

# Digital Money and the Implications for the Monetary System in Trinidad and Tobago

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## **ABSTRACT**

Driven by technological advancements, convenience, and financial inclusivity, the digital payments landscape has grown immensely. However, the rapid evolution of digital money presents significant implications for monetary policy. This paper examines the potential impact of digital money (namely CBDCs, e-money and fixed-price cryptocurrencies) on domestic policy effectiveness. By exploring these complexities, the study aims to better equip policymakers to address the opportunities and challenges presented by digital money, ensuring the continued stability and effectiveness of domestic monetary policy in the digital era. Employing a theoretic analysis using the Mundell-Fleming framework, the following key findings were observed. For public digital money, a direct distribution structure, whether interest-bearing or not, is likely to be the most disruptive, although it could amplify policy effectiveness. While, private digital money, if insufficiently regulated, could undermine financial stability and policy effectiveness.

**JEL Classification Numbers:** E42, E51, E52, E58, O33

**Keywords:** Monetary Policy, Central Bank Policy, Digital Money, Central Bank Digital Currency, Electronic Money, Cryptocurrency, and Mundell-Fleming Framework

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### Publisher:

Central Bank of Trinidad and Tobago

P.O. Box 1250, Eric Williams Plaza

Independence Square, Port of Spain

Phone: (868) 621-2288; (868) 235-288

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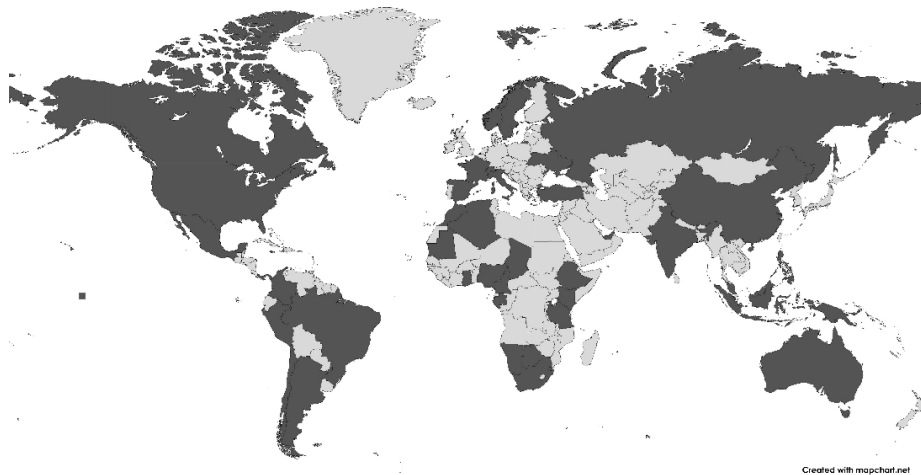
# Digital Money and the Implications for the Monetary System in Trinidad and Tobago

Alon Dhanessar and Natalie Thomas

## Introduction

The ongoing evolution of money continues to reshape the payments ecosystem. Modern payment systems have advanced significantly, enabling faster, more convenient, more secure, and more inclusive financial transaction mechanisms. Hence, through the integration of technology and changing payment preferences, new variations of money are being created. One such type of money is cryptocurrency. In 2008/9, Bitcoin, the first cryptocurrency and, by extension, distributed ledger technology ushered in new variations of digital money<sup>1</sup>. According to Statista Market Insights (2024), the total transaction value of the digital payments<sup>2</sup> market is projected to reach US\$11.5 trillion in 2024 (up from US\$10.1 trillion in 2023), record an annual growth rate of 9.52 per cent, and reach around US\$16.6 trillion by 2028. Additionally, as of December 2023, three countries<sup>3</sup> have launched a central bank digital currency (CBDC), over 100 CBDCs are in the research and development phase, and over 20,000 cryptocurrencies exist.<sup>4</sup> According to the Bank for International Settlements, 15 CBDCs are expected to be in circulation by 2030. Domestic efforts consist of research that has focused on assessing the implications of a Central Bank of Trinidad and Tobago (CBTT) issued CBDC (2018-2020) and stablecoins (2021).<sup>5</sup> Figure 1 depicts the spread of digital money (showing major global CBDC projects, stablecoins and e-money issuers) as at September 2024. For policymakers, this ever-changing financial landscape presents both opportunities and challenges. Thus, this paper seeks to understand the implications for the domestic monetary system of these growing and diverse forms of money.

**Figure 1: Global Spread Digital Money**



Sources: Atlantic Council (2024), Forbes (2024) and Bank for International Settlements (2024)

Note: As at September 2024.

<sup>1</sup> See Appendix.

<sup>2</sup> A form of digital currency that enables electronic transactions. According to Global Market Insights (2023), digital payments relate to money transferred or financial transactions conducted electronically without the need for physical cash or traditional payment methods, involving the use of digital technologies and online platforms to be authorised, authenticated, and processed.

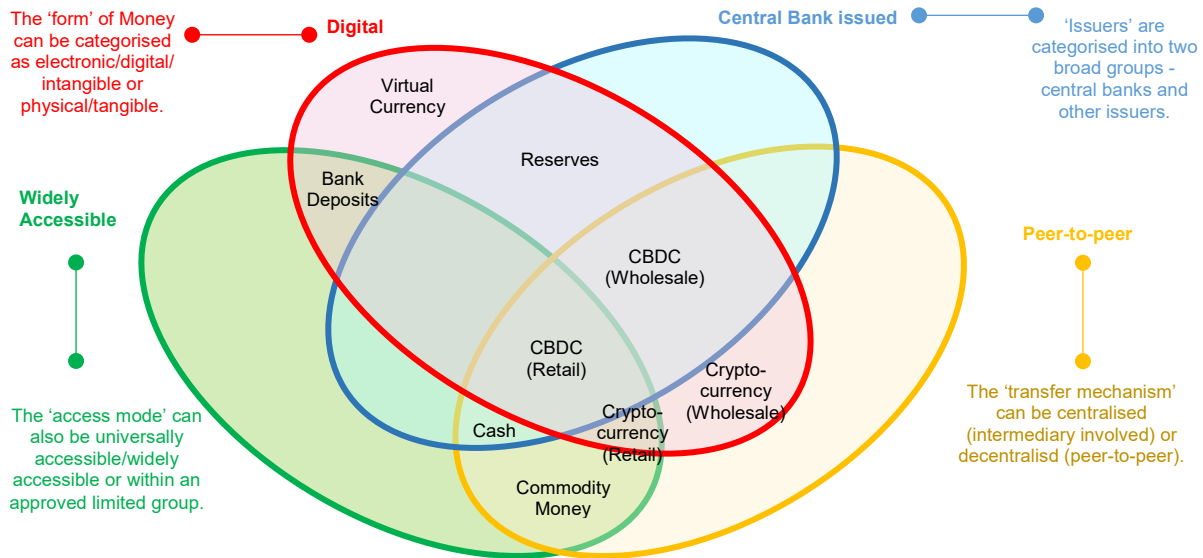
<sup>3</sup> The Bahamas, Jamaica, and Nigeria IMF (2023) and Bank for International Settlements (2024).

<sup>4</sup> Kosse and Mattei (2023); Forbes Media LLC (2023)

<sup>5</sup> Thomas and Harrypersad (2018), Thomas (2020), and Garcia-Singh, Thomas and Persad (2021).

Since its inception, money has taken many forms but has maintained three overarching attributes — a medium of exchange, a store of value, and a unit of account. Over time, its ability to perform these three tasks has evolved. Initially, money was often issued by governments and took physical forms like notes and coins, which were easily recognisable and accessible to the public. As commerce expanded, the need for more efficient transfer mechanisms led to the development of financial intermediaries, cheques, and electronic transfers. Thus, with the advent of digital money, the concept of money was further transformed, enabling instantaneous transactions that bypass traditional banking intermediaries. Unlike traditional money, which relies on physical representation and centralised issuance, digital money is often decentralised and can exist solely in virtual form, offering new dimensions of accessibility and transferability. The Bank for International Settlements' taxonomy of money is useful in depicting dynamic framework of money, showcasing the key elements that have changed as money evolved. According to Bech and Garratt (2017) and BIS (2017), four key properties (issuer, form, the scope of accessibility, and transfer mechanism) are used to classify money, see **Figure 2**.

**Figure 2: Taxonomy of Money**



Sources: Adapted from Bech and Garratt (2017) and Bank for International Settlements (2017)

Therefore, broadly, two forms of money exist in an economy: public money (central bank money) and private money (bank money, e-money and investment money). As of 2024, the list of digital money of top concern by policymakers include CBDC (a digital form of public money that is centralised and regulated)<sup>6</sup>; electronic money (known as e-money, a digital form of private money that represents stored monetary value pegged to a currency)<sup>7</sup>; and cryptocurrency (a digital form of private money that can be centralised, decentralised or both, and unregulated). Non-fixed price cryptocurrencies, in particular, pose significant macro-financial stability concerns such as price volatility and growing interconnections with traditional markets. In contrast, CBDCs, e-money and fixed-price cryptocurrencies (known as stablecoins) are more likely to co-exist as part of the traditional financial system, mitigating some concerns about their existence. Given the anticipated rise in CBDCs in the short-to-medium term (especially by key trading partners), the ongoing registration of e-money issuers in Trinidad and Tobago, and the growth of stablecoins make a compelling case for evaluating their potential impact on the local monetary system.

<sup>6</sup> The wholesale variant of CBDC limits its use to financial institutions and markets (e.g. reserves), as opposed to the retail variant of CBDC that can be used by the general public (e.g. cash).

<sup>7</sup> Available via a legally established e-money issuer.

Innovations in digital money have also raised critical questions regarding monetary policy transmission mechanisms and the effectiveness of conventional policy tools. For policymakers, having multiple digital currencies in circulation could pose several risks to the traditional concept of a single, unified form of money. Issues such as the possible fragmentation of the monetary landscape and regulatory challenges may complicate the payments system, reduce the dominance of a single currency, undermine the stability and trust in a singular monetary system and affect the effectiveness of central banks' control over the money supply. Consequently, given its potential to disrupt financial systems and influence key aspects of economic management and policymaking, an updated perspective on the potential impact of digital money on domestic monetary policy is crucial. Recognising data constraints, this study adopts a theoretical approach, utilising the Mundell-Fleming framework to examine the potential impact of digital money on the transmission of domestic monetary policy.

The discussion continues by reviewing the research on digital money in **Section 2**. **Section 3** discusses conduct of monetary policy in Trinidad and Tobago. **Section 4** provides a theoretical exploration of the impact of digital money on monetary policy in the domestic economy anchored by the Mundell-Fleming framework. Sections **5** and **6** follow with key domestic monetary policy implications of digital money and a summary of key findings and recommendations, respectively.

## Literature Review

In recent years, the rise of digital money has transformed the financial landscape, prompting significant interest among policymakers. For monetary policy, achieving objectives such as price stability, economic growth, and financial stability are attained by employing various instruments to influence the money supply and stabilise the economy. However, the introduction of digital currencies could complicate these mechanisms, as it has the ability to alter the velocity of transactions, reshape consumer behaviour, and disrupt traditional roles in the financial system. This section thus aims to examine both the opportunities and challenges presented by digital currencies in the context of contemporary monetary policy.

Changes in money demand and supply are critical in informing monetary analysis in policymaking, according to Masuch et al. (2003). Alterations to the composition and amount of monetary aggregates<sup>8</sup> in an economy affects money management and credit control. Hence, the degree to which new money can affect the money supply (that is, the total amount of cash and cash equivalents in circulation in an economy) varies by its type, its use and adoption (Assenmacher 2020). Thus, a further consequence is its ability to alter policy transmission channels.

Commonly cited areas impacted by money are liquidity, growth, credit and inflation — key factors in monetary analysis (Khalaf 2018 and Masuch et al. 2003). Highly liquid, readily accessible monetary aggregates are classified as narrow money<sup>9</sup> and less-liquid forms are classified as broad money<sup>10</sup>. CBDCs offer fixed-value redemptions (full convertibility), providing a highly liquid, reliable store of value that has the ability to become a policy instrument (Yang and Zhou 2022).<sup>11</sup> However, although other forms of private digital money, such as cryptocurrencies, are media of exchange, their purchasing power can be easily compromised over time (variable-value redemptions) [Xu and Yang

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<sup>8</sup> Monetary aggregates include the accumulation of currency in the hands of the public, money on demand via deposits and assets earning a return.

<sup>9</sup> Paper money and coin in active circulation, demand deposits and travellers' checks.

<sup>10</sup> Comprises of narrow money plus saving and other longer-term deposits.

<sup>11</sup> See Appendix .

(2023) and Adrian and Mancini-Griffoli (2021)]. Hence, the facilitation of transactions and preservation of value would be reflected and affected by the level of liquidity (readiness as a medium of exchange) and purchasing power (reliable store of value) of a specific type of money — key components in monetary analysis.<sup>12</sup> Consequently, the ability to (or inability to) act and/or assist as a policy instrument is likely to affect policy objectives such as growth and inflation.

Other aspects that determined the impact of new forms of digital money on policy relate to the issuer(s) of money, its accessibility, and its interest-bearing capability.<sup>13</sup> Given the mechanics behind monetary policy,<sup>14</sup> the number and type of money issuers could impact policy transmission and financial stability. According to Xu and Yang (2023), central bank money bears no default risk and is a key instrument used in stimulating economic growth, as it is a regulated media of exchange. Additionally, Yang and Zhou (2022) mention that centralised distribution (single issuer) strengthens monetary policy transmission, as it acts as a tool for monetary policy. In contrast, privately-issued monetary instruments carry risks (namely credit risks) and may negatively affect the speed and magnitude of policy transmission. However, this impact depends on its widespread use and adoption, underscoring the importance of accessibility, another key design aspect.

Accessibility (universal or restricted access) determines the scale of disruptiveness. Restricted access (wholesale use) has been discussed as less disruptive than universally accessible options (retail use). Cases favouring the latter are generally aligned to achieving financial inclusion — for example, retail CBDC and regulated e-money have been geared towards reducing the size of the unbanked population<sup>15</sup>. However, a shift in the velocity of money has also been cited as a drawback of retail CBDCs and cryptocurrencies, as it has been linked to destabilising the relationship between money and inflation (Lukonga 2023).

Increased financial pressures on bank intermediaries (due to deposit disintermediation) is another frequently raised concern. CBDC has been a popular tool linked to this fallout being a close substitute for traditional low-interest deposits. In the static partial equilibrium model<sup>16</sup> (**Figure 3**), depending on the specific features,<sup>17</sup> the introduction of CBDCs draws deposits away from banks, leading to a leftward shift in the deposit supply curve. Commercial banks can counter some of the decline in the deposit base by increasing deposit interest rates. However, this response depends on the demand for CBDC. Additionally, central banks exploring CBDC can consider precautionary design features such as holding and transaction limits, and tiering of interest rates (Das et al 2023).

The greater the demand for CBDC, the larger the disintermediation impact and the smaller the counter-response of an increase in the deposit interest rate. Notably, the attractiveness of a CBDC is often predicated on its structure and remuneration. Despite this, in theory, an interest-bearing CBDC could improve monetary policy transmission by allowing non-linear transfers and more direct implementation, in addition to strengthening interest rates and bank lending channels through increased competition for bank deposit funding [Davoodalhosseini et al. (2020) and Das et al. (2023)]. Furthermore, variations in design could reduce and/or eliminate disintermediation risks, including two-tiered distribution systems and wholesale options.

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<sup>12</sup> Lim and Sriram (2003), and Cartas and Harutyunya (2017).

<sup>13</sup> Meaning, Dyson, Barker, and Clayton (2021); Lukonga (2023); Griffoli et al. (2018); Garcia-Singh, Thomas and Persad (2021); and Assenmacher (2020).

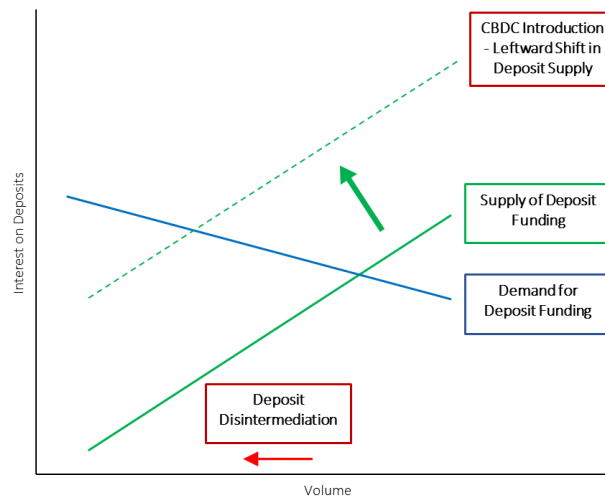
<sup>14</sup> Curry and Adams (2023), (European Central Bank (2015).

<sup>15</sup> Garrido and Nolte (2021).

<sup>16</sup> Adapted from Das et al (2023) and Mancini et al (2018).

<sup>17</sup> Das et al (2023) explain that the attractiveness of CBDCs relative to that of deposits would likely depend on features such as perceived safety, ease of access, convenience, technological innovation, cost, and privacy.

**Figure 3: Static Partial Equilibrium Model–Based Analysis of Bank Disintermediation**



Sources: Authors, Adapted from Das et al (2023), and Mancini et al (2018).

On the other hand, introducing a non-remunerated CBDC is unlikely to result in a significant decline in the deposit base. According to Li (2023) and Das et al. (2023), demand for existing unremunerated “e-money” has generally been low, while adoption has been slow and limited. The authors also indicated that banks with more market power (reflected by a steeper demand for deposit curve) can better insulate their deposit base, while banks with less market power are likely to exhibit larger deposit base contractions. In the domestic setting, the banking system is considered the primary source of financial products and services. Consequently, it can be safely assumed that domestic banks with systemic importance have relatively high market power and would be less impacted.

Moreover, other concerns cited include liquidity management challenges due to increases in privately-issued money operating outside of the traditional banking system, higher capital flow volatility and operational risks.<sup>18</sup> According to the literature,<sup>19</sup> the bank lending/funding channel, interest rate channel and balance sheet channel were the most referenced monetary policy transmission channels that would be affected by the digital money innovations.

Notably, the impact of these newer forms of money continues to vary by type. Theoretically, consequences are material, especially for those that are close substitutes to traditional money. However, given the low adoption and use of these newer forms of money, no material fallouts have been mentioned. For CBDCs, the uptake has been low for jurisdictions that have launched (less than 1 per cent of narrow money) despite the growth seen in pilot projects and research. According to Dowd (2024), experience suggests that the low public demand for CBDC is the lack of tangible benefits that existing alternatives cannot already deliver. Furthermore, Ree (2023) explains that despite a notable growth in digitalisation, the slow uptake of the Nigerian CBDC (eNaira) is largely due to the phased approach which initially placed restrictions on access and usage. Although the eNaira is legal tender, its acceptance cannot be imposed on the public. Authorities will require a coordinated policy drive to overcome the low adoption levels and effectively compete with established mobile money networks that provide the same service at the retail level. For private cryptocurrencies, though a medium of exchange, are not a widely accepted means of payment. Stablecoins, in particular, have not been able to scale successfully (roughly 6 per cent of the value of US currency in circulation

<sup>18</sup> Griffoli, et al. (2018); Financial Stability Board (2019); Meaning, Dyson, Barker, and Clayton (2021); Lukonga (2023); and Xu and Yang (2023).

<sup>19</sup> Mishkin (1996); European Central Bank (2024); and Huang et al. (2024).

as of 2023) and have had multiple crashes weakening confidence. Regarding regulation, it is similarly in a nascent stage.

Given that newer digital payment methods are still in their infancy stages, in the absence of data theoretical assessments can provide insights into their impact on policy. While many central banks have published research on CBDCs and some have launched their own (in an attempt to provide digital central bank money), quantitative analysis using empirical data is still very limited due to the small number of countries that have issued CBDCs and the length of time CBDCs have been in production. Similarly, in the local case the uptake of e-money is low. As such, the impact of digital money on monetary policy is confined to a theoretical assessment. By making appropriate assumptions on the structure and usage of digital money<sup>20</sup>, various scenarios can be explored to evaluate the impact on the monetary system and economy. Based on the literature the Mundell-Fleming framework emerged as a useful approach.

The Mundell-Fleming model, also known as the IS-LM-BP framework, integrates various facets of a small-open economy into a unified analytical framework describing the interactions between exchange rates, interest rates, and output. Using the Mundell-Fleming framework the dynamics of the goods market (IS curve), money market (LM curve), and foreign exchange market (BP curve) can be assessed, as the framework allows for a nuanced analysis of how digital currencies might alter the effectiveness and reach of traditional monetary policy instruments. For example, using the Mundell-Fleming framework, Enajero (2021) determined that cryptocurrencies can impact money demand, monetary policies, and income in economies with high cryptocurrency circulations. While research on digital currencies and monetary policy is still emerging, the principles and insights from the Mundell-Fleming framework are highly relevant for understanding the broader macroeconomic impacts. This includes understanding the potential to influence monetary policy effectiveness, exchange rate stability, and capital flow dynamics.

Despite its ability to integrate various facets of an economy, the IS-LM-BP framework has some limitations. Brunner and Meltzer (1993, 1972, and 1971) explain that the IS-LM model is constrained by its reliance on a single portfolio equation that represents all asset markets, and its implicit assumption about asset substitution. Furthermore, the authors suggest that the IS-LM model fails to integrate credit market dynamics, limiting its ability to analyse the transmission of shocks. Nonetheless, in the absence of an empirical assessment, the IS-LM-BP framework can offer a concise lens to evaluate how the adoption of digital currencies may affect the money supply, interest rates, and monetary policy transmission.

## Stylised Facts

Domestically, the conduct of monetary policy prioritises the management of inflation, the foreign exchange market, and international reserves. Empowered by the Central Bank Act of 1964, CBTT's monetary policy decisions have been guided by economic activity, fiscal operations, external stability and the operations of financial institutions. The ability to exact this control is also facilitated by the oversight and regulation of the National Payments System (NPS). Hence, the management of the money supply plays an important role in monetary policymaking.

For many years, the instruments of monetary policy were administratively determined.<sup>21</sup> Pre-trade and financial liberalisation, reserve requirements (a percentage of prescribed liabilities held at CBTT), selective credit and interest

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<sup>20</sup> For this analysis, digital currency and digital money are used interchangeably and it is assumed that the digital variations of money selected for review are widely used and adopted.

<sup>21</sup> Lindgren (1991).



rate controls<sup>22</sup> and directed lending were used. Post-liberalisation, the domestic monetary policy framework was amended, replacing direct monetary controls with more indirect or market-determined controls. Interest rates and credit were liberalised, while reserve requirements<sup>23</sup> remained, and a tool to alter financial system liquidity levels called open market operations (OMOs)<sup>24</sup>, and an overnight financing rate for commercial banks to meet their liquidity requirements – the Repurchase rate (Repo Rate) were introduced.

Using the instruments, the transmission of monetary policy can be summarised in two stages: (1) policy changes affect interest rates in the economy, and (2) changes to interest rates affect economic activity and inflation. However, the transmission is more complex and involves a variety of transmission channels. Hence, effective monetary policy transmission hinges on CBTT's ability to control the money supply, achieved through adjustments to the reserve requirement, OMOs, and the Repo rate. Strategic changes to the policy rate have been made to signal the monetary policy stance, regulate the money supply, and influence lending rates throughout the economy. However, achieving all objectives simultaneously is challenging due to trade-offs. These trade-offs are highlighted by the monetary policy trilemma, which underscores the impossibility of simultaneously maintaining independent monetary policy, a fixed exchange rate, and free capital mobility (Blinder 1998). In the context of Trinidad and Tobago's managed float exchange rate regime and free capital flows, there are constraints on the CBTT's ability to effectively utilise its policy interest rate (CBTT 2019).

The NPS also experienced transformations, changing the money supply. In September 1994, October 2004 and in June 2005, the LINX<sup>25</sup>, real-time gross settlement (RTGS)<sup>26</sup> system and automated clearing house (ACH)<sup>27</sup>, respectively, were introduced. Changes also occurred with the modernisation and/or digitisation of certain services, especially during and after the global novel coronavirus pandemic. In the private sector, among the many innovations include the broadening of online banking services, mobile banking (including the creation of a mobile wallet by a large commercial bank, called EndCash) and other e-money services.<sup>28</sup> In the public sector, changes such as faster electronic payments to civil servants, the introduction point-of-sale (POS) terminals at selected Government agencies, GovPayTT, CourtPay and a new electronic cheque clearing system occurred. Most NPS innovations, specifically changes in the retail payment ecosystem, have been bank-centric, thus are captured in bank deposits.<sup>29</sup> As a result, these innovations have not materially changed the composition of the money supply (**Figure 4, Panel A**). Meanwhile, the velocity of money (ratio of total spending to the money stock) has kept an uptrend. The gradual pickup in non-cash-related transactions<sup>30</sup>, driven by the many NPS innovations over time, is likely a main contributor for the steady trend in the velocity of money as well as the COVID-19 pandemic period which observed an acceleration in the use of touchless payment instruments (**Figure 4, Panel B**). Hence, the effectiveness of monetary policy transmission has not been materially affected by the addition of domestic e-money and mobile money.

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<sup>22</sup> Hilaire (2000), Central Bank of Trinidad and Tobago (2005), Central Bank of Trinidad and Tobago (2016), and Roberts (2012).

<sup>23</sup> The primary reserve requirement dictates the percentage of prescribed liabilities for all licensed bank and non-bank financial institutions.

<sup>24</sup> OMOs involve the sales and purchases of short-term Treasury bills and notes to commercial banks in order control financial system liquidity. In addition to altering liquidity levels in the financial system, this tool is used as a periodic intervention in the local foreign exchange market to ensure market supply stability.

<sup>25</sup> The network continued to expand as in 2007 Eastern Credit Union also joined the network.

<sup>26</sup> CBTT RTGS facilitates wholesale funding.

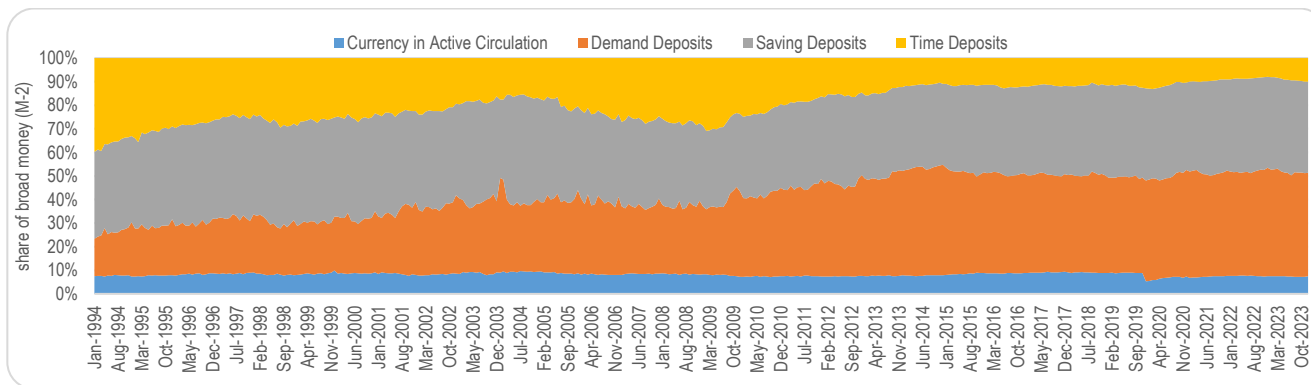
<sup>27</sup> Trinidad and Tobago Interbank Payments System.

<sup>28</sup> Three E-Money Issuers (EMIs) were registered and approved by the CBTT in October 2023, PayWise (live), PESH (live), TSTT PAYPR (inactive), and one E-Money Issuance Service was approved in March 2021, EndCash (CBTT 2023).

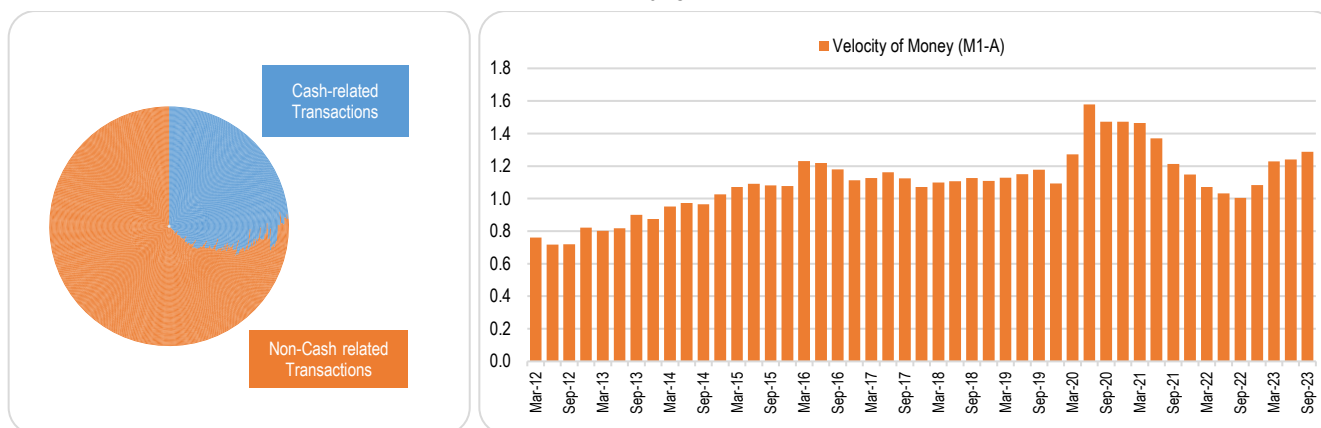
<sup>29</sup> Bank deposits have on average accounted for roughly 90 per cent since 1994 to present.

<sup>30</sup> For the purpose of this paper non-cash related transaction refer to transactions via ATMs, internet banking, telephone banking, and the RTGS and ACH systems.

**Figure 4 Money Supply Dynamics**  
**Panel A**



**Panel B**



Source: Central Bank of Trinidad and Tobago

## Theoretical Analysis of Digital Money and Monetary Policy using the Mundell-Fleming Framework

### The Mundell-Fleming Model of Digital Money and its Implications for Monetary Policy

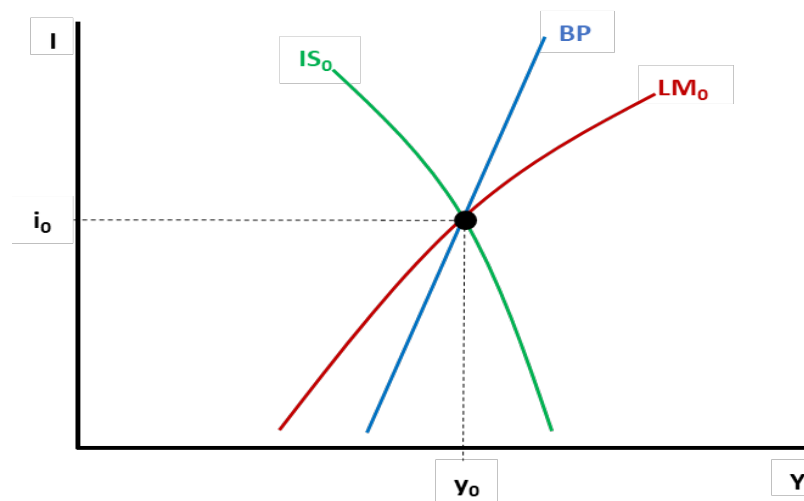
Using the Mundell-Fleming framework to understand the theoretical implications of digital money (namely, retail CBDC, e-money and fixed-priced cryptocurrency) on the transmission mechanism of domestic monetary policy will be considered in this section. CBDCs, e-money, and cryptocurrencies each affect the transmission of monetary policy in distinct ways. A widely accessible CBDC can serve as an instrument of central bank policy, potentially influencing interest rate transmission and banking intermediation. E-money, typically based on digital wallets linked to bank accounts can also affect monetary policy transmission by facilitating faster payments. However, stablecoins pegged to a major foreign currency introduces different dynamics by creating currency substitution and disintermediation risks which may significantly hinder monetary policy transmission.<sup>31</sup> Hence, by encompassing the dynamics of the goods market (IS curve), the money market (LM curve), and the foreign exchange market (BP curve), theoretically-based scenarios are constructed to assess the impact of these digital currencies on the domestic monetary system. First, retail CBDCs will be investigated based on two different remuneration scenarios. Subsequently, the potential monetary policy implications of EMIs will be explored in two situations. Last, a brief analysis of the potential impact of non-CBDC cryptocurrencies is investigated.

<sup>31</sup> Although fiat-backed stablecoins fall outside the bounds of domestic monetary policy its impact on policy transmission is worthy of inclusion in the analysis.

**Figure 5** shows the Mundell-Fleming framework, reflecting the conditions of the domestic economy, denoted by  $IS_0$ ,  $LM_0$ , and  $BP$ . For small open economies such as Trinidad and Tobago, the IS curve is downward-sloping and likely steep. This reflects conditions where changes to interest rates have a relatively small or unresponsive effect on the level of output in the short-run. In the domestic setting, this is likely due to a limited domestic production base, high marginal propensity to import, low interest elasticity of investment, and moderate marginal propensity to consume, rendering the effect of interest rate changes relatively muted. Additionally, fiscal leakages related to a lower impact of fiscal expansion on aggregate demand can result in a steeper IS curve.

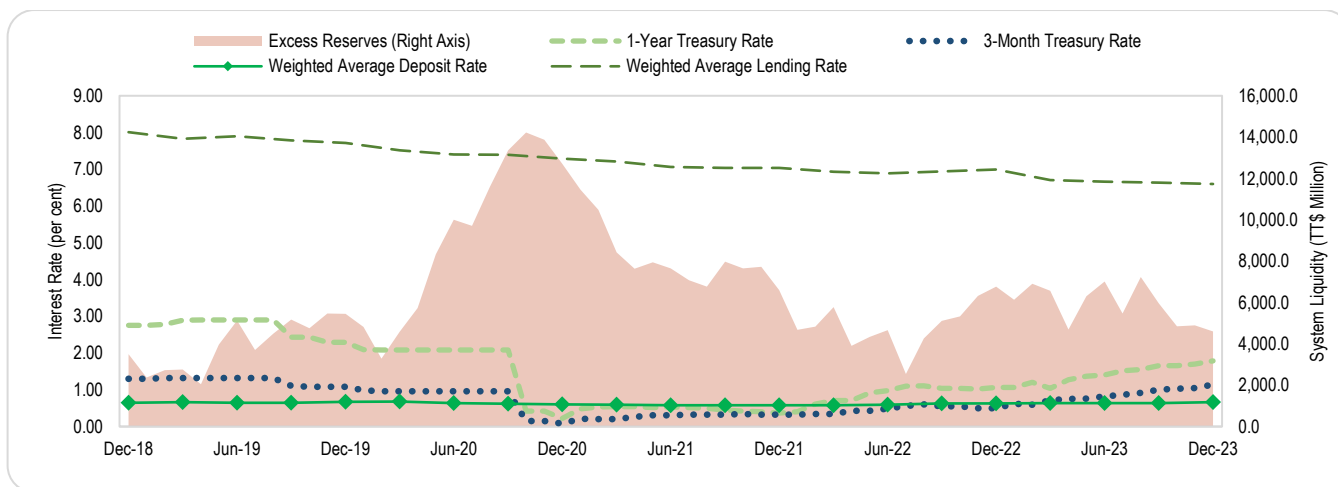
In the domestic context, the LM curve also tends to be steep, indicating a low sensitivity of interest rates to changes in the money supply. This dynamic can be observed in the relationship between commercial bank excess reserves and domestic interest rates. While short-term treasury rates respond strongly to variations in excess reserves, other crucial interest rates, such as lending and deposit rates, typically respond with less intensity and with a delay (**Figure 6**). Given that the domestic banking system typically held substantial excess reserves (up to 2023), fluctuations in the money supply are likely to have a diminished impact on lending rates. Additionally, the flat LM curve can be attributed to liquidity trap conditions<sup>32</sup> within the domestic financial system. This occurs when elevated excess liquidity and corresponding lower interest rates have a limited effect on aggregate investment and output.

**Figure 5: IS-LM-BP Framework**



<sup>32</sup> Keynes (1936) liquidity preference theory explains that expansionary monetary policy is powerless in affecting an already low interest rate, and therefore limited in stimulating economic growth.

**Figure 6 Commercial Banking System Excess Liquidity and Selected Interest Rates**



Source: Central Bank of Trinidad and Tobago

The BP curve, which relates to the balance of payments (BOP) equilibrium, is considered to be steep in the domestic case, due to limited capital mobility and foreign exchange market related dynamics. The shape of the BP curve could be partly attributed to cross-border portfolio flows being impacted by the scarcity of foreign currency, leading to low capital mobility. However, substantial activity in the financial account due to direct investment and other investment sub-categories largely related to energy company transactions somewhat counters this assertion. On the other hand, these energy sector related investment categories are largely unaffected by domestic interest rate changes. Additionally, the moderate marginal propensity to consume and high propensity to import consistently places significant outflow pressures on the BOP; however, these transactions are also largely unaffected by domestic interest rate changes. Although BOP imbalances can be corrected via exchange rate movements, Trinidad and Tobago’s managed exchange rate regime typically requires foreign exchange market interventions by the CBTT to stabilise exchange rate pressures.

Introducing a Retail Central Bank Digital Currency (CBDC)

Key determinants of the impact of introducing a retail CBDC on domestic monetary policy relate to the chosen distribution structure (direct or indirect), and the chosen remuneration structure. A direct CBDC operates as a single-tier system, representing a legal claim on the CBTT, which both issues and distributes the CBDC directly to the public.<sup>33</sup> This system allows CBTT to manage liquidity more effectively by responding immediately to shocks, although it increases the risk of bank disintermediation.<sup>34</sup> In contrast, an indirect CBDC represents a legal claim on an intermediary (with claims backed one-to-one with central bank money) which is responsible for enrolling users and managing transactions.<sup>35</sup> This structure supports deposit stability, and can preserve traditional monetary policy transmission channels. However, this would only lessen the risk of banking system disruption.

Regarding remuneration, the chosen structure of a CBDC can affect the effectiveness of the monetary transmission. Remunerated CBDC can enhance the effectiveness of CBTT’s interest rate policy in both distribution structures, by influencing spending and saving behaviour. However, in the case of a direct distribution structure, it may also reduce

<sup>33</sup> CBTT would manage customer accounts and retail payments.

<sup>34</sup> The Reserve Bank of India (RBI) (2022) cautions that a retail CBDC is designed for disintermediation and has the potential to disrupt the financial system, and if implemented via a direct channel, the CBDC has the potential to marginalise private sector involvement and hinder payment system innovation.

<sup>35</sup> CBTT would manages wholesale accounts, while intermediaries manage customer accounts and retail payments.

the effectiveness of the banking system's credit and savings channel. Conversely, a non-remunerated CBDC is less likely to compete with bank deposits, but if widely adopted, it could still weaken monetary policy transmission by shifting funds away from banks under a direct distribution structure.

Note the following scenarios assume that economic agents have a strong preference for retail CBDC over cash,<sup>36</sup> driven by factors such as convenience, accessibility, and security. It is also assumed that the CBDC design lacks specific features<sup>37</sup> to mitigate the impacts discussed. Furthermore, the analysis focuses on a direct distribution retail CBDC, as this is considered to potentially be the most disruptive.

### Non-Remunerated Retail CBDC

A directly-distributed retail CBDC, operating without an interest rate component, functions similarly to cash in digital form, providing a secure, accessible medium for transactions. However, if widely adopted, this could lead to significant bank disintermediation as individuals may shift deposits away from commercial banks. This shift could reduce banks' deposit base, limiting their lending capacity and potentially weakening the traditional credit channels of monetary policy transmission.

Assuming domestic economic agents hold a significant volume of the non-interest-bearing CBDC, CBTT's interest rate policy will be less effective in influencing spending and investment decisions. Without an interest component, the CBDC would not respond directly to policy rate changes, reducing the CBTT's leverage over demand for money. In this case, the significant adoption of a non-interest-bearing CBDC (an addition to traditional fiat currency in circulation but a substitute to cash and bank money) would impose a low interest elasticity of money demand and further steepen the LM curve.<sup>38</sup> This is especially critical in the case of monetary accommodation and a lowering of the CBTT's policy rate (Repo rate). The non-remunerated CBDC, coupled with an assumed reduction in the demand for traditional narrow money, would require the CBTT to significantly lower rates and increase money supply to induce a small uptick in output. Consequently, the CBTT will have to allow Treasuries to mature via OMOs and/or reduce the reserve requirement to build sufficient system liquidity.

However, due to the low sensitivity of interest rates, lending and deposit rates may not respond quickly to the policy adjustment. As a result, monetary accommodation is unlikely to have the desired effect on investment and output under the conditions of a high demand for a non-interest-bearing CBDC, low domestic interest rates, and in the presence of a liquidity trap. In this setting, the demand for the CBDC reduces the responsiveness of money demand to rate changes, and low rates further weakening the impact of additional monetary stimulus. Under these circumstances, monetary expansion by CBTT shifts the money market (LM) curve to the right (**A**) from  $LM_0$  to  $LM_1$ , resulting in a decline in interest rates from  $i_0$  to  $i_1$ , and output increasing slightly from  $y_0$  to  $y_1$  (**Figure 7**). In the event of a significant downturn in economic conditions, the central bank might be compelled to consider negative rates to stimulate the economy. However, this approach is unlikely given domestic foreign exchange market constraints, and its untested effectiveness can be unfavourable if implemented.

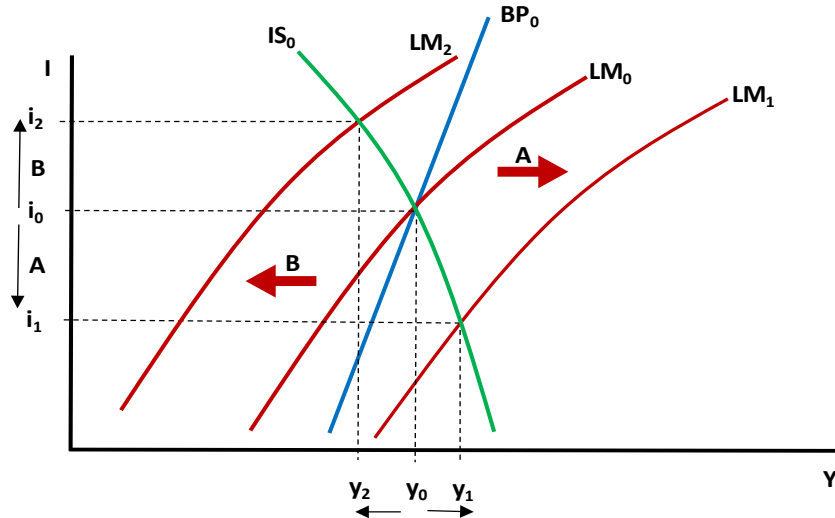
<sup>36</sup> The cash-like features of a CBDC enables the digital currency to be used for routine transactions, it is recognised as legal tender, and exchangeable at par (Mohammed et al (2022) and Kulkarni (2022)). Additionally, an unremunerated CBDC can be a good substitute for traditional low-interest deposits if the CBDC has little to no fee structure, while the commercial bank deposits may charge higher account management fees (Lukonga 2023).

<sup>37</sup> Design features such as holding, transaction, transfer and conversion limits and interoperability characteristics.

<sup>38</sup> The assumption of a high preference for a non-interest-bearing CBDC results in a steep LM curve as the demand for money, or in this case CBDC, is relatively insensitive to changes in interest rates. The Keynesian liquidity preference theory suggests that if economic agents hold a significant amount of money for transactional utility rather than speculative purposes or yield, their demand for money is less influenced by interest rates. Consequently, an increase in income would require a large shift in interest rates in order to maintain money market equilibrium.

Additionally, under this scenario, increased holdings of the non-remunerated CBDC would impact the composition of economic agents' financial assets. A larger allocation of CBDC compared to traditional low-interest-bearing commercial bank deposits could potentially impact the stability of the banking system. A lower deposit base would reduce the effectiveness of traditional bank lending, and negatively impact the credit channel of domestic monetary policy. Furthermore, this shift could influence the behaviour of traditional monetary aggregates, affecting the velocity of money, as the frequency of transactions using traditional bank deposits declines.

**Figure 7: IS-LM-BP Framework – Impact of a Non-Remunerated CBDC**



Source: Authors.

In this scenario, changes to the LM curve can also affect the investment and savings (IS) curve and balance of payment (BP) curve. The lower interest rates brought on by the rightward shift in the LM curve could result in a reduced level of savings, further and apart from the effect of a significant adoption in the non-interest-bearing CBDC. Although the domestic IS curve is considered steep, a small reduction in interest rates can still induce an increase in consumption and imports, shifting the IS curve to the right. Despite a positive effect on output, resulting inflationary pressures (both demand and import driven), can encourage the CBTT to tighten conditions to maintain stability. This would, therefore, counter the desired effect of monetary accommodation.

Additionally, lower domestic interest rates could generate adverse TT-US interest rate differentials, potentially resulting in adverse financial outflows. Although depreciation pressures would generally shift a BP curve to the right, any foreign exchange market pressures caused by this shift would necessitate CBTT intervention to stabilise the managed exchange rate. Additionally, conditions in the domestic foreign exchange system may limit the impact of financial outflows related to interest rate policy. Nevertheless, an extended period of financial outflows triggered by negative rate differentials may induce CBTT to reduce the pressures in the foreign exchange market. CBTT would undertake this by either increasing the reserve requirements, conducting OMOs to reduce system liquidity and increase Treasury rates or increase interventions depending on the stock of reserves.

Alternatively, if CBTT wishes to tighten financial conditions, a significant adoption of a non-remunerated CBDC could further delay monetary policy transmission and the responsiveness of economic agents. In this situation, rising interest rates impose an opportunity cost on holding CBDC, forcing agents to switch to an alternative interest-bearing monetary base to earn higher returns. However, assuming the condition of a low-interest elasticity of money demand,

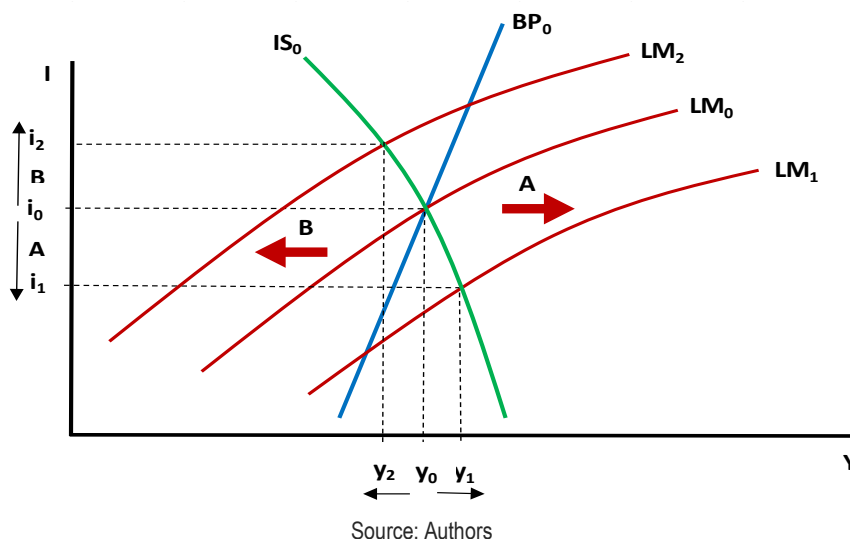
then economic agents may require a significant incentive to switch to a traditional monetary instrument. Consequently, CBTT would need to significantly reduce the money supply via OMO issues or an increase in the reserve requirement to shift the LM curve inward from  $LM_0$  to  $LM_2$  (**B**). These changes would result in interest rates increasing from  $i_0$  to  $i_2$ , and output falling by a small amount from  $y_0$  to  $y_2$  (**Figure 6**).

### Remunerated Retail CBDC

A retail remunerated CBDC that is directly distributed can enhance monetary policy transmission by enabling the central bank to influence economic behaviour directly through policy adjustments. As an interest-bearing alternative to cash and deposits, a remunerated CBDC strengthens the interest rate transmission channel. However, significant adoption of this type of CBDC can result in reducing commercial banks' deposit base, potentially constraining their lending capacity. Banks may need to increase deposit rates to retain funds, which could tighten credit conditions and counter accommodative policy positions. High adoption of a remunerated CBDC will therefore require CBTT to carefully manage rates to prevent volatility in deposits and protect bank stability. Consequently, while a remunerated CBDC offers additional monetary policy flexibility, it also demands careful balancing to limit disruptions in traditional banking systems. Choosing design additional features, such as holding and transaction limits, and/or a two-tiered distribution structure are ways to ensure banks retain a critical role in financial intermediation. Under an indirect distribution structure, in particular, intermediaries would manage CBDC accounts, preserving their role in deposit taking and lending. This model leverages existing financial infrastructure to enhance accessibility and reduced central bank's operational load. However, this will also limit the central bank's direct control over CBDC flows and interest rate transmission as intermediaries may influence adoption and transaction costs. Additionally, balancing CBDC interest rates with those of traditional deposits could complicate policy transmission, especially if banks adjust deposit rates in response to CBDC interest rates to retain funds.

Based on the IS-LM-BP framework, although the domestic characteristic of low interest rate sensitivity still applies, this scenario allows for a less steep LM curve (**Figure 8**). This would enable CBTT's monetary policy actions to have a more effective impact on economic objectives. Monetary policy accommodation and a lowering of interest rates will shift the LM curve to the right (**A**), impacting the value of money and influencing money demand. Considering that the traditional deposit base and CBDC are both interest-bearing, this should stimulate investment and consumption activity. Conversely, monetary policy tightening would increase the opportunity cost of consumption, encouraging an increase in savings. However, considering that an interest-bearing CBDC is essentially competing with commercial bank deposits, financial stability could be negatively impacted in the pursuit of monetary policy.

Figure 8: IS-LM-BP Framework – Impact of a Non-Remunerated CBDC



### Non-Central Bank Digital Currency

#### Electronic Money (E-Money)

A developing area within the Fintech space of the NPS is e-money. CBTT has developed a Fintech policy<sup>39</sup> to promote an environment that accommodates ongoing financial innovations while mitigating risks. Under the support of the Financial Institutions Act<sup>40</sup> and E-Money Issuer (EMI) Order<sup>41</sup> the addition of e-money is expected to (i) foster competition and encourage greater use and efficiency of e-payments and e-commerce, (ii) reduce the use of cash and cheque payments, and (iii) promote greater financial inclusion (CBTT 2024). In the domestic case, regulators<sup>42</sup> retain control over the overall system through Fintech policy. EMIs are required to register with CBTT, follow transactional limits and capital requirements, and “maintain a bank account for the purpose of conducting permissible activities”<sup>43</sup>. These rules allow CBTT to maintain oversight over EMIs.

In general, e-money systems can take two forms (linked to a regulated financial institution or privately-issued) with potentially different implications for monetary policy. This first form of e-money uses a digital wallet that is directly linked to a traditional bank account. In this system, the wallet holder authorises the EMI to access their bank account to fund the wallet. This method generally provides a seamless and direct transfer of funds. Therefore, e-money in this case is akin to bank money. Thus, the implications for monetary policy are limited as CBTT retains overall control of the monetary system. In this case, the impact on the Mundell-Fleming framework will be the same as the traditional banking system. Furthermore, this system provides CBTT with direct oversight, as transactions through the traditional financial system can be monitored and regulated. While we acknowledge that domestic uptake of e-money facilities has been slow, it is worthwhile to explore the implications of significant usage. In this case, the implications for monetary policy are essentially unaffected as there is no adoption of a non-traditional banking system currency. Within the Mundell-Fleming framework, this is shown as the baseline equilibrium point ( $IS_0$ ,  $LM_0$ , and  $BP_0$ ) (Figure 9). The

<sup>39</sup> CBTT (2024).

<sup>40</sup> Section 17(4) of the Financial Institutions Act, 2008 (FIA 2008) provides for other category of persons other than licensed financial institutions to issue electronic money.

<sup>41</sup> FIA 2008 Legal Supplement Part B – Vol.59 – The E-Money Issuer Order, 2020.

<sup>42</sup> The Central Bank, the Trinidad and Tobago Securities and Exchange Commission (TTSEC), and the Financial Intelligence Unit of Trinidad and Tobago (FIUTT).

<sup>43</sup> CBTT (2024)

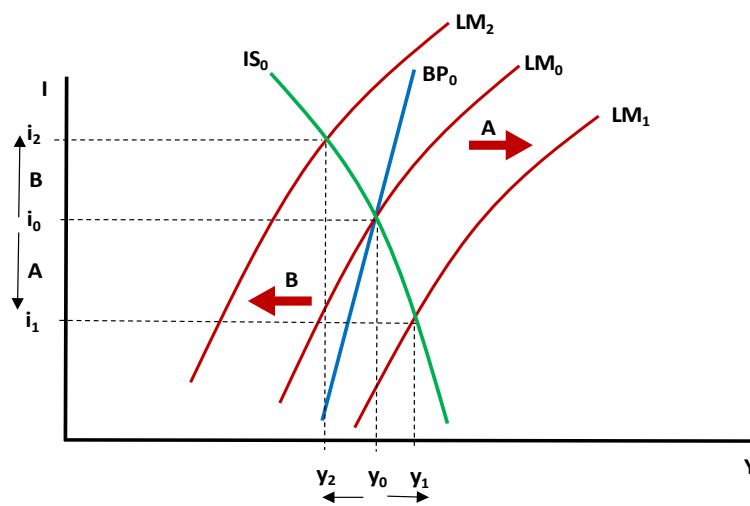


LM curve remains steep, reflecting the low sensitivity of interest rates to changes in the money supply. The IS curve is downward-sloping and steep, where interest rate changes have a relatively small effect on the level of output. While the BP curve is steep and almost vertical due to foreign exchange market conditions.

Conversely, the second is an e-money wallet that is funded by direct conversions of traditional fiat currency into non-central bank-issued forms of private e-money. Noting that wallet size and transfer limits do exist under this case, e-money systems such as this mostly operate outside of the regulated payments system, resulting in a more complex landscape with reduced central bank control. By limiting central banks' control, the influence of monetary policy actions and associated interest rate transmission mechanisms would be reduced. However, if the rules of the domestic EMI Order were not included and the uptake of the domestic e-money was substantial, then the likelihood of the implications discussed below materialising will increase.

The implications for the Mundell-Fleming Framework from this type of e-money is similar to the effect of non-interest-bearing CBDC. However, given its potentially decentralised operating environment, its effect on the framework could be more severe. Assuming a scenario where the adoption and usage of an e-money increases substantially, then a significant volume of bank deposits and cash can be potentially converted into these unregulated forms of private money. Although that this type of e-money will appeal more to the unbanked, there is merit in examining a potential bank-disintermediation scenario. Under this scenario, two conditions must be recognised. First, the traditional banking system could potentially lose a significant deposit base which would negatively impact the credit channel of monetary policy. Second, the lower deposit base and currency in active circulation could impact the behaviour of traditional monetary aggregates and the velocity of money.

Figure 9: IS-LM-BP Framework – Impact of E-Money



Source: Authors.

Significant<sup>44</sup> adoption of decentralised e-money could significantly hinder monetary policy operations. Similar to a non-interest-bearing CBDC, substantial usage of a decentralised e-money results in a steep LM curve as the demand for the e-currency is relatively insensitive to changes in interest rates. Under these conditions, accommodative monetary policy would be less impactful as the e-currency is not directly linked to policy interest rate. Consequently,

<sup>44</sup> Causing material changes to currency in active circulation and banks' deposit base.

CBTT would be required to significantly lower rates (shifting from  $LM_0$  to  $LM_1$ ) to induce a small uptick in output (**Figure 9**). Similar to the impact of a non-interest-bearing CBDC, this could potentially force a central bank to induce negative rates to stimulate the economy. However, such a situation is uncharted territory for Trinidad and Tobago and is unlikely to occur. While advanced economies can implement the use of alternative (unconventional) monetary policy tools,<sup>45</sup> the domestic monetary system is restricted by the monetary policy trilemma and an underdeveloped capital market.

Alternatively, under conditions of rising inflation and an overheating economy, the transmission of monetary policy tightening could be delayed further by the responsiveness of economic agents. Rising inflation reduces the purchasing power of e-money, while tighter financial conditions impose an opportunity cost on holding e-money. Ideally, economic agents would be encouraged to switch to a traditional interest-bearing monetary instrument in order to benefit from higher returns. However, in light of the low-interest elasticity of money demand condition, economic agents would require a significant incentive to switch to a traditional monetary instrument. Consequently, to have the desired economic impact, a sufficient reduction in the money supply using OMOs and direct policy actions would be required to increase interest rates, and encourage a switch to the traditional monetary base.

### Cryptocurrency

For purposes of this analysis, cryptocurrencies are assumed to be issued and managed by systems outside of the control or regulation of the domestic monetary authority. It should be noted that the Government of the Republic of Trinidad and Tobago has indicated that they will not support their adoption due to potential risks related to macro-financial stability, volatility, and criminal activity. As such, this analysis is a purely theoretical. Additionally, the analysis ignores the intrinsic asset price volatility exhibited by these currencies and assumes price stability, a stable conversion rate, and a non-interest-bearing characteristic.

The most likely scenario would involve the adoption of a non-CBDC that is issued externally, and used for domestic and international transactional purposes. If domestic economic agents demand a significant volume of this digital currency, this would result in a notable increase in demand for foreign currency and significant depreciation pressures on domestic currency. Given that the domestic foreign exchange system is a tightly managed float, CBTT would be required to supply the market with foreign currency from reserves to offset the net sales gap. While this helps to stabilise the exchange rate target, it also depletes CBTT's foreign currency reserves.

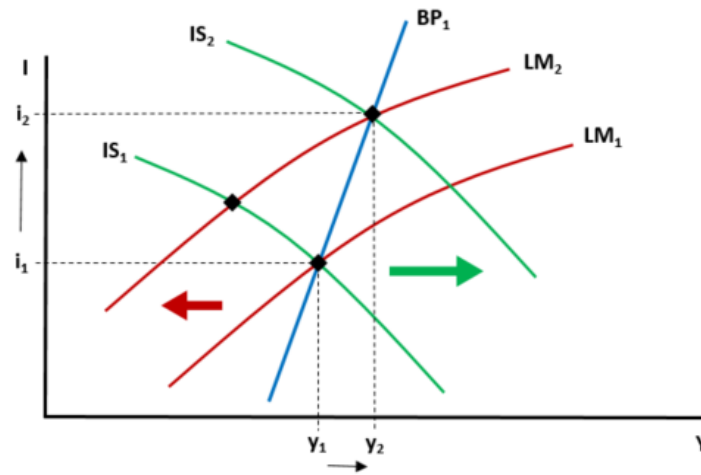
Consequently, the foreign currency demand driven by the adoption of an external cryptocurrency results in BOP pressures primarily within the financial account. The conversion of domestic currency to foreign currency, and the subsequent purchase of the cryptocurrency on the international market, leads to significant capital outflows recorded in the financial account. Historically, Trinidad and Tobago's overall BOP position has recorded deficits, which primarily stem from net outflows occurring in the financial account. A significant adoption of an external cryptocurrency would increase the outflows in the financial account and exacerbate any BOP deficit.

Within the Mundell-Fleming framework, these market pressures would result in system disequilibrium. The worsening BOP position pressures the BP curve to steepen and shift, however, due to the managed exchange rate and central bank interventions, the BP curve does not shift to the right (**Figure 10**). However, CBTT interventions result in the indirect sterilisation of domestic currency and a reduction in the money supply. This shifts the LM curve inward from  $LM_1$  to  $LM_2$ , resulting in higher interest rates and lower aggregate output, in addition to disequilibrium in the system.

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<sup>45</sup> Such as asset purchase programs, quantitative easing, negative interest rates, or even yield curve control.

Figure 10: IS-LM-BP Framework – Impact of a Non-CBDC Cryptocurrency



Source: Authors.


The system disequilibrium illustrates the policy trade-off between maintaining the exchange rate and domestic economic stability. This scenario underscores the delicate balance required to maintain economic stability and the potential vulnerabilities of a tightly managed exchange rate system in the presence of large capital movements. Consequently, in order to return to system equilibrium and increase domestic output, the government would need to undertake expansionary policies. A combination of increasing fiscal expenditure and tax cuts will raise aggregate demand and shift the IS curve to the right from  $IS_1$  to  $IS_2$  until equilibrium is achieved. However, the higher output and equilibrium is achieved at an increase in domestic interest rates from  $i_1$  to  $i_2$ .

Under these market-induced pressures, the efficiency of monetary policy is affected. The monetary policy trilemma suggests that under a fixed (or tightly managed) exchange rate and free capital mobility, monetary policy cannot act independently. Therefore, the non-CBDC cryptocurrency scenario further limits the capabilities of domestic monetary policy. The obligation of the CBTT to frequently intervene to stabilise the exchange rate results in upward pressures on domestic interest rates to limit capital outflows. Consequently, if domestic economic conditions are below the natural level of growth and authorities wish to stimulate aggregate output, the impact of monetary policy actions becomes limited and can further result in exchange rate pressures. Policies in support of aggregate demand would therefore depend more on fiscal measures as opposed to monetary measures.

### Monetary Policy Implications

Based on the results of the Mundell-Fleming theoretical analysis, digital money is likely to have a moderate-to-considerate impact on domestic monetary policy, should the parameters outlined in the scenarios hold (**Figure 11**). Using the results, based on design choices: (i) stablecoins (namely global stablecoins), due to their potential to minimise (and/or eliminate) price volatility, (ii) non-national CBDCs mainly due to limited capital mobility and foreign exchange market related dynamics, and (iii) privately-issued e-money will have the most impact.

**Figure 11: Summary of the Impact of Digital Money on Domestic Monetary Policy**

	Retail CBDC (Directly Distributed by CBTT)	E-MONEY					NON-CBDC CRYPTOCURRENCY		
<b>Structure</b>	<b>Non-Remunerated</b>	<b>Linked to Bank Account</b>					<b>Fiat-backed Stablecoins (outside of CBTT's control)</b>		
<b>Implications</b>	Low interest elasticity, slower policy transmission, and reduced monetary policy strength. Potential for increased foreign exchange pressures.	Monetary policy essentially unaffected.					Slower monetary policy transmission and reduced policy strength. Significant disintermediation impact. Additional balance of payment pressures resulting from increased foreign currency demand, leading to reserve depletion from CBTT interventions.		
<b>Monetary Policy Impact</b>	<b>Considerable Impact</b>	<b>Minimal Impact</b>							
<b>Structure</b>	<b>Remunerated</b>	<b>Conversion Required</b>							
<b>Implications</b>	Monetary policy potentially more effective; faster transmission effect. However, significant disintermediation risk.	More complex, possible decentralised system with reduced CBTT control. Slower monetary policy transmission and reduced policy strength. Significant disintermediation impact.							
<b>Monetary Policy Impact</b>	<b>Low Impact</b>		<b>Very High Impact</b>			<b>Significant Impact</b>			
	<b>Monetary Policy Impact</b>	Minimal	Very Low	Low	Moderate	Considerable	High	Very High	Significant
		1	2	3	4	5	6	7	8

Source: Authors.

The speed and impact of policy transmission largely reflect the effects of new digital money on the conduct of monetary policy. Guided by the Mundell-Fleming framework analysis, the domestic monetary policy implications of digital money currently appear contained. Domestically, transactions are mainly settled in cash, bank money, and through e-money services. Apart from currency issued by CBTT, EMIs are regulated and supervised. Furthermore, the uptake of newer payment services has been low. Consequently, the effectiveness of traditional monetary policy mechanisms will likely remain unchanged in the short-to-medium term. Nevertheless, factors that can affect the potency of local monetary policy transmission channels still exist.

An implication of digital money on monetary policy is the impact of changes in consumer and investor behaviour. Changes in money strongly influence behavioural patterns. For consumers, a shift in payment preferences could occur, affecting spending, saving, and borrowing patterns. For investors, changes in investment preferences for different asset classes and volumes held could arise. These changes dictate market dynamics and heavily influence how monetary policy measures are transmitted through the macro-financial system. As the digital money landscape expands, monetary policy analysis will need to incorporate new data, information, and methods to assess and predict consumer and investor behaviour and expectations.

Linked to consumer and investor behaviour is privacy and anonymity, two crucial factors that can either enhance or weaken the monetary policy framework. Cash, which plays a dominant role in the local economy, currently lacks full traceability. However, digital money allows for tracking transactions. A CBTT-issued CBDC and regulated e-money can be tracked, providing more data and real-time insights into economic activity. This can lead to better policy

decisions and enable quicker policy responses. In contrast, non-regulated options and, more so, those that are decentralised are likely to negatively impact policymaking.

Changes and additions to regulations and laws, as well as the development of adequate data management systems will also impact the effectiveness of monetary policy transmission. Mitigating risks such as cyber activity, theft, fraud, and other illegal activities will also become more challenging, impacting the execution of monetary policy. Overcoming these challenges will be crucial for strengthening local monetary policy.

Digital money affects monetary policy objectives differently, altering the use and effectiveness of policy tools. Domestic monetary policy prioritises the management of inflation, reserves and foreign currency. Apart from imported inflation, domestic inflation is largely dictated by the money supply, partly managed directly and via credit channels. For reserves and foreign currency, managing price volatility, asset liquidity, and diversification of financial balances and flows are key. Hence, the type and amount of money circulating in the economy (and outside the economy) is crucial. New digital money managed directly by central banks is likely to improve monetary policy transmission as it adds to the pool of public money. In comparison, new private digital money lessens monetary control, weakens policy transmission and generates contagion channels. Hence, the features adopted by different types of digital money will dictate their impact on key players in the macro-financial system.

For inflation management, design choices related to accessibility, remuneration, and transfer mechanism are important factors influencing policy decisions and responses. Introducing new forms of public digital money with restricted access (e.g. wholesale CBDC), could support liquidity management and interest rate policy actions, while also enhancing interbank settlement efficiency. Thus, aiding in managing inflationary pressures. Nevertheless, a potential drawback of this structure is the indirect transmission of monetary policy, as financial institutions must pass policy changes through their lending and investment practices before impacting the broader economy. Consequently, changes to financial conditions may be delayed and/or the magnitude of the intended impact may be affected.

This outcome is similar for private digital money subject to regulatory oversight. While unregulated digital money limits the effectiveness of policy interventions, retail CBDC and other private e-money can include design features that could strengthen policy transmission. For example, regulated private e-money that is publicly accessible, with features such as holding limits, and fees and charges, can increase the potency of policy transmission. Regarding the chosen transfer mechanism, centralised systems allow monetary authorities to directly implement monetary policy measures to stabilise inflation. While decentralised systems may rely more on market forces and other factors, potentially leading to different inflation dynamics.

New digital money also influences exchange rates and capital flows. Regarding reserve management, digital money could encourage diversification, invite volatility, and affect liquidity. CBTT's reserves, and those of other countries, could change if the adoption and use of non-traditional digital money increases, requiring adjustments to reserve-holding guidelines. Such changes include alterations to the amount of physical currency held and the selection of the basket of reserves.

Compared to private e-money, CBDC holdings are likely to have little to no volatility (and are more liquid). Due to default risks, non-public digital money is prone to price volatility. Moreover, cryptocurrencies primarily satisfy speculative demand rather than transactional and precautionary purposes at this time. As a result, only globally systemic private digital payment instruments (such as fiat-backed stablecoins) may be able to affect reserve management in the medium-to-long term. As such, the popularity of specific types of digital money will dictate the

magnitude of change in reserve management. With new digital money, regulatory changes in domestic monetary policy and when dealing with cross-border transactions may also be required, affecting reserves management.

Digital money can enhance the efficiency of foreign exchange management, particularly in foreign currency transactions. However, with widespread adoption of externally-issued digital money, financial flows could influence exchange rates and expectations, putting pressure on the managed exchange rate and reducing the effectiveness of interventions. Additionally, increased cross-border transactions may heighten sensitivities to external interest rates, requiring greater effort to manage the foreign exchange market. While public digital money is likely to benefit domestic monetary policy, private digital money (outside of CBTT's oversight) may drive higher demand for cross-border transactions, increasing transmission risk and potentially impacting financial stability. Therefore, understanding the interaction between digital money and exchange rate policy will be crucial for currency management.

Another implication of digital money is its potential effect on financial stability. Financial intermediation plays a key role in monetary policy transmission and facilitating the flow of funds within the economic system. More specifically, banks' main role in deposit-taking and lending supports monetary policy actions to change economic and financial conditions. This mutually beneficial relationship can be disrupted by new digital money as it creates competition for bank money. Disintermediation has been a common consequence of digital money, whether publicly or privately issued. Currently, the risk of bank disintermediation from new digital money in Trinidad and Tobago is moderate, as local banks remain key players in the monetary system.

Policy disharmony could also emerge, especially in the early adoption stages, increasing risks of arbitrage and loopholes that could be exploited by illicit activities such as money laundering and the financing of terrorism. Inadequate regulation weakens monetary policy transmission and presents challenges related to jurisdictional authority, consumer protection, and legal compliance. These regulatory gaps can undermine financial stability and erode consumer confidence in digital financial services.

Another monetary policy implication of digital money is financial inclusion. A key design choice linked to financial inclusion is accessibility. The development of digital currencies for retail purposes can potentially improve financial access to various societal groups in the economy. Supported by high internet and mobile device access, reductions in the unbanked population can strengthen monetary policy transmission channels, broadening the reach of policy changes.

Therefore, the overall effect on monetary and credit aggregates are net positive with public digital money and, if not managed effectively, are net negative for private digital money.

## Conclusion and Recommendations

Digital money introduces significant implications for monetary policy. New digital money has the potential to disrupt policymaking and the financial landscape, as it directly competes with traditional forms of money (cash and bank deposits). However, despite the risks, several opportunities exist. On the upside, policy transmission can be enhanced (new public money acting as monetary policy tools with broader financial access and oversight coverage). On the downside, cybersecurity threats and other illegal activities can weaken policy transmission. Whether the new variation aids or hinders policy is dependent on their design properties (issuer, form, the scope of accessibility, and transfer mechanism) and features (limits and remuneration). Among the new digital money, variations that are publicly-issued

and consider the involvement of intermediaries in managing customer accounts and retail transactions is likely the least disruptive. While, remunerated public digital money are more likely to be a potential tool for more direct monetary policy transmission. Meanwhile, new private money is likely to be policy-insensitive. Consequently, for Trinidad and Tobago, the impact of digital money on monetary and credit aggregates, consumer and business behaviour, cross-border activity, and financial stability are key factors that play a role in affecting the effectiveness of domestic monetary policy.

Using the Mundell-Fleming framework, a theoretical analysis was undertaken to examine the impact of different types of digital money on the Trinidad and Tobago monetary system. Remunerated CBDC that is directly distributed by CBTT has the highest potential to enhance policy transmission. However, this type of CBDC also creates competition with commercial bank deposits, potentially impacting financial stability through bank disintermediation. Meanwhile, non-CBDC digital currency also had varying implications for domestic monetary policy. E-money linked to traditional bank accounts had limited implications for monetary policy as it represents an electronic form of bank money over which the monetary authority retains control. However, e-money systems that convert traditional fiat currency into non-CBTT-issued private e-money would reduce central bank control and weaken policy transmission by creating a parallel monetary system.

Nonetheless, the adoption and usage of domestic e-money have been slow. On the other hand, fixed-price cryptocurrencies (for example, stablecoins) operating outside the domestic regulatory system pose significant challenges to monetary policy due to their potential to cause capital outflows and increase exchange rate pressures. Furthermore, variable-price cryptocurrencies are highly volatile and primarily used for speculative purposes, which limits their effectiveness as a reliable conduit for monetary policy.

Moving forward, a proactive approach by policymakers to prepare for the potential entrenchment of new variations of digital money in the domestic economy is needed as e-commerce grows and initiatives to go cashless progresses. First, as digital money gains ground, strengthening cybersecurity protocols at CBTT, its associates (other regulators) and licensees will be essential to safeguard the macrofinancial system. Second, to gain a foothold in the race for digital currency adoption, CBTT should consider CBDC research and pilots to better understand the implications for monetary policy and financial stability, and to remain competitive and responsive to the evolving financial landscape. Third, developing the technical capacity of staff is also recommended. Expertise development can assist with improving the assessment and implementation of new technologies in the fintech space, identifying opportunities and mitigating potential risks associated with digital currencies and related innovations, and shaping regulatory frameworks. Fourth, broader public education is also recommended to enhance understanding as new variations of digital money and payment instruments emerge. Sixth, coordinating policy efforts with other nations will support a cohesive approach to digital money adoption. Overall, the CBTT must navigate these advancements to leverage their benefits while managing the associated risks.

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