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The Rise of Digital Money: CBDCs, Crypto, and Global Finance

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I. INTRODUCTION

The rise of digital currencies has caught the attention of governments, banks, and tech companies. While cryptocurrencies and central bank digital currencies (CBDCs) take very different paths, both are changing how we think and talk about money on a global scale. CBDCs are electronic extensions of fiat money that is supported by the state and intended to be an instrument of legal tender with sovereign support, cryptocurrencies like Bitcoin offer decentralized, pseudonymous networks that are beyond the control of the center. This paper discusses how these tools are transforming the nature of financial inclusion, cross-border payments, and the implementation of monetary policy. Drawing exclusively from primary sources–reports and speeches by the BIS, IMF, PwC, Visa, and central banks–we assess the implications of digital currency adoption through both theoretical discussion and empirical case studies. Our focal point includes China's e-CNY and El Salvador's Bitcoin initiative, examining their policy goals, operational realities, and economic effects.

II. FOUNDATIONS AND ARCHITECTURE OF DIGITAL CURRENCIES

Evolution of Digital Money –

The development of digital currencies sits at the intersection of decades-long digitization trends and the more recent emergence of new monetary frameworks. While commercial bank money has been digital for decades, the past two decades have seen a shift in both infrastructure and ideology.

- **Real-time digital payment systems**: Platforms like UPI in India, PIX in Brazil, and CoDi in Mexico now let people move money instantly, around the clock. These systems are becoming part of the everyday cash, accelerating and facilitating payments.
- **Low-resource mobile money:** Despite the presence of low banking infrastructure, Kenya's M-Pesa showed how mobile wallets can operate and provide financial accesiblity.
- **Fintech shaking things up the status quo:** Startups and tech companies are revolutionizing the way people handle money – paying, sending money, and shopping online – making it easier, often bypassing banks.

Blockchain's Disruption and Emergence of CBDCs –

The establishment of Bitcoin in 2009 created a decentralized option to fiat currency. Yet, volatility and lack of regulatory clarity in cryptocurrencies prompted central banks to entertain CBDCs as equilibrium of sovereignty.

According to BIS General Manager Agustín Carstens (2021):

"CBDCs should do no harm. they must maintain monetary and financial stability, while facilitating new digital functionality."

Design Choices for CBDCs –

CBDCs are not one-size-fits-all. Their architecture depends heavily on the objectives of the issuing central bank. Based on BIS and PBoC documentation, the major design axes are:

Dimension	Options	Description
Access Model	Retail vs Wholesale	Retail CBDCs are accessible to the public; wholesale CBDCs are limited to interbank use.
Technical Infrastructure	Centralized vs Decentralized	Majority of CBDCs prefer centralized ledgers to ensure control and efficiency.
Validation Mechanism	Token-based vs Account-based	Token systems mimic cash, with privacy; account systems enable traceability and regulation.
Intermediation	Two-tier vs Direct issuance	Most CBDCs, like China's e-CNY, use a two-tier model: central banks issue to intermediaries (banks, fintechs), who distribute to end users.

Case Example: China's e-CNY Hybrid Model –
According to the PBoC's technical white paper, e-CNY in China is built on top of a two-tier hybrid architecture:
- •PBoC issues e-CNY to licensed banks (e.g., ICBC, CCB), and the licensed banks then issue it to users through apps.
- User wallets are distinguished by the level of identity verification—ranging from anonymous wallets with low limits to identified accounts with high usage limits.
- e-CNY facilitates offline payment, dual offline payment (device-to-device), and programmable capabilities such as smart contracts.
- This technology enables AML/KYC compliance without compromising usability. At the time of early 2024, e-CNY was pilot applied in more than 26 cities and was utilized in more than 950 million RMB of transactions at the Hangzhou Asian Games.

BIS Recommendations –
The BIS establishes fundamental operational objectives for CBDCs:
- Interoperability with current systems,
- Operational resilience with high transaction volumes,
- Privacy-protecting mechanisms still allowing traceability by law enforcement,
- Cooperation worldwide in order to avoid cross-border inefficiencies.

Carstens warns against a "race to deploy" situation for central banks. Instead, digital currency deployment should be prioritized with coherence and not haste, so that any new money contributes to enhancing the monetary system rather than fragmenting it.

REGULATORY RESPONSES AND GLOBAL DIVERGENCE
Not every country is going in the same direction regarding digital currencies. Their choices show how much politics, trust, and economic structure shape this space.
In richer countries, regulators are cautious. China's e-CNY is run by the state from top to bottom. The central bank issues it, state banks distribute it, and authorities can see the flows. The U.S. is still undecided. The Fed says any "digital dollar" would have to protect privacy, work through banks, and have clear approval from Congress. Europe is moving slowly on a digital euro, focusing first on laws and public trust.
In poorer countries, the moves have been bolder. Nigeria launched the eNaira in 2021 to cut remittance costs and widen access to money. Uptake has stayed low, mainly because of weak infrastructure and public doubt. El Salvador made Bitcoin legal tender in 2021 to draw investment and modernize payments. It has faced heavy pushback from the IMF for doing this without clear safeguards.
These examples show that digital currencies are not just a technical project. They are a political one. Without shared rules between countries, problems like money laundering or regulatory loopholes will spread. Both the BIS and the IMF warn against moving too fast without coordination.

MACROECONOMIC IMPLICATIONS OF DIGITAL CURRENCIES Digital currencies change how money moves and how central banks work. The effects cut both ways –
Financial Inclusion –
Retail CBDCs are supposed to make banking easier for people without accounts. Nigeria, Ghana and the Bahamas have tried them for this reason (PwC, 2021). But success depends on phones, internet, and whether people actually trust the system. Nigeria's eNaira shows how weak uptake can be when these aren't in place.

Cross-Border Payments –
Sending money abroad is slow and expensive. BIS data show correspondent banking links have fallen about 20% in the last decade, pushing up costs. CBDCs could clear transfers instantly between currencies. The mBridge test by China, Hong Kong, Thailand and the UAE show this can work technically, but rules between countries don't match yet.

Banks and Monetary Policy –
CBDCs enable central banks to pay money directly or even interest. However, that may be handy in recessions or taxation. If too many dollars get pulled out of bank deposits into CBDC accounts, banks lose deposits and lending gets weaker. BIS recommends limits and tiering of interest to dissuade the shift.

Currency Substitution –
Weak currencies also face the risk that people would resort to foreign CBDCs or stablecoins, just as they now use physical dollars. The IMF warns this would undermine domestic control if domestic systems are not strong.

Privacy and Security –
CBDCs open up new attack vectors. Visa mentions denial of service attacks, hacks, and insider leaks. China's e CNY has partial user anonymity and full regulator visibility. This trade-off helps compliance but is a worry on the surveillance side.

III. CASE STUDY: EL SALVADOR & CHINA

El Salvador –
In September 2021, El Salvador made Bitcoin legal tender alongside the U.S. dollar. The government promoted the move as a way to improve inclusion and modernize payments. It offered a $30 Bitcoin bonus to citizens downloading the Chivo wallet. According to the IMF's 2023 Article IV report, the impact has been minimal. Only 2% of remittances—which make up over a quarter of GDP—arrive in Bitcoin. 98% of businesses say they do not use it. Most Chivo users withdrew the bonus and stopped. The IMF indicated the policy to be non-transparent and suggested eliminating the legal tender status for Bitcoin.
Macroeconomic pressure contributes to the issue. The government debt hit 82% of GDP in 2023, and reserves fell to under two months' worth of imports. Details on Bitcoin activity remain limited, and the Fidebitcoin trust has not published full disclosures. The IMF also warned about the "Volcano Bonds"—planned tokenized debt backed partly by Bitcoin—calling them speculative and risky.

China –
China's e CNY follows a completely different path. It is a central bank digital currency run by the People's Bank of China. As of mid-2024, it had over 260 million wallets and overall transactions worth over USD 250 billion. The e CNY is still illegal tender all over the nation but is accepted everywhere in pilot cities and government services such as transportation, utilities, and local subsidies.
The PBoC says its aims are to protect monetary sovereignty, reduce reliance on Alipay and WeChat Pay, and tighten data governance. The design is two tiered: the central bank issues e CNY to state banks, which then distribute it to users. This keeps banks in the loop but gives the PBoC full visibility.
Adoption remains challenging. The majority of users still rely on private apps for better interfaces and merchant acceptability. Privacy and surveillance issues are the greatest impediment to higher adoption. e CNY adoption remains restricted cross border despite Hong Kong pilots and participation in the mBridge initiative.

Comparative Analysis –
El Salvador's Bitcoin move was symbolic and rushed but space and trust. China's introduction of e CNY is more measured and tightly managed but has its own issues with user habits and privacy. While the IMF is scolding El Salvador for fiscal risk, China is using the e CNY to further state control. The following table provides a comparative snapshot along key economic and policy dimensions, and it highlights the bifurcation in adoption, infrastructure, and regulatory approaches –

Metric/Theme	El Salvador (Bitcoin)	China (e-CNY)
Launch Year	2021	Pilots since 2020; broader expansion in 2022
Legal Status	Legal tender (mandated acceptance)	Not legal tender; optional use in pilots
User Adoption	~20% downloaded Chivo Wallet; 60% stopped using it after spending the $30 incentive	Over 260 million e-CNY wallets opened by mid-2023
Usage in Remittances	Only 2% of total remittances received in Bitcoin	Not yet used for cross-border retail transfers
Business Acceptance	98% of business do not regularly accept Bitcoin	e-CNY accepted in public transit, utility payments, selected retailers
Banking Infrastructure Integration	Limited – parallel system with minimal interoperability	Fully integrated with existing state-owned banks and WeChat/Alipay partners
Central Bank Oversight	Largely Hands-off, speculative driven	Directly issued and controlled by the People's Bank of China
Economic Motivation	Promote innovation, attract crypto investors	Reduce dependence on tech giants; enhance monetary control and financial inclusion
Risks Identified (IMF/BIS)	Fiscal exposure, price volatility, money laundering, reputational risks	Data privacy, surveillance concerns, disintermediation of banks

FORWARD-LOOKING IMPLICATIONS AND POLICY CONSIDERATIONS

Digital currencies are set to sit alongside cash, commercial deposits and stablecoins rather than replace them outright. Central banks will have to manage how these forms of money interact so that monetary policy remains effective and stable.

Programmable features in CBDCs create obvious opportunities. Governments could send direct transfers, deduct taxes automatically, or issue subsidies with conditions attached. Those same features also carry risks if

they're pushed beyond their original purpose. BIS officials have warned that central banks should not become active intermediaries in routine payments between citizens and firms.

International coordination is lagging. Without common rules, countries face gaps in supervision, mismatched technical standards and more room for abuse. The IMF and G20 are trying to build shared frameworks on taxation, anti-money-laundering and basic system design, but progress is slow.

Several tensions remain unresolved. Privacy sits opposite regulatory oversight; innovation risks undermining banks if deposits shift; open economies may find capital outflows harder to control. The IMF has highlighted that CBDCs could complicate capital-control policies in vulnerable countries if rollouts go ahead without safeguards.

INTEROPERABILITY AND CROSS-BORDER CBDC EXPERIMENTS

Most CBDC pilots are for domestic use, but the harder challenge is making them interoperable internationally. Remitting money across borders remains slow and expensive today, which is a real problem for trade-reliant or remittance-reliant countries. Digital currencies would fix this, however, if there is agreement between central banks on common rules. Project mBridge is one of the first real attempts at this. It links the central banks of China, Hong Kong, Thailand, and the UAE through a shared blockchain so they can each use their own CBDC for cross-border payments. In 2023, the pilot handled about $22 million worth of transactions. The idea is to clean between countries directly without going through correspondent bank tiers.

China is also testing the e CNY in restricted cross-border settings. Foreign visitors used it for use during the 2022 Winter Olympics, and trials are being conducted in some border areas. However, adoption beyond China is limited because of exchange rate risk, privacy concerns, and diverse legal regimes.

For small economies, the stakes are higher. If foreign CBDCs or stablecoins corner cross-border transactions, local central banks can be blinded and lose control. That's why groups like the IMF and BIS keep calling for shared standards on compliance and data security. Progress has been slow, but without those rules, interoperability will stay limited to pilots.

IV. CONCLUSION

Digital currencies are out in the real world now, not just in theory. But how they work—and whether they work at all—depends a lot on how they're rolled out and whether people actually want to use them. El Salvador and China show how different the outcomes can be. One went all-in on Bitcoin with almost no safety net, and the other is carefully testing a state-backed system. Neither has it fully figured out.

What's clear is that putting a new form of money into people's hands isn't enough. People need reasons to use it, trust in how it works, and confidence that it's better—or at least easier—than what they're already doing. If those parts are missing, it doesn't matter how innovative the tech is. Most people will just ignore it.

Cross-border payments are where digital currencies could help the most. Right now, sending money across countries is still slow and expensive. Projects like mBridge are trying to fix that by letting countries connect their digital currencies directly. It's a good start, but real change will only come if there's global agreement on rules, privacy, and how everything connects.

In the end, CBDCs and other digital currencies probably won't replace cash or bank deposits. They'll sit alongside them. What matters is whether they actually solve real problems—like high fees, lack of access, or slow transfers. If governments keep the focus on those goals, and don't just chase headlines, digital money could end up being useful. If not, it might just fade into the background.

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