CBDC does not necessarily require a direct relationship between the central bank and the public.

2. Account-based CBDC

An account-based CBDC is a digital currency design that relies on the existence of bank accounts reflecting savings and transactions held by an institution or individual. Commercial bank accounts are an example of an account-based money. Commercial banks require that their customers own bank accounts managed by said banks. The bank manages their transactions and credits or debits their accounts as needed. However, before one can open an account with a bank, it is important that the identity of the individual is verified. It is for this reason that banks perform a lot of identity verifications prior to registering and processing transactions. It is also for this reason that commercial banks request a lot of information from customers willing to open accounts. These same requirements apply to an account-based CBDC but this time around, said information will be required to create an account with the central bank. In order for an account-based CBDC to be in place, the central bank will need to apply similar KYC requirements as commercial banks. An exercise like this by is sure to make the central bank a huge repository of information and data of citizens.

The advantages of an account-based CBDC include- it will provide the central bank with a lot of avenues to exercise its oversight responsibilities over illicit and questionable transactions. It may also allow the central bank to deploy some specific monetary policy mechanisms to stimulate the economy through disbursement of funds to the public such as welfare payments and payments necessary for social safety nets. An account-based CBDC will also ensure that the central bank and the revenue collection authorities have oversight over revenue collection and taxes. It may

[254] The following states, countries or regions are either in the proof of concept stage, the pilot stage or have fully launched their respective token-based CBDC's on a DLT platform: Brazil, Kazakhstan, France, Australia, Turkey, Thailand, Switzerland, Cananda (exploring both account-based and token-based CBDC, South Africa, Bahamas, Hong Kong, Curaçao, Ukraine, Uruguay, Japan and the Euro area. Source CBDC tracker: https://cbdctracker.org/

make it easier to integrate new roles and responsibilities for financial intermediaries into an account-based CBDC design. These financial intermediaries, together with payment service providers will be able to work collectively towards ensuring the stability of the payment system and clearing and settlement infrastructure within the state.

Certain disadvantages also exist to the adoption of an account-based CBDC. Most of these disadvantages only exist when an account-based CBDC is compared to a token-based CBDC. For example, an account-based CBDC does not provide the level of anonymity that a token-based CBDC does. This is because the KYC requirements of the central bank and the fact that the account is being managed by the central bank.[255] In addition to this, the requirement of an intermediary to manage accounts (the intermediary in this case being the central bank and not the commercial bank) makes it difficult to make peer-to-peer transfers. Also, an account based CBDC may not operate a distributed ledger technology system, thus it may be difficult or impossible to reap the benefits of integrating smart contracts into an account-based CBDC design.

In the same way a token-based CBDC embodies the Societary theory of money, an account-based CBDC embodies the institutional theory of money. This is because the institutional theory of money sees money as a store of value and focuses on the institutions serving as financial intermediaries and actors in the existing credit systems and payment infrastructure. It is particularly because of this reason that an account-based CBDC may not contribute towards the narrowing of financial intermediation in the same way that a token-based CBDC might. We argue that if an account-based CBDC is adopted as the design structure for a potential CBDC, the state would by implication have selected a structure that favours convenience and satisfaction in the existing system as opposed to selecting a structure that favours the household. This decision may be understood because of the additional costs that may be involved in setting up the infrastructure for a new kind of currency. We also acknowledge the difficulties inherent in the narrowing of financial intermediation. These difficulties will arise not only from the direct relationship between the central bank and members of the household (because a token based CBDC also poses some threats to financial intermediation) but also arise from the fact that an account-based CBDC does

[255] Though as will be seen subsequently under our discussions on single and two-tiered CBDC designs, the central bank could delegate this responsibility to another entity, or it could be a public private partnership between the central bank and a private corporation.

not allow peer-to-peer payments. We will discuss the significance of the peer-to-peer payments subsequently.

3. Wholesale and Retail-CBDC

A wholesale-CBDC is designed for wholesale payments. It will likely be designed specifically for payments that exceed a particular regulatory limit and require additional identity verification and AML/ATF scrutiny. A wholesale-CBDC may be designed to be used for payments that have exceeded the regulatory limit and thereby need to be processed separately because of the necessary regulatory checks and additional manpower required to process said payments. A retail-CBDC on the other hand is a CBDC that is designed for payments under the regulatory limit and is designed to allow such payments pass through with little to no scrutiny and with some level of anonymity.

It is important to acknowledge that both a wholesale and retail-CBDC can also be structured as either token-based or account-based CBDC's. a wholesale token-based CBDC is a token-based CBDC that is applicable to process payments that have exceeded a regulatory payment limit. This form of CBDC will be difficult to monitor or oversee because by its nature, a token-based CBDC ought to provide a certain level of anonymity. This is not in any way inappropriate as the regulators and authorities have the agency and are at liberty to pick design elements that best suit their peculiar needs. However, it will be extremely convenient for retail payments to be done using token-based CBDC and for wholesale payments to be done using account-based CBDC. This is not to say that a wholesale token-based CBDC cannot exist or that its existence is a misnomer, rather we are saying that it will be more convenient to have tokens facilitate retail payments because of the anonymity they provide as being suitable for small transfers.

The difference between retail and wholesale-CBDC becomes more apparent when discussing interbank payments and settlements, and the clearing and settlement needs for purchasing securities and financial derivatives. Since interbank payments and settlements occur on the books of the central bank, we would expect this to be best facilitated by using an account-based CBDC. However, it is possible to have retail interbank payments that may require settlement in token-based CBDC to promote speedy payments and settlement using DLT. For this to be made possible, the central bank might encourage banks to make use of token-based wholesale CBDC. A token-based or account-based wholesale CBDC may also be required for the payment and clearing needs

of the financial markets where there is a need to take advantage of certain features of both token and account-based CBDCs.

4. Single-tier and two-tier CBDC design

In the preceding sections, we emphasised the significance of financial intermediation as it relates to the choice of design elements for CBDCs. This section specifically addresses the significance of financial intermediation in the CBDC landscape.

A single-tier CBDC envisages not only a direct relationship between the money users and the central bank, it also ensures that all ancillary services essential to money as a medium of exchange could be managed by the central bank. The central bank may also be responsible for recording retail and wholesale payments and may be responsible for the onboarding or KYC requirements of customers, though this may be delegated to financial intermediaries. It is important to note that the delegation of onboarding customers and collecting KYC information by the central bank to financial intermediaries is not significant in a single-tier CBDC. What matters is that there is a direct claim by the customers (households) to the central bank and that both retail and wholesale payments are processed and recorded by the central bank without the intervention of any financial intermediaries.

The difficulty inherent in the above is that it requires a lot of manpower and infrastructure for the central bank to perform onboarding activities and to process and record both wholesale and retail payments. A two-tier CBDC allows the central bank to avoid these problems by delegating the recording and processing of either or both retail and wholesale transactions to payment services providers as well as other financial intermediaries. The central bank may also delegate the onboarding and KYC requirements to the commercial banks while retaining the direct relationship (this time as a direct claim), between the central bank, the household, and firms.

According to Auer and Böhme, a two-tier CBDC can be structured in two different ways. One is by making use of an "intermediated architecture" where the payment service providers take responsibility for recording retail transactions which are then aggregated and transferred in wholesale form to the central bank for recording and the central bank takes responsibility for recording wholesale transactions. The significance of this "intermediated architecture" is that

although there still exists a direct claim on the central bank, unlike the single-tier CBDC, the central bank does not personally nor directly record retail payments and transactions but takes responsibility over recording wholesale transactions that have been registered and processed by the payment service providers.[256] In other words, the ledgers referencing retail payments do not actually reflect on the books of the central bank until said retail payments have been aggregated into wholesale payments and transferred into the books of the central bank.

The advantages of the above structure range from the expedited payments and manpower contribution by the inclusion of financial intermediaries to the simple operational setup for the central bank. More so, by reducing the concentration of data in the possession of the central bank, this structure could enhance data protection.[257] The disadvantage of this structure is that it will require additional supervisory standards for the payment service providers to ensure that accurate wholesale and retail transactions contained in the ledgers held by these payment service providers are transferred to the central bank.[258]

The second way a two-tier CBDC could be structured is in a hybrid model which is somewhere in between the direct relationship model and intermediated models. Under this structure, the payment service providers oversee all "consumer-facing payment services" but the central bank records all retail transactions from time to time and is in possession of the ledgers containing records of all retail and wholesale transactions. The payment service providers merely facilitate the payment and settlement activities between the individuals, firms, and the central bank. the major difference between the hybrid model and the intermediated architecture is that the extent of the central bank's operational involvement is higher in a hybrid model than in an intermediated model.

A major advantage of the hybrid model is that it isolates the financial position of the payment service providers from the financial position of the central bank. this is because the ledgers referencing wholesale and retail transactions never reflect on the books of the payment service providers. Thus, protecting the payment service providers from these payments make the payment

[256] R Auer and R Böhme, BIS Working Papers No 948 "Central Bank Digital Currency: the Quest for Minimally Invasive Technology" (2021) Monetary and Economic Department Online (pdf): https://www.bis.org/publ/work948.pdf.
[257] Hyun Song Shin, "Central Bank Digital Currencies: An Opportunity for the Monetary System", Speech by Economic Adviser and Head of Research, Bank for International Settlements on the occasion of the Bank's Annual General Meeting in Basel on 29 June 2021 at 11 online (pdf): https://www.bis.org/speeches/sp210629b.pdf.
[258] *Ibid.*

service providers bankruptcy remote as the payments pass through the payment service providers directly to the central bank. The disadvantages are similar to the disadvantages present in the direct relationship structure.

The legal significance of whatever choice is made between the direct relationship, hybrid and intermediary architecture models is important to consider. Whatever choice is made will affect the legal difference between a chose in action and a chose in possession. The established principle is that a chose in action refers to all personal rights to property which can only be claimed or enforced by legal action and not by taking physical possession of the property. A chose in action can also be said to be a right of which a person does not have present enjoyment but may recover it (if withheld) by legal action. A chose in possession on the other hand refers to vesting of actual possession of a thing or a right in person. It refers to all proprietary rights in personam, which are in the claimant's possession.[259]

For proper context on the distinction between a chose in action and a chose in possession in the context of money and currency; money and cash in the wallet/purse of an individual is a chose in possession however, the money which an individual has in their bank account is a chose in action which can only be recovered by the act of making a withdrawing from the bank. In essence, an account-based CBDC will operate like a chose in action while a token-based CBDC will operate like a chose in possession. Now, the additional design element placed on CBDC's such as the choice between the direct relationship, hybrid structure and intermediary architecture, will further complicate the distinction between a chose in action and a chose in possession. For example, a token-based CBDC that adopts an intermediary architecture may act like a chose in action in the legal relationship between the central bank and an individual if transactions have been aggregated and transferred to the central bank. On the other hand, it could also act like a chose in possession during the time between when the transaction is being processed by the payment service provider and when the payment is transferred to the central bank. things become more complicated if a hybrid structure is adopted or if a synthetic CBDC is adopted where there is no direct claim on the central bank. We discuss Synthetic CBDC in more detail below.

[259] For more on chose in action and chose in possession see: W. S. Holdsworth "The History of the Treatment of "Choses" in Action by the Common Law" (1920) 33:8 Harv. Law Rev. pp. 997-1030 (jstor). Online (pdf): https://www.jstor.org/stable/1327628.

5. Synthetic CBDC

A synthetic CBDCs are designed in such a way that partially or fully integrates private virtual digital currencies into the national payment and settlement system. They can be described as the equivalent of narrow-bank money issued by private entities and may not act as direct claims on the central bank. They are like commercial bank money in the sense that they are claims on a private institution as opposed to a direct claim/liability on the central bank. However, it is not in all cases that a synthetic CBDC is not a liability of the central bank. For example, a central bank could issue liabilities that are not in its own currency such as Eurobonds and Eurodollar bonds. In the same vein, a synthetic CBDC may be issued in a foreign CBDC but exist as a liability of the central bank.

An example of a Synthetic CBDC is the issuance of stablecoins guaranteed by debt securities denominated in a foreign currency. This could also be done by commercial banks and other private sector payment service providers.[260] This would work in a manner like the intermediated architecture discussed above save for the fact that it will not be a direct claim on the central bank but a direct claim to the financial intermediaries with additional security or insurance measures in place to make up for the absence of sovereign guarantee. If these additional guarantees and protections are placed on a synthetic CBDC, it is possible for them to match or replicate the same level of monetary stability that is possessed by a sovereign backed CBDC. However, it is believed that without operating as a direct claim to the central bank, synthetic CBDCs cannot be described as CBDCs but rather fit more into the description of narrow money.[261]

More so, synthetic CBDCs differ from CBDC in the underlying motivation for their uses. We have discussed three essential theories of money to wit: the Societary, state and institutional theory of money. We discussed that the proponents of the institutional theory of money have as their key concern the use of money as it relates to their profit-making activities from the NIM.[262] this is in stark contrast with the policy motivations of the proponents of the state theory of money and the purchasing power protection values held by proponents of the Societary theory of money. These differing motivations rob synthetic CBDC's of their ability to function as CBM. However, it must

[260] See Tobias Adrian Tommaso Mancini-Griffoli, "The Rise of Digital Money" (2019) IMF Fintech Notes 19/01 at 12-14.
[261] BIS- Central bank digital currencies: foundational principles and core features *supra* note 210 at page 4.
[262] See Section 2.2.3. of Chapter 2 of this thesis on the Institutional theory of money.

be admitted that the motivations of the institutional theory have incentivised the development of technologies and other avenues to facilitate effective payments and innovative financial solutions. We argue that the monetary and payment systems will be better served by a combination of the avenues developed by financial intermediaries as well as the neutrality and policy objectives of the central bank.[263]

Synthetic CBDC may also suffer from liquidity shortages. When the central bank is faced with the problem of liquidity shortage, it can expand its balance sheet by creating additional liabilities by issuing debt securities through OMO. The financial intermediaries, particularly payment service providers cannot perform this kind of balance sheet expansion activity. The ability of the central bank to expand its balance sheet makes a CBDC more liquid than a matched claim on a private provider. It is for these reasons and more that the BIS has stated that a synthetic CBDC does not meet the requirements of CBM and cannot serve the function of CBDC.[264] We will discuss the idea of CBDC as CBM in the following section.

3.5. CBDC as Central Bank Money (CBM); Applying Decentralized Tokenized Finance to the Administration of Monetary Policy

What distinguishes CBM from BM and what characteristics of CBM distinguish it from narrow money, virtual currencies and other hybrids including synthetic CBDC? In order to answer this question, we need to revisit the concept of fiat currency and the Societary theory of money. For any form of money to be recognised by a community it is important that there is a significant level of confidence in said money. Confidence births acceptance and thus confidence must precede acceptance. Forcing a community to accept a currency that they are not confident in will be against the monetary principles established by Oresme.[265] The acceptance by the community is dependent on the fact that a particular currency will be accepted by other members of the community in trade. Thus, Fiat money which by itself is based on a combination of the Mengerian/Metallist theory of money and the state theory of money, will have no value if the community refuses to accept it. Public acceptance of currency is so fundamental to currency that it has led to the recognition of empirical legitimacy by the courts and marked a great shift from the metallist theory to the state

[263] *Ibid.*
[264] BIS- Central bank digital currencies: foundational principles and core features *supra* note 210 at page 4.
[265] Nicholas Oresme *Supra* note 68 at 16. Oresme describes it as tyrannical if the acceptance of money is involuntary. He describes the 'Prince' or sovereign as being tyrannical if they were to impose a currency that is not accepted by the community.

theory of money where the intrinsic value of the precious metals used in coinage began to lose its significance because of the state theory of money and the introduction of paper money which has no intrinsic value.[266] The trust and confidence in the sovereign underpins the acceptance of paper money. The institutional theory of money and the delegation of powers over monetary affairs within the state to an institution known as the central bank and the introduction of monetary policy served as the final bond that brought together members of the community (households) merchants (corporations) banks (financial intermediaries) and the state (the central bank) regardless of their diverse motivations i.e as a store of value, a means of exchange and a unit of account.

It is due to the need to ensure confidence in the monetary system and the entire financial and monetary infrastructure of the state that the central bank is solely responsible for the creation of CBM. This is because, a single individual's confidence can be fickle. The confidence of every individual in a nation is exponentially fickler and depends on a lot more than the strength of the institutions and financial infrastructure in place to prevent crises. The value of a national currency has been known to be affected by political decisions and inconsistent government policies. Thus, there is no absolute guarantee of trust in the monetary affairs and currency of a state. It is at this juncture that the central bank has a crucial role to play in protecting public interest and ensuring public confidence. Through monetary policy, the central bank is able to create money by expanding its balance sheet and creating debts which can be used as money.[267] It is the money that is created from the liability of the central bank that is known as CBM.

However, the act of money creation does not belong in the exclusive purview of the central bank. Commercial banks are able to create money and as a matter of fact, commercial bank money (BM) existing as liabilities of the commercial banks represent a majority of the money in the economy, representing most of the money owned by households and firms within the economy. Thus, CBM and BM exist simultaneously in an economy. Now, the confidence in CBM also reflects in BM. The confidence in BM originates from the ability of a commercial bank to convert its liabilities

[266] For more on empirical legitimacy see the case of the Supreme Court of Canada in the Matter of Three Bills Passed by the Legislative Assembly of the Province of Alberta supra note 60 which was discussed previously in Section 2.2.1 of Chapter 2.

[267] This power of the central bank provided for by law. Most jurisdictions have provisions that enable the central banks to create liabilities and buy or sell debt securities to conduct monetary policy. We have discussed this previously in Section 2.6 of Chapter 2

into another commercial bank's BM and the ability of a commercial bank to meet the demand for BM of its customers.[268] The central bank ensures the confidence in BM in multiple ways:

1. Firstly, by enforcing reserve requirements that need to be met by commercial banks, commercial banks are encouraged to have reserves that they can draw on when the need arises.
2. Secondly, the central bank provides deposit insurance to commercial banks.
3. Thirdly, the central bank creates a framework for interbank payment and settlements and interbank borrowings by setting inter-bank offer rates to commercial banks.
4. Fourthly, though BM is of less intrinsic value than CBM, the central bank ensures that there is parity between CBM and BM by ensuring convertibility and redemption of BM to CBM at face value.
5. Fifthly, the central bank provides liquidity to the commercial banks whenever the need arises through buying and selling government securities.

A CBDC needs to perform similar roles as CBM. It needs to have sovereign guarantee and be a direct claim on the central bank. CBDC by its description is a sovereign backed digital currency and can be designed to be a direct claim on the central bank which can be achieved through a token or account-based CBDC. In addition, the central bank needs to be able to expand its balance sheet by creating new CBDC in a manner like CBM. A token-based CBDC can be mined in a similar fashion as private virtual digital currencies where mining activities are tied to existing or future assets and integrated to a DLT. An account-based CBDC which is based on a balance sheet can be expanded in the same way the central bank can expand its balance sheet. Additional control measures can also be put in place to limit the balance sheet expansion exercise while monitoring the economy in real time. It can also be argued that a CBDC will better meet the obligations of the central bank to the commercial banks and to households as well as to aid in conducting monetary policy.

We have discussed previously that legally, it is deemed that a financial market exists in order for monetary policy to be conducted. This is because, regardless of the absence of any statutory provisions nor formal arrangement between the central bank and the financial markets, there seems

[268] Bank for international settlements, "The Role of Central Bank Money in Payment Systems" (2003) Committee on Payment and Settlement Systems online (pdf): https://www.bis.org/cpmi/publ/d55.pdf.

to be a special relationship between the central bank and the financial markets particularly the financial intermediaries.[269] This relationship ensures that monetary policy has to be funnelled through financial intermediaries either directly (through commercial banks) and indirectly with OMO (through financial intermediaries and institutional investors in the financial markets). As it stands, traditional monetary policy and the payment and settlement of transactions in the financial markets operates primarily through the relationship existing between the central bank and commercial banks CBM and BM.

How then can CBDC be applied to the monetary policy framework of as presently constituted? We acknowledge that the informal but "special" relationship that exists between the central bank can be replicated using a smart contract protocol. This smart contract will make it easier for the obligations of both the central bank and intermediaries (where necessary) to be managed. In the alternative, the central bank in line with its statutory mandate to cater for the economic welfare of the state, may choose to do away with funnelling monetary policy through financial intermediaries to avoid the costs associated with the indirect transmission mechanism. If this is the preferred option by the central bank, then a token-based CBDC which requires no financial intermediaries can be adopted.

More so, since account-based CBDC's may be difficult to integrate with smart contracts and other programming controls, the preferred option may be to adopt a token-based CBDC.[270] By adopting a token-based CBDC, it may be easier to administer monetary policy by utilising tokenised finance. The legal ramifications of adopting tokenised finance to conduct monetary policy may lead to a reimagination of what constitutes a liability of the central bank.[271] Particularly if CBDC will coexist with other forms of money such as BM and cash. Additional benefits may accrue to the central bank and investors (firms and households) from the central bank being able to redeem its debt securities in token-based CBDC. These benefits include the speed and efficiency from the clearing and settlement process available on a DLT as well as the reduction in paperwork and

[269] Will Bateman and Jason Allen *supra* note 14 at 25.
[270] As done by the Banque de France in its experimentation on tokens for retail payments and monetary policy *supra* note 232.
[271] We will revisit this in Chapter 4 on the democratisation of monetary policy. Our argument is that if tokenised finance is used to control monetary policy i.e., where the central bank expands its balance sheet by creating additional liabilities which are then converted to debt securities such as government bonds which are then redeemed in token-based CBDC which are seen as a claim on the central bank. is this actually a claim or obligation of the central bank when the central bank can further expand its balance sheet and is remunerated via taxation and other form of government revenue?

transaction costs because of smart contracts. We believe that a few more advantages may become apparent if adopted and as time passes.

3.6. Conclusion

In this chapter, we have discussed the diverse state motivations for adopting CBDC. We made sure to align these motivations with the tenets of the Societary theory of money particularly the state's policy motivations to ensure monetary stability and to promote economic welfare. We emphasised on the statutory obligations of the central bank to ensure economic stability and to protect the purchasing power of currency. We argued that for the central bank to meet its statutory obligations and mandates it may be necessary for the central bank to integrate smart contracts and DLT into its CBDC design.

Following from the above, we explored the legal aspects of smart contracts and DLT. We focused on how smart contracts can be programmed to ensure that the mandate of the central bank is met and how smart contracts can ensure that the statutory role of the central bank is performed. We examined the cost cutting initiatives provided by smart contracts including reduced enforcement costs and how smart contract could be used to replicate the internal governance mechanism of the central bank and how programmable money can be used to meet the policy objectives of the central bank using cost effective transmission mechanisms. We then proceeded to discuss some of the available design options for CBDC from account or token-based CBDC to synthetic CBDCs which by definition do not qualify as CBDC because they do not meet the requirements of CBM (because it is not a direct claim on the central bank). We also discussed how the choice of some design elements could affect certain legal and equitable rights over assets.

Finally, we analysed how tokenised finance can be adopted to administer monetary policy through OMO. We reiterated our previous argument that because of the significant role played by financial intermediaries in the transmission mechanism of monetary policy, and because of the importance of BM to the payment and clearing of securities transactions in the financial markets, that financial intermediation is almost indispensable to monetary policy. This is irrespective of the fact that there is no statutory requirement that monetary policy must be conducted and funnelled through financial intermediaries. We argued that the central bank may choose to avoid financial intermediation or to concretise it's arrangement with financial intermediaries through the use of smart contracts. Both of these choices can be facilitated with the use of token-based CBDC.

The adoption of a token-based CBDC will allow monetary policy to be deployed with the aid of tokenized finance using blockchain technology as was done by the Banque de France. However, the combined effects of conducting monetary policy in this manner without the intervention of financial intermediaries coupled with the digitisation of monetary policy and central bank governance could have the effect of democratizing monetary policy. If this happens, monetary policy could be determined by households and firms as opposed to the institutions (the central bank and the commercial banks and other financial intermediaries). Though unlikely, it could have the effect of eroding the institutional theory of money by unbundling the statutory roles of the central bank and giving more power and control to the household and firms. Also, conducting monetary policy through tokenised finance makes us confront the idea of "CBM as a liability" with some skepticism. These amongst other issues will be discussed in detail in the next chapter.

CHAPTER 4: The Democratization of Monetary Policy

4.1. Introduction: What do we Mean by the Democratization of Monetary Policy?

In the preceding chapters, we discussed the threats that are currently being posed to monetary sovereignty. We subsequently discussed monetary policy as a product of the law and expatiated on the relationship between monetary law and monetary policy. We then proceeded to conduct a legal and economic analysis of CBDC and Tokenized finance. Our conclusions from the previous chapters were to the effect that there exists a strong relationship between monetary law and monetary policy, and that at the intersection of monetary law and monetary policy lies monetary sovereignty. More so, we performed an analysis as to how certain theories of money fit into the functional definition and historical development of money.[272] We also attempted to justify how our chosen theories of money remain applicable to the ongoing legal analysis of CBDC.[273]

In our analysis of CBDC and tokenised finance, we concluded that it is possible to replicate the internal governance as well as mechanisms employed by the central bank to conduct monetary policy and the entire, payment, settlement and clearing infrastructure of a nation. We concluded on this point that disintermediated monetary policy and governance as well as digital currencies are important ingredients for democratizing monetary policy. Our conclusion was premised on the argument that monetary sovereignty has by implication and by operation of law, been assigned to the financial intermediaries. This delegation is made evident by the conduct of monetary policy through OMO as well as the peculiar relationship between certain financial intermediaries (most notably the commercial banks) and the central bank. This delegation is solely responsible for the presumed indispensability of financial intermediaries to the administration and conduct of monetary policy.

Before now, we had refrained from conducting an analysis of the potential effect of financial disintermediation and decentralised finance because we had to lay a foundation for CBDCs and tokenized finance which are the foundation on which decentralised finance and disintermediated payments will be based. Although financial disintermediation and decentralized finance are incompatible with the current monetary and payment system, they are bound to provide

[272] For more on the functional definition of money, see section 2.2. of Chapter 2 of this thesis.
[273] See section 3.2 of Chapter 3.

opportunities to the monetary affairs and the payment system in almost equal proportions. Thus, we will not be turning a blind eye towards the challenges and opportunities posed by financial disintermediation and decentralized finance.

In this chapter we will be exploring just one of the numerous potential effects of the financial disintermediation and decentralised finance from the introduction of digital currency. Our focus here will be on the democratisation of monetary policy as an effect of the disintermediation of monetary policy through the adoption of CBDC.

For the purpose of this chapter, the prerequisites for the democratization of monetary policy include:

1. A decentralised central bank
2. The adoption of a remunerated and programmable CBDC
3. Disintermediated financial services
4. Transactions evidencing payments in CBDC are recorded on DLT.

It is only after all the above have been put in place that the actual democratisation of monetary policy can take place. What then do we mean by the democratisation of monetary policy? By this, we mean the following:

1. The democratization of monetary policy from financial disintermediation and the recording/storing of transactions on DLT whereby every participant in a sovereign digital ecosystem is by themselves an administrator of monetary policy through their activities and operations on a selected DLT platform.
2. The democratization of monetary policy by considering the proportionate weights of the diverse motivations of the participants in the monetary affairs of a state (to wit: money users, money managers and money maker) and making sure said motivations are reflected in the design of monetary instruments. By this we mean that the money creator (the state) ought to place the relative significance of the diverse motivations of the money users and managers on equal footing when considering a likely design of money.[274] For emphasis, the motivations of the money users should be of equal (if not more) importance as the motivations of the money managers when selecting design elements for a potential CBDC.

We will discuss the above in more detail in this chapter. More so, we will also revisit the inflation argument that was discussed in passing in chapters 2 and 3 previously and attempt to justify the motivations of the money users *vis* the Societary theory of money. In the later portion of this chapter and this thesis, we will discuss the significance of CBDC's to cross-border payments and the effects of Gresham's Law and the monetary policy trilemma and how these may cause the lines

[274] See Chapter 2 section 2.2.3.

between monetary and fiscal policy to blur. We will also be analysing the relationship between MMT and CBM and the role of the Societary theory of money in said relationship. In the concluding portion of this thesis, we will discuss the effect that public concern has over privacy and data protection and how these concerns may affect the conduct of monetary policy with the adoption of CBDC. Finally, we conclude this chapter by discussing our recommendations surrounding the legal and regulatory hurdles to be crossed along the way prior or subsequent to the adoption of CBDC. As part of our recommendations, we will discuss the responsibilities and the new face of the central bank in an increasingly digital world.

Without prejudice to all that has been discussed above, the major aim of this chapter is to indicate:

1. the category of roles of the central bank that are amenable to change
2. the hitherto unknown roles of the central bank that the central bank would have to gain a certain level of familiarity about from the introduction of CBDC's

More than any other thing however, we hope that our recommendations are able to serve as a foundation to any subsequent debates or analysis concerning the legal aspects of CBDC as it relates to monetary law.

4.2. Revisiting the Inflation Argument and the 'Societary' Theory of Money

The readership will recall that we discussed the importance of the central bank's role in controlling or managing inflation. More specifically, we identified that maintaining the purchasing power of money is one of the activities the central bank needs to perform in order to promote economic welfare. Inflation and maintaining the purchasing power parity are important to both the money users and the money manages and to varying degrees, form part of the motivations of the money users and money managers.[275]

Inflation control and protecting the purchasing power of money is very important to money users. We have witnessed scenarios where due to creeping inflation, governments, courts, regulators, legislators, and even professional accounting bodies are forced to intervene by proposing their well

[275] See Table 1 in Chapter 2 section 2.2.3. Although the money managers are concerned about inflation control from a general risk management angle their business model is geared to take advantage of the NIM which sets returns at a rate above the inflation rate. The money users on the other hand have no such unique advantage. Rather, they are only able to prevent the erosive effects of inflation through particular intermediated activities like savings and investments.

thought out inflation control measures.[276] While the measures put in place to control inflation by financial/economic regulators have been met with success to varying degrees[277], the law, besides serving the role as a catalogue for regulations governing the activities of the central bank, has not been able to proffer any notable solutions to this long running race against inflation. As the law and courts of law continue to play catch up to monetary policy and economic and financial development, inflation continues to wreak havoc on legally enforceable payment obligations.[278] This situation continues to remain the same with little or no signs of improvement even though there are many areas of the law suffering from the value eroding effects of inflation. These areas of the law include contract and commercial law, damages in tort law, taxation and succession to property including trusts and wills.[279]

The situation of things is quite shocking to say the least, especially one considers that the challenges inflation poses to earnings and savings, forms a major premise upon which the Societary theory of money is based. The readership may recall that in chapter 2 of this thesis, we discussed the Societary theory of money at length. We identified that the core tenets of the Societary theory of money including the idea that- it is the usage of money in commercial life as well as the general confidence of the money users that leads to the recognition and acceptance of money as a means of exchange. In other words, it is the collective outlook or inclination of the populace towards a particular monetary instrument that grants it its legitimacy as opposed to the state or the institutions. For good measure, we can simply state that the confidence of the people lends credence to CBM.[280] It is also for this reason that the courts have been known to apply empirical legitimacy to monetary instruments.[281]

One would expect that the appealing nature of the Societary theory of money would make its tenets occupy a central role in the design of money. However, what we find is that the institutional and state theories of money occupy a more central role in the current design of money and monetary

[276] Ivor Richardson "Legal Problems of Inflation" (2013) 44 VUWLR 679 online (pdf) https://deliverypdf.ssrn.com/delivery.php?ID=403118115089090092000020073093097018098035091034011074117080025026114021126074090028033027032044109027040104082087005071091121103082007012011090109006004118109091108007015042092099087098027090098122092082102127025078092079021086076120010010067074082089&EXT=pdf&INDEX=TRUE.
[277] For example, one of the most effective ways by to control inflation is by setting interest rates at a rate higher than the inflation rate. See John H. Cochrane "Do Higher Interest Rates Raise or Lower Inflation?" (2016).
[278] See E Hirschberg *supra* note 35.
[279] Ivor Richardson *supra* note 273.
[280] See Chapter 3 Section 3.4 above.
[281] Re Alberta case *supra* note 60.

affairs. This is evident in the intermediated finance that is central to monetary policy. To put things in perspective, MMT postulates that a sovereign government whose revenue comprises mostly of taxes, and which can borrow in its own fiat currency which it controls, will not be constrained by government spending limits. What this means in essence is that since the government has exclusive control over its money/currency then the government can decide to print as much money as it wants. This is in stark contrast to the households and corporations who don't have the privilege of limitless spending and face the threat of running out of money. Following from this, it becomes apparent that MMT merges the Societary and institutional theories of money and takes things a step further by postulating that commercial banks act solely as financial intermediaries by creating money and by acting as credit facilitators. It was for this reason that we concluded that the State has delegated its monetary sovereignty to financial intermediaries by permitting said intermediaries to create money.

The above is even more strange when considered empirically. For example, it is a fair assumption that the Societary theory of money which represents money users generally, is adhered to by most people. This is because logically, the household population will by far surpass the population of firms and institutions which represent the money users. More so, every money manager corporation or firm is populated by employees, directors, managers who are themselves money users. Now, having established that there it is very likely to find more numbers in the households as opposed to the corporations and firms (money managers), why then is it the State's preference to have monetary policy channelled through financial intermediaries especially when it may be more efficient to adopt a cheaper transmission mechanism that may not be totally reliant on financial intermediation. More so, the current approach of controlling inflation by channelling monetary policy through financial intermediaries seems rather strange when one considers that inflation might be more of a concern to the money users than the money managers.[282] Clearly, the state will be better served by utilising more cost-effective monetary policy transmission mechanisms. However, because of the unique role played by commercial banks in connecting savers with borrowers by take advantage of interest rates, financial intermediation may appear to be indispensable to the State for inflation control.

[282] The reason we are of the opinion that the money users are more concerned about inflation that the money managers because unlike the money users, the money managers have a variety of tools, operations, and mechanisms to hedge their exposure to inflation. More so, the money managers business model which takes advantage of the NIM is designed in such a way that their revenues are shielded from the erosive effects of inflation.

With technology, the state may be able to reduce costs/expenses incurred from the choice of transmission mechanism for deploying monetary policy. With the advent of virtual currencies and blockchain technology, it has become possible to design money and monetary affairs in a manner that does not require financial intermediation. Digital currencies provide a cost-effective opportunity and could serve as a platform on which the State can overhaul the current state of monetary affairs. The state through the central bank may finally be able to move away from the institutional theory of money and embrace the Societary theory of money if and only if the state so intends. Virtual currencies have shown that people are willing to accept and acknowledge certain virtual currencies as money in exchange for goods and services. As we have stated earlier, money as a medium of exchange in line with the Societary theory of money does not require the intervention of the sovereign before a monetary instrument is accepted as a legitimate means of exchange.

Why is this important? Besides the obvious cost saving benefits and operational efficiency, the Societary theory of money has potential application to a new definition of money. As we shall see in the next section, to adopt the tenets of the Societary theory of money, it may be necessary to develop a new description of money that may be utterly different from the accounting definition or treatment of money.

4.3. Towards a New Definition of Central Bank Money

As a result of the potential regulatory challenges posed to monetary affairs by digital currencies, certain legal scholars have proposed a new definition to CBM. Numerous scholars have proposed a change to the definition of CBM.[283] Some of these scholars propose this change to the definition of money because, in their words:

> The widespread treatment of CBM as a central bank liability goes back to the gold standard and uses analogies with commercial bank balance sheets. However, CBM is sui generis and legally not comparable to commercial bank money. Furthermore, in modern economics, CBM holders cannot demand repayment of CBM in anything other than CBM. CBM is not an asset of central banks either, and it is not central bank shareholder equity because it does not confer the same ownership rights as regular shareholder equity. Based on comparisons across several legal characteristics of financial instruments, we suggest that an appropriate

[283] See Micheal Kumhof et al "Central Bank Money: Liability, Asset, or Equity of the Nation? (2020) SSRN Academic journal, online (pdf): https://papers.ssrn.com/abstract=3730608.

> characterization of CBM is as 'social equity' that confers rights of participation in the economy's payment system and thereby its economy.[284]

The first thing we notice from the above quote is the association between the treatment of CBM as a central bank liability and the commercial bank balance sheet treatment of BM. We can recall that in the previous section, we discussed the MMT and indicated how the MMT merges the Societary and institutional theories of money. What we did not mention in the previous section is that the core statements of the MMT have also been criticized for being a balance sheet approach to macroeconomics.[285] If MMT and the definition of CBM can be faulted for being balance sheet treatments of concepts that appear to act differently in practice, then it is also a fair criticism to say that this balance sheet treatment tends to oversimplify CBM. The oversimplification of this balance sheet treatment originates from the balance sheet accounting standards for reserves and deposit accounting and then subsequently, sectoral balances accounting. [286] For additional context, the balance sheet treatment only provides information on how to record CBM in financial reports and fails to take account of how CBM and the participants in the monetary system actually behave and interact with each other.

The second thing we observe from the above quote is that it appears to argue that based on legal doctrine, CBM does not poses the same characteristics as an asset, a liability or even equity (based on the traditional definition and understanding of assets, liabilities, and equity). If CBM is neither an asset nor a liability or equity, what then is it? The authors of the above quote propose an innovative characterization of CBM as 'social equity'. the authors argue that this characterisation is apt because according to them, more than anything else, CBM performs the important role of providing to its holder the right to participate in an economy's payment system. In the same vein, the starting point of the MMT is the payment system (through reserve accounting) before proceeding to sectoral balances.[287] The authors also argue that characterising money as social equity works because money grants certain rights to an individual to participate in the economy which is similar to how equity grants certain rights to equity holder to participate in the governance of a company. However, the degree of participation in the economy that CBM provides to a CBM

[284] *Ibid* at P 1.
[285] Dirk Ehnts "Modern Monetary Theory: The Right Compass for Decision-Making" (2022) 57:2 Intereconomics pp. 128–134, online (Pdf): https://www.intereconomics.eu/pdf-download/year/2022/number/2/article/modern-monetary-theory-the-right-compass-for-decision-making.html.
[286] *Ibid.*
[287] Sectoral balancing is an accounting concept that states that government budget deficits add net financial assets to the private sector.

holder is limited when compared to equity. For example, the holder of CBM does not have rights to vote during monetary policy meetings and cannot exercise any rights to appoint officials to the central bank.

Since CBM grants access to the payment system which serves as the starting point of MMT, then what role can the Societary theory of money play in the relationship between CBM and MMT? The Societary theory of money agrees with the proposed new definition of CBM as social equity because as indicated previously, the Societary theory of money relies on empirical legitimacy. Empirical legitimacy is a process that attempts to aggregate the popularity of a particular monetary instrument based on a somewhat democratic process whereby the participants in the economy select the best monetary instrument for the markets.[288] Since the Societary theory of money and empirical legitimacy require a democratic process involving participants in the economy, then it logically follows that CBM is the instrument conferring the right to participate in the monetary system.

We discussed previously how it is possible to revert to the Societary theory of money from the state theory of money.[289] It is important to note that the reversion from the state theory to the Societary theory of money can also be performed using a democratic process. By this democratic process, we mean that the money users can decline to hold on to CBM or even transact in CBM where they are displeased or in disagreement with certain policies by the central bank. This is clearly the Societary theory at work. This democratic process allows the money users to have an indirect control over monetary affairs within the state. Furthermore, with CBDC's (which are a digital representation of CBM) and DLT, it may be possible to expand this democratic process to include the direct participation of the members of the household in decisions affecting monetary affairs within the state. This democratisation of monetary policy can only be achieved only after certain legal and regulatory hurdles have been crossed. Of course, we will be discussing this in more detail in the subsequent section of this chapter.

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[288] Participants in the market are able to select monetary instruments based on certain features they expect money to have such as sallability and liquidity. See Lawrence H. White "Accounting for Non-interest-bearing Currency: A Critique of the Legal Restrictions Theory of Money" (1987) 19:4 J. Money Credit Bank 448-456 p. 452 (Jstor) online (pdf): https://www.jstor.org/stable/pdf/1992613.pdf?refreqid=excelsior%3A1d6882855ee834e867527762a5b68fca&ab_segments=&origin=&acceptTC=1.

[289] This can be done for example during a time of inflation where the people decide not to hold on to a particular currency if it loses value. See chapter 2, section 2.2.2.

4.4. Certain Legal and Regulatory Hurdles

Before we can reap the benefits of CBDC, it is necessary to address certain regulatory hurdles that could impede the development and adoption of CBDC. We will be focusing on three legal and regulatory hurdles in this section. They are:

1. The hurdle arising from conflating monetary and fiscal policy.
2. The legal hurdle arising from remuneration of CBDC.
3. The hurdle arising from the legacy designs of the current payment infrastructure and payment and settlement laws.

We shall discuss the above hurdles in detail subsequently. It is important to note that in addition to the above hurdles there exists the overarching hurdle of absent regulations for DLT and blockchain technology. The non-existing regulations have severely hampered the general acceptability of blockchain technology and products and services that are based on said technology.

1. The hurdle Arising from Conflating Monetary and Fiscal Policy.

We have touched on the likely convergence of fiscal and monetary policy that may arise from the adoption of CBDC.[290] This convergence may emerge from the adoption of programmable CBDC and the remuneration of CBDC. It is necessary to point out that the conflation of fiscal and monetary policy does not necessarily mean that the central bank will no longer be able to administer monetary policy based on its own internal governance processes, nor does it mean that the department/ministry of finance and the legislature/parliament will no longer be involved in making decisions on government spending based on fiscal policy preferences.[291] Rather, what the conflation of fiscal and monetary policy means is that is that it is possible for monetary policy decisions to immediately affect fiscal policy decisions and vice versa.[292] For example, a monetary policy decision on interest rates which in turn will affect the remuneration that will be paid by the central bank to CBDC account holders. More so, the payment of CBDC remuneration to CBDC account holders is equivalent to government spending. Therefore, it is possible for the adoption of CBDC to obfuscate the administration of fiscal and monetary policy.

[290] See chapters 2 and 3 respectively.
[291] Bjerg Ole *supra* note 14.
[292] *Ibid.*

In light of the above, it would be quite tricky for regulators and other stakeholders to maintain the divide between fiscal and monetary policy. Also, the distinction between fiscal and monetary policy reflects in the legal infrastructure established for financial and monetary controls within the state. Both fiscal and monetary policy follow separate legal paths leading to different government agencies and regulators. For example, in most jurisdictions certain legislations exist on the conduct of fiscal policy by the government. In most cases the government's control over fiscal policy can be traced to the constitution or other specific enabling statutes (popularly known as fiscal law) including the following:

1. Taxation laws and regulation- including cross-border taxation issues and the design and creation of tax instruments
2. Budget laws- includes the rules governing the content of a budget as well as the (legislative) processes involved in passing national budgets as well as the unique political circumstances such as how a nation's unique system of government affects budget issues such as how much fiscal coordination is required in amongst the different tiers of government in a federal system of government.
3. Debt management laws- this includes the activities of the government to manage and issue public/national/sovereign debt.
4. Laws governing the management of the sovereign wealth fund- involves the legal framework for the management of sovereign funds, public corporations, state owned and controlled businesses/enterprises and sovereign investment assets.

In most cases, fiscal policy is usually managed by a designated government agency or ministry. In most jurisdictions, the department/ministry of finance is responsible for fiscal policy decisions.

Monetary policy on the other hand involves the policies utilized by the appropriate monetary authority (usually the central bank) within a nation to control one or all the following: interest rates, money supply, inflation and price stability, productivity, and the value and stability of the nation's currency. Since we have discussed monetary policy at length in previous chapters, we will not be discussing monetary policy with as much detail as fiscal policy above. Rather, we will highlight the fact that just as fiscal policy has it's designated legal infrastructure, monetary policy also has its own legal infrastructure and legal authority as well.

What then are the issues that may arise from a conflation of fiscal and monetary policy? Many issues arise from this conflation, ranging from the administrative issues that will arise from merging these distinct policy issues, to the law reforms that may ensue from the merger of fiscal and monetary policy. From the numerous issues that may arise from the conflation of fiscal and monetary policy, we will be focusing on the issues that affect the independence of the central bank.

The independence of the central bank is one of its core mandates and the conflation between fiscal and monetary policy will definitely have an effect on the independence of the central bank. As a matter of fact, a major reason for the separation between fiscal and monetary policy is to retain the independence of the central bank.[293] The independence of the central bank can be observed in the relevant governance provisions of the central banks of most nations including:

1. Provisions governing the tenure of the head/governor of the central bank. Most of the provisions indicate the predetermined tenure or restrictions on appointment of an individual as the governor/head of the central bank.
2. Provisions governing the appointment of the head/governor of the central bank through a non-political process;
3. Provisions granting the central bank the power to set and/or execute monetary goals as opposed to the government or finance department or ministry of a nation
4. Provisions limiting the government's ability to borrow money from its central bank.[294]
5. Provisions clearly defining the central bank's mandate in law; and
6. Provisions clearly defining the roles and reporting relationships of central bank officials in legislation.[295]

If the above controls were to be lost, merged and transferred to another government agency, there would be dire consequences to the economy and the established framework for the control of monetary affairs within a state. There could be operational advantages to the conflation of monetary and fiscal policy. For example, it is possible for the central bank to simply credit the treasury's CBDC account if the central bank intends to expand money creation by making new money available for public investment and spending. This transmission mechanism may be more efficient than the traditional transmission mechanisms.

Regardless of the above, it would be less than convenient to have monetary policy decisions affected by political considerations. The independence of the central bank should not be confused with accountability of the central bank. for all intents and purposes, the central bank remains

[293] See Wei Dong et al "Complementarities Between Fiscal Policy and Monetary Policy— Literature Review" (2021) Bank of Canada Staff Discussion Paper— 2021-4 online (pdf): https://www.bankofcanada.ca/wp-content/uploads/2021/03/sdp2021-4.pdf.

[294] Having these limits ensures that the government cannot finance all its spending by borrowing endlessly from the Bank. this is quite opposed to the limitless borrowing powers that was discussed previously in section 4.2 above. Unlimited government borrowing would inevitably lead to higher inflation; the overall demand for goods and services based on the larger amount of money in circulation would grow faster than the economy's ability to produce.

[295] Ryan Van Den Berg "Balancing the Independence and Accountability of the Bank of Canada" (2018) Library of Parliament, Background Paper, publication no.: 2018-37-E, online (pdf): https://lop.parl.ca/staticfiles/PublicWebsite/Home/ResearchPublications/BackgroundPapers/PDF/2018-37-e.pdf.

accountable to the department/ministry of finance and should remain so accountable. However, the independence of the central bank should never be compromised, especially not for political reasons.

2. The Legal Hurdle Arising From Remuneration of CBDC

By remuneration of CBDC's, we refer to the payment of interest on CBDC deposits held by the central bank. The idea of remunerating CBDC has garnered a lot of interest lately.[296] The points in support of interest bearing CBDC range from the possibility of controlling inflation by issuing interest bearing CBDCs and the attractive opportunities available by taking advantage of negative interest rates to stimulate the economy during a recession. Commercial banks are well positioned to take advantage of interest rates by encouraging borrowing and spending, with interest being paid to borrowers rather than lenders during a period of negative interest rates.

We must admit that this idea of remunerating CBDC, particularly the charging of negative interest rates on CBDC's may only exist on economic and financial theories and models and may not be tenable legally.[297] This is because if a CBDC is to have similar characteristics as bank notes (which are negotiable promissory instruments), then a CBDC may also have similar characteristics as promissory notes which are interest bearing notes. However, many jurisdictions have restrictive provisions which attempt to distinguish bank notes from promissory notes. In Canada for example, Section 25(6) of the Bank of Canada Act provides that: "Notes of the Bank are neither promissory notes nor bills of exchange within the meaning of the Bills of Exchange Act". This in turn could be interpreted to mean that notes of the Bank of Canada cannot have coupons, nor can they have interest rates and other features that promissory notes can possess legally.

We believe that Section 25(6) of the Act could be interpreted as merely being a way to exclude banknotes from the restrictions imposed by the statutory definition and liability provisions of a promissory note as contained in the Bills of Exchange Act. This belief is based primarily on the fact that Section 25(6) of the Bank of Canada Act was introduced shortly after the Supreme Court decision in the case of Bank of Canada v. Bank of Montreal[298] where the bank of Canada was held

[296] See Wouter Bossu et al, "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations" (2020) IMF Working Papaers WP/20/254 at P. 27 online (pdf): https://www.imf.org/en/Publications/WP/Issues/2020/11/20/Legal-Aspects-of-Central-Bank-Digital-Currency-Central-Bank-and-Monetary-Law-Considerations-49827.
[297] *Ibid*
[298] (1978) 1 SCR 1148

liable to the Bank of Montreal for notes that were damaged and destroyed by fire during transit. In this case, the Supreme Court of Canada held that the damaged notes were promissory notes and thus fell under the provision of the Bills of Exchange Act and therefore the Bank of Canada was liable to the Bank of Montreal for the damaged notes.

Regardless of the above, under the common law, banknotes and coins are seen as negotiable promissory notes. Since an interest-bearing promissory note needs to have the interest provisions including coupons written on its face, a banknote cannot be interest bearing because of the absence of said provisions on its face. The other alternative to interest bearing bank notes is to have a price differential between face value and issue price (above or below par) of the bank note at the time of issuance just as is done with the issuance of bearer bonds[299]. We can boldly state that this has never been done, as banknotes are usually issued at par value. Perhaps the rationale behind the distinction between a bank note issued by the Bank of Canada and a promissory note such as a bearer bond is premised on the now outdated 'Legal Restrictions Theory'.[300] This theory posits that non-interest-bearing currency cannot coexist with interest-bearing government securities without legal restrictions preventing the interest-bearing securities from being used as legal tender.

For additional context, the premise of the Legal Restrictions Theory is that a non-interest-yielding financial instrument of constant nominal value, for example, a $100 note, will be dominated by an interest-yielding asset of the same denomination, the same default risk and legal negotiability characteristics, e.g., a $100 bearer bond issued by the Government of Canada.[301] The conclusion from this is that rational consumers, investors, and speculators would prefer to hold on to interest-bearing securities as opposed to non-interest-bearing currency unless some form of legal restrictions in the form of legal tender and currency laws which prevent these securities from playing the same role in transactions are put in place.

Thus, due to legal restrictions, a $100 note is accepted as legal tender and a $100 bearer bond is not considered legal tender. Critics of the Legal Restriction Theory argue that even without legal restrictions contained in legal tender laws, non-interest-bearing currencies can coexist with

[299] Wouter Bossu *supra* note 293 at P 28
[300] John Bryant and Neil Wallace "A Suggestion for Further Simplifying the Theory of Money." (1980) Staff Report no. 62, Federal Reserve Bank of Minneapolis online (pdf): https://ideas.repec.org/p/fip/fedmsr/62.html
[301] See Lawrence H. White *supra* note 285. See also John Bryant *ibid.*

interest-bearing securities because money users may become aware of the unique advantages of liquidity from using non-interest-bearing currency to perform transactions that interest-bearing securities of same denomination, default risk and legal negotiability characteristics cannot perform. More so, in line with the 'Societary Theory of Money', cash balances in the form of non-interest-bearing currencies provide a liquidity service yield because, given that non-interest-bearing currencies are generally or routinely accepted in exchange for goods and services, possessing such currencies and monetary instruments puts one in the position of being able to make any potential purchase with minimum inconvenience.

The above advantage, coupled with the tendency for the markets to select monetary instruments based on salability makes it highly likely for highly salable non-interest-bearing securities to be the preferred monetary instruments when compared to their less salable interest-bearing counterparts. Legally, we can argue against the critics of the Legal Restriction Theory by stating that since the adoption of fiat currency and forced course, (*cours force*) the value of banknotes is dependent on nothing more than the face value of the currency i.e., the denomination of the currency. Hence the saying that a dollar is always a dollar. More so, the value of a banknote is not tied to a legal or contractual interest in the commodities, precious metals, or bullion kept in the reserve of the central bank from which the bank note can be redeemed like a loan.[302] In other words, at least presently, (and not since the Bank of Canada Act, R.S.C. 1952 was amended in 1953-54) there is no endorsement on bank of Canada banknotes to the effect that the "Bank of Canada will pay to the bearer on demand". Rather, the value of a bank note is dependent on the existence of a sui generis legal relationship between holder of the note and the issuing central bank. This relationship is described in the Bank of Canada Act as a "first charge" on the assets of the central bank.

Describing this relationship as a first charge may suggest the existence of a loan or debt in favour of the holder of the banknote, but this is not the case with a banknote. This is because there is no actual contract or agreement between the anonymous holder of the banknote and the central bank. Thus, in the absence of any agreement or endorsement on the face of the notes indicating coupon or interest payment or any similar provision, there can be no actual remuneration for holding banknotes. How does this relate to CBDCs we may ask? Well, the policy concern with CBDC is

[302] See Wouter Bossu *supra* note 293 at P. 27

that if a CBDC is expected to coexist with other forms of central bank money including bank notes and central bank book money as well as commercial bank money, an interest-bearing CBDC may lead to a situation where these forms of money are forced to compete amongst themselves leading to the complications evident in *Gresham's law* discussed in previous chapters.

Applying the earlier legal analysis to CBDC leads us to revisit the earlier distinction between an account-based and a token-based CBDC. For a token-based CBDC, the central bank may have to investigate the possibility of having multiple currencies where a single currency possesses a higher intrinsic value than others. This may lead to a situation where an interest-bearing, token-based CBDC has a higher intrinsic value than its face value. This may be a significant change and shift from the principle of nominalism. If this is the Bank of Canada's decision, then Parliament may need to revert to the 1952 and 1978 versions of the Bank of Canada Act which does not include the current provisions of section 25(6) of the Act.

In addition to the above, it may also be necessary to have policies in place to force or maintain the parity between the different forms of central bank money in existence. Without parity, the existence of CBDC alongside other forms of central bank money might make it difficult to ascertain the actual value of existing contractual obligations when there are different currencies with different intrinsic values. Depending on the economic implications, an interest-bearing token-based CBDC may be able to coexist alongside other forms of central bank money by borrowing from the earlier mentioned Legal Restriction Theory where an interest-bearing, token-based CBDC is seen as a digital asset without legal tender status.[303]

Moving away from the principle of nominalism may also affect the convertibility of token-based CBDC to other forms of central bank money, negatively affecting the circulation and liquidity of the token-based CBDC. Hence, charging interest on token-based CBDC may not appear to be a legally viable course of action. However, this may be different with an account-based CBDC, where the charging of interest, including negative interest, would be legally possible if policy makers so intend. Charging interest on CBDC's in this manner will not be strange to the central bank as interest is currently charged on current accounts in the books of the central bank.[304]

[303] See Lawrence H. White *supra* note 285
[304] See section 3.3

Consequently, it may be important for lawmakers and the central bank to introduce relevant provisions into either or both the Bank of Canada Act or the Bank Act that allow the Bank of Canada manage the account or accept deposits from citizens and stipulating the powers of the central bank to remunerate said accounts accordingly. More so If the central bank decides to pay interest on CBDC it is effectively paying a kind of social benefit to money holders, which is in line with the emerging proposals on a new definition of CBM as social equity.[305] Conversely, charging negative interest rates could be seen as a form of taxation on money which is another way that fiscal and monetary policy may merge from the adoption and issuance of CBDC.[306]

3. The Hurdle Arising from the Legacy Design of the Current Payment Infrastructure and the Payment and Settlement Laws.

The payment and settlement systems of most jurisdictions are based on fractional-reserve banking whereby deposit taking commercial banks are legally required to hold a fraction of all deposit liabilities in liquid assets as a reserve with the central bank. The commercial banks are then at liberty to conduct their NIM business operations with borrowers. It is due to this reserve requirement that most commercial banks are expected to have an account with the central bank.

Though reserve requirements are becoming less and less stringent of late,[307] commercial bank reserve accounts are the 'golden ticket' that grants commercial banks access to participate as huge players within a nation's payment and settlement infrastructure. Through the control over these accounts, the central bank can oversee the national payment and settlement system through innovative processes like Real-Time Gross Settlement (RTGS).[308] It is through this process that commercial banks can facilitate payments and participate in the interbank payment and settlement process. The introduction of CBDC may cause further complications to this process. We discussed the design elements of CBDC in the previous chapter and identified that a CBDC may affect financial intermediation if the public is allowed to open accounts with the central bank. This design

[305] See previous section 4.3.
[306] see (Huber 2017, 160–63; Jackson and Dyson 2012, 211–18)..
[307] Many jurisdictions are chosing to do away with the reserve requirement. The Bank of Canada for example does not have reserve requirements for commercial banks, rather the Bank of Canada utilizes the capital requirement (or capital adequacy ratio) which is represented as percentage of risk-weighted assets to equity. For the purpose of this thesis, capital adequacy ratio and reserve requirements will be used interchangeably.
[308] Known as Lynx or Large Value Transfer System (LVTS) in Canada, The British system is known as the Clearing House Automated Payment System (CHAPS). In France and the Eurozone, a system called Trans-European Automated Real-time Gross Settlement Express Transfer System (TARGET2).

will have a significant effect on the fractional reserve system. If public access to the central bank is granted, the central bank is likely to adopt the full reserve banking system, and commercial banks, and other financial intermediaries may be forced to operate as digital account providers. What happens to the RTGS and other structures and processes are presently in place to facilitate payments and settlements? It may be that the regulators, policy makers and other stakeholders may need to either consider an overhaul of the existing system/process or attempt to fit the adopted CBDC into the existing infrastructure.

In addition to the above, the current payment and settlement infrastructure deals with electronic funds transfers and not digital currency. Electronic funds transfers for payments can be described as a payment instruction expressed in encrypted strings of digits and with the ensuing monetary value expressed in electronic money.[309] This is different from a transfer of digital/virtual currency because the instruction as well as the identity of the currency/money are digitally represented. The payment and settlement systems of most jurisdictions are only equipped to address electronic transfers or payments and are not equipped to address transfers of digital currencies. The legal implication of this is that- as mentioned in the previous chapter, it may be difficult to apply equitable and legal remedies to a dispute arising out of the transfer or payment in digital/virtual currencies as these forms of currency are somewhat strange to the payment and settlement system. Unfortunately, until the payment and settlement systems are brought up to speed and are can comfortably accommodate digital currency, these legal issues cannot be addressed.

4.5. Conclusion and Recommendations; The Responsibilities of the Central Bank in an Increasingly Digitized World.

The readership can observe that a recurring theme in this thesis has been the idea that with a new form of money/currency with a different behaviour and characteristics, comes the new roles and responsibility to manage said currency. Alongside these new roles and responsibilities emerges novel governance mechanisms to aid in the management of central bank operations surrounding said new currency.

In addition to the above, we indicated that it is important for regulators (particularly the central bank) to consider the diverse motivations of the different participants in the monetary affairs of a state (to wit: the money users, the money managers, and the money maker). We argued extensively

[309] See Benjamin Geva *supra* note 35.

that the state should give the Societary theory of money prominence in its deliberations of the different design options for a CBDC. Our major argument was that the money users constitute a significant proportion of the participants in a state's monetary affairs. By this, we mean that- because the money users are the foundation of the monetary affairs and the bedrock of the financial economy of a state, whatever design elements being considered as potential features of a CBDC should be capable of meeting all the needs of the money users within the state. More so, we have also discussed in chapter two that the sphere of monetary sovereignty is dynamic, and the state has been known to at times take drastic steps to protect its monetary sovereignty. With this in mind, we would not be remiss if we did not proceed to argue further that the state should be able to control the sphere of influence of monetary sovereignty to the favour of its citizens which includes the households by reacquiring it's monetary sovereignty from financial intermediaries through disintermediated payments.

While analysing the motivations of the diverse participants within the monetary affairs of the state, we arrived at the conclusion that the priorities of the state in reinforcing the conduct of monetary policy through financial intermediaries is a little misplaced. This conclusion was premised on the fact that funnelling monetary policy through financial intermediaries' costs more to the state and is less effective than what has been demonstrated to be achievable when using CBDC. Our overreliance on financial intermediation has led to somewhat covert delegation of monetary sovereignty to the financial intermediaries. A series of economic recessions and financial crises have shown us that the overreliance on financial intermediation with laxed regulations is a recipe for disaster. Yet, nothing is being done by regulators to control or prevent future crises.

While regulators struggle to stay ahead of the next recession, the constant battle against inflation rages on. In opposition to the presumed nonchalance of regulators, a certain group of individuals stood up against the establishment by creating and private virtual currencies. We discussed the effect of these currencies on monetary sovereignty by drawing a nexus between monetary law and monetary policy and concluded that monetary sovereignty (though delegated to financial intermediaries) is under attack. This attack is twofold, one is the attack to monetary sovereignty from financial intermediation (we conclude that this is a moot issue as there seems to be an agreement between the state, the central bank and the commercial banks on the conduct of monetary policy). The second attack being the direct attack to monetary sovereignty from private

virtual currencies and the potential threat of digital currency substitution should another jurisdiction adopt a digital currency with more attractive features.

We analysed the design options that should be considered in the design of a CBDC as well as the legal implications of some design options. We also conducted a legal analysis of tokenised finance and decentralised finance and how they affect the operations of the central bank. We assessed what motivations need to be considered by the regulators and stakeholders and arrived at the conclusion that if the proper motivations are considered and the appropriate design elements are included in a future design of a CBDC, then the result might be the democratisation of monetary policy. We indicated that before attaining full democratisation of monetary policy, certain things need to be put in place and certain legal and regulatory hurdles, which we have discussed in the previous section, need to be jumped.

In this concluding section, we will be discussing our recommendations at length in the hopes of outlining proposed changes to the current operations of the traditional central bank. Some of our recommendations have been mentioned in passing in the previous chapters. We will repeat these recommendations where necessary, otherwise, we will refrain from unnecessary repetition. Our major aim in this section is to analyse our recommendations in light how novel they are and how well they can be distinguished from the current roles of the central bank.

4.1.1. Monetary Policy: How Do We Ensure the Independence of the Central Bank?

In the previous sections we discussed the importance of the independence of the central bank, we discussed how the introduction of CBDCs could create a situation where fiscal and monetary policy begin to merge. We have discussed the significance of such a merger and answered the question -why we need to prevent political considerations from affecting monetary policy decisions. Having established that the independence of the central bank should be protected, we will be addressing how the independence of the central bank can be guaranteed in light of the adoption of CBDC.

The independence of the central bank can be protected by adopting a Chinese wall to separate the monetary policy decision makers from fiscal policy decision makers. This could help prevent the political considerations from affecting monetary policy decisions. The Chinese wall can effectively act as a buffer to prevent fiscal and monetary policy from clashing. However, it may

be tricky visualising how this Chinese wall will work. Particularly when we consider our earlier statement that- the conflation of fiscal and monetary policy does not actually mean a serious alteration in the monetary and fiscal policy decision making process.

We indicated that the conflation could be indirect where for example, a presumed monetary policy decision has implications on fiscal policy. Where such is the case, a Chinese wall can assist by keeping the fiscal policy decision makers at bay from discussions surrounding monetary policy issues. By so doing, no conflict of interest could exist as political decision makers on fiscal policy issues have no forewarnings on emerging monetary policy decisions. This will put the state and the money users on equal footing when it comes to monetary policy decisions. The Chinese wall could be ad hoc -solely for the purpose of a particular project (e.g. inflation control, interest rate control, output control etc.) and be exclusive to a particular group of people (this could be committees, groups etc. and could include: central bank committee on inflation control, committee on output control etc.) the Chinese wall could also include a mixed group of monetary policy administrators (some employees of the central bank) and fiscal policy administrators (majorly employees of the ministry of finance). These groups of individuals/employees could have specific clearances and permits to participate in selected tasks and projects.

We must admit that the above will have no implication on instances where monetary policy decisions affect fiscal policy and vice versa. Rather, it is a way to ensure that no agency, government regulator or other stakeholder is privy to important material information on monetary policy. However, we must admit that the above Chinese wall proposal is inchoate as more work will need to be done on the actual governance control measures that need to be put in place to reinforce our proposal.

4.1.2. **mCBDC Bridge, and the Threat of Currency Substitution from International Payment, Expanding the Sphere of Monetary Sovereignty.**

We previously discussed the threat of digital currency substitution from currency competition. We identified how currency substitution from both private virtual digital currencies and foreign digital currencies could affect monetary sovereignty and monetary affairs within a country. We discussed that the central bank would need to develop novel, smart and responsive regulations to address the threat of digital currency substitution.

In addition to this threat of currency substitution, we also discussed the threat of the unbundling of money, i.e., the threat that could emerge when multiple currencies having different characteristics exist simultaneously within a state. As a refresher, the threat of unbundling exists where the money users have the option to select amongst multiple currencies, one currency acting as a medium of exchange (perhaps based on its' salability) and another currency as a store of value (perhaps for its remunerative features). This could happen where a CBDC with remuneration exists alongside CBM (cash) and BM (bank deposits). Under this arrangement, the money users would have the option of making use of cash as a means of exchange due to its salability, and the anonymity it provides or to make use of CBDC for its interest yielding properties.

The threat of currency substitution comes in different forms with a lot of moving parts making it difficult to pin down. This threat is this dynamic because it involves the digital currencies of multiple jurisdictions whose values are constantly changing in the foreign exchange markets. In addition to this, different jurisdictions have different laws, rules and regulations governing their municipal monetary affairs. Thus, it would be very difficult for a single central bank to have comprehensive and responsive regulations to address the plethora of complex monetary issues as they arise.

To address the above problem, we propose that another tool be added to the central bank's expanding tool shed. We propose that the central bank be allowed (through law reform) to participate in international politics as it relates to monetary affairs. The central bank can do this by proposing laws to grant the central bank powers to engage in treaty-making, which hitherto belongs exclusively under the purview of parliament and often requires consent before ratification.[310] In addition to this power, it may be necessary to have the central bank partake directly in international negotiations and agreements governing monetary affairs. We must admit that the central bank already participates in negotiating international trade agreements. If the central bank already does similar things, what then makes this proposal distinctive. The distinction inherent in our proposal is that it seeks to move the regulations and governance of monetary policy from soft law provisions to an approach based on hard law. The power to enter international treaties will provide avenues for the central banks of multiple jurisdictions to agree on best practices and standards as well as

[310] Thomas Cottier and Luca Satragno 'The Potential of Law and Legal Methodology in Monetary Affairs' The Rule of Law in Monetary Affairs: World Trade Forum (Cambridge: Cambridge University Press, 2014) at P. 411-433.

international treaties aimed to unite design elements on CBDCs amongst other modern economic challenges in the modern age. This power can only be granted through hard law.

We are not saying that soft law is not important to the conduct of monetary policy by the central bank. As a matter of fact, we acknowledge that soft law provisions are very important for the complex aspects of monetary policy that involve the economic levers that are available to the central bank as well as the mechanics of how these levers are used. Rather, our proposal is that having hard law provisions granting the central bank the powers to enter international treaties on monetary affairs and to negotiate internationally binding agreements will be better suited to combatting the threats of digital currency substitution and the ensuing unbundling of money/currency from the adoption of CBDC.

4.1.3. Blockchain Technology, Digital Currency, Decentralised Finance and the Governance of the Central Bank.

According to Hugo Benedetti and Sebastian Labbe, "decentralised finance" (DeFi) is a technological infrastructure built on a blockchain networking environment that supplies transparent, un-censorable, and decentralized financial services and products". Hugo and Sebastian believe that DeFi "offers the opportunity to replicate traditional financial instruments on a decentralized platform and incorporate added features provided by blockchain technology".[311] In the previous chapter, we discussed the ways by which blockchain technology could replicate the internal governance structure of the central bank. We relied on the governance framework used in DAO which employs the "retrofitting" theoretical approach, to set up a corporate-type organization without using a conventional corporate structure. We attempted to apply the DAO governance framework to the governance of the central bank. We concluded that though it is possible to replicate the governance of the central bank on certain blockchain platforms, replicating same would come at the cost of the reduced human capital involvement in the governance of the central bank.

We have identified numerous benefits to adopting blockchain technology in the operations and governance of the central bank. We must also point out that equipping digital currencies with

[311]Hugo Benedetti and Sebastián Labbé Karlsruhe, "A Closer Look Into Decentralized Finance" *The Emerald Handbook on Cryptoassets, (Forthcoming)* (2022) (SSRN Academic Journals) online (pdf): https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4069011&dgcid=ejournal_htmlemail_cryptocurrency:research:ejournal_abstractlink.

blockchain technology is not the only way for the central bank to reap the benefits of digital currencies. Some jurisdictions have adopted CBDC's without integrating blockchain technology or other forms of DLT.[312] However, it may be much more convenient to make use of DLT to host and manage digital currencies. The advantages that DLT could provide to the payment system cannot be overemphasized. More so, in previous discussions, we touched on the delegation of monetary policy by the state/central bank to the commercial banks/financial intermediaries. On this point, we argue further that adopting blockchain technology for the payment and settlement system could be the crucial first step necessary for the central bank to recover its monetary sovereignty from financial intermediaries. As we shall see in the next section, there are also tremendous benefits to personal data protection and privacy from the adoption of blockchain technology in CBDC design.

It is for the above reasons that we propose the adoption of blockchain technology by central banks particularly in any activities involving monetary affairs and the payment and settlement systems. As stated previously, the payment and settlement systems legislations will need to be amended to accommodate digital currencies and to include blockchain technology. The inclusion of provisions in regulations and laws concerning blockchain technology could be the crucial first step towards the eventual regulation of crypto assets and stable coins. In our opinion, it would be a huge mistake for regulators to proceed to regulating crypto assets and stablecoins without proper foundation. The foundation here being the regulation of blockchain technology and DLT in general. We propose that a comprehensive overhaul of the regulations and legislations governing the payment and settlement system by introducing a definition of blockchain technology and smart contracts as well as regulations governing blockchain ecosystems and mining activities, security and privacy requirements and consensus mechanisms. It may also be necessary to have provisions that define circumstances requiring regulatory intervention and compliance requirements[313].

[312] Countries like Jamaica, Ghana and Thailand are looking at designing their CBDC with all essential features but without the advantages that DLT would provide.

[313] It may be possible to introduce regulators and compliance experts as oracles in the blockchain system. By so doing they will have the ability to connect blockchains to external systems, thereby enabling smart contracts to execute based upon inputs and outputs from the real world.

4.1.4. Programmable Money and a Case for a "Smart- Social Contract"

Closely related to the challenges arising from the conflation of fiscal and monetary policy are challenges that may arise from the adoption of programmable or tethered money. We discussed the idea of programmable money in chapter 3 and arrived at the conclusion that many economic benefits would accrue to monetary affairs from the integration of smart contracts and programmable money via DLT (blockchain technology to be precise) into CBDC design. We concluded that the advantages of programmable/tethered money include:

1. Programmable money may be beneficial to the governance and decision-making process of the central bank.[314]
2. Programmable money may be capable of reducing seignorage expenses and promoting transactional efficiency.[315]
3. Programmable money provides the central bank with a plethora of monetary policy controls that may not be available without blockchain technology.[316]
4. Programmable money is beneficial to the transmission mechanism of monetary policy.[317]

While it would be extremely favourable to the economy if programmable money is adopted, the adoption of programmable money may come at a cost that money users may not be willing to or may be reluctant to incur. In section 3.3 we identified that data protection and privacy concerns are important issues when it comes to the public acceptance of CBDC. This concern will likely also play a huge role in any discussions or subsequent concerns about the unbundling of money.[318] These data and privacy concerns are also important when discussing the idea of programmable money.

Despite the well celebrated advantage of programmable money, the major concern with programmable money is the trade-off between the sophisticated monetary controls provided by programmable money and the privacy concerns of the potential users of programmable money. Money users believe that they may be forced to sacrifice anonymity for sophisticated monetary controls.[319] This is quite an important concern as we may soon be forced to grapple with the idea

[314] See section 3.2 and 3.2.3(1).
[315] See section 3.3.2.
[316] Se section 3.5.
[317] See section 3.2.4.
[318] See 4.5.2 above and 3.2.4 above.
[319] See IBM Institute for Business Value, "Programmable Money: Will Central Banks Take the Lead" (2018) at P. 7 (ExpertInsights@IBV) online (pdf): https://www.ibm.com/downloads/cas/WVJNWYO4.

of programmable money. More Particularly, we may confront the central bank's increased oversight and control over how money users spend their money. Members of the household may reject the additional controls available to the central bank over household spending which is in turn based on the idea that money can be programmed to only be spent on goods and services. The effect of this on financial/economic liberty and financial agency is significant.

While it is left for the policy makers and law makers to deliberate on the legitimacy of programmable money and its benefit to the conduct of monetary policy and monetary affairs generally, the outcome of said deliberation will most likely lead to one of two outcomes – one, the total acceptance of programmable money with unaddressed privacy concerns and two, unanimous rejection of programmable money due to the privacy concerns. Going strictly by the tenets of the Societary theory of money, it is highly expected that programmable money will be rejected by the public if the privacy concerns are not resolved. This is because most people would not want their expenses monitored or their financial decisions restricted by the government and regulators.

To us, the numerous advantages of programmable money, makes it almost inconceivable to imagine its rejection. A simple cost benefit approach will show us that the benefits of adopting programmable CBDC's far outweighs the costs of adoption. Therefore, rather than having to deal with the binary options of accept or reject programmable money for privacy reasons, it should be possible to find a middle ground with the potential for saving programmable money and making it much more acceptable to money users. It is for this reason that we propose a novel form of "smart social contract" to incentivise potential money users (CBDC users) on the advantages of programmable money.

Our smart social contract proposal seeks to strike a balance between the privacy concerns and personal agency of the money users and the privacy concerns and agency of the government/regulators and other stakeholders. Our proposal utilises quadratic voting to make members of the household/public to participate in democratic decisions concerning government public expenses.[320] This quadratic voting can be done using quadratic funding which is a quadratic

[320] Quadratic voting is a collective decision-making procedure which involves the allocation of individual votes to not just express the direction of their preference but also the degree of their preference through the acquisition of additional votes by voters to express how strongly they feel about the degree to which they prefer their selected choice. Quadratic voting seeks to address issues of voting paradox and majority rule.

voting mechanism introduced to the blockchain community. This kind of voting system allows community members donate cryptocurrency to new projects as a form of appreciation of the community's efforts in delivering public projects. Thus, in addition to the budgetary allocation for projects to be completed within a particular timeframe, we now have a way of selecting projects to be executed based on a democratic process where the project with the most crypto donations becomes the community project that gets executed.[321]

How would quadratic voting/funding help with balancing public interests and private rights? Quadratic funding/voting could serve as a sweetener to encourage members of the household to accept programmable money. Quadratic voting/funding could also help alleviate fears/concerns about government oversight over personal expenses. Quadratic funding mechanisms could be set up to help members of the household determine government spending decisions. This could be by developing a platform whereby the household members will have the opportunity to vote on government projects and the government projects with the most quadratic funding will get executed. By so doing, the oversight powers work in favour of both the government and the citizens. The citizens get to exercise control over government spending through quadratic funding and the government may if it decides to, choose to control public spending through programmable money. This is a clear middle ground that could incentivise the money users into accepting programmable CBDC.

We call this a "smart social contract" because, just like the social contract theory expounded by Thomas Hobbes posits the total submission of individual rights to the government in exchange for a quality life better than that available in the ordinary state of nature, our 'smart social contract' serves to build on the social contract by attempting to encourage the submission of individual rights to privacy and property in exchange for a right to determine and control government expenditure which is better than the ordinary voting rights available in a democratic state.

In addition to the smart social contract, other incentives may also take the form of decentralised monetary controls/regulations/governance. If programmable money is accepted by the household, it will work well in combination with other attempts to democratize monetary policy such as decentralised finance and disintermediated payments. However, it is left for the law makers to

[321] Quadratic funding can be performed on blockchain platforms like Ethereum. As a matter of fact, quadratic funding was introduced as a mechanism design or decentralized governance.

decide how CBDC's would be designed and deployed. Although more work needs to be done to determine how to design programmable money, we suggest that the law makers take account of the important tenets of the Societary theory of money when considering the design options for a CBDC. Law makers, regulators and other stakeholders are encouraged to design CBDC's in such a way that strikes the perfect balance between individual rights and public good.

4.6. Conclusion

Finally, we suggest that the concerned stakeholders in this important enterprise of designing money take this opportunity as a blank slate where we can collectively right past mistakes that have been made in economic and financial regulation. For the first time ever, states and regulators have the unique option of selecting behavioural properties for their currencies. We envisage a situation where at least during these initial stages, different jurisdictions will have their own unique digital currencies with different features. However, a global economy cannot function well with heterogeneous currencies that act differently under similar economic circumstances. Thus, it will eventually become necessary for states to harmonise their currencies for the sake of interoperability. It would be impossible to determine what essential design features these jurisdictions acting in concert will eventually settle on. However, one thing remains constant and cuts across most jurisdictions and that is – that most of these institutions have agencies and institutions responsible for controlling monetary affairs – the central bank.

The central bank is perfectly positioned to guide the trajectory of monetary evolution. The traditional central bank has gone through a series of evolutions leading to this point. The central bank has shown that the concept of monetary sovereignty is malleable, and it can be contracted and expanded by the state and/or the central bank where absolutely necessary. The central bank plays a pivotal role in the national payment and settlement system and the central bank "tolerates" financial intermediation. For the central bank to continue to remain relevant in this modern age, the central bank needs to adapt to technological advancement.

Private and virtual digital currencies have shown us that a fully functional payment and settlement system is possible without financial intermediaries. The idea of programmable money has taught us that monetary policy can be programmable. With all these developments, the central bank will have to adapt by taking up roles it had hitherto never played before. The central bank would have

to develop roles to deal with the conflation of fiscal and monetary policy, the central bank may have to develop a framework to combat digital currency substitution whilst also combatting other forms of currency substitution. The central bank may have to develop policies governing the remuneration of CBDC. If the central bank accepts deposits from the public, it may have to develop new operations departments to manage depositor accounts. With the prevalence of adjustments that need to be made to the central bank, we envisage that the central banks of today, will be slightly different from the central bank of the future.

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