ONLINE ANNEX 2.1. TECHNICAL NOTE

A Basic Taxonomy[1]

For the purposes of this chapter, digital money and crypto assets can be classified[2] according to key features that highlight their risks. These differ according to (1) the issuer—whether it is private or public; (2) the denomination—whether it is in an existing monetary unit or in a new unit of account; (3) convertibility or redemption into a sovereign currency—whether at a fixed face value or at the prevailing market value; and (4) the type of backing—including reserve assets of varying degrees of stability and liquidity regarding which end-users may have a direct legal claim, as well as additional public backstops such as access to emergency liquidity. Different features of digital money and crypto assets have important implications in terms of "money-like" properties (that is, in their fungibility with existing national currencies) and risks to end-users and financial stability. This classification, and how the chapter will refer to the different categories, is summarized in Table 2.1.

- **Central bank digital currency (CBDC)** is a public digital form of money issued by a central bank. It is commonly denominated in the national currency and is typically convertible to other forms of central bank money. Depending on the objectives, it can be made accessible for all domestic users to serve as a substitute for cash (retail CBDC), or only to selected financial institutions to help improve financial market efficiency (wholesale CBDC). Launched in October 2020, The Bahamas' sand dollar is the only fully operational CBDC, and it is retail. Many countries, however, are investigating CBDCs and several have completed proof-of-concepts or pilots.

- **eMoney** is a privately issued digital alternative to cash. eMoney providers are regulated and supervised according to rules specific to their activities. This creates a legal obligation of redemption at face value and a requirement to have means to do so. Reserve assets can only be highly safe and liquid, and eMoney providers must have sufficient capital.

- **Crypto asset** is a type of a private digital asset that depends primarily on cryptography and distributed ledger technology (DLT) for record keeping.

    - **Stablecoin** is a crypto asset that aims to maintain a stable value relative to a specified asset (or a pool of assets).[3] Stablecoins that maintain a peg to a sovereign money are more likely to be used as form of digital money. Stablecoins vary in their characteristics, such as their backing assets. These differences should result in substantially different regulatory treatment, as discussed in the stablecoins section. Depending on their structure and usage, they could fall under payments, securities, or banking regulations or even require bespoke regulation. Stablecoins also share many of the money laundering/terrorist financing risks (ML/TF) as other crypto assets. For example, depending on how they are designed, stablecoins may allow anonymous peer-to-peer transactions via "unhosted" wallets.

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[1] The authors of this section are Parma Bains, Dimitris Drakopoulos, Federico Grinberg, Evan Papageorgiou, Nobuyasu Sugimoto.

[2] See CPMI (2015) and Adrian and Mancini-Griffoli (2021) for a discussion of more granular categorizations of digital means of payment.

[3] A related term is "global stablecoins", which is a stablecoin with a potential reach and adoption across multiple jurisdictions and the potential to achieve substantial volume. According to the survey conducted by FSB in 2019, BigTech involvement is considered as one of the main features of a global stablecoin by some participating jurisdictions.

- **Non stablecoin crypto assets,** such as Bitcoin, Ether, and others are issued in their own denomination, also use DLT for record keeping, are not backed by other assets, and cannot be redeemed by the issuing entity. By most standards, crypto assets do not represent money, as their value is volatile and they lack public backing.

Online Annex Table 2.1. Taxonomy of Digital Money and Crypto Assets

	Publicly Issued	Privately Issued		
			Crypto assets	
	Central Bank Digital Currency	eMoney	Stablecoins	Non stablecoin crypto assets
Denomination	National currency	National currency	National currency or commodity	Own
Redemption Pledge	None (not a claim but convertible to other forms of central bank money)	At face value	At face value or market value of reserves	None
Backing	Central bank balance sheet	Full backing only by highly safe and liquid assets, capital, and bankruptcy remote structures	Full or partial backing by a variety of assets	None
Examples	Sand dollar (The Bahamas)	AliPay, mPesa, Wyoming license	Tether, USD Coin	Bitcoin, Ether

Source: IMF staff.

Features of the Crypto Ecosystem

The growing interest in crypto assets has given rise to several associated entities that together have formed a "crypto (assets) ecosystem"[4]. Examples of entities are crypto exchanges, wallet providers, miners, and stablecoin issuers. These entities perform key functions in the crypto ecosystem, including (1) establishing governing rules, (2) storing the private access keys for users, (3) trading crypto assets, (4) issuing, creating, and destroying crypto assets, (5) managing reserves, (6) providing custody and trust services for reserve assets, (7) operating the infrastructure and (8) validating transactions. The functions can be performed by entities that operate on-chain or off-chain (Table 2.2). On-chain refers to actions executed on the DLT network, and those actions are usually public but can be anonymous (for example, privacy tokens).[5] Off-chain refers to actions executed on a network (for example an exchange) but not on the DLT itself. These actions can be public depending on the preferences of the network operator.

[4] There is also a broader ecosystem around digital money and assets but for the purpose of this chapter the focus is on crypto assets.

[5] Privacy tokens are designed to be anonymous and untraceable by obscuring the origin and destination of transactions and concealing any other identifiable information.

Online Annex Table 2.2. On-Chain and Off-Chain Functions in the Crypto Ecosystem

	On-Chain	Off-Chain
Transactions	Executed on blockchain using cryptography	Executed on a network (for example, exchange) but not on the blockchain
Data Availability	Transaction history is (usually) public but anonymous	A network operator (for example, exchange) can record personal identification, online identifiers as well transaction information data

Source: IMF staff.

An important consideration for the regulation of these entities is whether or not they are centralized. Centralized entities act as an intermediary for a specifying function (for example, matching buyers and sellers). Their governance is "off-chain" and set by a single entity. Decentralized entities operate without an intermediary. A key example is decentralized finance platforms, or entities that offer various types of financial services.[6] Such entities can exist and operate fully autonomously without legal incorporation and typically without being subject to traditional financial regulations and oversight.

Crypto exchanges play a vital role in the crypto ecosystem. Most large crypto exchanges are centralized entities (for example, Binance, Huobi). Many of them play the critical role of allowing users to access crypto assets and stablecoins through a large selection of sovereign currencies (also known as "on and off-ramps"), while others focus on intermediating trading of crypto assets and stablecoins. These exchanges also differ from traditional exchanges in three main ways: they typically permit direct trading access to retail investors; they can trade off their own inventory rather than matching buyers and sellers (for example, they have trading desks exposed to principal risk); and they also provide off-chain custody services.

Owning a crypto asset can be anonymous.[7] The ownership and use of crypto assets relies on knowing the private "keys" that are stored in "wallets." Depending on how they operate,[8] wallets can be classified as "hot" (connected to the Internet) or "cold" (kept offline) as well as "hosted" (hosted by a third-party provider) or "unhosted." "Unhosted" wallets can make it difficult or impossible to determine who is in control of the crypto assets which in turn can allow for concealment of illicit financial activity.

[6] Decentralized finance platforms operate using smart contract blockchains such as Ethereum and enable peer-to-peer trading of crypto assets on-chain. "Smart contracts" are self-executing contracts that run when predetermined conditions are met.

[7] Sometimes referred to as "pseudo anonymous" given that forensics around the activity of a public address holding crypto assets can potentially trace back to a real word identity.

[8] Another distinction is whether the wallet uses hardware (for example keys stored on a USB flash drive), online (for example keys stored on in an application) or even a physical medium (for example keys written on a piece of paper).

References

Committee on Payments and Market Infrastructures. 2015. Digital currencies.

Adrian, Tobias and Mancini-Griffoli, Tommaso. 2021. “The Rise of Digital Money.” Annual Review of Financial Economics, Volume 13.