Money as a Mirror: Classical Islamic Monetary Ontology and the Foundations of Interest-Free Pricing*

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Abstract

Contemporary Shariah-compliant financial engineering defends the exclusion of interest almost entirely through twentieth- and twenty-first-century institutional economists, framing it as a regulatory adjustment to fractional-reserve banking. This paper recovers a deeper and older foundation. Drawing on al-Ghazali's teleology of money as a "mirror," Ibn Taymiyyah's conception of money as an immutable measure (*mi'yar al-amwal*), Ibn Khaldun's labour theory of value, and al-Maqrizi's account of currency competition, it argues that the prohibition of riba follows by construction from a classical ontology of *what money is*, and that a riba-free pricing primitive—the convergence intensity κ, which a purpose-built blockchain substrate is designed to enforce at the consensus level—is the mechanical instantiation of that ontology rather than a modern compromise with it. The contribution is conceptual: it supplies the κ-program with its missing foundation and grounds, in named classical authority, claims its companion papers currently assert without one. Throughout, the substrate is said to *operationalize* classical principles; we do not claim the classical authors endorsed distributed consensus.

Keywords: al-Ghazali; money as a mirror; riba; Islamic monetary theory; interest-free pricing; convergence intensity (κ); Ibn Taymiyyah; Ibn Khaldun; history of economic thought; blockchain; Shariah.

JEL classification: B11; E42; Z12; P48; O33.

1 Introduction

Modern Islamic finance carries a quiet embarrassment at its foundation. Its instruments—the *murabaha* mark-up, the *ijara* lease, the *sukuk* certificate—are routinely defended as compliant *workarounds*: structures that reproduce the cash-flows of conventional finance while avoiding the contractual form of interest. The literature that justifies them is overwhelmingly contemporary, and overwhelmingly institutional: El-Gamal (2006), Chapra (1985), Al-Jarhi (1981), Usmani (2002), and the standards of AAOIFI. That literature is indispensable for modern practice, but it tends to present the exclusion of interest as a *regulatory adjustment*—a constraint imposed on an otherwise conventional monetary system. On this telling, riba-freedom is something Islamic finance must engineer around, at cost.

*This paper provides the classical conceptual foundation of the κ-rate research program; companion papers develop the formal no-arbitrage pricing, empirical, and general-equilibrium results referenced herein.

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This paper argues that the framing is backwards. The classical Islamic monetary canon—the work of jurists and historians writing between the eleventh and fifteenth centuries—does not treat the prohibition of interest as a constraint bolted onto a theory of money. It derives the prohibition *from* a theory of money: an account of what money is for, from which the impermissibility of earning money from money follows as a matter of definition. Recover that ontology, and interest-freedom ceases to be a compliance cost and becomes the natural state of a correctly-specified monetary system.

The argument matters now because, for the first time, that classical ontology can be *enforced* rather than merely asserted. The companion papers of this program construct a riba-free pricing primitive—the convergence intensity κ, a stopping-time hazard that plays the role the risk-free rate r plays in conventional finance, but with no interest input—and embed it in a blockchain substrate[1] whose consensus rules are designed to make a positive interest parameter structurally impossible. The present paper supplies what that construction has lacked: its conceptual foundation. It shows that each core invariant of the substrate is the algorithmic form of a specific classical principle.

A discipline governs the whole. We claim that the substrate *operationalizes* or *instantiates* classical principles; we never claim that al-Ghazali or Ibn Taymiyyah *endorsed* Byzantine-fault-tolerant consensus, which would be a plain anachronism. The classical authors supply the normative ontology of money; the protocol supplies a mechanism that realizes it. The verb is "operationalizes," never "validates."

2 The modern compromise and its silent gap

The intellectual scaffolding of contemporary Islamic monetary economics is a twentieth-century construction. Al-Jarhi (1981) and Chapra (1985) set out the case for a non-interest monetary system; Khan & Mirakhor (1987), Iqbal & Mirakhor (2011), and Askari et al. (2012) developed its banking and macro-prudential implications; El-Gamal (2006) supplied the now-standard operational analysis of riba and *gharar*. This body of work is rigorous and necessary, and the present paper depends on it. But it shares a characteristic feature: it argues at the level of *institutions and contracts*—reserve regimes, profit-and-loss-sharing ratios, the legal form of permissible instruments—and rarely descends to the ontological question of what money *is*. Where it reaches for first principles, it reaches for the Qur'anic prohibition (Q 2:275) and moves directly to modern implementation, leaving a gap of some thirteen centuries between scripture and the 1980s—an instance, within Islamic finance itself, of the lacuna that Ghazanfar & Islahi (1990) and Ghazanfar (2003) term the Schumpeterian "Great Gap": the neglected centuries of medieval Islamic economic thought between the Greeks and the Latin Scholastics (Schumpeter, 1954).

That gap is not empty in the historical record; it is empty only in the program literature and in the working canon of Islamic finance. A smaller scholarly tradition has excavated the classical monetary writings—Islahi (2001) on al-Ghazali and Islahi (2012) on Ibn al-Qayyim, with Islahi (2014) surveying the tradition to the fifteenth century, Ghassan (2019) on the equation of exchange in Ibn Taymiyyah and Ibn Khaldun, and Figuera (2018) on medieval Islamic monetary thought as a whole, with Uddin (2019) surveying Islamic monetary economics. The present

[1] For the reader coming from the history of economic thought: the substrate is the design of a proof-of-stake blockchain (the κ-Chain) whose consensus rules are specified to (i) reject any transaction implying a positive interest parameter ι and slash a validator who includes one; (ii) compute κ each block as a stake-weighted median of validators' market observations; and (iii) pay validators only from real transaction fees, with no inflationary issuance. These three invariants—$\iota = 0$ enforcement, the κ oracle, and the fee-only reward—plus the execution-isolation choice discussed with al-Maqrīzī below, are what the classical principles are mapped onto in the Synthesis. At the time of writing the κ-Chain consensus layer is a specification; the EVM reference implementation of the instruments (Baraka Protocol) runs on a public testnet, while the consensus substrate described here is a design.

paper continues their recovery and extends it in a direction those recoveries did not pursue: it connects the classical ontology to a *working mechanism*. The modern compromise asks how to avoid interest within a monetary system designed around it. The classical canon asks what money is such that interest was never its proper use.

A second body of work bounds the contribution from the other side, and the space between them must be stated precisely. A growing literature already reads the classical scholars *forward* onto digital money, asking whether cryptocurrencies satisfy al-Ghazali's and Ibn Taymiyyah's criteria for a valid medium of exchange—and reaching mixed verdicts, from qualified acceptance (Alzubaidi & Abdullah, 2017; Haq & Ali, 2018) to scepticism on grounds of volatility and speculation (Siswantoro et al., 2020). That literature renders permissibility verdicts on instruments that already exist—is a given coin money in the Shariah sense?—and takes the artefact as given. The present paper inverts the direction: it treats the classical ontology as a *design specification* and exhibits a substrate *design* engineered to satisfy it by construction, in which the prohibition of interest is enforced as a consensus invariant rather than adjudicated after the fact, and in which the riba-free measure κ is given a formal, no-arbitrage definition rather than asserted. The novelty is therefore neither the classical recovery (Islahi, 2001; Figuera, 2018) nor the act of relating the canon to digital money (Alzubaidi & Abdullah, 2017; Siswantoro et al., 2020), but the demonstration that a specific, fully-specified mechanism instantiates the ontology as an enforced and priced invariant.

The neglect this paper addresses is not incidental; it has a name in the history of economic thought. Schumpeter's *History of Economic Analysis* (Schumpeter, 1954) posited a "Great Gap"—"over 500 years" that, on his account, could safely be leapt over on the way from the Greeks to St Thomas Aquinas—in which nothing of analytical significance was written; the leapt-over centuries are precisely those of medieval Islamic scholarship. Ghazanfar & Islahi (1990) and the contributors to Ghazanfar (2003) have shown the claim untenable: the gap is filled, densely, by the very authors on which this paper draws. Yet the recovery has remained largely internal to the history-of-thought literature; it has not been carried into the working canon of Islamic finance, which continues to reach past the medieval monetary writers to the Qur'anic text and then forward to the twentieth century. The wager here is that this canon is not merely of antiquarian interest but *operationally* consequential: it specifies, with a precision the modern compromise lacks, what a monetary system must do to be interest-free by construction rather than by exception. The *maqasid* (higher-objectives) tradition frames the prohibition of riba not as an isolated rule but as protection of a wider good—the integrity of exchange and the circulation of wealth—which is the register in which the classical monetary authors wrote.

3 Al-Ghazali (1058–1111): the teleology of money and the mirror

Abu Hamid al-Ghazali's account of money, set out in the *Ihya' Ulum al-Din*, is not a list of money's functions but a teleology—an argument about the *purpose* for which money exists, from which its permitted and forbidden uses follow. Money, for al-Ghazali, is a remedy for the structural failures of barter: the absence of a common denominator and the impossibility of relating dissimilar goods. Its defining property is that it has no value of its own. "Dirhams and dinars," he writes, "are not created for any particular persons, they are useless by themselves; they are just like stones. They are created to circulate from hand to hand, to govern and to facilitate transactions" (al-Ghazali, *Ihya'*; trans. Islahi, 2001).

From this absence of intrinsic value al-Ghazali draws his central image. A medium can measure all things precisely *because* it is itself featureless: "a thing [such as money] can be exactly linked to other things if it has no particular form or feature of its own, for example, a mirror which has no colour but can reflect all colours. Same is the case with money—it has no

purpose of its own but it serves as a medium for the purpose of exchanging goods" (al-Ghazali, *Ihya'* (al-Ghazali, c.1105); trans. Islahi, 2001). Money is a mirror: it carries no colour, and exists only to reflect the colours—the values—of real goods.

The prohibitions follow by construction. To hoard money (*kanz*; cf. Q 9:34)[2] is to withdraw the mirror from circulation, defeating the purpose for which it was created. And to trade money for money at a premium—riba—is to make the mirror an end in itself. In al-Ghazali's own framing, when "a person is permitted to sell [or exchange] money with money, then such transactions will become his goal" (al-Ghazali, *Ihya'*; trans. Islahi, 2001)—the medium is forced to generate its own colour, a return arising from the mirror rather than from the goods it should reflect. Interest is therefore not a contingent abuse to be regulated but a *category error*: a demand that a colourless thing produce colour.

What the κ-substrate operationalizes. The protocol's substrate invariant—the interest parameter ι in the funding-engine state is asserted to equal zero, with the consensus layer rejecting at inclusion any state transition that implies $\iota > 0$ and slashing a proposer who admits one—is a mechanical instantiation of the mirror principle. The native unit is structurally prevented from accruing a time-value return; it can only reflect realized commercial risk, which the program measures as the convergence intensity κ. In an extension of al-Ghazali's image, κ is the colour of the goods—an intensity read from real trade—and the substrate guarantees the mirror never manufactures colour of its own.

Two further elements of al-Ghazali's account deserve emphasis, because each has a direct structural analogue. The first is his critique of the *store-of-value* function. Al-Ghazali does not deny that money can be held, but he warns that when the store-of-value motive predominates—when money is desired for its own accumulation rather than for the exchange it enables—the medium is diverted from its purpose; hoarding (*kanz*), he writes, is like imprisoning a just ruler, depriving the community of the circulation through which value is realized. The second is his treatment of debasement and counterfeiting, which he condemns not merely as fraud but as a corruption of the measure itself: to adulterate the coinage is to falsify the yardstick against which all goods are priced, an injustice to every party to every subsequent exchange. Both concerns—that money not become an end, and that the measure not be corrupted—reappear, transposed into mechanism, in the substrate's refusal of inflationary issuance (debasement by another name) and its protection of the published measure from manipulation. The two ways al-Ghazali identifies by which a monetary system betrays its purpose—letting the medium become the goal, and corrupting the measure—are precisely the two failures the architecture is built to foreclose.

4 Ibn Taymiyyah (1263–1328): money as an immutable metric

Where al-Ghazali supplies the ontology, the Hanbali jurist Ibn Taymiyyah supplies the operational mandate. Money, he argues, is fundamentally a *measure*: "*Athman* [prices, that which is paid as price] are meant to be a measurement of objects of value (*mi'yar al-amwal*), through which the quantities of the objects of value (*maqadir al-amwal*) are known; and they are never meant to be used for themselves" (Ibn Taymiyyah, *Majmu' al-Fatawa* 29; trans. Islahi, 2001). Money is the yardstick of every contract, and like al-Ghazali's mirror it is corrupted the moment it becomes the object rather than the instrument of exchange.

From the metric conception Ibn Taymiyyah derives two claims that bear directly on protocol design. The first is normative: because money measures the fairness of all obligations, the authority's tampering with it—debasement by alloy or by reducing weight—is a systemic

[2]We use *kanz*, the Qur'anic register for the hoarding of money, rather than *ihtikar*, which in fiqh usage denotes the monopolistic hoarding of commodities.

injustice (*zulm*), since it warps the standard against which every party's labour and goods are valued. The second is analytical: the quantity of money in circulation should be proportioned to the volume of transactions, so that the metric neither inflates nor deflates the values it records—an early articulation of a quantity-theoretic discipline (Ghassan, 2019).

An honest caveat against overreading. Ibn Taymiyyah is sometimes conscripted for a strict commodity-money (gold-and-silver-only) position. The texts do not support this. He explicitly accepted *fulus*—copper token money—provided it is minted "according to the just value of the people's transactions, without injustice to them" (Ibn Taymiyyah, c.1315). His objection is to *debasement and distortion of the metric*, not to non-commodity money as such, and the present account does not enlist him against token or fiat money per se.

What the κ-substrate operationalizes. Two design elements descend from Ibn Taymiyyah, with different strengths. First, the oracle module operationalizes the demand that the value-metric be insulated from manipulation: index observations enter consensus through ABCI++ vote extensions and are aggregated by a stake-weighted median, so that no single proposer—no "authority"—can debase the published κ. Second, his quantity-tracks-transactions principle maps most directly onto the fee-only, non-inflationary reward of Section 5: the medium expands only with realized activity, never by fiat issuance.

It is worth dwelling on the originality of Ibn Taymiyyah's second claim, because it is easily underestimated. To hold that the quantity of money should be proportioned to the volume of transactions is to grasp, in the fourteenth century, the intuition that later crystallized as the quantity theory of money: that the value of the monetary unit is not intrinsic but depends on the relation between the stock of money and the goods it must measure. Ghassan (2019) reconstructs this as a "Shariah rationale money" in which the velocity and volume of transactions are endogenous and the stock is the variable the authority must discipline. The normative and the analytical claims are, for Ibn Taymiyyah, one: the authority's duty to keep the measure stable just *is* the requirement that issuance track real activity rather than fiscal convenience. This is the seam along which the substrate's fee-only, zero-emission reward is cut—issuance, in effect, is bound to realized transactions because there is no issuance at all beyond the fees those transactions generate.

5 Ibn Khaldun (1332–1406): the labour theory of value and velocity

Ibn Khaldun's *Muqaddimah* completes the picture by tying the value money measures to its ultimate source. Value, for Ibn Khaldun, originates in human effort: "profit is the value realized from human labour", and "when there is more labour, the value realized from it increases among the people" (Ibn Khaldun, 1377/2015, 273ff.). Money itself is not wealth but a vehicle through which wealth, produced by labour, is acquired and measured. Prosperity, in his account, rises with the *velocity* of money through real commercial activity, and falls when money is sequestered in passive accumulation rather than circulated through production and trade.

The implication is a sharp criterion of legitimacy for return. A gain that tracks productive labour, or genuine exposure to commercial risk, is value realized; a gain that accrues to capital without corresponding effort or risk is not value created but value redistributed—a dilution of the real measure. This is the conceptual ancestor of the program's distinction between κ (an intensity earned from real market activity) and r (a return to the mere passage of time).

What the κ-substrate operationalizes. The fee-only wakala reward of the distribution module instantiates the Khaldunian criterion at the level of network economics. Block producers

receive no inflationary emission whatsoever; their entire compensation is drawn from the transaction fees generated by real trades clearing on the order book. Validators are therefore paid for the actual labour of producing blocks—computation, latency, security, storage—and for nothing else, with no value minted for idle capital. Network income rises and falls with transaction velocity, precisely as Ibn Khaldun holds that legitimate prosperity must.

Ibn Khaldun's monetary claims sit inside a larger theory of *umran* (civilisation) and its rise and decline, and the embedding matters. For Ibn Khaldun the wealth of a society is a function of the division of labour and the density of cooperative production—*asabiyya* furnishing the social cohesion that makes it possible—and money is the instrument through which that produced value is measured and exchanged, its circulation tracking the vitality of the underlying production. Decline sets in, on his account, when the state's extraction (through confiscatory taxation or monetary manipulation) outpaces the productive labour that sustains it, so that the measure is loaded with charges unrelated to real value. The lesson the architecture draws is narrow but exact: a network's compensation should be a function of the real economic activity it processes, not of a claim levied on the mere passage of time or the mere holding of the token. The fee-only reward is the Khaldunian criterion enforced at the level of protocol incentives—validators prosper precisely to the extent that real exchange occurs, and not otherwise.

6 Al-Maqrizi (1364–1442): currency competition and systemic integrity

The last of the four, Ibn Khaldun's student Ahmad al-Maqrizi, contributes a systemic warning rather than a definition. In *Ighathat al-Umma bi-Kashf al-Ghumma*, his analysis of the Mamluk monetary crisis, al-Maqrizi documents how the over-issuance of low-quality copper *fulus* alongside the gold and silver standard drove the sound coin out of circulation and produced ruinous inflation—an early statement of the principle later named Gresham's Law, that "bad money drives out good" (al-Maqrizi, *Ighatha*; trans. al-Maqrizi, c.1405; cf. Figuera, 2018). His prescription was the restoration of a sound standard, with debased token coin confined to petty transactions.

What the κ-substrate operationalizes—and an explicit limit. The protocol's choice to keep execution within a sovereign, isolated virtual machine rather than bridging natively to an external interest-bearing ($r > 0$) settlement layer can be *framed* in al-Maqrizi's terms: an interest-bearing wrapped asset admitted into a zero-interest substrate is the digital analogue of debased coin admitted to a sound system. But this is an *analogy, not a derivation*, and it is the weakest of the four mappings for two reasons. First, al-Maqrizi's subject is the debasement of *coinage*, not the interoperability of execution environments. Second, Ibn Taymiyyah's acceptance of *fulus* shows the classical tradition is not monolithically hostile to "lesser" money. The execution-isolation decision therefore stands on its independent technical grounds—determinism, light-client compatibility, the avoidance of a consensus fork, and the refusal to depend on infrastructure the protocol does not control—with al-Maqrizi supplying historical resonance rather than load-bearing proof.

The historical specificity of al-Maqrizi's analysis is part of its force. Writing as an eyewitness-historian of the Mamluk crisis of 806–808/1403–1405, he traces a causal chain—fiscal mismanagement, the over-minting of copper *fulus*, the flight of gold and silver from circulation, and the collapse of the price system—with a rigour that anticipates not only Gresham but the broader recognition that a debased medium does not merely lose value but *disorders* the measurement of all other values. The point for the present argument is deliberately modest: al-Maqrizi establishes that the integrity of a monetary system can be destroyed from within by the admission of an inferior, over-issued instrument alongside a sound one; whether that

observation transfers to the admission of an interest-bearing wrapped asset into an interest-free execution environment is a question of analogy, not derivation, and the analogy is offered as illustration rather than proof.

7 Supporting voices: a tradition, not four figures

The four principal figures are the prominent peaks of a continuous tradition, and three further voices confirm that the ontology is a school rather than a selection. **Ibn Rushd** (Averroes, 1126–1198), in the *Bidayat al-Mujtahid*, gives the prohibition of riba its most systematic juristic analysis, distinguishing riba al-fadl (excess in the exchange of fungibles) from riba al-nasi'ah (excess through deferment) and—characteristically—not merely stating the law but reconstructing the *rationale* the schools offer for it, locating the wisdom of the prohibition in the preservation of equivalence and the prevention of exploitation in exchange (Ibn Rushd, c.1180). His move from rule to underlying reason is the juristic counterpart of al-Ghazali's move from function to teleology.

Ibn al-Qayyim (1292–1350), in *I'lam al-Muwaqqi'in*, supplies the structural logic that connects the two categories of riba. He classifies riba al-nasi'ah as the manifest usury (*jali*) and riba al-fadl as the hidden (*khafi*), the latter forbidden not in itself but as *sadd al-dhari'ah*—the blocking of a means to the former, "prohibited to stop it from becoming" open usury (Islahi, 2012; Ibn al-Qayyim, c.1345). This anticipatory logic is precisely the reasoning the companion perpetual-futures paper (Ahmed & Bhuyan, 2026d) invokes in its treatment of *bay' al-kali bil kali* (debt-for-debt), and it grounds the substrate's posture of foreclosing interest at the level of structure rather than policing it after the fact.

Al-Dimashqi (Abu al-Fadl Ja'far ibn Ali al-Dimashqi, eleventh–twelfth century), in his merchant manual *Kitab al-Ishara ila Mahasin al-Tijara*, descends from jurisprudence to commercial practice, treating money's role in valuation and prudent exchange and the ethics of honest dealing (al-Dimashqi, 11th–12th c.). His exact dates are debated—the sole internal evidence is a coin he names—but his authorship is established, and his presence shows the ontology of money as neutral measure was not the preserve of theologians but the working assumption of the merchant class itself.

Taken together, these three voices close the distance between the high monetary theory of al-Ghazali and Ibn Taymiyyah and the daily practice of the market. Ibn Rushd supplies the jurist's reasoned account of *why* the prohibition holds, refusing to leave it as bare command; Ibn al-Qayyim supplies the structural logic by which a lesser, hidden form of riba is foreclosed precisely to protect against the greater, manifest form—the *sadd al-dhari'ah* reasoning the architecture mirrors in foreclosing interest *ex ante* rather than policing it *ex post*; and al-Dimashqi shows that the conception of money as a neutral measure, far from being a theologian's abstraction, was the operating assumption of the merchant himself. The cumulative effect is to establish that the ontology this paper recovers is not a doctrine assembled from convenient fragments but a tradition—continuous across four centuries and across the schools—Shafi'i, Maliki, and Hanbali alike—and the divide between the scholar's study and the trader's ledger.

8 Synthesis: a classical ontology of interest-free pricing

Read together, the canon yields four load-bearing principles. From al-Ghazali and Ibn Taymiyyah: money is a **neutral measure**—a mirror, a *mi'yar*— with no value of its own, corrupted the moment it becomes the object rather than the instrument of exchange. From Ibn Khaldun: legitimate value originates in **labour and real activity**, so that return must track effort or genuine risk, never the mere passage of time over idle capital. From Ibn Taymiyyah again and from al-Maqrizi: the **integrity of the measure** must be defended. And from Ibn

Rushd and Ibn al-Qayyim: the prohibition is to be secured **structurally**, by reason and by the blocking of means.

These are one ontology seen from four angles, and the κ-substrate instantiates each in a distinct invariant:

Component	Rule	Classical anchor	Operationalizes
`x/perp`	$\iota = 0$ at inclusion; slashing	al-Ghazali (+ Ibn Taymiyyah)	neutral mirror; no time-value r
`x/oracle`	ABCI++ median κ	Ibn Taymiyyah	integrity of the value-metric
`x/distribution`	0% inflation; fee-only	Ibn Khaldun (+ quantity discipline)	return tracks labour/velocity
`x/evm`	sovereign isolated execution	al-Maqrizi *(illustrative)*	resists "bad-money" pollution
posture	foreclose $\iota > 0$ ex ante	Ibn Rushd; Ibn al-Qayyim	prohibition by reason / *sadd a*

Table 1: Classical principles and the substrate invariants that operationalize them. Module names refer to the κ-Chain design: `x/perp` (the funding engine), `x/oracle` (the κ oracle), `x/distribution` (the validator-reward module), `x/evm` (the isolated execution environment).

The mapping is bounded, and its strength varies by figure: tight for al-Ghazali's mirror and the $\iota = 0$ invariant, strong for Ibn Taymiyyah and Ibn Khaldun, explicitly illustrative—the weakest—for al-Maqrizi, and structural for the Ibn Rushd/Ibn al-Qayyim posture.

9 From ontology to mechanism: the κ-substrate

The bridge from this ontology to a working system is the convergence intensity κ. Ackerer et al. (2025) establish that, when the interest parameter of a perpetual contract is set to zero, a unique no-arbitrage price still exists; the companion papers show that this interest-free price is isomorphic to the reduced-form pricing of credit, with κ playing the role of the default intensity (Ahmed & Bhuyan, 2026a). κ is therefore a measure read entirely from realized market activity, with no interest input—the formal counterpart of al-Ghazali's "colour of the goods."

At the level of pricing, the program's Separation Theorem renders this mirror an identity rather than a figure of speech. A claim's value embeds a charge for the passage of *time* (the interest parameter ι) and a charge for the intensity of real *convergence or risk* (the hazard κ), and the no-arbitrage price remains uniquely defined when the first is set to zero (Ackerer et al., 2025; Ahmed & Bhuyan, 2026a):

$$\text{value} \;=\; f\Bigg(\underbrace{\iota}_{\text{time-value}},\; \underbrace{\kappa}_{\text{real risk}}\Bigg), \qquad \iota = 0 \implies \text{value} = f(0,\kappa).$$

Money may reflect the colour of the goods (κ) but may not manufacture colour of its own (ι); setting $\iota = 0$ does not break pricing, it isolates the reflection. And the mirror is not merely a metaphor: a companion empirical study measures κ directly on real data and finds it behaves as a probability intensity must—strictly non-negative across a cross-section of 195 actively-quoted USD sukuk, and Feller-consistent in every estimated issuer series of a separate constant-maturity dynamics panel (Ahmed & Bhuyan, 2026b)—so the program's κ behaves, in modern data, as the classical ontology requires of a measure of real risk—an instantiated property rather than an aspiration. The substrate is designed to do three things the classical authors could only prescribe. It *enforces* the neutrality of money by making $\iota > 0$ unrepresentable in valid state. It *protects the measure* by computing κ from a stake-weighted median of validator observations, so that no single authority can debase it. And it *ties reward to labour* by paying validators only from realized transaction fees. What al-Ghazali, Ibn Taymiyyah and Ibn Khaldun could establish only as principle, the substrate is specified to establish as invariant—to be checked every block, by every honest node.

10 Conclusion and honest boundaries

This paper establishes a genuine classical lineage for interest-free pricing, and in doing so closes the thirteen-century citation gap in the program literature — and shows how the working canon of Islamic finance, which still reaches past the medieval monetary writers, can close its own. The exclusion of interest is not, on this account, a modern regulatory patch; it is the recovery of an ontology in which money is a neutral measure whose proper use was never to breed itself.

The boundaries are as important as the claim. The paper does *not* establish that the classical authors endorsed blockchain, consensus, or any modern mechanism—the relation is operationalization, not endorsement. The al-Maqrizi mapping is explicitly the weakest, illustrative rather than probative. And the canon settles only the riba question; the contract-level questions of *gharar* (excessive uncertainty), *maysir* (speculation), and *qabd* (constructive possession) on cash-settled instruments are not resolved here and remain matters for a qualified Shariah board. What the classical ontology supplies is not a fatwa but a foundation: the demonstration that a correctly-specified monetary substrate is interest-free not by constraint but by construction.

It bears restating where the argument stops. The classical ontology recovered here speaks to *riba*, and the substrate enforces what that ontology requires. It does not, and cannot, settle the adjacent prohibitions—*gharar* (excessive uncertainty), *maysir* (speculation), and *qabd* (possession)—which turn on asset ontology, contractual intent, and delivery rather than on the time-value of money, and which therefore remain matters for qualified jurisprudential adjudication, particularly for cash-settled synthetic instruments. A companion note sets out that division explicitly and proposes the product-layer conditions under which asset-backed instruments built on the riba-free foundation can satisfy the remaining pillars (Ahmed & Bhuyan, 2026c). The claim of the present paper is correspondingly bounded: that the foundation is sound, classical, and enforceable—not that the foundation alone renders every instrument built upon it compliant.

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