ISSN (Print): 2788-8320 ISSN (Online): 2788-8339

JOURNAL OF SOCIAL RESEARCH DEVELOPMENT
www.jsrd.org.pk editor@jsd.org.pk

WHICH CODE IS CURRENCY? A LAYERED MODEL OF THE MONEY-PROSPECTS OF BITCOIN, ALTCOINS, STABLECOINS AND CENTRAL BANK DIGITAL CURRENCIES

Muhammad Suleman Afzal[1], Usama Tahir[2], Baber Amin[3]

[1]Assistant Professor, International Institute of Islamic Economics (IIIE), International Islamic University Islamabad, Email: muhammad.suleman@iiu.edu.pk

[2]Assistant Professor, International Institute of Islamic Economics (IIIE), International Islamic University Islamabad,

[3]Assistant Professor, International Institute of Islamic Economics (IIIE), International Islamic University Islamabad,

KEYWORDS

Money-prospects; Cryptocurrency; Stable coins; CBDC; Thamaniyyah; Ontology of money; Islamic monetary economics

ARTICLE HISTORY

Date of Submission: 25-07-2026
Date of Acceptance: 28-08-2026
Date of Publication: 30-08-2026

ABSTRACT

Purpose – The money-prospects of cryptocurrencies remain hotly debated, largely indecisive and, with respect to their different genres, only partially attempted. This study develops and applies a conceptual model to assess the money-prospects of cryptocurrencies as a whole and across Bitcoin, altcoins, stablecoins and, as a limiting case, central bank digital currencies (CBDCs), in conventional as well as Sharīʿah terms, and derives testable propositions for empirical research. **Design/methodology/approach** – A layered ontology of money, which joins substrate (māl), validity (taqawwum), social constitution (iṣṭilāḥ), function (taʿāmul), persistence (miʿyār) and purpose (maqāṣid), is operationalised into a rubric-based assessment model. Seven genre types are rated for 2021 and 2026 on evidence published, including peer-reviewed studies, statutes, central bank reports and collective fatāwá, and the ratings are subjected to sensitivity analysis. **Findings** – Cryptocurrency does not form a single monetary kind. Unanchored tokens are property with network-level convention; they are restrained first by contested validity and then by weak circulation and stability. Fiat-backed stablecoins show the most complete private profile, though their moneyness is borrowed from the currency they represent, while CBDCs are state money in a new technical form constraint by weak adoption and acceptance. Across genres, moneyness declines as decentralisation rises. **Originality/value** – The study offers the first layer-wise and genre-specific assessment of money-prospects that brings juristic and conventional criteria together, documents how the evidence of 2022–2026 moved each genre, and sets out seven propositions for empirical testing.

2026 Journal of Social Research Development

Correspondence	Muhammad Suleman Afzal
Email:	muhammad.suleman@iiu.edu.pk
DOI	https://doi.org/10.59075/jsrd.v7i6.651
Volume/Issue	7(6), 2026, 566-593

Introduction

The new breed of money, cryptocurrency, is not "old wine in a new bottle"; it is rather a new wine in a new bottle, having a decentralised, publicly distributed and immutable protocol-based mechanism of creation and issuance which contrasts it from conventional digital fiats (Afzal, 2022). Seventeen years after the white paper on Bitcoin (Nakamoto, 2008), whether such code can become currency remains hotly debated and largely indecisive. What has changed is the object of the debate. The cryptocurrency market has evolved from Bitcoin alone (Cryptocurrency 1.0) to altcoins built on programmable blockchains (Cryptocurrency 2.0) and then to stablecoins and central bank digital currencies (Cryptocurrency 3.0), and these generations, owing to fast development and innovation, still overlap and evolve together (Afzal, 2022). Since 2021, however, they have also parted ways sharply. An algorithmic stablecoin lost about USD 50 billion of value within three days (Liu et al., 2023); El Salvador made the acceptance of Bitcoin voluntary less than four years after declaring it legal tender (Alvarez et al., 2023; International Monetary Fund, 2025); and spot Bitcoin exchange-traded products were approved as investments in what the regulator itself called "primarily a speculative, volatile asset" (Securities and Exchange Commission, 2024). In the meantime, statutes in the European Union, Hong Kong and the United States turned fiat-backed stablecoins into licensed payment instruments (GENIUS Act, 2025; Regulation (EU) 2023/1114; Stablecoins Ordinance, 2025), and 91% of the central banks surveyed by the Bank for International Settlements were exploring a CBDC (Illes et al., 2025). Any answer that treats "cryptocurrency" as one thing can hardly capture paths so divergent.

Most of the researchers who have worked on the money-prospects of cryptocurrency have largely relied upon the commodity perspective and its functions of money (Afzal & Bhatti, 2021). A ray of studies maintains that cryptocurrencies behave as speculative assets rather than as money (Baur et al., 2018; Yermack, 2015), while another contends that they carry real advantages over traditional currencies and may yet become money (Hazlett & Luther, 2020; Luther & White, 2014). Both camps, by and large, measure the functions; few of them ask what money is. The social ontology of money, which takes money as an institutional status upheld by collective acceptance (Searle, 2017; Smit et al., 2016), has been brought to Bitcoin in essays (Bjerg, 2016; Weber, 2016), though not as a model with stated criteria. Likewise, the Islamic finance literature mostly pronounces on cryptocurrency in general and Bitcoin in particular (Adam, 2019; Kirchner, 2021; Siswantoro et al., 2020), even though the instruments now differ in the very features on which such rulings turn, namely backing, issuer, yield and stability. Declaring all cryptocurrencies permissible or impermissible in a single pronouncement is, therefore, practically and logically flawed (Afzal, 2022).

Three gaps follow from this. First, the literature offers no model that links an ontology of money to observable indicators in a way that can be applied genre by genre. Second, the developments of 2022–2026, which postdate the evidence base of the original thesis, have not been read through any such model. Third, empirical work lacks propositions derived from the ontology of money; its tests of volatility, sentiment and price formation are, as a result, rarely tied to the question of what would make a token money. To bridge these gaps, the study poses three research questions (RQs).

RQ1. How can a layered ontology of money be turned into a model for assessing the money-prospects of digital instruments?

RQ2. Where do Bitcoin, altcoins, the main stablecoin designs and CBDCs stand on each layer, and how did their positions change between 2021 and 2026?

RQ3. What testable propositions follow for empirical research on the money-prospects of cryptocurrencies?

The main contribution of the study stems out of its distinctive treatment of money-prospects as a profile across layers rather than as a single verdict. It contributes in four ways. First, it builds the Layered Money-Prospects Model (LMPM), which maps the design features of a token onto six layers of moneyness, each carrying Sharīʿah and conventional content and an explicit scoring rubric. Second, it applies the model to seven genre types for 2021 and 2026 on post-2021 evidence and reports how robust the ratings are. Third, it marks a consistency of concept, across genres: the more decentralised, the more moneyness, since it is the unfilled layers that crypto designs put into place that are the ones that the issuers and states fill in. Lastly, it derives seven propositions which tie the empirical study of fatāwá, sentiment, volatility and price formation to specific layers. The study reports no empirical estimates of its own; these are left to subsequent work.

The rest of the paper proceeds as follows. Section 2 restates the layered ontology, Section 3 explains the method and Section 4 sets out the genres. Section 5 applies the model and Section 6 compares the genres. Section 7 states the propositions, Section 8 discusses implications, and Section 9 concludes.

The layered ontology of money

The commodity perspective explains what can be included as money through its functions (medium of exchange, unit of account and store of value) and the recognitional properties of good money; however, it gives a half-cooked basis for money-prospects as it neither explains what money is nor how money evolved after the gold standard (Afzal, 2022; Mäki, 2021). The social perspective treats money as a social institution grounded in collective intentionality, whose status starts with a performative speech act and gradually becomes the prevailing norm and shared belief in a society (Searle, 1995, 2017). The Sharīʿah perspective creates a connection between the two. For anything to be money, it has to comply with the conditions of māl (being desirable, storable and of legal value) and of thamaniyyah, which is acquired through social concurrence (iṣṭilāḥ) and social practice (taʿāmul) (Afzal, 2022; Usmani, 2015). Against the state theory of money, it takes a balanced view that a currency does not necessarily need to be backed by the state; the role of the state is justifiable only on the basis of maṣlaḥah, that is, to protect the interest of the public and repel harm from them, and if maṣlaḥah can be achieved through decentralisation, state backing is not a condition of money-prospects (Afzal, 2022).

A companion study reconstructs this Sharīʿah account into six layers, each of which presupposes the one below it (Author, under review). Table 1 restates them along with their conventional counterparts.

The first layer, the substrate, asks whether the object is māl, something to which people incline and which can be possessed, rights and usufructs included (Ibn ʿĀbidīn, 1836/1992; Majallah, Art. 126, in Tyser et al., 1901; Usmani, 2015). The second, validity, asks whether it carries legal worth (taqawwum), free of elements the Sharīʿah does not recognise (Majallah, Art. 127). The third, social constitution, asks whose convention makes it a price; the Ḥanafī dispute over selling one fals for two shows that a bilateral convention can be dissolved by the parties themselves, whereas a general convention (iṣṭilāḥ al-kull) cannot (al-Marghīnānī, 1197/1995). The fourth, function, asks whether it actually circulates (rawāj), since fulūs that circulate are treated as prices and those that do not are treated as goods (Ibn ʿĀbidīn, 1836/1992). The fifth, persistence, asks whether it serves as a stable standard. For Ibn al-Qayyim (1350/1991, Vol. 2, p. 105), a price that rises and falls like goods ceases to be a price at all, and the jurists also gave rules for currencies that lose circulation (kasād). The sixth, purpose and governance, asks whether the arrangement serves the objectives of the Sharīʿah in wealth, namely circulation, clarity, preservation, stability and justice (Ibn ʿĀshūr, 1946/2006), under an authority, the state or another, that protects the public (Ibn Taymiyyah, 1328/1995, Vol. 29, p. 469).

Table 1: Six layers of moneyness and their conventional counterparts

Layer	Sharīʿah content	Conventional counterpart	Guiding question for a digital instrument
L1 Substrate	Māl: desirability and capacity for possession; corporeal thing, usufruct or right	Searle's X term; prior value (Lawson, 2016)	What exactly is held: a claim, a usufruct, a bare record of control?
L2 Validity	Taqawwum: legal worth, free of ribā, gharar and maysir in its structure	Lawfulness; regulatory status	Does its structure or use deprive it of legal worth?
L3 Social constitution	Iṣṭilāḥ: bilateral, network or general convention	Collective acceptance; legal tender	Whose convention makes it a price, and at what scale?
L4 Function	Taʿāmul, rawāj: actual circulation as medium and measure	Medium of exchange; unit of account	Is it spent and used to price, or held for gain?
L5 Persistence	Stability of the thaman as miʿyār; rules of kasād	Price stability; settlement at par	Does it hold still as a measure, and what happens if it fails?
L6 Purpose and governance	Maqāṣid of wealth; authority justified by maṣlaḥah	Regulation; holder protection; integrity	Who protects holders, and does the arrangement serve the ends of money?

Note. Adapted from the companion study (Author, under review) and Afzal (2022).

Two features of this ontology matter for its application. Each layer admits of degree, so that thamaniyyah may be realised more or less fully; and the layers are ordered, in the sense that circulation as a price cannot arise for what lacks legal worth, nor can stability of a measure arise for what does not circulate. Being indifferent to material, the Sharīʿah further leaves the form of money open. Ibn Taymiyyah (1328/1995, Vol. 19, pp. 251–252) holds that the dirham and the dīnār have no natural or legal definition and refer back to custom and convention, and it was on this basis that the International Islamic Fiqh Academy (1986) extended full thamaniyyah to paper money. Nothing in the ontology, therefore, excludes code as a substrate. Which code meets which layer is the real question.

Method

Design

The study is conceptual and follows the model design in Jaakkola's (2020) typology of conceptual articles; it specifies a set of constructs, the relations among them and the conditions under which they hold, and then derives propositions for testing. In line with Whetten (1989), it addresses the four elements of a theoretical contribution: what (six layers and their indicators), how (the sequence and gating of layers), why (the juristic and social-ontological grounds of each layer, set out in Section 2) and who, where and when (seven genre types, assessed for 2021 and 2026). In MacInnis's (2011) terms, its contribution is of the delineating and relating kinds, since it charts the money-prospects of each genre and relates design features to moneyness.

Evidence base

The thesis on which this paper draws covers developments up to 2021 (Afzal, 2022). The model is therefore applied to evidence published from 2022 to October 2026, while earlier seminal work is retained wherever it defines a design or a mechanism. Evidence is drawn, in order of preference, from (a) peer-reviewed studies indexed in Scopus or the Web of Science; (b) primary official sources, i.e., statutes, publications of central banks and the IMF, and supervisory statements; (c) collective juristic resolutions and fatāwá of recognised bodies; and (d) reports of such resolutions in established news outlets, used only where the primary text was not accessible. Every source was checked for bibliographic accuracy and for retraction, and none of those used is retracted. Each rating cites the evidence on which it rests in a public register (Supplementary Table S1).

Rating rubric and protocol

Each layer is rated on an ordinal scale from 0 (absent) to 3 (established), with anchors fixed in advance (Table 2) and worded so that the same rule applies to every genre and to both years. A rating records the position of the typical member of a genre, not its best or worst member; exceptions are

named in the text. The year 2021 is rated on the evidence available at the end of that year and 2026 on the evidence up to October 2026, and the two differ only where an identified event or statute moved a layer.

Table 2: Rating rubric: anchors for each layer

Layer	0 Absent	1 Weak	2 Partial	3 Established
L1 Substrate	No object of desire or possession	Object exists, but desirability rests only on expected resale	Digital right of exclusive control with sustained, demonstrated demand, without claim or usufruct	Identifiable claim on an issuer or asset, a usufruct (service right), or a legal liability
L2 Validity	Structure entails a prohibited element intrinsically, or instrument unlawful	Contested: major prohibitions alleged by significant juristic bodies, or banned in significant jurisdictions	Permissible conditionally; prohibited elements separable from the holder's position	Valid and lawful without material objection
L3 Constitution	No convention, or convention collapsed	Network-specific convention only	General convention by authority, or inherited from a reference currency, without full de facto acceptance	General convention de jure and de facto
L4 Function	No circulation	Held mainly for investment; circulation marginal or confined to own network	Significant circulation as medium of exchange in a defined domain	General medium of exchange and unit of account in an economy
L5 Persistence	Collapsed or lost circulation (kasād)	Fluctuates like a commodity; no anchor	Anchored to a reference unit, with occasional deviations from par	Par convertibility guaranteed by the issuer of the reference unit
L6 Purpose and governance	Arrangement defeats	Some objectives served (e.g.,	Accountable authority or	All five objectives served

	preservation of wealth; losses without recourse	transparency, rule-based supply) without accountable protection of holders	regulation protects holders; material concerns remain	under accountable governance

Note. Scale is ordinal. "Typical member" ratings; exceptions are discussed in Section 5.

Aggregation and robustness

As the layers are ordered, the profile of a genre is read first by its binding layer, i.e., the earliest layer at which it reaches its lowest score, and then by the full vector. A mean across layers is reported only as a summary for comparison and is not taken as an interval measure of moneyness. Two checks examine whether the comparisons hinge on particular judgements. In the first, every cell of the 2026 matrix is perturbed by −1, 0 or +1 with probabilities of 0.25, 0.50 and 0.25, clipped to the 0–3 range, over 10,000 draws under a fixed random seed. In the second, each layer is dropped in turn and the genres are re-ranked. The ratings, evidence register, code, outputs and checksums are deposited for audit (see Data availability).

The genres of cryptocurrency

The evolution of cryptocurrencies can be categorised into generations; however, it is crucial to understand that these generations have overlapped with each other and are all still alive and evolving, struggling to prove their case as the best alternative to existing currencies (Afzal, 2022). Cryptocurrency 1.0 refers to Bitcoin alone. Cryptocurrency 2.0 refers to altcoins, which are supposed to have achieved energy efficiency, better functionality, scalability and transaction speed on blockchains that enable tokens, smart contracts and decentralised applications. Cryptocurrency 3.0 refers to the era of stablecoins and CBDCs, evolving to solve the problems of stability, control, speed and interoperability. For the purpose of assessment, however, these generations need to be split further by the design features that bear on the layers, namely who issues the token, what (if anything) it is a claim on, how consensus and governance work, what legal recognition it enjoys, and what contract terms attach to holding it (Halaburda et al., 2022; John et al., 2022). Table 3 sets out seven genre types on these features. Stablecoins are split by their stabilisation mechanism, because the mechanism decides the substrate. CBDCs are kept as a limiting case; they use some digital-ledger techniques but remain central bank liabilities and are not cryptocurrencies in the ordinary sense (Auer et al., 2022). Their inclusion shows what the model says about digital money that is not decentralised.

Table 3: Genre types and design features relevant to the layers

Genre type	Examples	Issuance	Backing or claim	Consensus and governance	Legal recognition (2026)
Bitcoin	BTC	Protocol; fixed schedule, capped supply	None	Proof of work; open-source community	Investment asset; no legal tender after 2025 reforms
Altcoins (platform tokens)	ETH, ADA, SOL	Protocol; issuance rules vary, no hard cap for ETH	Usufruct: fee for computation and staking	Mostly proof of stake; foundations and stake-weighted validators	Investment asset; varies by jurisdiction
Fiat-backed stablecoins	USDT, USDC	Single company, on demand	Claim on issuer, reserves in cash and short-term government debt	Issuer; public blockchains	Licensed payment instrument in EU (2024), Hong Kong (2025), US (2025, phasing in)
Crypto-collateralised stablecoins	DAI	Protocol, against over-collateralised loans	Claim on collateral vaults	DAO governance	Largely unregulated
Algorithmic stablecoins	UST (Terra)	Protocol mint/burn against a sister token	None independent	Founding company	Collapsed May 2022
Gold-backed tokens	PAXG, XAUT	Custodian company	Title to allocated gold	Issuer; public blockchains	Varies; limited specific regulation
Retail CBDC	Sand Dollar, eNaira, e-CNY pilots	Central bank	Direct central bank liability	Central bank; permissioned ledgers	Legal tender where issued

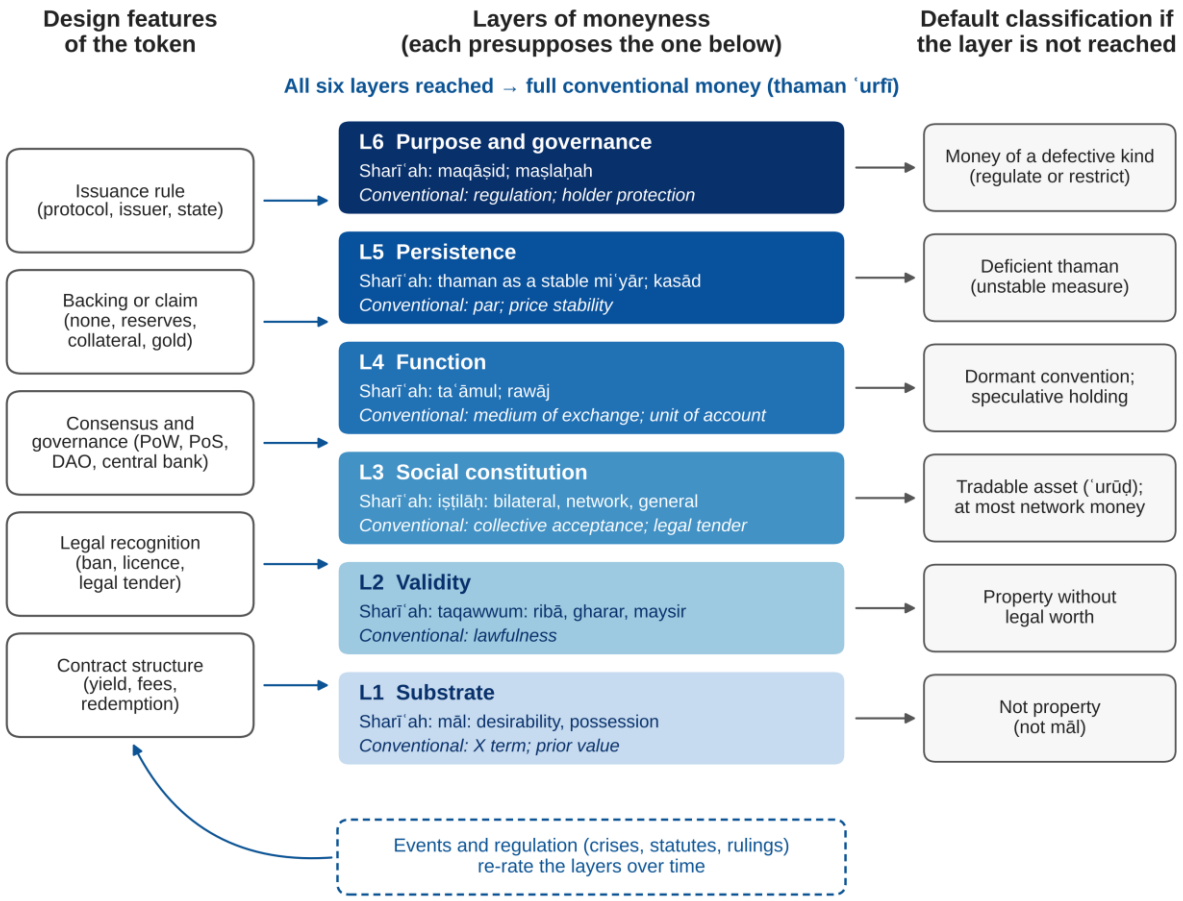
Note. Compiled from Afzal (2022), Böhme et al. (2015), John et al. (2022), Bank for International Settlements (2025), Auer et al. (2022) and the statutes cited in Section 5.

The model applied

Figure 1 presents the model, while Figure 2 registers the ratings for both years. The layer-wise reasoning for each genre follows.

Figure 1

The Layered Money-Prospects Model (LMPM)



Note. Design features of a token (left) determine how far it reaches on six ordered layers of moneyness (centre), each read through Sharīʿah and conventional criteria. The right-hand column gives the default classification of an instrument that does not reach a layer, subject to juristic qualification. Events and regulation re-rate the layers over time. Source: Author's construction from the layered ontology in Section 2.

Bitcoin

With respect to the substrate (L1 = 2), what a Bitcoin holder possesses is exclusive control, through a private key, over an entry in a public ledger rather than a claim on anyone (Böhme et al., 2015); the substrate is, in other words, a digital right of control. Under the Ḥanafī criteria as restated by Usmani (2015), which admit intangibles that are desirable and retrievable, sustained demand qualifies it as māl, and a good part of the juristic literature accepts as much (Adam, 2019; Kirchner, 2021). In the field of juristic writing, it is challenged by objections it does not have intrinsic value (Adam, 2019; Selcuk & Kaya, 2021) and with doubts in the field of economics (García-Monleón et al., 2021; Treiblmaier, 2022). Searle (2017) would respond that money need never be backed, and Kocherlakota (1998) that money is, at the bottom of things, a record. Between the two is the Sharī'ah account, which requires a basis of value, but which sees the basis of value not in the material, but in human inclination.

Concerning validity (L2 = 1), there is a debate surrounding the legal value of Bitcoin. The International Islamic Fiqh Academy (2019) postponed its decision in electronic currencies. Indonesia's national council of scholars ruled cryptocurrency to be unsuitable as currency due to uncertainty and wagering and harm, but said it allowed investors to trade tokens provided they meet Sharī'ah conditions and there is a clear benefit (Al Jazeera, 2021). There are scholarly evaluations that split on the same grounds (Selcuk & Kaya, 2021; Siswantoro et al., 2020). The treatment of Bitcoin on the conventional side has shifted from bans to licensing; Pakistan's government, for instance, has introduced a regime of licensing in 2025, which requires a Sharī'ah Advisory Committee to advise the new regulator (Arab News, 2025). The trend is important for the following layer, but it doesn't resolve the juristic objection.

As for social constitution (L3: 2 → 1), the process of social construction of cryptocurrencies has started and is upheld by technology, the blockchain architecture, rather than by commodities or states (Afzal, 2022; Dierksmeier & Seele, 2018). In 2021 Bitcoin briefly reached a general convention by authority when El Salvador made it legal tender, followed by the Central African Republic in April 2022. Both moves were reversed. The Central African Republic repealed its law in March 2023 under pressure from its monetary-union partners (Central Banking, 2023), and El Salvador, as conditions of an IMF arrangement in 2025, made acceptance voluntary and required taxes to be paid only in US dollars (International Monetary Fund, 2025). What remains is a network convention among users, now joined by regulated investment vehicles that treat Bitcoin as an asset (Securities and Exchange Commission, 2024). In the terms of the Ḥanafī debate, this convention is wider than a bilateral one but falls short of iṣṭilāḥ al-kull.

Coming to function (L4 = 1), El Salvador offered the closest test of Bitcoin as a medium of exchange. Alvarez et al. (2023), drawing on a nationally representative survey and blockchain data from the government wallet, report low and declining use of Bitcoin for payments after the initial take-up, and the earlier finding of Baur et al. (2018) that Bitcoin is held mainly as a speculative investment has not been overturned. The features which support its role as a medium of exchange, such as low

cost, speed, borderless transfer, transparency and immunity from institutional failure, are offset by low adoption, setup costs, complexity, network externalities, the absence of consumer protection and limited scalability (Afzal, 2022; Luther, 2016). As a unit of account, Bitcoin is infinitely divisible, and quoting prices in satoshi removes the whole-number bias and makes small prices clearer; however, the volatility makes prices hard to compare and raises menu costs, which distorts its role as a yardstick (Afzal, 2022). Divisibility, in short, is a recognitional property. It does not create circulation.

On persistence (L5 = 1), Bitcoin has no anchor. The price of which is determined by the demand for it against a given supply schedule, as a commodity is determined by the price of it (Schilling & Uhlig, 2019), and Baur & Dimpfl (2021) demonstrate that this volatility will hinder its use as a medium of exchange and unit of account. Even the law of one price has been weak on exchanges, where there are significant and persistent price deviations (Makarov & Schoar, 2020). The object that moves up and down like the goods is a commodity in the commodity business and not a measure, according to ibn al-Qayyim. The rating of 1, not 0, is a testimony to the fact that Bitcoin has not lost circulation, thus not entered the condition of kasād; the question of the volatility of Bitcoin compared to gold and fiat over a lengthy sample is an empirical one, that will be taken up in Proposition 3.

Notwithstanding its bubbles and crashes, Bitcoin has kept and increased its value in the long run, and its known and deterministic supply schedule underpins the claim that it hedges against inflation and devaluation (Afzal, 2022; Ammous, 2018). Yet the same non-inflationary design would create deflationary pressure if Bitcoin served as money, since prices quoted in an appreciating unit must fall (Afzal, 2022). The store-of-value case and the measure case thus pull in opposite directions. A thing whose value is expected to rise is hoarded rather than spent, which is the very behaviour al-Ghazālī (1111/n.d.) condemned as diverting money from its purpose, and which keeps it from serving as a stable miʿyār.

In regards to purpose and governance (L6 = 1), a rule-based supply that the ruler cannot debase is indeed one of the main grievances of the jurists regarding rulers who engaged in coinage (Ibn Taymiyyah, 1328/1995, Vol. 29, p. 469) and a public ledger is for clarity (wuḍūḥ). However, preservation (ḥifẓ) is not strong: There is no known entity to protect the holders, and the shortcomings of exchanges and custodians have weighed on the users (Afzal, 2022). Furthermore, proof-of-work mining has a significant energy expense (de Vries, 2023).

Collectively, Bitcoin becomes māl, whose legal value is not debated, is regarded as price totally inside its network. It is maintained primarily for monetary benefit and is unstable as a measurement. It is classified as a tradable asset (ʿurūḍ) by default and carries network level convention. Validity, its binding force, is what it falls short of if granted, it will still fall within the limits of circulation and stability.

Altcoins

Altcoins share Bitcoin's lack of an anchor but differ from it in substrate. Platform tokens such as ether, ada and sol are needed to pay for computation and to stake in validation, so that holding them gives

access to a service, a usufruct (manfaʿah) in the jurists' vocabulary (John et al., 2022; John et al., 2023). This gives them a stronger substrate than Bitcoin (L1 = 3), and it is precisely on this utility that a Sharīʿah assessment of ether rests (Amanie Advisors & Ethereum Foundation, 2019). Going further, Ethereum's move to proof of stake in September 2022 cut its electricity requirement by at least 99.84% (de Vries, 2023), while Cardano was built on a proof-of-stake protocol from the outset (Kiayias et al., 2017).

The other layers, however, do not follow from the substrate. Validity is contested as it is for Bitcoin (L2 = 1), with further questions over staking rewards and the lending protocols built on these platforms. Convention is network-specific (L3 = 1): ether is the unit in which fees and many on-chain assets are priced, but only within its own economy (Halaburda et al., 2022). Circulation is likewise confined to that economy (L4 = 1). Liu and Tsyvinski (2021) find that returns on cryptocurrencies as a class are driven by momentum and investor attention rather than by exposure to conventional risk factors, and altcoins accordingly fluctuate at least as much as Bitcoin does (L5 = 1). Governance by foundations and stake-weighted validators, along with repeated security failures such as the attack on Ethereum in 2016 (Afzal, 2022), leaves holders without accountable protection (L6 = 1).

Platform tokens are, therefore, better described as the fuel of a computing service than as money. Their default classification is utility property with network-level convention and, like Bitcoin, they are bound at validity. The model separates them from Bitcoin only at the substrate, which is reason enough not to subject the two genres to a single ruling.

Stablecoins

Stablecoins are the genre in which design does most of the work, and the four designs reach very different layers.

Beginning with fiat-backed stablecoins, the holder of USDT or USDC holds a claim on an identifiable issuer, redeemable against reserves of cash and short-term government debt (L1 = 3). In Sharīʿah terms, the holder has lent to the issuer; the claim is a debt (dayn), and its exchange against fiat has to meet the conditions of ṣarf. Validity is accordingly conditional (L2 = 2). United States and EU law now forbid issuers to pay interest or yield to holders (GENIUS Act, 2025, Sec. 4(a)(11); Regulation (EU) 2023/1114, Arts. 40, 50), which removes ribā from the holder's position even as the issuer continues to earn interest on its reserves.

On social constitution, fiat-backed stablecoins moved from 1 to 2 between 2021 and 2026. They do not create a convention of their own; they borrow the dollar's, given that over 99% of stablecoins are denominated in US dollars (Bank for International Settlements, 2025). What changed is the recognition of the token as a payment instrument. MiCA's regime for e-money and asset-referenced tokens applied from 30 June 2024 (Regulation (EU) 2023/1114); Hong Kong's Stablecoins Ordinance (Cap. 656) commenced on 1 August 2025, requiring licences, reserves at least equal to par and redemption at par; and the GENIUS Act, enacted on 18 July 2025, requires one-to-one reserves while stating that payment stablecoins are neither national currency nor deposits nor

securities (GENIUS Act, 2025). In function (L4 = 2), stablecoins serve as the main medium of exchange and settlement asset within crypto markets, where, as Gorton et al. (2026) show, much of their demand comes from traders seeking leverage.

Persistence is partial (L5 = 2). Pegs are held through arbitrage and redemption (Lyons & Viswanath-Natraj, 2023), though not perfectly (Grobys et al., 2021). In March 2023, USDC had to drop to 86 cents on the secondary market after the issuer announced USD 3.3 billion of reserves, representing approximately 8% of the total, were kept at the failed Silicon Valley Bank, before recovering once authorities in the United States guaranteed all deposits at that bank (Du et al., 2025). Redemption is also focused: Ma et al. (2025) show that Tether supports only roughly six agents per month to redeem for cash, which helps to stabilize secondary prices, but increases run risk. A stablecoin is not a stablecoin if it trades at a different exchange rate, as it does not meet the requirement for the stablecoin to trade at a par, which is the test used by the Bank for International Settlements (2025). This governance was raised to 2 with regulation, but is not yet at 3, due to opaque reserves, of crypto issuance timed to support prices (Griffon & Shams, 2020), of concerns regarding illicit use, and of the parallel Gorton and Zhang (2023) draw to the unregulated banknotes of the American free-banking era.

Fiat-backed stablecoins, then, carry the most complete profile of any private genre, with no layer below 2. Their moneyness is, nonetheless, derivative. They do not create a new thaman; they are documents of claim on an existing one, nearer to a transferable bank liability or a bill of exchange than to an independent currency. In Sharīʿah terms their analysis belongs to the law of debt and transfer (qarḍ, ḥawālah) and of ṣarf, not to a new theory of money.

Crypto-collateralised stablecoins tell a different story. DAI is minted against over-collateralised loans of crypto assets on which a stability fee is charged (John et al., 2023). Its substrate is a claim on volatile collateral (L1 = 2), and the fee-bearing debt through which it is created places it within the zone of ribā (L2 = 1). Convention, circulation and governance are all network-specific (each rated 1). Over-collateralisation protects the peg; yet because part of its collateral was USDC, DAI was drawn into the USDC disturbance of March 2023 (Du et al., 2025), and its peg can be no stronger than the collateral behind it (L5 = 1).

Algorithmic stablecoins fail at every layer. TerraUSD had no independent backing; its peg rested on minting and burning a sister token, and demand for it was propped up by a deposit protocol paying high fixed yields. Both features fail validity, since a guaranteed return on a loan is ribā and a peg dependent on confidence in a sister token is gharar (L2 = 0). The run of May 2022 wiped out about USD 50 billion of value in three days, with wealthier and more sophisticated investors exiting first and smaller holders bearing larger losses (Briola et al., 2023; Liu et al., 2023), and by 2026 every layer stands at 0. For the model, this is the clearest case of kasād, a convention that once existed and then ceased. The juristic rules on currencies that lose circulation, which ask whether debts are settled by counterpart or by value (Ibn ʿĀbidīn, 1836/1992), apply directly to obligations denominated in such tokens.

Gold-backed tokens, lastly, give title to allocated gold and so have the strongest substrate (L1 = 3), inheriting a link to natural money (thaman khilqī). Their exchange against gold or fiat must, however, meet the conditions of ṣarf, spot exchange and constructive possession included (Muslim, 875/1955, No. 1587; Usmani, 2015), which makes validity conditional (L2 = 2). Ajouz et al. (2020) find that acceptance of precious-metal-backed cryptocurrency among Muslim users depends on its Sharīʿah compliance and perceived usefulness, and maqāṣid-based evaluations favour backed over unbacked tokens for Islamic portfolios (Izadin et al., 2025). Yet convention and circulation remain niche (L3 = L4 = 1), the token is as stable as gold rather than as a fiat unit (L5 = 2), and governance depends on the custodian (L6 = 1). The genre is a natural candidate for Islamic finance; the model shows, though, that its constraint is acceptance and not legitimacy.

Central bank digital currencies

A retail CBDC is a direct liability of the central bank (L1 = 3) and legal tender wherever issued. Under the collective resolution that gives paper money full thamaniyyah (International Islamic Fiqh Academy, 1986), an unremunerated CBDC raises no fresh question of validity (L2 = 3), and Faizi (2026) argues that a Sharīʿah-compliant CBDC is feasible so long as interest-bearing features are avoided. Settlement at par with cash and reserves is guaranteed by construction (L5 = 3); this is exactly the singleness that private stablecoins lack (Bank for International Settlements, 2025).

Its binding layer is function. Legal tender status supplies a general convention de jure (L3 = 2), but uptake has been weak wherever retail CBDCs have launched, and Ree (2023) reports that adoption of Nigeria's eNaira did not move beyond an initial limited wave. Elsewhere, work is advancing but slowly. Of 93 central banks surveyed in 2024, 91% were exploring a CBDC, wholesale projects were further ahead than retail ones, and more than one in three had accelerated their work in response to stablecoins (Illes et al., 2025). The European Central Bank moved the digital euro to its next phase in November 2025, with a possible first issuance in 2029 should legislation be adopted in 2026 (European Central Bank, 2025). Contrastingly, the United States prohibited federal agencies from establishing or promoting a CBDC (Executive Order No. 14178, 2025). As for governance (L6 = 2), central banks offer accountable protection to holders, but concerns over privacy, the risk of drawing deposits away from banks (Auer et al., 2022; Ozili, 2023) and the inflation that erodes all fiat money (Afzal, 2022) keep the score short of full realisation.

A CBDC is, in essence, fiat money in a new technical form, and the model treats it as such: its ontology is that of Money 2.0, issued through some of the techniques of Money 3.0. That it carries the highest mean score is, therefore, no evidence for the money-prospects of cryptocurrency. It shows rather that digital form is neutral, as Ibn Taymiyyah's principle on the form of money would predict, and that moneyness follows the issuer and the convention behind the form.

Recognitional properties across genres

The commodity perspective also allows a comparison of the recognitional properties of good money, the nominal essence of money, across instruments (Afzal, 2022; Mäki, 2021). Benchmarked against

fiat currency and gold, cryptocurrencies score high on fungibility, portability, divisibility and recognisability, because they are nothing but digits that cannot be counterfeited, forged or minted outside their networks; they pitch somewhere between gold and fiat on scarcity, and they are the least stable of the three (Afzal, 2022). Table 4 extends that comparison, originally made on the evidence up to 2021, to fiat-backed stablecoins and CBDCs.

Table 4: Recognitional properties of good money: fiat, gold and digital genres

Property	Fiat (notes)	Gold	Bitcoin and altcoins	Fiat-backed stablecoins	Retail CBDC
Fungibility	Medium	Low	High	High	High
Portability	Low	Medium	High	High	High
Durability	Low	High	Medium	Medium	Medium
Divisibility	Medium	Low	High	High	High
Recognisability	Medium	Low	High	High	High
Stability	Medium	High	Low	Medium	Medium
Scarcity	Low	High	Medium	Low	Low

Note. The first three columns follow Afzal (2022, Table 3.2). The last two columns are the author's extension.

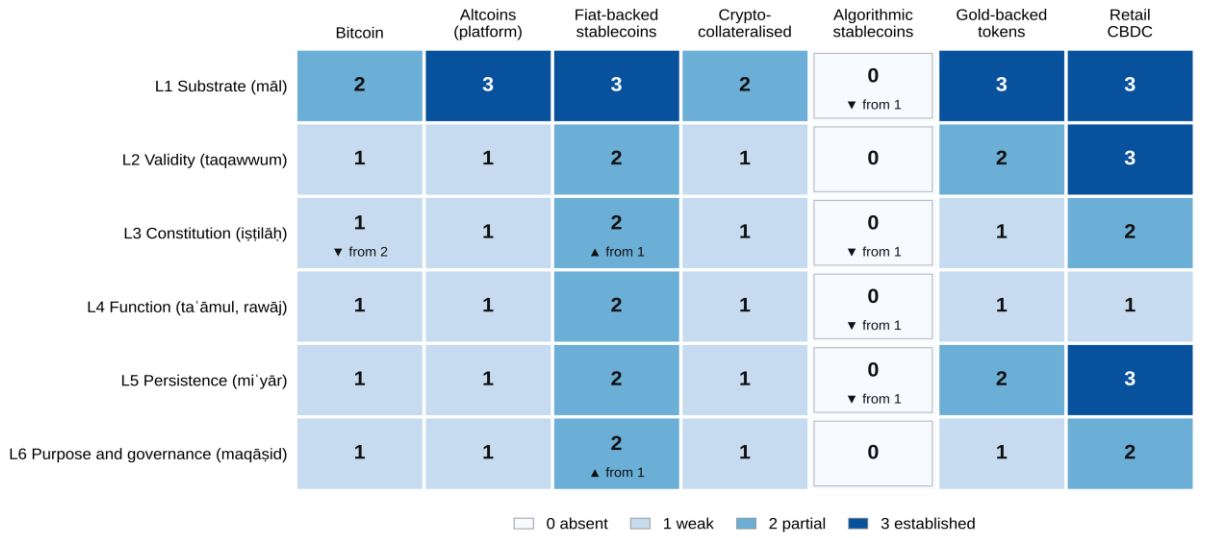
The extension brings out something the original comparison could not. Digital form levels five of the seven properties; whatever the issuer, a token is fungible, portable, divisible and hard to counterfeit. What sets the genres apart is the pair that digital form cannot supply, stability and scarcity, and these two trades off against each other. Bitcoin is scarce because its supply cannot meet its demand, and for the same reason, Bitcoin is unstable. On the other hand, Bitcoin stablecoins and CBDCs are stable because their supply matches its demand, and for the same reason, they are not scarce. Gold's value is due to its scarcity, which is determined by nature, and its demand, which is established by long custom. The recognitional properties, then, cannot settle money-prospects on their own. They describe the nominal essence, whereas the outcome turns on the layers of the real essence and, above all, on who stands behind the measure.

Comparing the genres

Cryptocurrency is not one monetary kind

The comparison first yields a negative finding. The seven genre types share neither a profile nor a binding layer (Table 5). Bitcoin, altcoins and crypto-collateralised stablecoins are bound at validity, gold-backed tokens at constitution and CBDCs at function, whereas algorithmic stablecoins fail at the substrate itself; fiat-backed stablecoins alone reach at least 2 on every layer. A single ruling on "cryptocurrency", whether juristic or regulatory, thus applies one answer to questions that differ from genre to genre. The thesis reached this point on the evidence up to 2021 (Afzal, 2022), and the evidence since 2022 only strengthens it.

Figure 2 Layer ratings by genre type, 2026, with changes since 2021



Note. Cells give ordinal ratings (0 absent to 3 established) under the rubric in Table 2. Arrows mark cells that changed between 2021 and 2026 and give the 2021 rating. Ratings describe the typical member of each genre type. Evidence for each cell is listed in Supplementary Table S1. Source: Author's ratings.

Table 5: Binding layer and default classification by genre type, 2026

Genre type	Binding layer (score)	Mean of six layers	Default classification (Sharīʿah)	Conventional reading
Bitcoin	L2 Validity (1)	1.17	Tradable asset (ʿurūḍ) with network convention; validity contested	Speculative digital asset; network money at most
Altcoins (platform tokens)	L2 Validity (1)	1.33	Utility property (manfaʿah) with network convention	Platform commodity
Fiat-backed stablecoins	L2 Validity (2)	2.17	Claim on an existing thaman (dayn); rules of	Regulated private payment instrument; fails singleness

			qarḍ, ḥawālah, ṣarf	
Crypto-collateralised stablecoins	L2 Validity (1)	1.17	Claim on collateral created through fee-bearing debt	Synthetic dollar inside DeFi
Algorithmic stablecoins	L1 Substrate (0)	0.00	Convention extinguished (kasād)	Failed instrument
Gold-backed tokens	L3 Constitution (1)	1.67	Title to natural money; ṣarf conditions apply	Tokenised commodity
Retail CBDC	L4 Function (1)	2.33	Conventional money (thaman ʿurfī) in digital form	Central bank money; low uptake

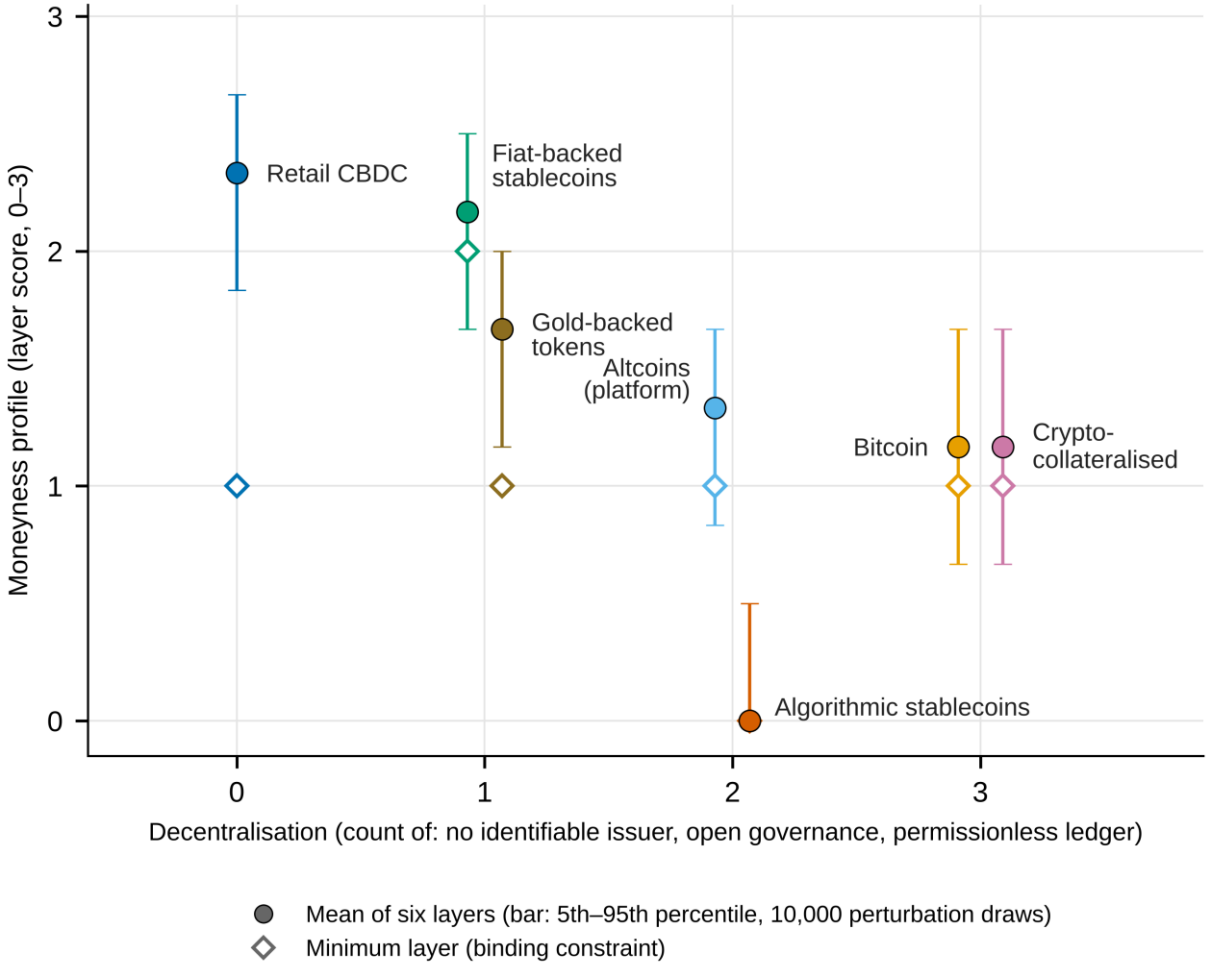
Note. Binding layer is the earliest layer at the genre's lowest score. The mean is an ordinal summary for comparison only.

The decentralisation–moneyness trade-off

The second finding is a regularity that runs across genres. The genres scoring highest are those with an identifiable issuer, while the most decentralised genres score lowest (Figure 3). Across the seven types, the rank correlation between a simple count of decentralisation features and the mean layer score stands at −0.83; with seven observations on ordinal scales, this describes the pattern and does not test it.

The model also explains why the pattern arises. The layers on which unanchored cryptocurrencies are weak, namely validity, persistence and accountable governance, are supplied in the other genres by an identifiable party: a reserve-holding issuer whose claims fix the substrate and anchor the price, a statute that sets reserves and forbids yield, or a central bank that guarantees par. Even decentralised designs that reach stability, DAI being the case in point, do so by holding the liabilities of centralised issuers as collateral. Moneyness, it appears, is bought by reintroducing the very issuer that Bitcoin was designed to remove. This sharpens the thesis view that the role of the state is instrumental and that decentralisation could, in principle, secure maṣlaḥah (Afzal, 2022). The Sharīʿah does not require a state; it does require that someone, or something, perform the protective functions the jurists assigned to the ruler, i.e., preventing fraud and debasement, keeping the measure stable and shielding holders from harm. So far, no decentralised design has performed them without borrowing from centralised ones. Whether one can remains an open question, stated as Proposition 6.

Figure 3: Decentralisation and moneyness across genre types, 2026



Note. Horizontal axis: count of three decentralisation features (no identifiable issuer; open governance; permissionless public ledger). Points are offset slightly where genre types share a value. Circles show the mean of the six layer ratings with 5th–95th percentile bars from 10,000 perturbation draws; diamonds show the minimum layer rating (for algorithmic stablecoins, both are zero). Both axes are ordinal. Source: Author's ratings and sensitivity analysis.

What moved between 2021 and 2026

Seven cells, spread over three genres, changed between 2021 and 2026 (Figure 2), and together they tell a coherent story. Regulation raised the constitution and governance layers of fiat-backed stablecoins. The reversal of legal tender laws lowered Bitcoin's constitution from a general convention by authority to a network convention. The collapse of TerraUSD reduced algorithmic

stablecoins to zero on every layer, moving four cells at once. Nothing moved Bitcoin or altcoins on function or persistence, and nothing moved CBDCs on function. The market's drift from Bitcoin towards stablecoins over the period was, therefore, not a move towards decentralised money; it was a move towards private claims on state money.

Robustness

The comparisons hold up against the rating judgements. Under random perturbation of every cell, fiat-backed stablecoins and CBDCs occupied the top two places by mean score in 91.6% and 92.1% of draws respectively, algorithmic stablecoins ranked last in 99.7%, and the median rank correlation between perturbed and baseline means was 0.92 (5th percentile 0.75). Fiat-backed stablecoins had the highest minimum layer score in 88.7% of draws. Dropping any single layer left CBDCs first, fiat-backed stablecoins first or second, gold-backed tokens third and algorithmic stablecoins last. The ordering among Bitcoin, altcoins and crypto-collateralised stablecoins, however, is not robust, and these three genres are best read as a group.

Propositions for empirical research

An ontology earns its place in empirical research only when it tells the researcher what to measure and what to expect. Table 6 states seven propositions, each tied to the layer it tests, the genres to which it applies and the evidence that would test it. The first four follow the empirical programme of the thesis, which examined Sharīʿah authorships, public sentiment, volatility and price determinants (Afzal, 2022); the remaining three arise from the post-2021 evidence. All seven are stated as expectations, not as results.

Proposition 1 (validity and substrate). Sharīʿah authorships are expected to be more permissive towards genres carrying an identifiable claim or usufruct and an anchor, and their grounds of impermissibility to concentrate on the substrate (absence of intrinsic value) and on persistence (price instability). The thesis recommends that Sharīʿah perception be assisted by empirical research (Afzal, 2022); the proposition specifies which frames should vary with which design features.

Proposition 2 (constitution). Public sentiment, taken as a proxy for the formation of social concurrence, is expected to respond more strongly to events that change the persistence or governance of a genre, such as crashes, depegs and regulation, than to technological events. This responds to the call for new ways of measuring social construction (Afzal, 2022).

Proposition 3 (persistence). The volatility gap between cryptocurrencies and benchmark monies is expected to vary systematically by genre. Anchored genres should approach the volatility of their reference unit, whereas unanchored genres are better compared with gold than with fiat currencies, as neither has an issuer standing behind the price.

Proposition 4 (function versus constitution). The prices of unanchored genres are expected to be driven more by attention and knowledge factors, which reflect the formation of a convention, than

by transactional fundamentals, which reflect circulation (Kristoufek, 2013; Liu & Tsyvinski, 2021). For anchored genres, supply is expected to adjust to demand while the price stays fixed.

Proposition 5 (governance and constitution). Statutory recognition of fiat-backed stablecoins is expected to raise their circulation outside crypto markets and to narrow their deviations from par, relative both to unregulated stablecoins and to the period before recognition.

Proposition 6 (decentralisation–moneyness trade-off). A decentralised design is expected to reach a persistence score of 2 or more only by holding claims on centralised issuers as collateral. A design that breaks this regularity would refute the trade-off identified in Section 6.2.

Proposition 7 (function of CBDCs). Uptake of retail CBDCs is expected to depend more on their functional advantage over existing money (cost, reach and offline use) than on legal tender status, such that convention by authority will not by itself produce circulation.

Table 6: Propositions, layers and evidence for testing

Proposition	Layer(s)	Genres	Indicators	Suggested design
P1 Permissibility follows claim and anchor	L1, L2, L5	All	Verdict and frames of fatāwá and Sharīʿah research by genre	Framing analysis with genre as moderator
P2 Sentiment responds to persistence and governance events	L3	All crypto genres	Sentiment polarity around crashes, depegs, statutes and upgrades	Event study on social media text
P3 Volatility gap depends on anchor	L5	All, against gold and fiat	Conditional volatility; volatility ratios	GARCH-family models by genre
P4 Attention drives unanchored prices	L3, L4	BTC, ALT vs stablecoins	Search, page views, posts; supply; volume	ARDL or panel models with attention and supply variables
P5 Recognition raises use and narrows deviations	L3, L4, L5, L6	Fiat-backed stablecoins	Payment share outside crypto; peg deviations	Difference-in-differences around MiCA, Hong Kong, GENIUS

P6 Stability requires centralised collateral	L5, L6	Decentralised stablecoins	Collateral composition; peg deviations	Panel of stablecoin designs
P7 CBDC uptake follows functional advantage	L3, L4	Retail CBDCs	Wallets, transactions, merchant acceptance	Cross-country comparison of launched CBDCs

Note. P1–P4 correspond to the empirical strands of Afzal (2022). P5–P7 arise from post-2021 developments.

Discussion and implications

Relation to recent literature

The model converges with recent central bank thinking at three points and departs from it at two. The three tests that the Bank for International Settlements (2025) has for money, namely singleness, elasticity and integrity, relate to the persistence layer (settlement at par), the circulation layer (elasticity under changing demand) and the governance layer. Like Gorton and Zhang (2023) who observed in the history of private banknotes, stablecoins are lacking on all three counts. However, there are two layers added to the model that this view does not explicitly mention. The substrate layer is the reason behind the disparity between fiat-backed and algorithmic stablecoins, which seem to be indistinguishable in the market: one is a claim on something, the other a claim on nothing. Conventional tests do not examine this question, but its presence is enough to determine whether the instrument is adopted by Muslim users or not, based on the validity of its holding, which involves ribā, gharar or maysir. Both perspectives agree that money is a social convention which relies on trust, and that the Sharī'ah version recognizes that in addition, the convention must be valid and be for the purposes of wealth (Bank for International Settlements, 2025; Searle, 2017).

Similarly, if we consider the tokens from the standpoint of the microeconomics of cryptocurrencies, which views them as a platform with network effects (Halaburda et al., 2022), the model provides a theory of why network effects create network money, but not general money: it creates convention within a network (L3 = 1), but it does not provide the anchor and protection that wider circulation requires. Against the Islamic finance literature, which has mostly asked whether "cryptocurrency" is permissible (Kirchner, 2021; Siswantoro et al., 2020), the model replaces one question with six and shows that the answer to the validity question varies with design.

Whose convention counts?

The companion study leaves open whether a convention among the users of a network can count as the convention of all, iṣṭilāḥ al-kull, since the Ḥanafī conditions for custom were developed for territorial communities (Author, under review). The genre evidence lends that question some content.

A network convention has the logical feature that Muḥammad al-Shaybānī required: no pair of users can set aside the status of bitcoin or ether between themselves, because the protocol, rather than their agreement, fixes what the units are. In that sense it is collective and not bilateral. What it lacks is reach. The users of a network form a voluntary and self-selected community, and the convention binds only those who choose to enter it; it does not bind the market in which they buy food or pay rent. The model therefore treats network convention as a distinct and intermediate degree of constitution (L3 = 1). This is enough for the rules of ṣarf to apply to exchanges within the network, much as Mālik extended them to a hypothetical leather money once it had acquired the status of coin (Saḥnūn, 854/1994), but not enough for the token to be treated as the general thaman of a society. The El Salvador case, in turn, shows that authority alone cannot close the gap; a legal tender declaration supplied a general convention de jure, but not the usage on which thamaniyyah also depends (Alvarez et al., 2023).

Implications

Due credence should be given to the individuality of a specific cryptocurrency when issuing Sharīʿah pronouncements (Afzal, 2022). The model spells out what that individuality consists of. A board asked about a fiat-backed stablecoin should apply the rules of debt, transfer and currency exchange; one asked about a platform token should assess a usufruct; and one asked about Bitcoin should assess a contested māl traded as a commodity. Pakistan's statutory requirement of a Sharīʿah Advisory Committee for its virtual asset regulator (Arab News, 2025) creates a forum where genre-specific rulings of this kind can be issued.

For regulators, the model suggests regulating by layer rather than by label. Reserve and redemption rules raise persistence and governance; a ban on interest to holders raises validity in Sharīʿah terms besides separating payment from investment; and disclosure raises clarity. For central banks in Muslim-majority economies, the evidence suggests that a CBDC needs functional advantages to circulate and that an unremunerated design avoids the validity question altogether (Faizi, 2026). For Islamic product designers, lastly, gold-backed tokens are legitimate in principle but bound by acceptance, which points towards integration with payment networks rather than further certification.

Conclusion

The study set out to ask which code can become currency. Applying a layered ontology of money to the genres of cryptocurrency shows that no single answer exists, because the genres reach different layers. Bitcoin and altcoins are māl with contested validity and network-level convention, held mainly for gain and unstable as measures. Fiat-backed stablecoins come closest among private instruments, yet they borrow their moneyness from the dollar they represent. Algorithmic stablecoins show how a monetary convention dies, while CBDCs are state money in digital form, held back by circulation rather than by legitimacy. Across genres, moneyness rises as decentralisation falls. The Sharīʿah perspective takes a balanced view of the state, holding that a currency need not be backed

by it if the public interest can be protected otherwise (Afzal, 2022). The evidence up to 2026 suggests that decentralised designs have not yet managed to do so.

The study is not without limitations. The ratings are ordinal judgements, made by a single rater against a stated rubric and public evidence; the sensitivity analysis shows the main comparisons to be robust, but not the fine ordering among unanchored genres. Ratings describe the typical member of each genre, and individual tokens may differ. The Sharīʿah layers follow the preponderant Sunni positions reconstructed in the companion study. The evidence base is also moving quickly, especially for stablecoin regulation and CBDCs, and the model is designed to be re-rated as it moves. Future research may test the seven propositions, extend the model to tokenised deposits and other tokenised assets, and develop indicators that measure each layer directly.

References

Adam, F. (2019). Fatawa analysis of bitcoin. In M. M. Billah (Ed.), Halal cryptocurrency management (pp. 133–147). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-10749-9_9

Afzal, M. S. (2022). Money-prospects of cryptocurrencies [Doctoral dissertation, International Islamic University Islamabad].

Afzal, M. S., & Bhatti, A. A. (2021). Money-prospects of cryptocurrencies – A bibliometric review. Islamic Banking and Finance Review, 8(2), 1–35. https://doi.org/10.32350/ibfr.82.01

Ajouz, M., Abdullah, A., & Kassim, S. (2020). Acceptance of Sharīʿah-compliant precious metal-backed cryptocurrency as an alternative currency: An empirical validation of adoption of innovation theory. Thunderbird International Business Review, 62(2), 171–181. https://doi.org/10.1002/tie.22106

Al Jazeera. (2021, November 11). Indonesia's national religious council says crypto is forbidden. https://www.aljazeera.com/economy/2021/11/11/indonesias-national-religious-council-says-crypto-is-forbidden

Alvarez, F., Argente, D., & Van Patten, D. (2023). Are cryptocurrencies currencies? Bitcoin as legal tender in El Salvador. Science, 382(6677), Article eadd2844. https://doi.org/10.1126/science.add2844

Amanie Advisors & Ethereum Foundation. (2019). Shariah white paper on Ether. https://amanieadvisors.com/v4/wp-content/uploads/2019/08/Shariah-Whitepaper-Ether-v1.0.pdf

Ammous, S. (2018). Can cryptocurrencies fulfil the functions of money? Quarterly Review of Economics and Finance, 70, 38–51. https://doi.org/10.1016/j.qref.2018.05.010

Arab News. (2025, July 9). Pakistan enacts landmark law to regulate virtual assets, plans pilot for digital currency. https://www.arabnews.pk/node/2607495/pakistan

Auer, R., Frost, J., Gambacorta, L., Monnet, C., Rice, T., & Shin, H. S. (2022). Central bank digital currencies: Motives, economic implications, and the research frontier. Annual Review of Economics, 14, 697–721. https://doi.org/10.1146/annurev-economics-051420-020324

Author. (under review). [Companion paper on the ontology of money; details removed for peer review].

Bank for International Settlements. (2025). III. The next-generation monetary and financial system. In Annual Economic Report 2025. https://www.bis.org/publ/arpdf/ar2025e3.htm

Baur, D. G., & Dimpfl, T. (2021). The volatility of Bitcoin and its role as a medium of exchange and a store of value. Empirical Economics, 61(5), 2663–2683. https://doi.org/10.1007/s00181-020-01990-5

Baur, D. G., Hong, K., & Lee, A. D. (2018). Bitcoin: Medium of exchange or speculative assets? Journal of International Financial Markets, Institutions and Money, 54, 177–189. https://doi.org/10.1016/j.intfin.2017.12.004

Bjerg, O. (2016). How is Bitcoin money? Theory, Culture & Society, 33(1), 53–72. https://doi.org/10.1177/0263276415619015

Böhme, R., Christin, N., Edelman, B., & Moore, T. (2015). Bitcoin: Economics, technology, and governance. Journal of Economic Perspectives, 29(2), 213–238. https://doi.org/10.1257/jep.29.2.213

Briola, A., Vidal-Tomás, D., Wang, Y., & Aste, T. (2023). Anatomy of a stablecoin's failure: The Terra-Luna case. Finance Research Letters, 51, Article 103358. https://doi.org/10.1016/j.frl.2022.103358

Central Banking. (2023, March 27). CAR to drop crypto as legal tender. https://www.centralbanking.com/central-banks/currency/digital-currencies/7956294/car-to-drop-crypto-as-legal-tender

de Vries, A. (2023). Cryptocurrencies on the road to sustainability: Ethereum paving the way for Bitcoin. Patterns, 4(1), Article 100633. https://doi.org/10.1016/j.patter.2022.100633

Dierksmeier, C., & Seele, P. (2018). Cryptocurrencies and business ethics. Journal of Business Ethics, 152(1), 1–14. https://doi.org/10.1007/s10551-016-3298-0

Du, C., Sonawane, R., & Watsky, C. (2025, December 17). In the shadow of bank runs: Lessons from the Silicon Valley Bank failure and its impact on stablecoins (FEDS Notes). Board of Governors of the Federal Reserve System. https://www.federalreserve.gov/econres/notes/feds-notes/in-the-shadow-of-bank-run-lessons-from-the-silicon-valley-bank-failure-and-its-impact-on-stablecoins-20251217.html

European Central Bank. (2025, October 31). Other decisions taken by the Governing Council: Digital euro – next phase [Decision of 29 October 2025]. https://www.ecb.europa.eu/press/govcdec/otherdec/2025/html/ecb.gc251031~e931e3ccd6.en.html

Exec. Order No. 14178, 90 Fed. Reg. 8647 (January 31, 2025). Strengthening American leadership in digital financial technology.

Faizi, F. (2026). Shariah-compliant central bank digital currency: Proposed design and implementation. Journal of Banking Regulation, 27(2), Article 15. https://doi.org/10.1057/s41261-026-00315-3

García-Monleón, F., Danvila-del-Valle, I., & Lara, F. J. (2021). Intrinsic value in crypto currencies. Technological Forecasting and Social Change, 162, Article 120393. https://doi.org/10.1016/j.techfore.2020.120393

GENIUS Act, Pub. L. No. 119-27, 139 Stat. 419 (2025). https://www.govinfo.gov/app/details/PLAW-119publ27

al-Ghazālī, A. Ḥ. M. (n.d.). Iḥyāʾ ʿulūm al-dīn (Vol. 4, Kitāb al-shukr). Dār al-Maʿrifah. (Original work completed before 1111)

Gorton, G. B., & Zhang, J. Y. (2023). Taming wildcat stablecoins. University of Chicago Law Review, 90(3), 909–971.

Gorton, G. B., Klee, E. C., Ross, C. P., Ross, S. Y., & Vardoulakis, A. P. (2026). Leverage and stablecoin pegs. Journal of Financial and Quantitative Analysis, 61(1), 99–136. https://doi.org/10.1017/S0022109025000134

Griffin, J. M., & Shams, A. (2020). Is Bitcoin really untethered? Journal of Finance, 75(4), 1913–1964. https://doi.org/10.1111/jofi.12903

Grobys, K., Junttila, J., Kolari, J. W., & Sapkota, N. (2021). On the stability of stablecoins. Journal of Empirical Finance, 64, 207–223. https://doi.org/10.1016/j.jempfin.2021.09.002

Halaburda, H., Haeringer, G., Gans, J., & Gandal, N. (2022). The microeconomics of cryptocurrencies. Journal of Economic Literature, 60(3), 971–1013. https://doi.org/10.1257/jel.20201593

Hazlett, P. K., & Luther, W. J. (2020). Is bitcoin money? And what that means. Quarterly Review of Economics and Finance, 77, 144–149. https://doi.org/10.1016/j.qref.2019.10.003

Ibn ʿĀbidīn, M. A. (1992). Radd al-muḥtār ʿalā al-Durr al-mukhtār (Vols. 4–5). Dār al-Fikr. (Original work completed before 1836)

Ibn al-Qayyim, M. ibn A. B. (1991). Iʿlām al-muwaqqiʿīn ʿan Rabb al-ʿālamīn (M. ʿA. al-S. Ibrāhīm, Ed.; Vol. 2). Dār al-Kutub al-ʿIlmiyyah. (Original work completed before 1350)

Ibn ʿĀshūr, M. al-Ṭ. (2006). Ibn Ashur: Treatise on maqāṣid al-sharīʿah (M. el-T. el-Mesawi, Trans.). International Institute of Islamic Thought. (Original work published 1946)

Ibn Taymiyyah, A. ibn ʿA. al-Ḥ. (1995). Majmūʿ al-fatāwá (ʿA. al-R. ibn M. ibn Qāsim, Comp.; Vols. 19, 29). Majmaʿ al-Malik Fahd li-Ṭibāʿat al-Muṣḥaf al-Sharīf. (Original works completed before 1328)

Illes, A., Kosse, A., & Wierts, P. (2025). Advancing in tandem – Results of the 2024 BIS survey on central bank digital currencies and crypto (BIS Papers No. 159). Bank for International Settlements. https://www.bis.org/publ/bppdf/bispap159.htm

International Islamic Fiqh Academy. (1986). Resolution No. 21 (9/3) on paper currency and changes in the value of currency. Third session, Amman.

International Islamic Fiqh Academy. (2019). Resolution No. 237 (8/24) on electronic currencies. Twenty-fourth session, Dubai. https://iifa-aifi.org/en/5980.html

International Monetary Fund. (2025, February 26). IMF Executive Board approves new 40-month US$1.4 billion Extended Fund Facility arrangement for El Salvador (Press Release No. 25/043). https://www.imf.org/en/news/articles/2025/02/26/pr25043-el-salvador-imf-approves-new-40-month-us1-bn-eff-arr

Izadin, A. A. I., Yusof, R. M., & Mazlan, A. R. (2025). The integration of Maqasid Shariah in evaluating stablecoins and traditional cryptocurrencies for Islamic portfolios diversification. International Journal of Islamic and Middle Eastern Finance and Management, 18(3), 577–597. https://doi.org/10.1108/IMEFM-08-2024-0380

Jaakkola, E. (2020). Designing conceptual articles: Four approaches. AMS Review, 10(1–2), 18–26. https://doi.org/10.1007/s13162-020-00161-0

John, K., Kogan, L., & Saleh, F. (2023). Smart contracts and decentralized finance. Annual Review of Financial Economics, 15, 523–542. https://doi.org/10.1146/annurev-financial-110921-022806

John, K., O'Hara, M., & Saleh, F. (2022). Bitcoin and beyond. Annual Review of Financial Economics, 14, 95–115. https://doi.org/10.1146/annurev-financial-111620-011240

Kiayias, A., Russell, A., David, B., & Oliynykov, R. (2017). Ouroboros: A provably secure proof-of-stake blockchain protocol. In J. Katz & H. Shacham (Eds.), Advances in cryptology – CRYPTO 2017 (Lecture Notes in Computer Science, Vol. 10401, pp. 357–388). Springer. https://doi.org/10.1007/978-3-319-63688-7_12

Kirchner, I. K. F. (2021). Are cryptocurrencies ḥalāl? On the sharia-compliancy of blockchain-based fintech. Islamic Law and Society, 28(1–2), 76–112. https://doi.org/10.1163/15685195-BJA10005

Kocherlakota, N. R. (1998). Money is memory. Journal of Economic Theory, 81(2), 232–251. https://doi.org/10.1006/jeth.1997.2357

Kristoufek, L. (2013). BitCoin meets Google Trends and Wikipedia: Quantifying the relationship between phenomena of the Internet era. Scientific Reports, 3, Article 3415. https://doi.org/10.1038/srep03415

Lawson, T. (2016). Social positioning and the nature of money. Cambridge Journal of Economics, 40(4), 961–996. https://doi.org/10.1093/cje/bew006

Liu, J., Makarov, I., & Schoar, A. (2023). Anatomy of a run: The Terra Luna crash (NBER Working Paper No. 31160). National Bureau of Economic Research. https://doi.org/10.3386/w31160

Liu, Y., & Tsyvinski, A. (2021). Risks and returns of cryptocurrency. Review of Financial Studies, 34(6), 2689–2727. https://doi.org/10.1093/rfs/hhaa113

Luther, W. J. (2016). Cryptocurrencies, network effects, and switching costs. Contemporary Economic Policy, 34(3), 553–571. https://doi.org/10.1111/coep.12151

Luther, W. J., & White, L. H. (2014). Can Bitcoin become a major currency? (GMU Working Paper in Economics No. 14-17). George Mason University. https://doi.org/10.2139/ssrn.2446604

Lyons, R. K., & Viswanath-Natraj, G. (2023). What keeps stablecoins stable? Journal of International Money and Finance, 131, Article 102777. https://doi.org/10.1016/j.jimonfin.2022.102777

Ma, Y., Zeng, Y., & Zhang, A. L. (2025). Stablecoin runs and the centralization of arbitrage (NBER Working Paper No. 33882). National Bureau of Economic Research. https://doi.org/10.3386/w33882

MacInnis, D. J. (2011). A framework for conceptual contributions in marketing. Journal of Marketing, 75(4), 136–154. https://doi.org/10.1509/jmkg.75.4.136

Makarov, I., & Schoar, A. (2020). Trading and arbitrage in cryptocurrency markets. Journal of Financial Economics, 135(2), 293–319. https://doi.org/10.1016/j.jfineco.2019.07.001

Mäki, U. (2021). Reflections on the ontology of money. Journal of Social Ontology, 6(2), 245–263. https://doi.org/10.1515/jso-2020-0063

al-Marghīnānī, B. al-D. ʿA. ibn A. B. (1995). Al-Hidāyah fī sharḥ Bidāyat al-mubtadī (Ṭ. Yūsuf, Ed.). Dār Iḥyāʾ al-Turāth al-ʿArabī. (Original work completed before 1197)

Muslim ibn al-Ḥajjāj. (1955). Ṣaḥīḥ Muslim (M. F. ʿAbd al-Bāqī, Ed.). Dār Iḥyāʾ al-Kutub al-ʿArabiyyah. (Original work compiled before 875)

Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. https://bitcoin.org/bitcoin.pdf

Ozili, P. K. (2023). Central bank digital currency research around the world: A review of literature. Journal of Money Laundering Control, 26(2), 215–226. https://doi.org/10.1108/JMLC-11-2021-0126

Ree, J. (2023). Nigeria's eNaira, one year after (IMF Working Paper No. 2023/104). International Monetary Fund. https://www.imf.org/en/Publications/WP/Issues/2023/05/16/Nigerias-eNaira-One-Year-After-533487

Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets. Official Journal of the European Union, L 150, 40–205. https://eur-lex.europa.eu/eli/reg/2023/1114/oj

Saḥnūn, ʿA. al-S. ibn S. (1994). Al-Mudawwanah [transmitting Mālik ibn Anas] (Vol. 3, Kitāb al-ṣarf). Dār al-Kutub al-ʿIlmiyyah. (Original work compiled before 854)

Schilling, L., & Uhlig, H. (2019). Some simple bitcoin economics. Journal of Monetary Economics, 106, 16–26. https://doi.org/10.1016/j.jmoneco.2019.07.002

Searle, J. R. (1995). The construction of social reality. Free Press.

Searle, J. R. (2017). Money: Ontology and deception. Cambridge Journal of Economics, 41(5), 1453–1470. https://doi.org/10.1093/cje/bex034

Securities and Exchange Commission. (2024, January 10). Statement on the approval of spot bitcoin exchange-traded products [Statement by Chair Gary Gensler]. https://www.sec.gov/newsroom/speeches-statements/gensler-statement-spot-bitcoin-011023

Selcuk, M., & Kaya, S. (2021). A critical analysis of cryptocurrencies from an Islamic jurisprudence perspective. Turkish Journal of Islamic Economics, 8(1), 137–152. https://doi.org/10.26414/A130

Siswantoro, D., Handika, R., & Mita, A. F. (2020). The requirements of cryptocurrency for money, an Islamic view. Heliyon, 6(1), Article e03235. https://doi.org/10.1016/j.heliyon.2020.e03235

Smit, J. P., Buekens, F., & du Plessis, S. (2016). Cigarettes, dollars and bitcoins – An essay on the ontology of money. Journal of Institutional Economics, 12(2), 327–347. https://doi.org/10.1017/S1744137415000405

Stablecoins Ordinance (Cap. 656) (Hong Kong). (2025). Commenced 1 August 2025. https://www.elegislation.gov.hk/hk/cap656

Treiblmaier, H. (2022). Do cryptocurrencies really have (no) intrinsic value? Electronic Markets, 32(3), 1749–1758. https://doi.org/10.1007/s12525-021-00491-2

Tyser, C. R., Demetriades, D. G., & Effendi, I. H. (Trans.). (1901). The Mejelle: Being an English translation of Majallah el-Ahkam-i-Adliya.

Usmani, M. T. (2015). Fiqh al-buyūʿ ʿalā al-madhāhib al-arbaʿah (Vols. 1–2). Maktabat Maʿārif al-Qurʾān.

Weber, B. (2016). Bitcoin and the legitimacy crisis of money. Cambridge Journal of Economics, 40(1), 17–41. https://doi.org/10.1093/cje/beu067

Whetten, D. A. (1989). What constitutes a theoretical contribution? Academy of Management Review, 14(4), 490–495. https://doi.org/10.5465/amr.1989.4308371

Yermack, D. (2015). Is Bitcoin a real currency? An economic appraisal. In D. Lee Kuo Chuen (Ed.), Handbook of digital currency (pp. 31–43). Academic Press. https://doi.org/10.1016/B978-0-12-802117-0.00002-3