THE ADOPTION OF MONEY INNOVATIONS: A COMPARATIVE ANALYSIS

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Abstract: Since the Global Financial Crisis, money has been undergoing transformational changes. *Cryptocurrencies* like Bitcoin and the lesser-known *stablecoins*, powered by blockchain technology, have grown rapidly, allowing people to undertake financial transactions globally without central intermediaries. In addition, many countries have explored *central bank digital currencies*, which are digital representations of fiat monies controlled by national central banks. While descriptive studies on these money innovations abound, systematic analysis of their drivers is lacking. This paper offers the first systematic analysis of the conditions under which societies adopt these money innovations. Based on an original cross-country dataset capturing the extent to which money innovations have been deployed, regression analysis shows limited overlap in the significant drivers of these money innovations, aside from fundamental country characteristics including level of development, population size, and (to a lesser extent) regime type. Cryptocurrency use appears to be driven by macro-financial instability and lack of access to bank finance. In contrast, CBDC adoption by states appears to be driven by exposure to sanctions and previous experimentation with CBDC projects. While confirming the role of financial inclusion for cryptocurrency adoption, the findings partly challenge the official discourse of financial inclusion as a key motivation for CBDC adoption.

Keywords: Digital money; cryptocurrency; central bank digital currency (CBDC); money innovations; cross-country analysis

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1. Introduction

The current financial system has come under criticism for its manifold challenges—from a lack of financial inclusion especially for women (Pani 2016), its inability to prevent transnational financial crime (He et al. 2016), to its continued susceptibility to contagious financial crises (Helleiner 2011; Pauly 2009; Underhill and Zhang 2008). The current system of money is upheld by central banks and corporate networks of financial institutions (Dixon 2024; Lascaux 2012; Metzger 2024). These financial institutions control access to money, for example by deciding who can hold a bank account and who obtains a loan. Even for those who hold bank accounts, payments are not frictionless, especially across borders. As different nation-states maintain their own currencies, payments need to be converted into foreign currency—often via currency triangulation through the US dollar—a service for which banks often charge significant markups. Despite ever-increasing financial integration since the end of the Bretton Woods system, access to finance and stable frictionless money is a privilege available to only a fraction of the global population.

In response to the drawbacks of a financial system marked by centralized national control—but fragmented control at the global level—the idea of decentralized money became increasingly popular. Bitcoin was the first decentralized global payments system that allows for the secure transfer of money by relying on blockchain technology (Nakamoto 2008). To date, the Bitcoin network has facilitated 'trustless' monetary exchanges in the order of several trillions. As of today, the value of all bitcoins in circulation is about $1.2 trillion, while the global crypto market capitalization is around $2.27 billion. Bitcoin accounts for about half of the market (CoinMarketCap 2024). Ethereum—a general-purpose blockchain that facilitates self-executing 'smart contracts'—has made money programmable, leading to a proliferation of decentralized finance products that can automate financial decisions (Dixon 2024). These developments demonstrate how technological advances like blockchain technology are changing the face of money—more than the money innovations that were less directly relevant for ordinary citizens, like 'shadow money' created by non-bank financial institutions (Murau and Pforr 2023).

With the rise of cryptocurrencies, the intermediary role that banks have historically played is decreasing. Decentralized finance forces banks to adapt and innovate, for example as custodians for decentralized financial systems. Cryptocurrencies also threaten to reduce *de facto* state control over money and monetary policy. Therefore, states around the world have announced to develop 'central bank digital currencies' (CBDCs)—digital versions of fiat money—that

can be used to settle transactions on a central bank ledger (Kuehnlenz, Orsi, and Kaltenbrunner 2023). Hopes are that CBDCs can help central banks maintain or enhance control over monetary policy while fulfilling requirements related to the containment of terrorism financing and anti-money laundering (Copestake et al. 2023). Like cryptocurrencies, CBDCs carry potential to upset existing domestic money architectures, depending on their design. *Retail CBDCs*, which allow citizens to hold accounts in digital currency directly with the central bank, may compete with commercial banks, thus creating a potential conflict of interest for central banks as both financial regulators and financial service providers. In contrast, *wholesale CBDCs* work through the existing architecture, using commercial banks as intermediaries.

In this article, I derive and test expectations about when and why societies adopt these two types of money innovations. To understand the drivers of adoption, a useful point of departure are the white papers of cryptocurrency projects and the official communication by central banks around CBDCs. Both types of money innovations are frequently motivated by a desire to promote financial inclusion. For decentralized finance, and stablecoins in particular, I thus expect adoption to be more likely where there is large unmet demand for financial services and where people have more frequently suffered from high inflation and financial crises. While financial inclusion often is among the stated goals of CBDC adoption, many such currencies in practice require access to a bank account, contradicting this aim and suggesting alternative explanations. In fact, CBDC adoption is often portrayed as a response by states to the growing use of cryptocurrencies. Domestic reasons for CBDC adoption thus include a desire to increase the efficiency of domestic payments systems through seamless integration of digital currencies while maintaining the effectiveness of monetary policy (Copestake et al. 2023). A more nefarious domestic motivation is to control financial transactions of citizens—a relevant driver of CBDC adoption in autocratic states. In addition, governments may support CBDC adoption to facilitate cross-border settlements, while avoiding using the US dollar. Another international-level driver of large-scale cryptocurrency investments by states (through their central banks) are payments-related sanctions imposed by powerful fiat currency reserves issuers (Chainalysis 2024a).

I construct a cross-country dataset capturing the extent to which money innovations have been deployed. While my analysis is a snapshot using the most recent available data, I incorporate time dynamics by measuring the correlates of money innovations using their time lags. For the outcome variables, I use data on peer-to-peer cryptocurrency adoption as of October 2023 (Chainalysis 2023) and data on CBDC adoption from the CBDC Tracker website (CBDC Tracker 2024).

To analyze the determinants of money adoption, I conduct bivariate correlation analyses and multivariate regression analyses. The analysis shows limited overlap in the significant drivers of these money innovations, aside from fundamental country characteristics including level of development, population size, and (to a lesser extent) regime type. On the one hand, the usage of cryptocurrency appears to be driven by conditions of macro-financial instability—measured by high inflation and past incidence of banking crises—as well as lack of access to finance via the banking system. On the other hand, CBDC adoption (by states) is driven by exposure to (EU) sanctions, as well as a track-record of experimentation with CBDC projects. I also examine the drivers of adoption separately for retail CBDCs and wholesale CBDCs, suggesting that retail CBDCs tend to be deployed more in countries with a lack of financial stability while wholesale CBDCs appear to be driven by diffusion processes across networks of central banks. There is no significant evidence that CBDC adoption is more likely where decentralized finance is widely used.

The main contribution of this paper is to offer the first systematic analysis of the drivers of adoption of money innovations. While numerous reports and case studies have documented the rise of money innovations (Caton and Harwick 2022; Chainalysis 2023; Circle 2024), and Science and Technology Studies have assessed the societal implications of new technologies from a normative perspective (Beaumier and Kalomeni 2022; Bernards and Campbell-Verduyn 2019; Campbell-Verduyn 2018), a systemic analysis of the correlates of their adoption has been lacking. My cross-country analysis—despite its relative simplicity—provides novel insight into the general importance of competing drivers of different money innovations. My findings reveal a greater need for theory development regarding when and why money innovations are adopted, given that financial inclusion does not appear to be among the significant correlates—especially for CBDCs.

2. Categorizing money innovations

Money is the lifeblood of our modern economies. As *unit of account*, it facilitates the exchange of goods, services, and credit. As *unit of exchange*, money is used to measure the value of goods and services, making it easier to compare and exchange them. As *store of value*, money facilitates the intertemporal transfer of wealth. Money is ubiquitous, and few people think about it as long as it fulfils its role as a ‘lubricant’ of economic exchanges (Ingham 1998; Lapavitsas 2005; Murau and Pforr 2020; Wullweber 2019).

Money is often described by what it does, not what it is. Yet, money can take different forms. Coins and notes are most familiar to most people. However, there are also foreign reserves, typically managed by the central bank, and money in bank accounts. Modern money is first and foremost 'credit money', as only a fraction of the money held in bank accounts is immediately convertible into coins and notes (Wullweber 2019).

All these money forms are part of a 'monetary hierarchy', which can be pertinently studied through balance sheets. The credit system is designed such that every liability shows up as an asset elsewhere (Murau and Pforr 2020). Money is foremost a liability of the central bank, which then becomes a liability of commercial banks when those banks provide commercial credits. Banks are not the only financial institutions that *create* credit money: non-bank financial institutions have created various forms of private credit instruments that could be seen as 'shadow money' (Murau and Pforr 2023). Central banks are the ultimate clearinghouse for credit transactions from these financial institutions.

Cryptocurrencies and stablecoins

Since the Global Financial Crisis, money has been changing its face following several key money innovations—from cryptocurrencies and stablecoins to central bank digital currencies. Bitcoin—as the first-ever cryptocurrency—is 'digital money' that is not controlled by any central authority but a global network of computers.[1] To ensure that bitcoins have the properties of money, Bitcoin combines several technologies. A data structure called 'blockchain' records transactions so that they are immutable once recorded on the blockchain, verifiable for everyone. Cryptography ensures that only authorized users have access to the bitcoins they own and protects privacy despite transactions being auditable. To prevent fraud, the Bitcoin networks operates a consensus mechanism that requires 'proof of work'—the solution of a computationally hard cryptographic problem—for a network participant to propose a new block (Nakamoto 2008).

Stablecoins are a type of cryptocurrency designed to address the volatility of many digital currencies. Stablecoins are pegged to a stable asset, like gold or fiat currencies. Popular stablecoins like USDT (Tether) or USDC (Circle) are tied to the US dollar, or other established currencies (Mento Labs 2024). Because they peg their value to fiat money or other stable assets, stablecoins are more suitable for everyday transactions compared to Bitcoin. Indeed, use of cryptocurrencies in North America reached the equivalent of $1.2 trillion in value received from Q3/2022—Q2/2023. Over half of all cryptocurrency traffic has been in stablecoins, mostly pegged to US dollar (Chainalysis 2023).

Blockchain-based digital currencies have facilitated an explosion of applications in Decentralized Finance (DeFi). Powered by blockchain technology, DeFi makes money programmable, facilitating new forms of financial interactions such as peer-to-peer lending. To be sure, because peer-to-peer lending in cryptocurrencies does without banks as central intermediaries, customer validation checks and creditworthiness assessments are no longer provided for. Therefore, peer-to-peer lending relies on over-collateralization, whereby borrowers stake crypto-assets whose nominal value exceeds the amount they want to borrow (Metzger 2024). DeFi does not just involve financial assets but also includes tokenized real-world assets, such as real estate, which can be brought on chain.[2] Tokenization is a new source of yield in DeFi, but also raises concerns about default risks due to undercollateralized loans (Lim 2024).

Cryptocurrencies can be considered liabilities or commodities, depending on their design. The classification of cryptocurrencies as either liabilities or commodities is a complex issue that varies depending on jurisdiction and regulatory framework. For example, the Commodity Futures Trading Commission (CFTC) in the United States has classified Bitcoin and other virtual currencies as commodities (CFTC 2018). However, some stablecoins, especially those backed by fiat currency or other assets, may be considered liabilities of the issuer, as they represent a claim on those assets.

It is not obvious that decentralized money will move to the top of the money hierarchy. Due to its recency, people still need to build trust in these systems. Decentralized money still relies on traditional forms of higher-level money for it to be seen as useful and involving low risk. This becomes clear when considering that stablecoins are often backed by central bank reserves and, when it turns out they are not, trust in these stablecoins diminishes (Shillito 2022). In this sense, stablecoins are a good example for the private-public hybridity of modern money (Mehrling 2013).

Central bank digital currencies (CBDCs)

Central bank digital currencies (CBDCs) are issued and controlled by central banks but rely on distributed ledger technology (Auer, Cornelli, and Frost 2020; Kuehnlenz, Orsi, and Kaltenbrunner 2023; Swartz and Westermeier 2023). Unlike reserves, notes, and coins, CBDCs only exist electronically, and can be transferred securely and efficiently through the blockchain. There are two main types of CBDCs being explored. *Retail CBDCs* are designed for everyday consumer and business transactions. *Wholesale CBDCs* are used for transactions between banks and other financial institutions. According to estimates, about 60

countries had launched, piloted, or developed proof of concept of CBDCs by late 2024 (CBDC Tracker 2024).

CBDCs are generally considered liabilities of the central bank that issues them (Cesaratto and Febrero 2023). Both retail CBDCs and wholesale CBDCs may be considered liabilities, although the latter can also be a type of reserves held by banks (BIS 2023). In both cases, CBDCs would be the ultimate settlement currency in the money hierarchy—a feature that becomes important in times of financial turmoil. In normal times, different money instruments in the monetary hierarchy—central bank reserves, commercial bank loans, and shadow money—are exchangeable on par (Murau and Pforr 2023). In times of crisis, however, market actors seek to settle claims in lower-hierarchy forms of money in exchange for higher-level money forms. Game-theoretic analysis supports this expectation, suggesting that the introduction of a CBDC would incentivize customers to withdraw more quickly from commercial banks, leading to a more fragile banking system and making banks offer higher yields to attract deposits (Ahnert et al. 2023). However, it is unclear to what extent this logic extends to countries with unstable currencies and less-credible central banks. Here stablecoins may become higher-level money forms as they inherit the properties of their underlying fiat currencies.

3. Adopting money innovations: theoretical expectations

When and why are money innovations adopted? A useful point of departure is to consider how key actors motivate the introduction of money innovations. The key actors are somewhat different across different types of money innovations. In the case of cryptocurrencies, their *developers* help them come into being, but it is societies that decide about whether they are widely used. As we will see below, states can also be a key driver for the demand for cryptocurrency. However, states have little influence over the supply of cryptocurrency because cryptocurrencies exist beyond state boundaries—relying on a globally distributed decentralized network of computers. While states cannot prevent people from using cryptocurrencies, they can nurture these currencies by providing a favorable regulatory environment. In contrast to cryptocurrencies, the decision to deploy CBDCs lies with *state actors*—central banks in particular—which is why it is important to consider state interests to explain CBDC adoption.

An often-stated goal of money innovations is financial inclusion. For example, Tether, one of the most influential cryptocurrency provider, argues that cryptocurrencies—and stablecoins in particular—provide ‘an essential lifeline

for individuals to protect their savings, send remittances, and access capital markets' (Mento Labs 2024). Another example is Mento Labs, a developer think-tank for DeFi. According to its mission statement, Mento Labs 'strives to advance the Web3 economy with innovative stablecoin solutions, promoting financial inclusion and global adoption of digital assets' (Mento Labs 2025). The need to reach the 'unbanked' is also a stated motivation behind many CBDCs. For example, Nigeria launched its e-Naira—the first CBDC in Africa in October 2021—with the explicit motivation to promote financial inclusion, in addition to facilitating cross-border payments and remittances from diaspora communities (Salami 2023).

Grassroots adoption of cryptocurrencies is higher in countries facing macro-financial instability. In Sub-Saharan Africa, for example, cryptocurrency is a lifeline for businesses facing significant shortage of foreign exchange, which is required for international trade (Chainalysis 2024b). In many emerging market countries, individuals have adopted stablecoins to escape the skyrocketing inflation of their national fiat currencies. In Argentina, for example, the Argentinian peso lost over half of its value against the US dollar around mid-2023, leading to an increase in cryptocurrency adoption to an all-time high of $85.4 billion in value received. Cryptocurrencies, specifically stablecoins tied to the US dollar, have become an attractive option for day-to-day transactions and money-saving (Chainalysis 2023, 25). According to an IMF analysis, states establish a CBDC to maintain control over money, to ensure that monetary policy and capital controls remain effective (Copestake et al. 2023). Assuming states want to maintain monetary policy sovereignty, CBDC adoption should be more likely where states were vulnerable to currency crises and high inflation in the past.

To measure demand-side motives relating to financial inclusion, financial stability, and access to finance, I use three indicators that are available for most countries. I respectively use the (logged) number of bank branches per 100,000 inhabitants capturing the physical infrastructure for accessing financial services, the (logged) average inflation rate, and the number of systemic banking crises that a country experienced in its recent history.

Given the rapid growth of crypto-markets, governments are concerned about the implications of cryptocurrency use for macro-financial stability. From this perspective, CBDCs can be seen as response to the threat from cryptocurrencies for macro-financial stability (Cesaratto and Febrero 2023). To be sure, cryptocurrencies do not need to pose a threat to financial stability, if they are appropriately regulated. For example, the central bank may require stablecoins to

be fully backed by fiat currency, which would maintain the position of these currencies (Kuehnlenz, Orsi, and Kaltenbrunner 2023; Marmefelt 2024). To measure the extent to which CBDC adoption is a response to the rapidly growing use of cryptocurrencies, I include an index capturing the relative extent to which individuals hold their wealth in the form of cryptocurrency (Chainalysis 2023). In addition, there are endogenous drivers of CBDC adoption. In line with sociological institutionalism—a theory about the diffusion of policy scripts that has been applied to financial instruments (Chwieroth 2014; DiMaggio and Powell 1991; Lall 2012)—central banks might mimic each other in CBDC adoption as the sector is fast-evolving and uncertainty is high (IMF 2024). Central banks must engage with CBDC projects to learn from experience and to shape their future path of adoption. I capture these incentives for adoption respectively using the number of CBDCs previously deployed by other states and the number of CBDC projects that a country explored.

Despite the non-territorial nature of cryptocurrency, nation-states can be important actors for cryptocurrency adoption—both as *regulators* and as *investors*. As of July 2024, cryptocurrencies are legal in 33 countries, partially banned in 17 countries, and generally banned in 10 countries (Atlantic Council 2024). Even if a ban cannot completely stop the use of cryptocurrency—as transactions would move from centralized exchanges to decentralized wallets and informal channels—a ban can prevent its widespread adoption. At the same time, states enjoy benefits from cryptocurrencies as investors that should make them less inclined to strictly regulate them. In fact, states, through their central banks, are often the primary holders of cryptocurrency. Bitcoin in particular—as a deflationary asset—is considered 'digital gold' and has good properties as a reserve asset, being easier to handle than gold. For example, the central bank of El Salvador has purchased bitcoin reserves soon after president Nayib Bukele announced Bitcoin to become legal tender in June 2021.[3]

States may also hold decentralized currencies to avoid sanctions by powerful fiat currency reserves issuers. 'Sanction-busting' has become an increasingly salient motive given mounting geopolitical tensions that manifest themselves through instances of 'weaponized interdependence' (Farrell and Newman 2019). Indeed, the weaponization of currencies would be a less effective sanctioning tool with a more diversified payments system (Kuehnlenz, Orsi, and Kaltenbrunner 2023). Russia—heavily sanctioned by G7 governments since its full-blown invasion in the Ukraine—is a case in point (Brunnermeier, James, and Landau 2022; Ferranti 2023; Wronka 2022). Through laws enacted in August 2024, the Russian government took steps to legalize cryptocurrencies, thereby allowing its central bank to circumvent (financial) sanctions. To be sure, large-scale sanction

evasion—involving Russian central bank reserves—is unlikely given the liquidity limits of crypto-markets and the possibility that large on-chain transactions could be identified, attributed, and sanctioned. Hence, the legalization of centralized crypto-exchanges in Russia might be interpreted as a strategy to make crypto-markets more liquid and thus facilitate (off-chain) clandestine transactions by exposed individuals. Leading officials cited in the Chainalysis report acknowledged that "this legislative change is aimed at mitigating the impact of sanctions and facilitating international payments" (Chainalysis 2024a). To capture whether sanction pressure is a systematic driver of money innovations, I construct a binary variable indicating whether the country has been under any EU sanctions.

Even if not targeted by sanctions, states might want to guard themselves against the possibility of disruptions in the international payments system that would harm their economic interests. The risk of such disruptions has materialized since the US-led 'War on Terror', when many smaller countries have been cut off from US dollar supply as they had trouble to comply with extensive counter-terrorism regulation (World Bank 2018a). While the US dollar remains the dominant international reserve currency despite challenges to the 'liberal international order' (Norrlof et al. 2020), mounting geopolitical tensions may have incentivized governments to diversify their options for the settlement of international transactions. The cross-country CBDC project mBridge provides a case in point. Piloted by China, Hong Kong, Saudi Arabia, Thailand, and the United Arab Emirates—with technical support from the BIS Innovation Hub—mBridge is currently tested on a number of trade settlement transactions across 11 industries (BIS 2021). The need for a 'fallback option' for payments was also mentioned in other cases, like Aber—a cross-border CBDC between Saudia Arabia and the United Arab Emirates—and the digital Yuan (e-CNY) in China (CBDC Tracker 2024). These examples demonstrate that global interconnectedness may push governments toward cross-border CBDCs as an alternative to the current international payments system. Cross-border CBDCs provide an alternative to the settlement of transactions in fiat currency and currency triangulation via the US dollar (Kuehnlenz, Orsi, and Kaltenbrunner 2023; Reslow, Soderberg, and Tsuda 2024). To capture the propensity of a country to engage in international cooperation, I use the Political Globalization Index, provided by the KOF Institute and measuring the extent to which a country maintains embassies and memberships in international organizations. To capture ideological alignment with the US hegemon, I draw on the Economic Freedom Index, which captures the extent to which an economy is free from state intervention.

CBDCs can also be driven by domestic considerations. While promoting more efficient domestic payments systems and financial development are undeniably key motivations for CBDC adoption, a particularly nefarious motivation is to gain more control over citizens and civil society through collecting data on their financial transactions. The opportunities afforded by certain CBDCs for enhanced tracking of financial transactions—compared to cash money—have been considered as a relevant driver of CBDC adoption in autocratic states (Bilotta 2021; Laband 2022; Serada 2022). For example, China announced plans to explore a retail CBDC (e-CNY) as early as 2014. The stated goal of e-CNY is 'to provide a convenient, yet more efficient and secure retail payment system to increase financial inclusion, preserve monetary sovereignty, and to provide a "back up" payment infrastructure for the private sector payment solutions' (CBDC Tracker 2024). Yet, observers are concerned that the control the e-CNY affords state authorities over its citizens—through potential access to transaction histories and personal data—could provide incentives for authorities to restrict certain transactions that do not align with their policy goals (Werner 2023). Similar concerns have been raised in the case of Russia, where the central bank is soon to launch a digital Ruble while being allowed to monitor cryptocurrency transactions (Chainalysis 2024a). Unless states can credibly promise to prevent data linkage from CBDC accounts with other state agencies like the police, the *secret service, and tax authorities, retail CBDCs can be a threat to democracy* (Freiman 2022). From this perspective, fully decentralized cryptocurrencies can guard individuals against potentially malign intentions of autocratic governments. Venezuela provides a case in point. As the Maduro regime has refused to accept international aid and controls the financial system, cryptocurrencies are a conduit for Venezuelans to receive remittances from those who fled the country and for direct humanitarian cash transfers to communities in need (Chainalysis 2023, 27–28). To test if regime type affects the adoption of money innovations, I use the polyarchy measure of regime type from the V-Dem project.

Beyond the simple framework above, other theoretical approaches can be used to derive expectations about the adoption of money innovations. For example, a political economy perspective would consider the strength of key interest groups—notably the financial sector. As money innovations tend to undercut the current role of banks, these innovations would stand a lower chance of adoption where banks have a strong lobby. However, once a CBDC is adopted, its design may be influenced by the strength of banks. Specifically, countries should be relatively more likely to adopt a retail CBDC where the domestic banking system is weak. Conversely, a wholesale CBDC is more likely in countries with well-

developed banking systems. As such type of CBDC may require citizens to have a bank account, it may not enhance financial inclusion but serve other purposes instead. Lacking a pertinent proxy measure for bank power, I cannot test this expectation. Lack of pertinent measures also preclude tests of possible determinants such as low trust in state institutions, lack of financial literacy, and speculative motives. Finally, there are some basic characteristics that should obviously facilitate the adoption of money innovations, such as the general level of development of a country and the size of its population which captures economies of scale. Table 2 below shows variable definitions, data sources, and descriptive statistics of all variables used in subsequent analysis.

Table 2: Variable definitions, data sources, and descriptive statistics

Variable	Definition	Obs	Mean	Sd	Min	Max
Crypto-adoption index	Crypto-adoption index, defined as an inverted rank. Country ranks are based on Peer-to-peer (P2P) exchange trade volume, weighted by PPP per capita and number of internet users, as of October 2023 (Chainalysis 2023)	151	77.616	44.636	1	154
CBDC adoption	Binary indicator for whether a country has been exploring a CBDC. Any CBDC project can be in five stages: 1) cancelled (or decommissioned); 2) research (conducted first explanatory CBDC research); 3) proof of concept (advanced research stage and have published a CBDC proof of concept); 4) pilot (developed a CBDC that is tested in a real environment either with a limited number of parties or on a wide scale); 5) launched (officially fully launched a CBDC). Any stage beyond research is considered a positive case of CBDC adoption (CBDC Tracker 2024)	193	0.207	0.406	0	1
Inflation	Rate of inflation, hyperbolically transformed to mitigate skewness, averaged over 2015-19 and drawn from World Development Indicators (WDI) (World Bank 2022)	174	1.58	1.115	-0.897	6.025
Banking crises	Number of systemic banking crises, cumulated over 1970-2017 (Laeven and Valencia 2013)	193	0.777	0.755	0	4
Bank branches	(Logged) number of bank branches per 100,000 inhabitants in 2018, drawn from the Global Financial Development Database (World Bank 2018b)	166	2.66	0.96	0.36	7.46
GDP per capita	(Logged) GDP per capita, drawn from the WDI (World Bank 2022)	187	8.658	1.408	5.614	12.094
Population	(Logged) population, drawn from the WDI (World Bank 2022	143	16.087	1.499	12.498	20.846
Democracy	V-Dem Polyarchy Index, capturing the extent of electoral democracy (Coppedge et al. 2023)	172	0.526	0.255	0.016	0.917
Economic freedom	Economic Freedom Index from the Fraser Institute, capturing the extent to which markets are free from government intervention along five dimensions (Fraser Institute 2021)	160	6.868	0.995	3.36	8.82
Political globalization	Political Globalization Index from the KOF institute (Gygli, Haelg, and Sturm 2018)	188	65.216	21.415	10.96	97.804
EU sanctions	Binary indicator for any sanctions from the European Union, drawn from the Global Sanctions Database V3 (Felbermayr et al. 2020; Kirilakha et al. 2021; Syropoulos et al. 2023)	193	0.238	0.427	0	1
CBDC experience	Number of CBDC projects (at any stage) before CBDC adoption (0 if no adoption) (CBDC Tracker 2024)	193	0.104	0.395	0	3
CBDC diffusion	(Logged) number of CBDC projects adopted by other countries before CBDC adoption (CBDC Tracker 2024)	193	3.671	0.678	0	4.094

4. Adopting money innovations: empirical evidence

I create a cross-country dataset to test a range of correlates of digital money adoption. The dataset is a snapshot of money innovations and their underlying correlates. To examine the correlates of money innovations, I estimate linear regressions using Ordinary Least Squares with robust standard errors.

Correlates of cryptocurrency adoption

I encoded country rankings on cryptocurrency adoption from the 2023 Chainanalysis report (Chainalysis 2023). Chainanalysis publishes the most comprehensive data on cryptocurrency exchanges across all such currencies, although this data only includes cryptocurrency held in centralized wallets. I focus on country ranks based on *peer-to-peer exchange volume* as of October 1, 2023—the latest available data—and weighted by GDP per capita and the number of internet users in a country. Chainanalysis prefers ranks over raw volumes as market size is highly skewed by per-capita income and country size, whereas the Global Crypto Adoption index seeks to 'identify countries where the most people are putting the greatest share of their wealth into cryptocurrency' (Chainalysis 2023, 3). To make the interpretation more intuitive, I inverse the ranking so that countries with more widespread use of cryptocurrencies have a higher crypto-adoption index.

I begin with simple correlational analysis between cryptocurrency adoption and a range of country characteristics.[4] Table 3 shows the raw correlation coefficients, along with the *p*-values which denote the statistical significance of the correlation. I find that nearly all the correlates are individually significant. Specifically, cryptocurrency use appears to be related to high inflation, higher incidence of systemic banking crises, and a low number of bank branches. Crypto-adoption correlates positively with sanctions but also with greater integration in global politics. The strongest predictor of crypto-adoption appears to be market size—more populous countries have higher cryptocurrency use—whereas per-capita income is negatively related to cryptocurrency use. Crypto-usage is also lower in more democratic countries and economically more liberal countries. Finally, while the number of CBDC projects explored domestically has no relationship with crypto-usage, peer-to-peer crypto-exchange and global CBDC adoption appear to be substitutes.[5]

Table 3: Bivariate correlations for cryptocurrency adoption

	Correlation coefficient	p-value
Inflation	0.383	0.000
Banking crises	0.360	0.000
Bank branches	-0.274	0.001
EU sanctions	0.281	0.001
Political globalization	0.363	0.000
GDP per capita	-0.461	0.000
Population	0.788	0.000
Democracy	-0.216	0.009
Economic freedom	-0.385	0.000
CBDC experience	0.065	0.430
CBDC diffusion	-0.208	0.010

To further examine these patterns, I conduct a multivariate analysis of the correlates. Table 4 shows the results. In the first model, I probe key demand-side variables relating to macro-financial instability and access to finance. I indeed find that higher inflation and a history of banking crises are positive predictors of crypto-usage, whereas better penetration with bank infrastructure decreases it. The second model adds basic controls, which reduces the importance of macro-financial correlates. Specifically, poorer countries and more populous countries have relatively higher crypto-usage. In the final model, I add controls relating to economic ideology and global politics, which do not appear to matter. Importantly, the number of banking crises retains statistically significant throughout all models. One additional banking crisis over the 1970-2017 is predicted to push a country at least five ranks up the list in terms of crypto-adoption. Besides structural factors like per-capita income, country size, and regime type, the collective experience of banking crises thus appears to drive people into decentralized money.

Table 4: Multivariate correlations for cryptocurrency adoption

	(1)		(2)		(3)	
Crypto-adoption index						
Inflation	12.786***	(3.795)	2.421	(2.232)	1.956	(2.158)
Banking crises	17.217***	(4.723)	5.815*	(3.082)	4.955*	(2.756)
Bank branches	-7.431*	(4.041)	0.966	(2.256)	0.520	(2.102)
GDP per capita			-10.168***	(2.210)	-8.663***	(2.679)
Population			19.223***	(1.461)	21.172***	(1.840)
Democracy			4.618	(9.402)	19.258*	(11.266)
Economic freedom					-4.359	(3.487)
Political globalization					-0.328	(0.228)
EU sanctions					2.239	(5.338)
Observations	134		121		119	
R-squared	0.255		0.729		0.771	

Ordinary Least Squares regression with robust standard errors in parentheses. Significance levels: * p<.1 ** p<.05 *** p<.01

Correlates of CBDC adoption

I used data from the CBDC tracker to construct a binary indicator for whether a country has explored CBDC beyond the stage of research (CBDC Tracker 2024). The CBDC tracker distinguishes four active phases of CBDC deployment: research, proof of concept, pilot, and launch. Since almost all countries are undertaking research into CBDCs, I focus on the later stages. As of December 1, 2024—the reference date of my analysis—about one-fifth of all countries have gone beyond the research stage: 24 countries have reached the proof-of-concept stage, another twelve countries have tested pilots, and four countries have launched a fully functional CBDC. These four countries are the Bahamas (Sand Dollar), Jamaica (JAM-DEX), Nigeria (e-Naira), and Zimbabwe (ZiG).

I begin with simple t-tests, comparing the average values of various covariates across ‘CBDC adopters’ and ‘non-adopters’. Table 5 also shows the difference in group averages, along with the *p*-value of a *t*-test (with unequal variance) for testing whether the difference is statistically significant. CBDC adopters register similar inflation rates, but slightly higher incidence of banking crises and bank penetration in the economy. I find limited evidence for sanctions to matter—in fact, CBDC adopters appear to more politically integrated globally. Per-capita income and country size are significantly positively related to CBDC adoption. There is no apparent difference in political regime type, though CBDC adopters are economically more liberal. Finally, CBDC adoption is positively correlated with peer-to-peer cryptocurrency usage and prior engagement of a country with

CBDC projects. The number of global CBDC adopters has a negative relationship with CBDC adoption at home.[6]

Table 5: Bivariate correlations for CBDC adoption

	CBDC adopters	Non-adopters	Difference	p-value
Inflation	1.481	1.609	-0.128	0.517
Banking crises	1.000	0.719	0.281	0.053
Bank branches	2.966	2.569	0.397	0.067
EU sanctions	0.300	0.222	0.078	0.340
Political globalization	77.899	61.788	16.112	0.000
GDP per capita	9.582	8.407	1.175	0.000
Population	17.118	15.753	1.365	0.000
Democracy	0.577	0.512	0.066	0.227
Economic freedom	7.279	6.740	0.539	0.001
Crypto-adoption index	92.947	72.460	20.487	0.009
CBDC experience	0.475	0.007	0.468	0.000
CBDC diffusion	3.012	3.844	-0.832	0.000

To further examine these patterns, I conduct a multivariate analysis of the correlates using a linear-probability model. Table 6 shows the results. I find that macro-financial correlates—capturing the officially stated motivations—play a limited role for CBDC adoption. If included on their own, macro-financial constraints appear to have the expected effect, but the overall importance of these macro-financial variables is much smaller than in the case of peer-to-peer cryptocurrency usage. Contrary to the findings for cryptocurrency adoption, bank penetration tends to be positively related with CBDC adoption, which suggests that existing CBDCs tend to be designed as wholesale CBDCs rather than retail CBDCs, thereby maintaining the (current) role of banks in the financial system. This is confirmed by IMF research which reports a notable uptick in wholesale CBDC experiments in 2023 (IMF 2024). The trend is strong among Western central banks, which are developing wholesale CBDC after they have found retail CBDCs of limited value. For example, Denmark investigated the viability of a retail CBDC in 2016-17. Danish central bank governor Lars Rohde, quoted on CBDC Tracker, noted that the key question was about the anonymity of the retail CBDC. The investigation concluded that ‘the potential benefits of introducing central bank digital currency for households and businesses in Denmark would not match the considerable challenges which this introduction would present’ (CBDC Tracker 2024).

The motivations for CBDC based on financial inclusion no longer matter once considering the level of development, population size, and regime type. These macro-structural determinants behave as expected. Richer countries and larger countries are more likely to adopt a CBDC, reflecting their greater capacity and economies of scale. More democratic countries are less likely to adopt a CBDC, which may reflect the greater desire of autocracies to use CBDCs for monitoring domestic transactions. Indeed, less-democratic countries seem to be ahead in the stage of adoption of retail CBDCs. The exception is the EU: the European Central Bank has concluded its research on its retail CBDC—the digital euro—motivated by a desire to 'create synergies with private payment solutions and contribute to a more innovative, competitive and resilient European payment system'. The symbolic value of a digital euro should not be underestimated, as 'a digital euro would also be an emblem of the ongoing process of European integration' (CBDC Tracker 2024). In November 2023, the ECB moved into the preparation phase for the digital euro, which involves finalizing its rulebook and selecting providers that could help build a technical platform before a potential rollout in November 2025 (IMF 2024, 6).

Turning to externally-oriented drivers, I find a significantly positive relationship between CBDC adoption and EU sanctions. As the estimated coefficient size is large, this finding lends strong support to the notion that countries are adopting CBDCs to become more resilient against sanction pressure and to further the internationalization of their currencies. Economic freedom and political globalization do not appear to matter for CBDC adoption. Looking at coefficient magnitudes, the existence of any EU sanctions on a country is related to an increase in the likelihood of CBDC adoption by up to 20 percent. The relationship is also statistically significant.

Finally, the last column shows a full model that allows for adoption dynamics and cross-responses of money innovation by including indicators of CBDC experience, CBDC diffusion, and the crypto-adoption index. I find a statistically significant positive relationship between prior CBDC experience and CBDC adoption, suggesting that countries which have investigated the potential for CBDC adoption in the past are more likely to eventually adopt a CBDC—even if with a different design. As introduced before, Denmark matches this pattern: Following a feasibility study on a retail CBDC, the Danish central bank concluded that there was no need for a retail CBDC and decided to not pursue this type of CBDC further in 2016-17. However, Denmark announced research into a wholesale CBDC in 2022.

Apart from registering the highest fit—explaining about half of the variation in CBDC adoption (R^2=0.464)—the final model highlights the most robust correlates of CBDC adoption. While CBDC adoption is strongly related to per-capita income and market size, previous experience with CBDCs matters. This suggests that capacity considerations—from the size of an economy to the availability of technical expertise within national central banks—are critical for CBDC deployment. In addition, sanction pressure is a significant driver of CBDCs—reflecting the mounting geopolitical tensions of our present times.

In further analysis, I exploit differences in the design of CBDCs. The choice between retail CBDC and wholesale CBDC is not merely technical: it affects fundamentally the balance of power between the central bank and commercial banks and whether money innovations are permeated through the existing monetary order—built around commercial banks—or outside it. The results are in line with expectations. I find that macro-financial instability is a more relevant driver for retail CBDCs than for wholesale CBDCs. In fact, inflation even has a negatively significant relationship with wholesale CDBCs, suggesting that only countries with effective central banks and a track-record of financial stability are able to launch an endeavour as complex as a wholesale CBDC. Moreover, low-inflation countries are better positioned to using a wholesale CBDC, as the banking system is considered capable of performing the technical implementation of the digital currency. I also find that sanctions matter more for wholesale CBDC. Prior opportunities for learning help with the adoption of wholesale CBDC but not retail CBDCs. This again reflects the observed pattern whereby almost all central banks started out researching retail CBDC, but then adopted wholesale CBDC after they realized the practical challenges in designing retail CBDCs (Table A1).

In a final set of models, I examine the drivers of cross-border CBDCs. These CBDCs are set up with the explicit goal to facilitate international payments without the need for currency triangulation. Reflecting the low number of cases included in the dataset, the results are not particularly informative. Yet, I find that autocracies and politically less integrated countries seem to be more likely to adopt these CBDCs—in line with the theoretical expectation that countries at higher risk of exclusion from the US-dominated international payments system have greater incentives for self-insuring against disruptions to the current system (Table A2).

Table 6: Multivariate analysis of CBDC adoption

	(1)		(2)		(3)		(4)	
CBDC adoption								
Inflation	0.013	(0.033)	0.025	(0.049)	0.019	(0.048)	0.029	(0.055)
Banking crises	0.081*	(0.047)	-0.010	(0.049)	0.006	(0.050)	0.015	(0.054)
Bank branches	0.088**	(0.037)	0.005	(0.040)	-0.000	(0.039)	-0.010	(0.034)
GDP per capita			0.158***	(0.036)	0.168***	(0.043)	0.138***	(0.046)
Population			0.123***	(0.022)	0.158***	(0.033)	0.107*	(0.057)
Democracy			-0.321*	(0.185)	-0.151	(0.199)	-0.133	(0.196)
Economic freedom					0.070	(0.059)	0.058	(0.060)
Political globalization					-0.007	(0.005)	-0.004	(0.005)
EU sanctions					0.219**	(0.089)	0.192**	(0.091)
CBDC experience							0.248***	(0.069)
CBDC diffusion							0.025	(0.018)
Crypto-adoption							0.001	(0.002)
Observations	160		126		124		119	
R-squared	0.053		0.352		0.394		0.464	

Ordinary Least Squares regression with robust standard errors in parentheses. Significance levels: * p<.1 ** p<.05 *** p<.01

5. Discussion and conclusion

I examined the correlates of two forms of money innovations: *cryptocurrencies* and *central bank digital currencies* (CBDCs). I argued that the use of cryptocurrencies (and stablecoins in particular) should be driven by demand from societies with experience of banking crises, high inflation, and limited access to finance. In contrast, I expected CBDC adoption by states to be driven by a host of factors in addition to financial inclusion and financial stability, such as diversifying reserves, avoiding sanctions, and facilitating (alternative) cross-border payments, and leveraging information from transaction data. Using cross-country data on the adoption of money innovations, I found that peer-to-peer use of cryptocurrency is significantly related to the past occurrence of banking crises, high inflation, and lack of financial inclusion. In turn, CBDC adoption is significantly related to sanction pressure, whereas indicators of macro-financial instability were inconsistent. Adoption of both types of money innovations is significantly more likely in more-developed countries and in countries with a larger population size. To be sure, the study is not without limitations, as its results are based on relatively rough proxies of the underlying theoretical concepts. Moreover, the findings are correlational, which leaves unaddressed the potential for omitted-variable bias and spurious correlation. Nonetheless, as the first systematic cross-country analysis of its kind, my study provides a useful reference point for probing different potential determinants of money innovations in a multivariate framework.

Since the Global Financial Crisis, money innovations have been uniquely associated with cryptocurrencies, stablecoins, and DeFi products, reflecting financial innovation in the private sector boosted by digital technology. Since the end of the past decade, states have invested massively in their capacity to innovate money, leading to over 40 ongoing cases of CBDC exploration to date. Throughout this experimentation process, distinct CBDC designs have diffused. While initial research by central banks explored the viability of retail CBDCs, the latest wave of research focuses primarily on wholesale CBDCs. The latter are tied to the current financial system in which commercial banks are the main intermediaries for money.

While wholesale CBDCs appear to be cost-effective solutions where a well-functioning financial architecture is already in place, their underlying model is far away from the inventors of decentralized digital money that cuts out intermediaries. Wholesale CBDCs are an example of piecemeal evolution which reinforces existing infrastructures and the power relations within them. Given that wholesale CBDCs require people to have a bank account, they are unlikely to

contribute to a massive boost in financial inclusion. Wholesale CBDCs hence will be the primary choice for industrialized economies with well-developed financial markets where financial inclusion is already high but where there is potential for enhancing the efficiency of payments systems. The focus of future work by central banks will be on ensuring the interoperability among different money forms.

Notes

1 Whether bitcoin is money depends on the underlying theory of money. Bitcoin arguably fulfills all three functions conventionally associated with money. Whether bitcoin qualifies as ‘credit money’ is debatable.

2 A prominent example of a real-world asset protocol is MakerDAO, which is linked to the DAI stablecoin.

3 The official reasons for the transition to Bitcoin were to reduce the cost of remittances and to attract tourists and foreign investors. The decision has been controversial. Despite monetary incentives, adoption by citizens has been low (Hawkins 2022). The IMF warned El Salvador against increased financial instability, as Bitcoin is an unbacked reserve asset. After initial losses due to a falling price of Bitcoin, the central bank has recently made gains as the price of bitcoin has reached an all-time high (Bhattacharya, Vasilyev, and Villafuerte 2023).

4 The appendix includes bivariate plots for several country covariates and the crypto-adoption index.

5 I also explored additional correlations, finding that crypto-adoption is negatively correlated with the UN e-government index and positively correlated with corruption. I drop these variables as they are nearly collinear with other variables already included, which could lead to estimation problems in the multivariate analysis.

6 I explore additional correlations, finding a positive relationship between CBDC adoption and the UN e-government index ($p<0.01$) and a negative relationship with corruption ($p<0.01$).

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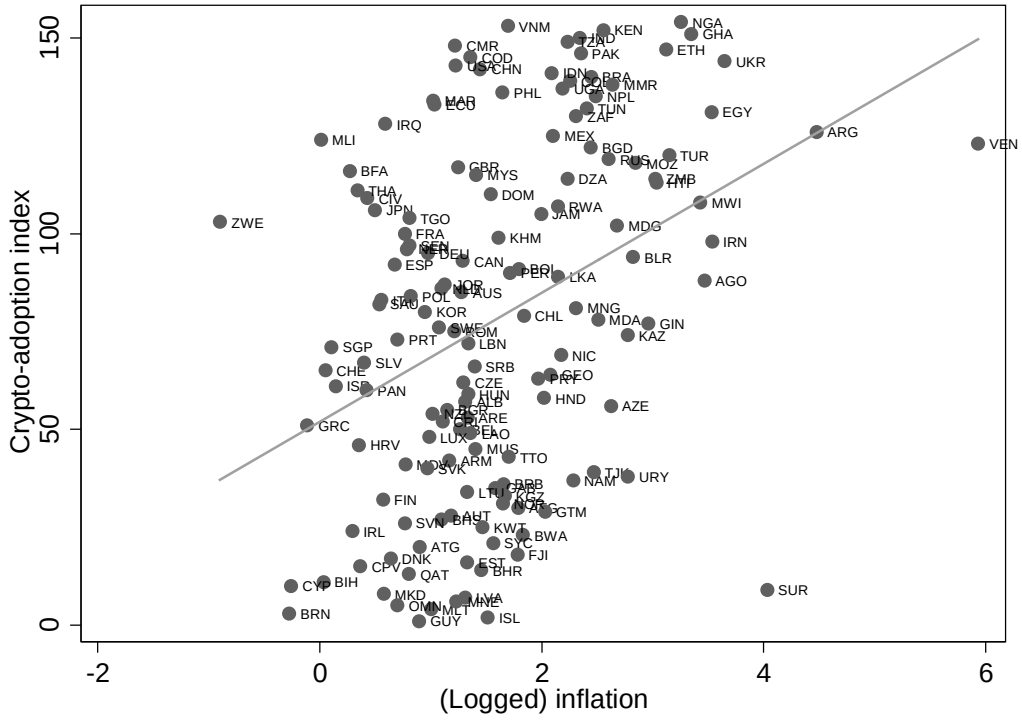
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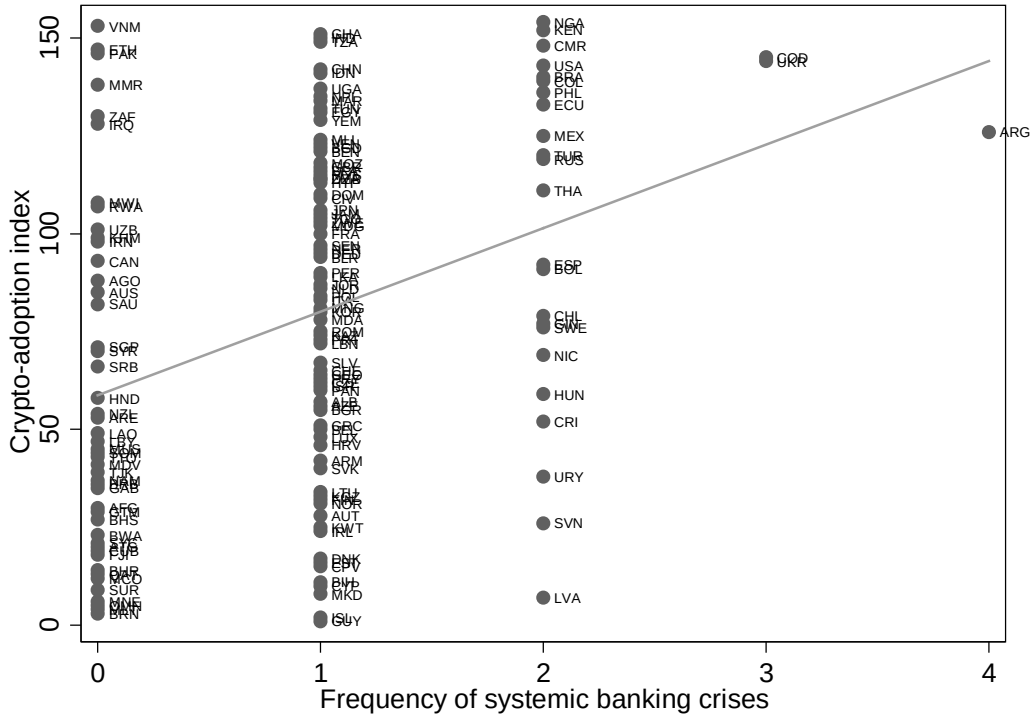
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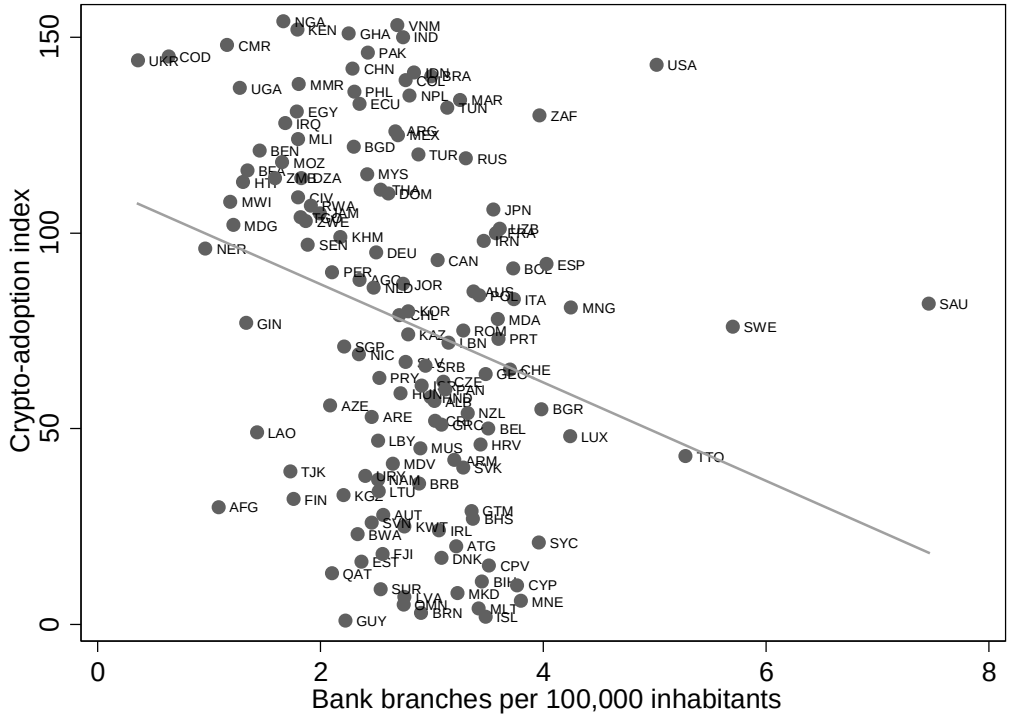
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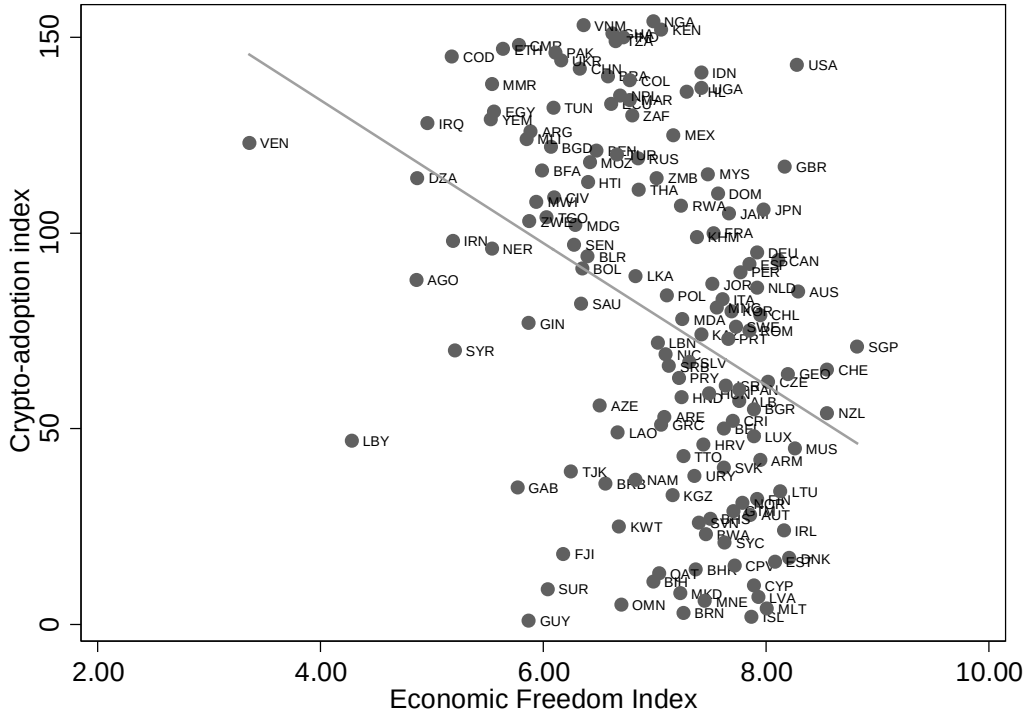
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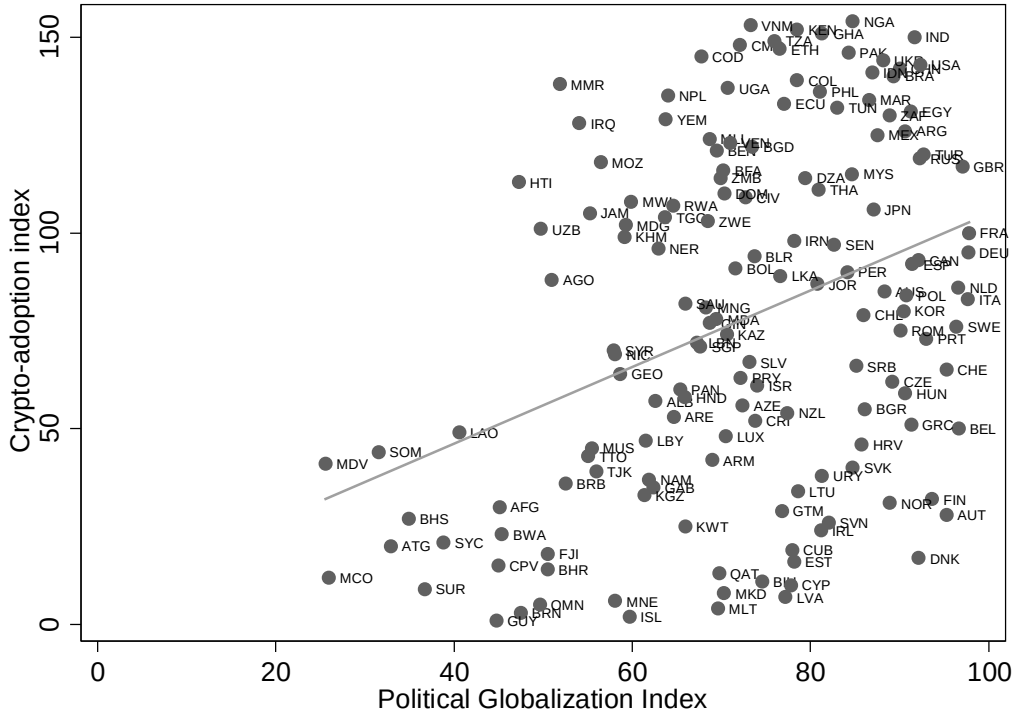
Supplemental appendix

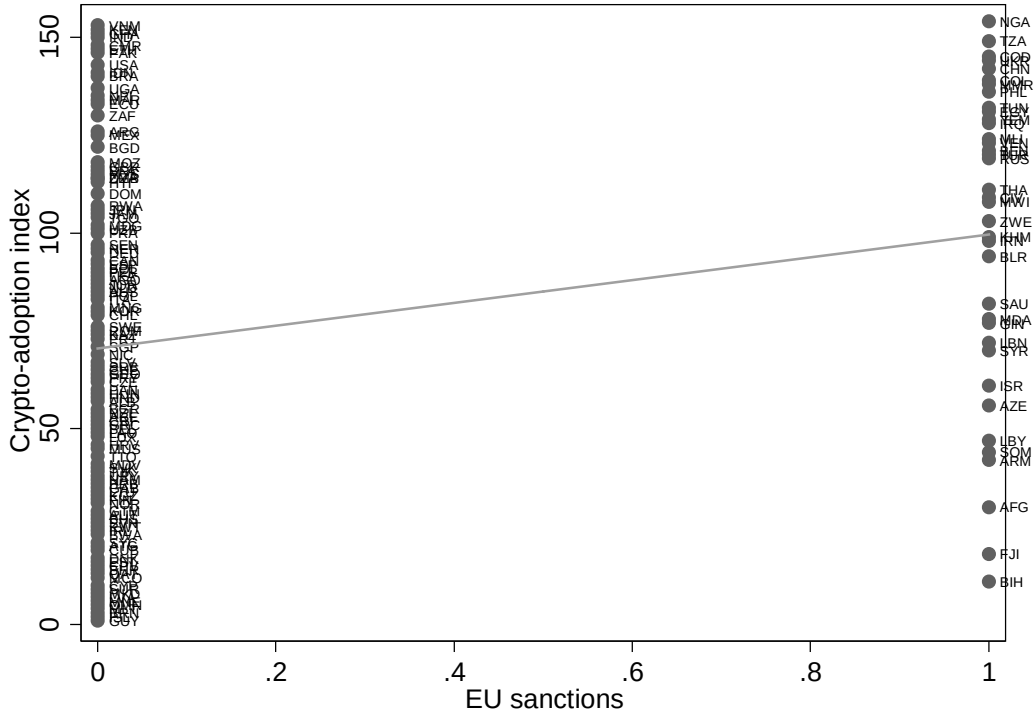


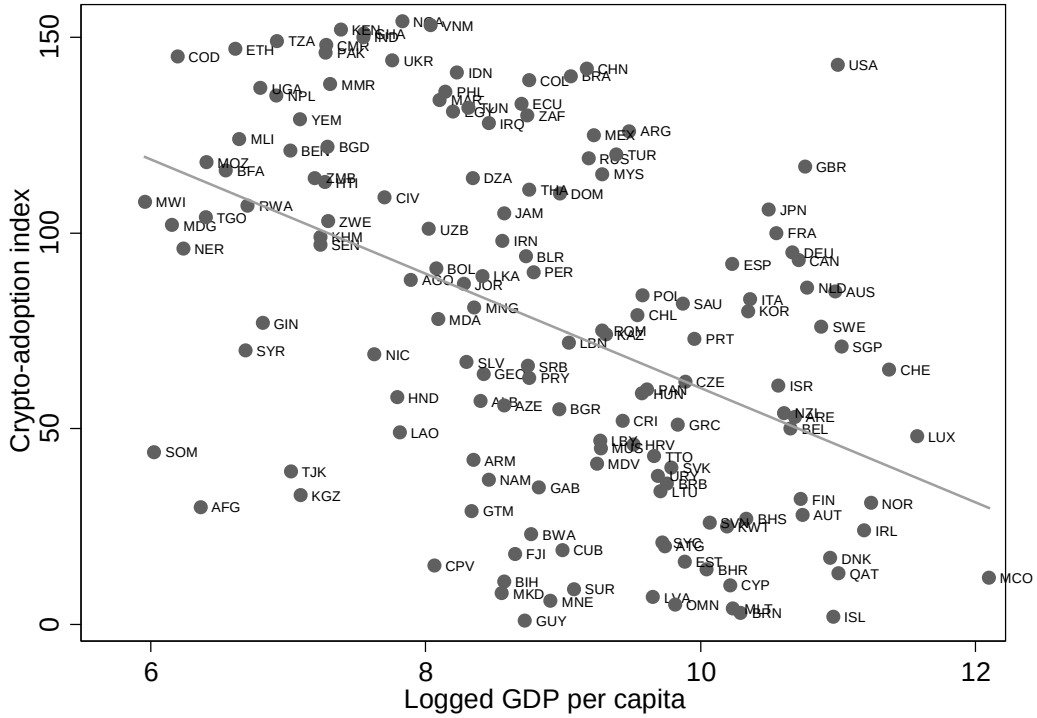


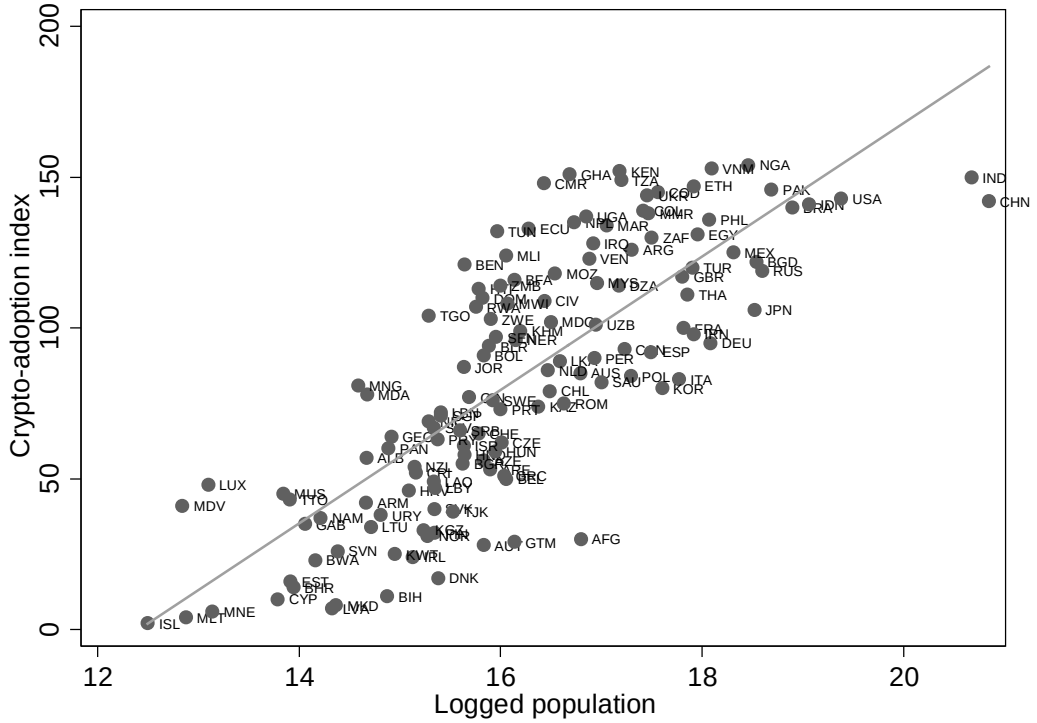

Crypto-adoption index
0
50
100
150
0
2
4
6
8
Bank branches per 100,000 inhabitants


Crypto-adoption index
0
50
100
150
2.00
4.00
6.00
8.00
10.00
Economic Freedom Index


Crypto-adoption index
0
50
100
150
0
20
40
60
80
100
Political Globalization Index


Crypto-adoption index
0
50
100
150
0
.2
.4
.6
.8
1
EU sanctions


Crypto-adoption index
0
50
100
150
6
8
10
12
Logged GDP per capita
NGA
VNM
KEN
GHA
IND
TZA
CMR
ETH
PAK
COD
UKR
USA
IDN
CHN
BRA
COL
PHL
UGA
NPL
MMR
ECU
TUN
ZAF
EGY
IRQ
YEM
MEX
ARG
MLI
BGD
BEN
TUR
RUS
MOZ
BFA
MYS
GBR
ZMB
HTI
DZA
THA
DOM
CIV
MWI
RWA
JAM
JPN
TGO
ZWE
FRA
MDG
KHM
UZB
DEU
SEN
IRN
CAN
NER
BLR
ESP
BOL
PER
LKA
AGO
JOR
NLD
AUS
POL
SAU
ITA
MNG
KOR
GIN
MDA
CHL
SWE
ROM
KAZ
PRT
SYR
LBN
SGP
NIC
SLV
CHE
GEO
SRB
PRY
CZE
ISR
HND
HUN
AZE
BGR
NZL
CRI
GRC
LAO
BEL
LUX
SOM
LBY
MUS
HRV
TTO
ARM
MDV
SVK
TJK
NAM
GAB
LTU
FIN
NOR
KGZ
AFG
GTM
AUT
BHS
IRL
BWA
KWT
FJI
CUB
DNK
CPV
EST
QAT
BIH
BHR
CYP
MCO
MKD
SUR
MNE
LVA
OMN
ISL
GUY


Crypto-adoption index
0
50
100
150
200
12
14
16
18
20
Logged population
NGA
VNM
GHA
KEN
IND
CMR
TZA
ETH
PAK
USA
CHN
UKR
BRA
PHL
UGA
MMR
MAR
EGY
TUN
ECU
IRQ
ZAF
ARG
MEX
MLI
VEN
BEN
MOZ
TUR
RUS
BFA
MYS
DZA
GBR
THA
ZMB
CIV
JPN
TGO
ZWE
MDG
UZB
FRA
DEU
ESP
BOL
PER
JOR
NLD
AUS
POL
SAU
ITA
KOR
MNG
MDA
CHL
SWE
ROM
KAZ
PRT
CZE
LUX
MDV
MUS
TTO
ARM
NAM
URY
GAB
LTU
AFG
GTM
AUT
SVN
BWA
IRL
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CYP
BIH
MNE
ISL
MLT

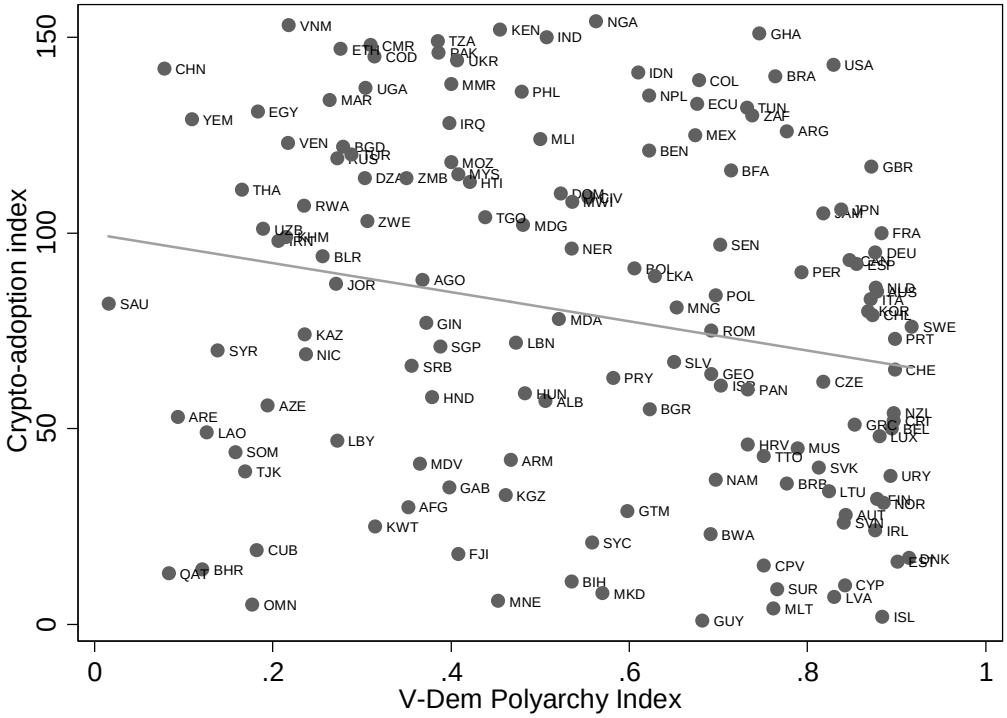

Crypto-adoption index
0
50
100
150
V-Dem Polyarchy Index
0
.2
.4
.6
.8
1
VNM
KEN
NGA
IND
GHA
TZA
ETH
CMR
COD
PAK
UKR
CHN
IDN
COL
BRA
USA
UGA
MMR
PHL
NPL
ECU
TUN
MAR
ZAF
EGY
IRQ
MEX
ARG
YEM
MLI
VEN
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RUS
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BFA
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MDA
ROM
SWE
KAZ
LBN
PRT
SYR
SGP
NIC
SLV
CHE
SRB
GEO
PRY
ISR
PAN
CZE
HND
HUN
ALB
BGR
NZL
ARE
AZE
GRC
LAO
LBY
HRV
MUS
LUX
SOM
MDV
ARM
TTO
SVK
TJK
NAM
URY
GAB
KGZ
BRB
LTU
AFG
GTM
NOR
KWT
AUT
SVN
BWA
IRL
CUB
SYC
FJI
CPV
BHR
BIH
SUR
CYP
OMN
MNE
MKD
LVA
MLT
GUY
ISL

Table A1: Design of CBDCs: retail CBDC versus wholesale CBDC

	(1)		(2)		(3)		(4)	
Retail CBDC								
Inflation	0.059**	(0.026)	0.095**	(0.038)	0.093**	(0.038)	0.093**	(0.040)
Banking crises	0.072*	(0.040)	0.043	(0.048)	0.056	(0.047)	0.055	(0.052)
Bank branches	0.046	(0.032)	0.018	(0.038)	0.015	(0.039)	0.017	(0.040)
GDP per capita			0.063**	(0.029)	0.054	(0.036)	0.052	(0.034)
Population			0.051**	(0.023)	0.070*	(0.036)	0.082	(0.052)
Democracy			-0.110	(0.170)	-0.074	(0.177)	-0.059	(0.176)
Economic freedom					0.069	(0.049)	0.072	(0.052)
Political globalization					-0.003	(0.004)	-0.003	(0.004)
EU sanctions					0.084	(0.079)	0.103	(0.088)
CBDC experience							-0.043	(0.055)
CBDC diffusion							0.003	(0.012)
Crypto-adoption index							-0.001	(0.001)
Observations	160		126		124		119	
R-squared	0.069		0.185		0.202		0.308	
Wholesale CBDC								
Inflation	-0.046**	(0.023)	-0.070**	(0.035)	-0.075**	(0.034)	-0.065*	(0.035)
Banking crises	0.009	(0.029)	-0.053	(0.035)	-0.050	(0.039)	-0.040	(0.035)
Bank branches	0.041	(0.031)	-0.013	(0.040)	-0.015	(0.037)	-0.026	(0.035)
GDP per capita			0.095***	(0.032)	0.114***	(0.038)	0.086**	(0.040)
Population			0.072***	(0.023)	0.088***	(0.033)	0.025	(0.050)
Democracy			-0.211	(0.168)	-0.077	(0.173)	-0.074	(0.146)
Economic freedom					0.001	(0.054)	-0.013	(0.048)
Political globalization					-0.004	(0.003)	-0.001	(0.003)
EU sanctions					0.135*	(0.076)	0.088	(0.074)
CBDC experience							0.291***	(0.065)
CBDC diffusion							0.022*	(0.013)
Crypto-adoption index							0.001	(0.001)
Observations	160		126		124		119	
R-squared	0.052		0.254		0.283		0.441	

Maximum likelihood estimation of a system of two equations with robust standard errors in parentheses. Significance levels: * p<.1 ** p<.05 *** p<.01

Table A2: Cross-border CBDCs

	(1)		(2)		(3)		(4)	
Cross-border CBDC								
Inflation	-0.010	(0.015)	-0.025	(0.023)	-0.031	(0.024)	-0.006	(0.017)
Banking crises	0.004	(0.024)	-0.025	(0.032)	-0.010	(0.037)	-0.010	(0.024)
Bank branches	0.060*	(0.031)	0.031	(0.036)	0.032	(0.034)	0.023	(0.028)
GDP per capita			0.075**	(0.032)	0.101***	(0.036)	0.085**	(0.038)
Population			0.034*	(0.020)	0.060**	(0.029)	0.007	(0.049)
Democracy			-0.374**	(0.166)	-0.254	(0.170)	-0.249*	(0.129)
Economic freedom					-0.002	(0.047)	-0.007	(0.034)
Political globalization					-0.006*	(0.003)	-0.005*	(0.003)
EU sanctions					0.072	(0.062)	0.027	(0.053)
CBDC experience							0.321***	(0.075)
CBDC diffusion							-0.006	(0.008)
Crypto-adoption index							0.001	(0.001)
Observations	160		126		124		119	
R-squared	0.065		0.235		0.271		0.545	

Ordinary Least Squares regression with robust standard errors in parentheses. Significance levels: * p<.1 ** p<.05 *** p<.01