Islamic Finance in the Muʿtazilī Madhab

Mathematical Equivalence, the Mutaqlid Method, and Decentralized Economic Justice

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This edition retains the 28 chapters, five original figures, legal analysis and explicit proof limits. A bounded set of new passages engages Mohammad Hashim Kamali on futures, Matt Levine on synthetic leverage, Satyajit Das on engineering incentives, and the author's Bitcoin finance experience.

> **Governing thesis.** A fatwa about finance should disclose its evidence, legal theory, material contract rights, and consequences under adverse states. The proposed *mutaqlid fī al-uṣūl* selects and reconciles premises with a declared account of authority. Mathematical equivalence tests whether a proposed legal difference is real; it does not itself supply revelation, juristic competence, or the validity of a new contract.

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Introduction. A Fatwa and a Proof

Suppose two households end a year with the same money and the same debts. The first borrowed from a bank; the second used an Islamic bank's cost-plus sale. Someone announces that the first household dealt in ribā while the second conducted trade. The jurist may be right. The task is to find the property of the transaction that makes the distinction true.

The Qurʾān at 2:275 distinguishes sale from ribā [S01]. That distinction is a premise of the book. At 4:29 it condemns the wrongful consumption of wealth and names trade undertaken by mutual consent [S02]. At 2:279–280 it speaks of return of principal and respite for a debtor in hardship [S03]. These verses give a direction of inquiry. They also prevent an indiscriminate theorem that reduces every contract to a terminal cash number. The legal history of an asset, the vulnerability of a borrower, and the reality of consent can change the judgment while the net payoff remains unchanged.

This manuscript proposes ʿ**ilmī uṣūl**, an epistemic discipline in which a fatwa must carry five items: (i) the sources with their dates and claimed authority; (ii) a model of rights and obligations throughout the contract; (iii) its governing axioms, including how one source is prioritized if two disagree; (iv) a proof or inspectable argument that the verdict follows; (v) a list of facts that would revoke the verdict. An unresolved legal question remains unresolved. Mathematical precision increases the importance of that final sentence.

The philosophical inspiration is historical rather than a claim of historical authorship. The Muʿtazila defended the knowability of ethical value by reason. Abū al-Ḥusayn al-Baṣrī's *al-Muʿtamad fī uṣūl al-fiqh* and the dispute over *qiyās* and *taʿlīl* provide a serious predecessor for this interest in identifying reasons for rules [S04, S05, S06]. Neither writer possessed formal verification software, and none of the following Lean theorems is attributed to him.

To call the new method a madhhab is a normative proposal. Classical membership in a school requires more than an algorithm. Its proof obligations must develop alongside an account of interpretive authority, the hierarchy of Qurʾān and reports, and the treatment of dissent. A programmer can check a conditional syllogism. A jurist must still defend its premises.

The first editorial discipline

Every proposition in this manuscript receives one of four statuses in the accompanying source ledger: **attested** (an identifiable text says this), **proposed** (our jurisprudential choice), **proved-conditionally** (a formal implication under stated premises), or **open** (a fact or legal bridge needs more work). This will protect the book against a tempting form of epistemic money laundering: taking a learned model's own categories, typing them into a proof assistant as axioms, and announcing that revelation has spoken.

Editorial note: what experience can prove

This is a work of fiqh. Its controlling arguments come from revealed texts, juristic reasoning, defined contractual rights, and observable consequences. I have also worked inside the trade and treasury machinery being examined. Those experiences matter as leads for inquiry. They are observations from one career, not a substitute for a primary legal source or a representative dataset. Unpublished professional records establish the chronology; particular judgments remain my responsibility [S175].

The reader will encounter occasional field notes from Bitcoin treasury work, derivatives trading, protocol development, and the peculiar business of searching for real liquidity in a market that advertises abundance. I have kept the notes short. A story should expose the assumption the next legal argument must test.

Part I. The Financial Problem

1. The Jihād Against Ribā: Principal, Promise, and Price of Time

A widow has borrowed to plant her field. Rain fails. The bank knows precisely how much it will collect if she can pay, precisely what penalty it will demand if she cannot, and precisely when her farm can be seized. The widow knows much less. Her crop is a probability distribution; her debt is an enforceable number. The Qurʾān's ribā passages speak into this imbalance while also distinguishing the commerce by which people live. A serious new school of Islamic finance has to examine the words of the text, the meaning of its prohibitions, and the property rights of the people whose livelihoods hang on the answer.

The present work proposes a Muʿtazilī jurisprudence of finance, but its first premises are the Qurʾān's. Its mathematical tools should make the resulting judgment accountable. They must never reduce the prohibition to a preference for one clever contract diagram. Nor can a general commitment to justice silently suspend a textual rule whenever a borrower happens to consent to interest. The task is to develop a theory in which *ribā*, its classical extensions and the present economy receive individually argued treatment.

1.1 Reading 2:275–280 as one legal argument

Verse 2:275 records the claim that trade and ribā are alike and rejects that identification. It also states that God permits trade and prohibits ribā [S01]. The next verses move through charity and the cessation of outstanding ribā claims, before 2:279 allows the lender recovery of *ruʾūs amwālikum*, their principal sums, with the injunction of neither wronging nor being wronged. Verse 2:280 addresses the debtor in hardship and directs a period of respite [S03]. The sequence is juridically dense. It concerns the kind of gain being claimed, the amount recoverable after repentance, and the position of a debtor unable to pay.

The provision about principal has an immediate consequence for a credit dossier. A creditor who advances 1,000 units of a fungible monetary asset and contractually secures repayment of 1,100 units cannot satisfy the text merely by describing the additional 100 as a charge for time. Under the widely attested classical prohibition of stipulated benefit on a loan, the additional obligation is a ribā problem. A modern lender may argue that administrative or liquidity services explain some charge, and the jurist must hear the evidence of a distinct service. The party advancing the funds still carries the burden of showing which obligation is payment for which thing.

Verse 3:130 condemns consuming ribā in multiplied increases [S66]. The historical severity of compounding belongs to the textual record. Read alongside the broader wording of 2:275 and the principal rule in 2:279, it cannot by itself establish that only spectacularly compounded rates are prohibited. Verse 30:39 draws a moral distinction between giving for increase among people's wealth and giving in charity [S67]. These passages are relevant to the ethical account of indebtedness. Their exact legal reach, including the relationship between gifts seeking human return and commercial interest, is an interpretive question to be stated explicitly.

The Qurʾān's other transactional principles belong in the same file. Verse 4:29 prohibits taking wealth *bi-l-bāṭil* and identifies trade by mutual agreement [S02]. Verse 2:282 requires documentation of deferred debts in its long procedural instruction [S69]. The debtor's vulnerability, the creditor's claim, the evidence of consent and the enforceable promise form a connected legal problem. The text has no modern central-bank balance sheet inside it; it gives the jurist reasons to investigate such balance sheets once the relevant rights are identified.

1.2 What makes a debt a debt

A loan of fungible property changes legal relationships at once. The borrower receives property to use, while the lender receives a claim for return of an equivalent quantity under specified conditions. A sale exchanges an asset and its incidents of ownership for a price. An investment partnership distributes results according to a different agreement concerning capital and profit. The labels *qard*, *bayʿ* and *sharika* are legal classifications requiring proof about ownership, recourse and the source of each claimant's return.

Sīstānī's contemporary Jaʿfarī rulings give a particularly clear comparator. Ruling 2299 concerns return of equivalent fungible property even when its market value changes. Ruling 2301 prohibits a lender's stipulated extra in quantity, quality or another benefit. Ruling 2302 distinguishes the validity of the underlying loan from the prohibited extra [S54]. This matters for Bitcoin. A promise to repay 1.05 BTC in return for receiving 1 BTC is an identifiable stipulated surplus. Bitcoin's uncertain dollar price leaves that BTC-unit obligation intact. A contract that demands fixed dollar value at repayment raises another question about what was borrowed and the agreed conversion right.

An earlier Academy resolution classifies guaranteed, withdrawable bank deposits as loans because the bank is obliged to repay them on demand [S52]. The analogy to a custodial token balance is fact-dependent. When a platform may use the funds as its own and guarantees a general claim for return, the position resembles debt. Where customer property is segregated and the platform acts as an agent or custodian, different rights may follow. The balance displayed in the interface is evidence of an accounting quantity. The agreements and insolvency treatment identify what the user owns.

1.3 Exchange ribā and the limits of analogy

The well-known report in Ṣaḥīḥ Muslim 1587c lists gold, silver, wheat, barley, dates and salt, with rules for equal exchange within a category and hand-to-hand settlement [S50]. Jurists developed the doctrines commonly described as *ribā al-faḍl* and *ribā al-nasīʾa* with distinct accounts of the operative cause, *ʿilla*, and of how the rules extend to other commodities. The report should be entered into a source register with its transmitted status and the argument by which a given school applies it to modern fiat currency or Bitcoin.

This book's source comparison cannot claim that every school has independently pronounced on BTC-denominated derivatives. It can ask a narrower question. If a school treats Bitcoin as *thaman* or currency for purposes of its exchange rule, which spot-possession and equality conditions follow? If another school treats Bitcoin as transferable *māl* with its own trading rules, which deferred transactions does it admit? Those are conditional derivations. They establish a means to audit a purported fatwa rather than a manufactured historical consensus.

The distinction is practical. Selling BTC for dollars through immediate settlement is one transaction. Promising to exchange a fixed amount of BTC for a fixed amount of dollars three months later may be classified as a deferred currency exchange by a jurist who treats both sides as money. A cash-settled price hedge with a net payoff is a different object again, whose legitimacy requires a source-specific argument about its claim. Careful type definitions prevent the swap from being smuggled into a permitted category by naming it something familiar.

1.4 When a higher deferred price is a sale price

The strongest challenge to a simple arithmetic theory of ribā comes from approved installment sales. The International Islamic Fiqh Academy's Resolution 51 (1990) allows a commodity's agreed deferred sale price to exceed its cash price, subject to a determinate price and payment mode. It separately prohibits adding an express interest component and increasing an overdue debt [S68]. Under that framework, a seller who offers a machine for 1,000 dollars cash or 1,200 dollars payable in a year can execute a sale at 1,200 dollars when the parties select that price at formation.

The resulting cash flows may resemble a loan of 1,000 dollars repaid as 1,200 dollars. The 1988 Academy murābaḥah resolution supplies a substantive difference: genuine possession, risk of loss before resale and obligations concerning defects [S07]. The new school's *barzakh al-ḥukm* chapter specifies how to look for that difference in an adverse state. A financier that never exposes itself to the asset's ordinary legal incidents weakens the claim that the markup comes from a real sale.

We should resist an easy inference in the other direction as well. A real seller's fixed markup can be permitted by a source-specific rule even when the seller's period of price risk is short. A contract audit cannot invent a requirement that the institution maintain a given percentage probability of loss unless the proposed school expressly adopts such a rule. Our Muʿtazilī investigation may demand more extensive economic substance in a separate justice analysis. That additional demand belongs to our proposed doctrine, with reasons and a test that can fail.

1.5 A taxonomy of the lender's return

For any contract that advances spendable property, let P be the principal whose return is promised, E the additional amount or benefit due to the advancing party, and S a separately identified and actually rendered service. Write the enforceable obligation as

$$D_T = P + E + F_S,$$

where F_S is a charge causally connected to S. The notation records obligations rather than assigning their rulings. A fee labeled administrative may behave like a loan premium when it is calculated exclusively by principal and duration, with no verifiable service cost. A genuine custody fee may vary with operational risk and remain separately justified. The correct fatwa tests the source and recipient of the payment, its enforceability, the timing of its accrual, and the relevant school's rules concerning costs.

A lender might require a borrower to buy an unrelated token, provide a personal service, or write a favorable option as a condition of receiving the loan. Sīstānī's explicit treatment of stipulated lender benefits shows why the extra cannot be assessed through money alone [S54]. We must examine the value of the side benefit. A profitable covered call granted by the borrower solely to compensate the lender for a guaranteed-principal loan presents a substantial ribā objection even if its premium is quoted separately.

A different counterexample is a partnership that supplies working capital while acquiring a claim to a share of actual profits. It can produce returns much larger than the same-size loan. Its permissibility turns on the underlying partnership rules, especially the allocation of genuine losses and the investor's power to enforce guaranteed returns. A contract guaranteeing the investor's capital against all ordinary commercial loss while collecting a stated percentage of profit may reproduce debt-like risk allocation under a partnership label. The source rules for *muḍāraba* and *mushāraka* must be checked directly before declaring such a structure acceptable.

1.6 The cost of delay and the debtor in hardship

Let the borrower owe D at maturity. Suppose the contract adds a fee of k each overdue month. If the fee becomes a new amount payable to the lender regardless of actual loss or service, the modern Academy installment-sale decision treats late addition as prohibited ribā [S68]. Any proposed treatment of verified collection costs needs its own source and evidentiary standards. A judge's authorization, charitable assignment, or contractual covenant changes the analysis only through its actual rights and the governing rule.

Verse 2:280 obliges a moral and legal encounter with genuine hardship. A protocol that can identify a debtor in distress only by a volatility-triggered threshold may fail to account for the circumstances the verse names. A collateral lender nevertheless holds a legitimate interest in preserving its security. The collision is real. An architecture could allow term financing with a funded protective put, postponing enforcement of a temporary price fall and reserving a genuine terminal shortfall process. The design must also provide for insolvency, unavailable hedges and partial repayment. An indefinite guarantee of free credit would be another policy whose cost somebody bears.

The digital contract's enforcement schedule is therefore part of the ribā inquiry. A system that takes the debtor's residual collateral when collecting a legitimate principal claim may engage the separate wrong of

appropriating another person’s property. A protocol can be free of a fixed interest rate while exposing users to an unfair liquidation waterfall. Islamic finance needs a doctrine of enforcement alongside a doctrine of pricing.

1.7 Synthetic dollars without a dollar lender

Suppose a merchant owns one BTC purchased at $100,000. She wants purchasing power expressed in dollars over the next three months. A correctly maintained short derivative with a notional of one BTC can offset the dollar change in the underlying. The abstract cash-settled hedge identity is

$$S_T + \left(S_0 - S_T\right) = S_0.$$

That identity uses no interest-bearing dollar loan. It transfers market exposure between the parties to the derivative. Its proof says nothing about funding charges, counterparty ability, liquidation before maturity or the legal nature of the settlement promise. Those additional mechanics determine whether this particular contract is an acceptable way to preserve purchasing power.

A protocol can create a synthetic dollar whose backing consists of BTC plus a realizable hedge. Its risk may then lie in the enforceability and timing of the short rather than in a direct debt owed by the user to a bank. If its margin lender charges interest on borrowed margin, a separate ribā problem reappears. If the swap has recurring funding payments, the payments must be classified from the rights and obligations they create. A transfer from longs to shorts based on a pricing imbalance is mathematically distinct from a lender’s stipulated premium, but the distinction requires an argument accepted by the declaring legal method.

The Academy’s 2018 resolution recognizes hedging as a legitimate protective purpose while rejecting specific instruments and compensation for abstract risk [S32]. Its 2019 elaboration continues these constraints [S33]. A new Muʿtazilī fatwa permitting a funded contingent right therefore needs to engage the Academy at the point of disagreement: can an enforceable option or swap entitlement qualify as compensable property, and under which conditions? The use of a hedge to avoid interest-bearing credit strengthens a purposive argument. It cannot by itself discharge the competing formal objections.

1.8 The lender, the trader and the carrier of risk

A useful legal test asks which party ultimately bears a bad outcome and why. In a loan the borrower promises repayment of an equivalent principal, subject to the legally recognized remedies and hardship rules. In a genuine share-based investment the investor may suffer business losses. In a fully collateralized option the writer accepts a defined, funded contingent obligation; the holder owns the right to demand fulfillment. A cash-settled swap transfers the consequences of a stated price path according to a contractual formula. All four arrangements may increase or decrease someone’s wealth. Their legal reasoning concerns the promises by which wealth moves.

The central paradox of modern Islamic finance appears when a bank uses serial purchase-and-resale steps to produce a fixed financing return while an exchange offers a transparently collateralized hedge that protects an existing livelihood. Some authorities permit the former and prohibit the latter. Their source rules warrant a fair hearing. Our proposed method adds an inquiry into the material differences, the severity of potential harm and whether the new contract has a defensible property-right rationale. This is the book’s case for decentralized risk markets within limits.

An adverse case matters as much as a successful one. A trader with no underlying exposure who continually borrows on interest to finance large swap positions cannot claim a protective purpose merely because a different trader uses the same contract as a hedge. A firm that promises redemption of 100 million synthetic dollars while maintaining only uncollectible claims threatens the property of holders even if its marketing copy uses the language of Islamic risk sharing. A jurisdiction-independent economic model still needs local law for insolvency and dispute resolution; smart-contract execution alone provides only a partial settlement system.

The invoice printer has learned Arabic

In treasury operations I learned that an invoice can be impeccable while the accounting beneath it remains a small archaeological dig. Financial services are unusually good at giving the same flow of money several names. A customer advances 100 and owes 107; one business calls the seven interest, another calls it origination, and a third lets a smart contract collect it before the borrower sees the proceeds. A spreadsheet will faithfully record the difference. The legal question concerns the right for which the seven is being claimed. It should survive examination after every friendly name has been replaced by the obligations themselves [S175].

This is the reason to examine the minting fee separately from a funded hedge. A risk transfer may be useful; its usefulness cannot settle the classification of the credit that accompanies it. The most interesting column in a financing agreement is often the one whose title changed during the last legal review.

1.9 The proposed ribā dossier

A *mutaqlid* fatwa on any new financial instrument should begin by identifying whether the transaction is a debt, purchase, partnership, custody, agency, or contingent claim, and whether its components can be legally separated. It should specify every party entitled to a fixed return and every circumstance in which that return can change. The dossier then traces principal, services, lender benefits, overdue charges and any compulsory side contract. It identifies the textual and school-specific rule used at each step, then tests the result under default, inflation, force majeure and insolvency.

The proposed Muʿtazilī addition is an explicit account of justice for the resulting allocation of risk, with adverse effects that can falsify its recommendation. The method offers no automatic conclusion that an economically useful contract is permissible. Rather, it obliges the proponents of every payment to explain what lawful right or performance earns it, and the proponents of a prohibition to explain which identified legal rule applies to the actual transaction.

1.10 Formal tasks and unresolved legal questions

R1. Loan-premium detection: given a contract with guaranteed principal, classify enforceable lender benefits and identify those lacking an independently justified service. **R2. Sale-path audit:** verify acquisition, pre-resale loss-bearing and post-sale remedies in a purported murābaḥah. **R3. Hardship and remedies:** model collection, postponement and collateral surplus without treating temporary price movement as a complete definition of personal solvency. **R4. Swap settlement:** distinguish lender payments from compensable financial rights and test funding and forced liquidation. **R5. Source reconciliation:** show precisely where the proposed Muʿtazilī legal premise diverges from IIFA Resolutions 224 and 238.

The controlling textual record is Qurʾān 2:275–280, 3:130, 30:39, 4:29 and 2:282 [S01–S03, S66–S67, S69]. Source-specific applications include Ṣaḥīḥ Muslim 1587c [S50], the 1988 and 1990 Academy resolutions [S07, S68], Sīstānī's loan rulings [S54] and the Academy's hedging decisions [S32–S33]. The definitions and examples in this chapter are a proposed synthesis, whose conclusions remain conditional until the named contract and its actual execution have been verified.

2. The Widow, the Farmer, and the Option

The widow owns a plot whose productive capacity she cannot work herself. A cultivator owns tools, labor, and practical knowledge, though the working capital for a bad season is scarce. They can agree on fixed cash rent, a share of the crop, or an arrangement in which some of the crop is purchased in advance. Each contract moves a different risk. An honest jurist must find out which one the participants have made before asking how its Arabic name is spelled.

In the simplest model let $Y(\omega)$ denote the value of the harvested output available for distribution in future state ω. Under a fixed-rent lease the owner's agreed receipt is R, and the cultivator's net receipt before other costs is $Y - R$. Under a forty-percent share of distributable harvest the owner's receipt becomes $0.4\,Y$, and the cultivator's is $0.6\,Y$. A wet season makes the share attractive to the owner. A failed harvest can make the same arrangement easier on the farmer, depending on which party supplies inputs and bears damage. The parties' real rights also depend upon whether the share concerns gross crop, net crop, a particular irrigated strip, or harvested sale proceeds.

The legal record gives us an instructive disagreement. The Khaybar cultivation report in Ṣaḥīḥ Muslim 1551a concerns sharing a portion of agricultural produce [S19]. In the Ḥanafī development, Abū Ḥanīfa's treatment of *muzāraʿah* was more restrictive than that of Abū Yūsuf and Muḥammad al-Shaybānī, who supplied conditions under which it could be practiced. A defensible *mutaqlid* cannot flatten these positions into an invented consensus that agricultural uncertainty is always acceptable. The dispute makes the actual allocation of labor, land, seed, and loss a legitimate subject of renewed inquiry.

2.1 Optionality is already present in an ordinary crop

Even a crop-share entitlement is contingent. It may yield a large sum, a modest sum, or nothing. The farmer has an economic exposure to weather before sowing and to price before selling. The widow may possess the land's residual value while surrendering the right to its use for a season. When the first rains arrive, they can also make a more sophisticated bargain: the widow contributes land rent to the venture as capital, the farmer receives a minimum seed allocation, and the parties share the remainder. Every adjustment transfers a claim over a future state.

Suppose Y is measured in thousands of dollars and its illustrative values are 0, 10, and 30. An ordinary 40% revenue share pays the widow 0, 4, and $12. A fixed $5 rent yields a different exposure. At the poor harvest the landowner takes a loss of expected income under the share. At the prosperous harvest the share pays more. There is no mystery in the arithmetic. The unresolved legal task is to establish title to the crop, liability for cultivation costs, and whether each party knowingly consented to the distribution.

The word *option* becomes useful here. One can buy a right to take delivery of produce at an agreed price after the harvest, or agree to a minimum price in advance while allowing the farmer to retain some upside. Such rights are valuable because one party assumes a contingent obligation that helps another plan. Their enforceability must be assessed at the contracting date. A promise made by an insolvent merchant is a different object from a paid claim backed by collateral under an agreed and reliable settlement rule.

2.2 The counterexample hidden in a good harvest

Consider two contracts that both pay the widow $4,000 when the harvest is worth $10,000. In Contract A she owns forty percent of the harvested crop and can choose when to sell. In Contract B the farmer owes her $4,000 in cash regardless of his realized crop sales, having promised to pay the debt out of other resources if necessary. The illustrated payoff matches in one state. The rights differ in crop theft, storage loss, credit default, and price

movements after harvest. At least one witness state is enough to defeat the claim of complete contractual equivalence.

A further distinction concerns conditional promises. A person might give the farmer the right to surrender grain against a minimum price, with a funded guarantor standing behind settlement. That right resembles a put in economic payoff. Islamic jurisprudence still has to determine the sale's subject, the legitimacy of payment for the contingent right, and any independent restrictions on the exchange. The 1992 Academy position on conventional options [S09] and the Malaysian treatment of certain warrants [S10] provide rival premises for that inquiry. Neither ruling issued a blanket judgment about every possible agricultural hedge.

The farmer wants a price while the crop is still a rumour

Our farmer has a season rather than a trading terminal. Seed and wages arrive in the present; payment for the harvest arrives in a future full of weather, transport, and other people's promises. A fixed sale price can be an extraordinary form of relief when one bad month might otherwise send the family back to an expensive lender. Mohammad Hashim Kamali made agricultural price risk central to his affirmative discussion of commodity futures in Malaysia. His case forces the jurist to reckon with a practical demand for forward commitments, while examining the precise rights that the exchange sells [S178, S180].

A farmer can also be ruined by a poorly constructed hedge. Daily variation margin is payable on the exchange's clock. The land and harvest obey another calendar. The chapter's principle of optionality has to survive the interval when the hedge is economically sound and the farmer has run out of cash.

2.3 The knowledge demanded of the jurist

A modern jurist invited to certify the widow's agreement needs more than a harvest forecast. The dossier identifies who owns the land, who purchases the seed, how output is weighed, when title transfers, whether a state authority can prevent export, which party pays for storage, how a dispute is adjudicated, and what happens if either party dies before settlement. A finite list of future outcomes may simplify the model, but its adequacy is itself a disputable factual premise.

The chosen legal authority must also be explicit. A ruling based on a recognized *muzāraʿah* doctrine may require crop-specific conditions. A new-school justification for a funded put may take those precedents as analogies but must carry a separate proof of its operative legal cause. Sharing financial uncertainty is not sufficient to make two contracts legally identical. It does establish that contingent future payments have been part of serious Muslim commercial reasoning from its earliest legal debates.

For the rest of this book, the widow remains our test participant. If the protocol's alleged innovation would leave her unable to recover the land, collect the crop, obtain the hedge, or discover who seized her collateral, its sophistication has proved something about the technology and little about justice.

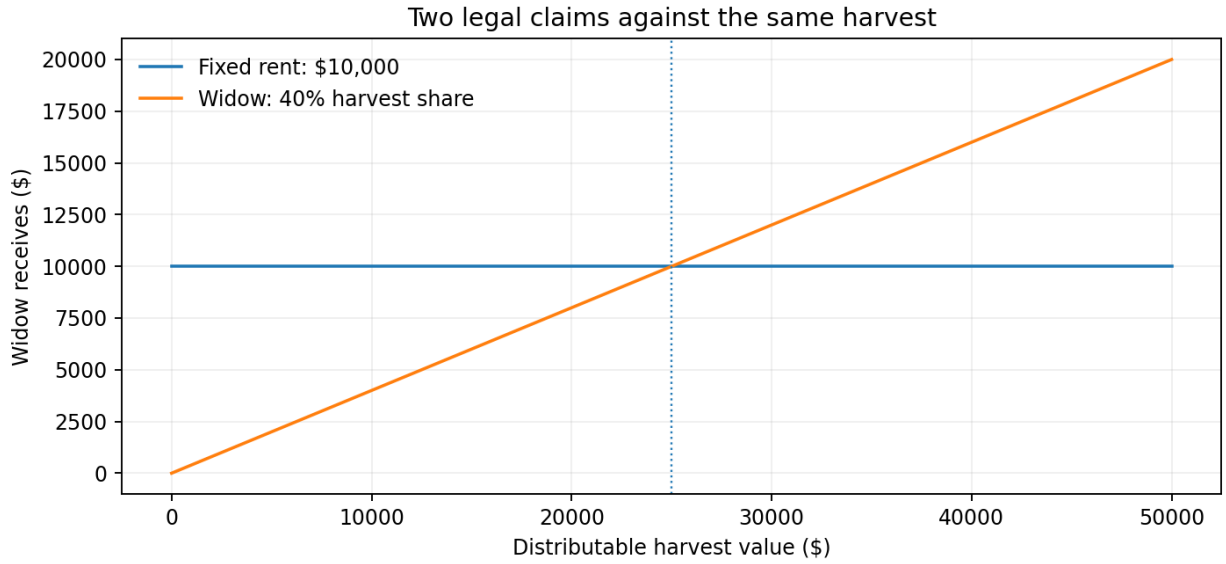
2.4 Original agricultural worked example

Consider a widow who owns productive land and a farmer who supplies labor. Fixed land rent of \$10,000 pays the widow \$10,000 even when the harvest disappoints, subject of course to collectibility. The farmer owes the rent despite uncertainty of revenue. A share of forty percent of a nonnegative distributable harvest value Y changes the entitlement:

$$W_{rent}(Y)=10,000,W_{share}(Y)=0.40\,max(Y,0).$$

At $Y=0$ the widow forgoes income, and the farmer owes no harvest-linked share. At $Y=50,000$ her percentage yields \$20{,}000. The functions cross at $Y=25,000$. The tenant also bears production costs, labor, and risks that the simple graph omits. These must be specified in a real *muzāraʿah* rather than guessed from a pleasant curve.

The Khaybar report transmitted in Ṣaḥīḥ Muslim 1551a describes a division of fruit and crop output [S19]. The early Ḥanafī disagreement about agricultural partnership matters because Abū Ḥanīfa's own judgment differed from positions attributed to his pupils. Our programme must verify the original texts before identifying precise grounds. In Jaʿfarī fiqh, *muzāraʿah* and *musāqāh* receive their own chapters [S15]. This variety defeats the claim that uncertainty of the amount received at contracting time is sufficient on its own to invalidate every productive arrangement.



Fixed rent and variable harvest share. Model illustration, not a guarantee of harvest receipts.

The share is contingent property. It is still unlike a modern exchange option in its power to exercise, its settlement obligations, and its relation to real production. The analogy supports a mathematical idea of state-contingent entitlement. A separate uṣūl argument must establish alienability and lawful consideration before the marketable put follows.

The optionality equation

The farmer's fixed-rent obligation gives the widow a senior claim on output, assuming the farmer remains solvent. The shared-harvest arrangement instead partitions outcomes. If the objective is sustainable land use and fair risk, a percentage contract can make the loss borne by the landowner covary with the farmer's loss. The ethical fact here is the arrangement of losses, rather than the name of a classical contract.

The widow may reasonably prefer fixed income. The tenant may welcome the predictability of a fixed price. Their actual choices and bargaining positions matter. A rule justified by welfare must inspect the parties' agency and the rights granted to each. The proposed method offers multiple permissible designs when they meet the core tests.

3. The Murābaḥah Paradox: Who Owned the Risk?

Deferred sale, disguised credit, and a proof that cannot stop at the last payment.

A household needs a machine worth $20,000. A bank purchases it and agrees to resell it for $21,400 payable after twelve months. Another lender advances $20,000 to the household, which buys the machine and promises to repay $21,400 at the same date. An observer sees a machine arrive today and a payment of $21,400 leave next year. He concludes that the two contracts are economically equivalent, hence their rulings must agree. The Qurʾān distinguishes trade from ribā, and the jurist has to discover the characteristic of the transactions that gives that distinction content [S01, S03].

The obvious financial analysis uses discounted expected cash flows. This book needs the corresponding legal analysis of what the parties own at each instant and who loses when the promised transaction does not happen. The decisive difference may exist during a short interval between purchase and resale. It can also survive for the whole life of the agreement through rights of defect, rejection, default, and enforcement. Those distinctions are the subject of the *murābaḥah mirror*.

3.1 The Academy's actual rule

In December 1988, the International Islamic Fiqh Academy issued Resolutions 40–41 concerning promises and murābaḥah to the purchase orderer. Its permission requires goods already possessed by the seller and obliges that seller to bear loss risk before delivery, along with responsibility for justified returns and concealed defects [S07, S84]. These details are the governing conditions for the example, rather than dispensable ceremony.

The same resolutions address promises made before the final sale. A unilateral promise may carry moral force and can be binding under stated circumstances where the promisee has relied and incurred expenses. Mutual promises in murābaḥah are treated differently depending on whether the parties retain an option, because a fully binding arrangement can amount to a sale entered before the seller possesses the commodity. The sequence of contractual operations matters [S84].

The March 1990 Resolution 51 separately permits an increased fixed price for a commodity sold on deferred terms when the parties settle on the particular payment arrangement. It rejects a separately stated interest charge tied to the postponement and any additional sum imposed for overdue payment. It also permits a pledge securing the agreed sale-price debt while rejecting retention of the seller's ownership after the completed sale [S68, S85].

These decisions establish a substantive legal account. The institution recognizes a higher agreed price for a deferred sale and specifies what makes the sale real. It prohibits additional interest on the buyer's debt. A critic of modern murābaḥah must address those provisions as written.

3.2 The four events of a genuine purchase-order sale

At t_0 the household asks the financier to acquire a specified machine. At t_1 the financier purchases it and receives the rights and risks required by the chosen doctrine. At t_2 the financier sells it onward at the fixed deferred price, with enforceable delivery and defect remedies. At t_3 the household makes the agreed payment or triggers defined default remedies.

A model of the contract must preserve ownership history:

$$Vendor \xrightarrow{t_1} Financier \xrightarrow{t_2} Household, t_0 < t_1 < t_2 < t_3.$$

During the interval from t_1 to t_2, the financier can suffer an actual loss on the asset. When the machine is defective, the household may acquire a recognized remedy. A postponed payment gives the financier a claim for the agreed price, while title to the machine has passed to the household subject to whatever security agreement is permitted. Each of these statements must be proved from the actual transaction documents and their governing law, rather than inferred from an accounting entry labeled ‘sale’.

A conventional creditor may disburse funds against a repayment obligation. The borrower’s purchase of the machine from the merchant is a separate contract. The lender’s rights can begin as a money claim rather than ownership of the machine. We thus compare systems of events, with parties and assets typed from the outset.

3.3 The warehouse-fire witness

Suppose the machine is destroyed in a warehouse after the financier has bought it but before it has sold and delivered it to the household. Under the Academy’s prescribed genuine-sale conditions the financier bears the relevant risk of loss [S84]. The household has not yet acquired that machine from the financier under the completed sale. The expected profit on that sale has vanished along with the machine, barring any separate rights under an actual insurance contract.

In the cash-loan construction, the lender never acquired the machine. The borrower may already own it and bear the destruction risk under the purchase and delivery terms with the merchant. Liability depends on the precisely timed event. The two financial arrangements may produce matching expected payments in their ordinary path, but the fire exhibits a reachable state in which their distributions of loss diverge.

A witness only proves what its premise establishes. If the borrower in the loan construction has not received title, the outcome can differ again; if the bank arranged insurance or a supplier guarantee, its net financial loss may be hedged without erasing its underlying legal role as buyer and seller. The auditor must follow the indemnification and subrogation clauses. Our finite model deliberately isolates title and pre-delivery loss-bearing, then instructs the jurist to extend it to the actual parties.

The formal objection to naive equivalence is therefore:

$$CashFlows_{normal}(A) = CashFlows_{normal}(B) \not\Rightarrow \forall \omega \, Rights(A,\omega) = Rights(B,\omega).$$

A fee schedule or lender’s balance sheet can conceal a material distinction. Equally, the mere presence of a warehouse receipt cannot demonstrate that the financier ever acquired a claim capable of being enforced against the vendor or its creditors.

3.4 The nanosecond of risk

Some modern financing systems arrange for the financier to own an asset only briefly before selling it onward, sometimes with predetermined counterparties and documents signed in a single sequence. The short interval can contain a real transfer in legal terms. The question is whether the transfer’s economic and enforceable content survives adverse events and whether the binding pre-sale promises have already extinguished the seller’s commercial exposure.

Consider a timed transaction trace. If the asset is destroyed before the intermediary acquires it, who loses? If it is destroyed one block later, after acquisition and before resale, can the intermediary refuse a claim for the sale price because delivery became impossible? Can the household compel delivery notwithstanding the loss? If the vendor sold defective goods, which party can rescind, and against whom? If the intermediary becomes insolvent during the interval, in whose bankruptcy estate does the asset appear? These questions turn an imaginary instant into a series of possible legal claims.

It may be that the arrangement meets the formal criteria of a sale while transferring very little ordinary market-price risk. Such a finding would make a financial and moral critique of its contribution possible. A proposed

Muʿtazilī judgment about exploitative bargaining or systemic harm would need an independent rule for that further criticism. The existence of a small risk period cannot be silently replaced by the conclusion that no sale occurred.

3.5 What a price for time can mean

Resolution 51 permits a fixed deferred selling price greater than a cash price, subject to its conditions [S85]. In a genuine sale the seller parts with ownership and receives a receivable payable later. A buyer may willingly pay more for a delayed payment obligation that allows use of the machine today. That economic reason for a price difference is intelligible. Its lawfulness under a particular fiqh method turns on the validity of the sale and its agreed consideration.

The same household may obtain an interest-bearing loan and pay the merchant's lower cash price. Both arrangements expose the household to a future claim and expose the financier or creditor to default risk. Those common financial features make them worth comparing, but they cannot by themselves establish that a deferred sale is the same legal instrument as a loan. The original difference between trade and ribā is presupposed by the governing scriptural argument.

The hardest critique focuses on arrangements that create the deferred-price claim while bypassing every material incident of property transfer. Suppose the 'financier' owns no deliverable asset, lacks title and defect remedies, and merely sends the customer's money to a supplier. It then demands a return calculated from the amount advanced and the time elapsed. The new school's test must identify its underlying obligation as a financial advance and bring the ribā analysis to bear on that obligation. If a genuine purchase and resale occurred, the opposite direction of inquiry is demanded.

An accounting identity cannot choose which factual case occurred. Commercial documents, delivery receipts, financing agreements and state-dependent creditor rights provide that evidence.

3.6 The delayed installment as a new contract state

A murābaḥah receivable is a debt after the sale has concluded. The sale consideration may be higher because payment was deferred, and Resolution 51 requires that amount to be settled in the agreed contract. When the customer misses the next installment, the seller cannot add a new payment for the mere passage of time under that resolution [S85]. The original permissible consideration does not provide a continuing license to charge more because the buyer is late.

A protocol can enforce this distinction mechanically. The faceAmount can be fixed at sale formation. The balanceDue can decline with payments or be reduced by lawful credits. lateUplift is prohibited in the Academy's specified model. When a financier purports to 'restructure' the debt, the jurist must check whether the old claim has merely grown in exchange for delay or whether a new real transaction took place with independently permissible terms.

The borrower in hardship raises a further duty. Qurʾān 2:280 calls for respite for the debtor in difficulty [S03]. Exactly how an Islamic finance institution implements that duty involves rules of proof, collection and remedies. A liquidation engine that sells family assets instantly based on a noisy price oracle may conflict with a proposed ethic of forbearance even if the underlying collateral contract was valid. Such a critique needs the particular security and debtor protection law; its moral force does not turn a loan into a sale.

3.7 The defect, return, and collateral cases

In the first counterexample, the machine is delivered but contains a concealed manufacturing defect. The buyer's contractual right to return it, claim compensation, or pursue the seller varies with governing law and the quality of the agreement. The Academy's 1988 murābaḥah resolution expressly identifies justified return due to

concealed defects as part of the seller’s risk [S84]. A document that strips the customer of every such remedy demands special scrutiny.

In the second example, the household has pledged the machine as security for the unpaid sale price. Under Resolution 51 the seller may obtain that mortgage-style security while ownership after the sale belongs to the buyer [S85]. A collateral administrator that describes itself as the owner of the machine may be confusing the creditor’s enforcement power with title to the customer’s property. That difference determines who receives proceeds beyond the valid outstanding claim.

In the third example, the customer prepays the price early. The book must separately investigate whether, and on what conditions, a discount is permitted. The 1990 resolution expressly postponed some questions about pay-early discounts and bills of exchange [S85]. We should not infer a universal ruling on early settlement from the clauses it did decide.

3.8 The Fiat–Bitcoin mirror

The same inquiry recurs in Bitcoin-backed finance. A vault that receives BTC as security and issues a dollar-denominated token may be implementing a collateralized loan, a minting of a redeemable obligation, a sale of a contingent entitlement, or a mixture. Its label is not the legal category. It matters whose property the BTC remains, what the borrower owes, what happens at maturity or liquidation, and whether fees compensate identifiable independent services.

Ducat’s advertised minting charge and liquidation threshold furnish an applied dossier in the wider book. A fee equal to a constant percentage of minted credit faces a different inquiry from a documented charge for actual custody, oracle services, transaction processing or settlement. The regulator of the proposed fatwa must examine the contractual origin of the charge. A very small loan premium may be ribā under the chosen rule, whereas a substantial but legitimate price in a real asset sale has a different legal foundation. How much money someone paid does not answer what they paid for.

The warehouse-fire witness becomes a Bitcoin insolvency witness. Suppose a custodian holds collateral at the moment its keys are lost, its security interest is challenged, or its ledger is reversed by authorized cosigners. When an options writer claims priority to the same output, the ordering of encumbrances matters. The legal model must show which party can force a transaction, how much collateral each can seize, and how residual property returns to its owner.

3.9 A formal specification the court could test

Define a contract as a state machine $C = (S, s_0, T, R)$, with states S, initial state s_0, admissible transitions T, and an observable rights function R. For each reachable state, R includes asset title, possession, delivery duty, pre-delivery loss, defect claims, amount due, and enforcement priority. Define *behavioral legal equivalence* to require a relation between reachable states that preserves these legally relevant observables and the ability of parties to compel or reject future acts.

An analyst may first compare ordinary cash flows. If they coincide, she searches for a distinguishing legal trace. The warehouse fire is one possible witness; creditor insolvency, mistaken delivery, withheld assent and late-payment penalty are others. If the analyst proves equivalence across every modeled trace, a jurist still must certify that the model includes every material right according to the chosen school. An omitted remedy can defeat the certificate without any arithmetic error.

An intended formal contract test can thus be written:

$$\mathit{RightsEq}(A, B) \wedge \mathit{Complete}(R) \Rightarrow \mathit{HukmEq}(A, B).$$

conditional on the *mutaqlid* school's declared equivalence rule. The theorem is conditional mathematics; LegallyComplete is a demanding jurisprudential and evidentiary premise. We should challenge it with deliberately hostile histories of fraud, warehouse loss, and priority disputes.

Harris Irfan and the price of a compliant label

Harris Irfan offers an unusually useful challenge to this argument. In Heaven's Bankers, he recounts how conventional investment banking met a market demanding Sharia-compliant structures. The engineering was often sophisticated. The difficulty was whether an instrument inherited the discipline of Islamic commerce or simply the economic business of its conventional relative. In a 2015 interview he worried that imitative debt products and the search for favorable scholarly rulings were making Islamic banking resemble the institutions it wished to reform [S168, S169].

That objection lands directly on the murābaḥah mirror. A genuine seller can take title, bear casualty risk, and owe remedies for defective goods. An arranger can also route papers through several companies so rapidly that its exposure becomes economically vanishingly small. Duration alone does not settle the ruling, since even a short exposure may carry enforceable duties. The inquiry must inspect who can suffer a loss before delivery, who must replace a defective asset, and who owns the warehouse receipt when trouble comes. Irfan's warning belongs next to the equations because a bank with enough lawyers can engineer nearly any diagram. A customer who has no effective remedy has received something rather different from the advertised sale.

The capital that came to work wearing a costume

Satyajit Das described, in a 2012 FRONTLINE interview, arranging hybrid bank instruments that functioned as debt while gaining a measure of regulatory recognition as capital. This is a useful lesson from the actual trade, rather than a theologian's caricature of finance: legal classifications alter capital requirements, permissible activities, and the price somebody pays to hold a risk [S182]. The instrument can be clever and lawful within its regulator's rules while serving an economic purpose that should still be examined.

An Islamic arranger can engage in a similar exercise with purchase orders, title certificates, and sale agreements. A warehouse receipt has a legal life of its own, provided the seller truly owes the duties of a seller. Where the transaction leaves the customer with all the hazards of a borrower and none of the remedies of a purchaser, the jurist has acquired an excellent diagram and a very unhappy client. The question of *qiyās* begins at the point where the legal costume finally encounters the contract's obligations.

3.10 Five questions for every murābaḥah fatwa

The jurist should first ask who acquired enforceable title to the goods and from whom. She must then examine the period of seller responsibility and what a destruction or defect claim would do to the parties. The third question concerns when the final sale and its price obligation were formed, including the effect of advance promises. Next comes default: what can the creditor demand when payment is late or the collateral must be enforced? The final question concerns the independent legal reason for each additional charge, whether named service cost, sale price, or compensation for holding debt.

The factual and legal answers may permit the transaction under an attested doctrine, condemn the sham under the ribā rule, or leave an issue open for further evidence. This is a stricter procedure than the ceremony of selecting a familiar Arabic contract name. It also protects genuine commercial sales from being condemned solely because their expected return looks similar to an interest calculation.

Source and validity notes. IIFA Resolutions 40–41 (1988) and 51 (1990) supply institutional conditions [S84, S85]. The Qurʾānic provisions on trade, principal and hardship are primary texts. Behavioral equivalence and the hypothetical warehouse fire are proposed constructions. Applying them to a deployed Bitcoin protocol requires pinned code, enforceable terms and a tested liquidation path. This chapter certifies no product.

4. An Engine, Not a Camera

Donald MacKenzie's *An Engine, Not a Camera* argued that models of markets can help change the markets whose movements they are meant to describe [S29, S110]. The statement matters for financial jurisprudence because a contract can change its own consequences after people begin to use it. Pricing formulas become collateral requirements, collateral requirements dictate transactions, and the transactions change the observable prices that feed the formulas. The relevant market may be partly produced by the instruments under examination.

A pricing equation usually begins with a set of assumptions about available assets, trading costs, volatility, funding, and how people behave. It then produces a value. Once market makers agree to transact at that value, their hedging trades can alter liquidity and return distributions. When a risk manager applies the equation to decide whether a position has enough margin, the formula acquires power over property. Its errors are therefore operational events. An apparently neutral number may trigger the compulsory sale of somebody's asset.

4.1 The model becomes a clause

Suppose a Bitcoin borrower must maintain a collateral ratio of at least 135%. The protocol employs a mark price M_t and a fixed debt D. The contract's trigger is $q\,M_t < 1.35\,D$. In mathematical exposition, M_t is just a process. In the deployed agreement it may determine who can seize the BTC. Two systems can use the same nominal threshold while producing different legal outcomes because one derives M_t from a robust exchange median and the other from a manipulable thin market.

The source of the mark is thus part of the legal facts. So are the time window, stale-price policy, update authority, ability to challenge an observation, and the treatment of a chain reorganization. A signer who can replace an oracle or update a liquidation script is a party with contingent power. That power matters even if the signer never uses it. Islamic contract reasoning has room for precisely these questions under consent, uncertainty, and the enforceability of rights.

4.2 Feedback and the false comfort of a risk statistic

For an illustrative leverage cycle, let the collateral demand of traders be $L\left(M_t\right)$ and the aggregate market impact of forced sales be $\kappa\,L\left(M_t\right)$. A toy feedback equation is $M_{t+1} = M_t - \kappa\,L\left(M_t\right) + \epsilon_{t+1}$. This is an explanatory model, not an empirically fitted law. If falling price increases forced sales, the risk parameter used by the exchange can manufacture part of the next decline. Each participant may be obeying a published rule while the ensemble amplifies instability.

A protective hedge can be caught inside the same mechanism. A farmer shorts a futures contract to fix a price. Its theoretical terminal payoff compensates for a fall in the underlying crop. Before harvest, however, a rally generates margin calls. A creditor closes the futures position while the crop is still in the field. Subsequent collapse of the crop price exposes the farmer again. At no point need the payoff formula have been calculated incorrectly. The failure belongs to the financing and enforcement path.

4.3 A market creates obligations among strangers

A derivative exchanges a right and an obligation. A clearinghouse replaces some direct counterparty exposures with margin, netting, and default rules. Those rules can improve the chance of performance when the membership, collateral and authority are sound. They can also concentrate losses where the members have weakest remedies. Each institution is an argument about how risk should be allocated, rendered as executable governance.

Under the book's method the relevant question is whether the engine's rules give rise to conditions that established jurisprudence recognizes as material. A contractual promise that depends on an impossible sequence of settlement steps may possess theoretical value but fail the ordinary demand of performance. A sales contract that uses a third party to hold collateral may convey a genuine conditional claim when the trustee owes clearly enforceable duties. These are not matters settled by measuring volatility alone.

Satyajit Das and the desk that sells certainty

Satyajit Das gives this chapter its necessary antagonist from conventional finance. Traders, Guns & Money describes the culture of derivatives distribution, including the distance between dealers and customers, incentives to sell complexity, and the politics of whose valuation is accepted. Extreme Money pursues the larger story of cheap credit, financial engineering, and risk transferred through institutions that can appear solvent until a common shock arrives [S170, S171]. His critique is directed at incentives and their consequences, a much more serious objection than an accusation that every derivative is wicked.

A trader may purchase a contract to protect a payroll or a shipment. The same pricing technology can help a dealer sell an exotic note whose apparent yield conceals concentrated downside. The model has done what its author instructed. The disclosure and distribution process decides whose benefit it serves. A Muʿtazilī investigation of gharar should therefore request the original term sheet, the scenarios shown to the purchaser, the institution's retained exposure, and the compensation of its sellers. Probability distributions belong in that dossier alongside consent and title. Das is useful precisely because a mathematically accurate model may still participate in an unjust bargain.

The model moved the price while the author was at lunch

A market-maker can set a mark, a liquidation engine can compare collateral to that mark, and the resulting sales can move the price observed by the next market-maker. The risk model becomes a participant in the event it forecasts. MacKenzie supplies the theory; anyone who has watched a thin crypto book under stress will recognize the mechanism. We have built machines that quote the weather and then arrange for everyone to rush outdoors at the same moment.

Matt Levine regularly notices the legal wrapper as part of financial engineering. His discussion of the Treasury basis trade shows institutions obtaining leveraged exposure through futures when direct borrowing would be treated differently by portfolio mandates [S181]. The Muʿtazilī jurist has to ask what rights the wrapper changes. A contract's declared purpose is evidence about the parties' intention; its executable machinery provides evidence about what they actually bought.

4.4 The fiqh of an engineered reality

The classical report prohibiting *bayʿ al-gharar* [S30] generates a serious inquiry into uncertainty in the transaction. Financial engineering adds a difficult question: does the party who designs the engine create uncertainties that are absent from an ordinary bargain? If the designer chooses an execution waterfall that permits an insider to liquidate a solvent customer, the uncertainty is partly an institutional choice. If an exchange publishes transparent limits and segregates customer property, its design may reduce uncertainty despite a contingent final payoff.

We should preserve the distinction between **measurable market risk**, **uncertainty about one's contractual rights**, and **uncertainty about whether the promised settlement can occur**. They may move together, and a jurist needs evidence before treating them as interchangeable. Later chapters work out margin and funding analytically. This chapter establishes why the final legal object is the complete economic institution, including its programs, oracles, courts and emergency procedures.

A model becomes part of the contract when parties accept its outputs as binding. A model becomes part of governance when its operators can change rules or dictate compulsory transfers. The *mutaqlid* method asks

each authority to disclose the legal rule governing that power, and each technician to show what the machine will do when a debtor, price source or intermediary fails.

Part II. The Jurisprudential Revolution

5. The Mutaqlid fī al-Uṣūl: Authority, Talfīq, and the Law of Choosing

Chapter 5 of the canonical 28-chapter manuscript.

A widow owns land that somebody else cultivates. She accepts a defined share of the harvest in place of a fixed rent and later receives payment in bitcoin. To protect the price of a crop she plans to purchase with those coins, she proposes a short futures position. The jurist examining her case encounters familiar legal materials: a crop-sharing precedent, doctrines of possession and beneficial ownership, prohibitions of stipulated surplus on loans, conditional rights embedded in sales, and a contemporary institutional objection to the sale of abstract options. The exchange adds its own contractual machinery. A margin engine can liquidate the hedge before the harvest is sold. Its funding formula may transfer a payment that resembles interest. The custodian may possess a unilateral claim over the bitcoin pledged as margin.

The legal challenge begins when these parts enter a single transaction. A jurist can quote a permissive account of *māl* from one school, an accommodation for contingencies from another, and a statement about financial necessity from a third. The quotations might all be accurate. Their conjunction can nonetheless authorize an arrangement none of those authorities would recognize. The borrower then receives something called an Islamic product, while the reasons that made each source authoritative have been quietly discarded.

The proposed *mutaqlid fī al-uṣūl* must survive that criticism. Our question is whether a jurist can publicly adopt and reconcile principles from more than one legal tradition, giving a defensible reason for every retained rule, every departure, and every resulting verdict. The problem concerns the authority to reason. Mathematical consistency belongs inside it, as one of its tests.

5.1 A name that makes a demand

Mutaqlid fī al-uṣūl is the project's chosen name for a legal method. The recognizable Arabic term *muqallid* ordinarily designates a person who follows a jurist's ruling, while *uṣūl al-fiqh* concerns the methods by which jurists derive those rulings. The name therefore carries a deliberate tension. Someone who follows methodological principles has not, by that act alone, acquired the qualifications of a *mujtahid* or the authority to issue new fatwas.

We use the name for a school-building proposal: a qualified investigator adopts carefully attributed methodological premises from multiple traditions, examines their relationship to the Qurʾānic rules governing just exchange, and states a new legal method openly wherever reconciliation entails departing from the contributing schools. The resulting system is a proposed neo-Muʿtazilī *uṣūl*. Its foundation is articulated here as a normative legal argument; its historical ingredients remain the doctrines of their respective authors.

Three roles require different certificates. A student can compare rulings and test an economic hypothesis. A researcher trained in engineering can authenticate protocol behavior. A person issuing a formal religious opinion must also establish the relevant jurisprudential competence and the authority under which the fatwa is given. The International Islamic Fiqh Academy's Resolution 153 (2006) expressly demands knowledge of the sources, disagreement, uṣūl, the facts of an emerging issue, and consultation with domain experts. It recommends collective fatwas for complex contemporary matters [S57]. These demands fit decentralized finance: the legal analyst needs a protocol engineer, and the engineer cannot supply the legal warrant by writing a successful unit test.

To make that separation auditable, the book uses four labels on its conclusions: **reported ruling** means a specified authority actually made the statement; **reconstructed implication** means a conclusion conditional on premises attributed to a source; **proposed ruling** identifies our own jurisprudential act; **unresolved** means the necessary primary text, factual witness, or authority rule remains missing. A proposal may acquire authority

within the new school through accepted juristic practice. It gains none merely by being placed between citations.

5.2 The classical permissions that do exist

Some movement among schools is already a recognized legal activity. *Takhayyur* selects among established positions. *Tarjīḥ* judges the relative weight of competing proofs. *Talfīq* combines different elements into a compound legal act. Fresh *ijtihād* argues for a conclusion through a qualified jurist's own legally authorized reasoning. The distinctions govern the entire programme. Mohammad Hashim Kamali distinguishes selection from piecing together in separate chapters of *Shariah and the Halal Industry* (2021), and explains why an unprecedented composite carries a distinct risk [S61, S62].

The strongest institutional source for permitted selection is the International Islamic Fiqh Academy's Resolution 70 (1/8), issued in Brunei in June 1993 [S56]. The Academy distinguished concessions specifically established for an excuse from juristic concessions, in which one recognized legal opinion permits something another forbids. It permitted taking the latter under conditions. The adopted opinion must be a legally regarded position rather than an isolated anomaly. A relevant need must exist. Selection requires competence or reliance on someone competent. The result must respect the other restrictions in the resolution, serve a lawful purpose, and satisfy the conscience of the person relying upon it.

The Academy also required more careful treatment of concessions in public matters. A public need can support a collectively issued juristic accommodation by scholars qualified to choose, provided the relevant interest is recognized by law. The proposition is valuable for financial institutions: community benefit and expert deliberation may justify selecting a defensible position. The institution still must disclose precisely which position it adopted.

In 2024 Jordan's General Iftaa Department similarly stated that a jurist may issue a ruling from another documented school where its basis is understood and accurately attributed. Its published guidance rejects pursuing dispensations on desire and distinguishes the needs of an individual from those informing public fatwas [S60]. Egypt's Dar al-Ifta discusses both permission to consult more than one mufti on distinct questions and the particular risk created when dissimilar rulings are joined inside one legal event [S59]. These are decisions of particular institutions. Their authority extends according to their own legal frameworks.

A competent jurist might therefore accept a rule on constructive possession from one tradition and a separately sourced rule on collateral surplus from another because both govern a transaction he has examined under a defensible adopted methodology. The existence of those materials gives him reasons to consider them. Whether they may be joined depends on the scope of the rules, the method of adoption, and the legitimacy of the combination.

5.3 Talfīq, the adversary inside the method

Resolution 70 defines a dangerous form of *talfīq* as a follower combining interconnected branches of one issue into an act that none of the followed jurists sanctions. Its prohibition applies when the composite is driven by desire, violates the conditions of permitted concessions, reverses a judicial judgment, overturns the treatment of the same completed incident, contradicts established consensus, or yields a compound arrangement accepted by none of the mujtahids being followed [S56]. The last ground is especially important to the present project.

Consider the familiar example of ritual purification. A Shāfiʿī position may count a small amount of head wiping, while a Ḥanafī position allows the prescribed sequence of washing to be relaxed. The composite ablution, performed with an insufficient amount of wiping under the Ḥanafī rule and an invalid order under the Shāfiʿī rule, fails both source tests. Egypt's Dar al-Ifta uses this pattern to explain the legal phenomenon [S59]. Each individually quoted permission survives examination; the constructed act lacks authority in either contributing school.

We can express the defect as a simple pair of predicates. Suppose the Ḥanafī test of a stylized act requires Q, the sufficient amount of wiping. The Shāfiʿī test requires O, the requisite order. A person whose act satisfies neither condition cannot conclude that two dispensations jointly validate it. More formally:

$$\neg Q(c) \wedge \neg O(c) \Rightarrow \neg H_{Hanafi}(c) \wedge \neg H_{Shafii}(c)$$

This is an **illustrative abstraction**, restricted to the conditions selected for the example. Complete classical ablution rulings involve additional requirements.

The analogous financial act would borrow money for margin under a stipulation benefiting the lender, invoke an otherwise valid property rule for the resulting digital claim, and then claim that the existence of a hedge validates the complete package. The property rule speaks to an owned right. Its presence leaves the loan condition to be judged on its own facts. Selecting the first rule never dissolves the second obligation.

A jurist wishing to permit the entire structure must establish a novel and independent rule of recognition for it. This would be the new school's own *ijtihād*, carrying its own burden and its own opposition. The Academy's permission to select recognized concessions cannot be offered as institutional permission for every unprecedented combination.

5.4 Al-Shāṭibī and the discipline of reasons

Al-Shāṭibī's *al-Muwāfaqāt* identifies concrete harms arising from the pursuit of concessions: legal obligation dissolves into a selection of desired outcomes, knowledge gives way to the mere existence of disagreement, and coherent public judgment becomes difficult [S58]. The author of this book wants financial freedom and the preservation of people's property. Those objectives can make a permissive fatwa attractive before the argument has begun. Al-Shāṭibī exposes that risk as an intellectual conflict of interest.

Our response is to bind the proposed jurist to public commitments in advance of examining the profitability of a particular transaction. A rule governing compensation on loans will apply to an attractive Bitcoin product and to a conventional commercial loan. A rule requiring return of residual collateral will apply to a favored decentralized exchange and a disliked bank. The same property classification must be available to a creditor pursuing a legitimate debt and a borrower contesting an illicit seizure. The selection protocol must allow an adverse result against the author's own economic preferences.

This is a substantive constraint. An independent scholar should be able to challenge an adopted premise, test a different case with it, and find circumstances where it forbids something the original advocate wished to permit. When the method is stable only for the proposed product, the fatwa resembles marketing copy. A jurisprudence worthy of the name has to retain the capacity to disappoint its inventor.

5.5 Al-Ghazālī and jurisdiction over a particular problem

The classical literature supplies a different opening. In *al-Mustaṣfā*, al-Ghazālī argues that competence in *ijtihād* can be divisible. A scholar may have the necessary mastery of one question without claiming exhaustive expertise over every branch of law [S65]. He immediately emphasizes the importance of knowing one's limits and refraining from judgment where the necessary knowledge is absent.

That is a stronger model for financial innovation than the fantasy of one theologian, programmer, trader and economist who knows every source and every execution path. A qualified jurist might specialize in financial obligations and contractual property, drawing technical facts from engineers and economists. A collective research group can examine the scope of historical doctrine, model the payoffs, audit the code, and record dissent. The jurist still bears responsibility for deciding which methodological premises have legal force.

The model does not convert engineering expertise into juristic qualification. It establishes a possible discipline of **domain-specific inquiry**, subject to demonstrable mastery of the legal texts and methods relevant to that

domain. This principle has an identifiable classical ancestor. Its application to a particular contemporary scholar requires evidence of that scholar's own competence.

5.6 The Jaʿfarī objection cannot be skipped

A Twelver Uṣūlī critic can bring an unusually direct objection. Sīstānī's *Islamic Laws*, Chapter One, requires an individual who lacks the capacity for *ijtihād* either to follow a qualified *mujtahid* or exercise adequate precaution. Where the most learned marjaʿ gives a fatwa, a follower cannot ordinarily substitute another jurist's more convenient opinion. The stated route to the next most learned jurist applies under specific conditions, such as obligatory precaution or absence of an accessible fatwa [S63].

The proposed *mutaqlid* therefore cannot announce that a following of Sīstānī has permission to combine his ruling with Mālikī *maṣlaḥa* whenever a mathematical model is persuasive. Sīstānī's source gives a different account of who may issue and adopt binding legal judgments. The critic has identified an authority rule whose rejection would require an explicit new legal position. The fair account says: the proposed school may draw reasoned benefit from a Jaʿfarī contract ruling while declining the Jaʿfarī hierarchy of contemporary legal imitation. That departure is part of the proposed school's *uṣūl*, and its opponents are entitled to insist that the resulting fatwa lacks validity **within their authority regime**.

There is a further terminological trap. Sīstānī's first ruling distinguishes *uṣūl al-dīn*, foundations of belief, from derived legal rulings in which *taqlīd* operates. Our term *uṣūl* refers to **uṣūl al-fiqh**, the methods of legal inference. The book must mark that distinction wherever it discusses Twelver obligations of imitation.

The neo-Muʿtazilī school can choose to defend a wider jurisdiction of reason in financial law. Its argument then concerns a new source-authority regime. The recognition of that regime by other religious institutions remains a separate question.

5.7 Four pathways and four kinds of conclusion

Path	Authorized act	What a valid dossier demonstrates	What the result may claim
Takhayyur	Choose a recognized opinion under the applicable authority rules	Authenticated source, scope, legitimate need, and no forbidden combination	Adoption of that **specified** existing opinion
Tarjīḥ	Prefer an opinion on stronger evidence within a defined method	Competence, ranked evidence, and disclosed reasons for preference	A jurist's selected conclusion under that method
Restricted *talfīq*	Combine partial rules where the adopted authority system allows	Interdependent conditions satisfied without a prohibited composite	An authorized composite, with school-relative limits
Independent or renewed *ijtihād*	Derive a new position from a publicly defended authority structure	Juristic competence, precise premises, conflict treatment, and full contract facts	**New-school** opinion, with explicit disagreement from the contributing schools

The fourth pathway is the one on which our most ambitious options and futures proposals will ultimately depend. The first pathways provide established tools and historical constraints. They cannot be converted into blanket ecclesiastical endorsements for an entirely new instrument.

Within the proposed madhhab, a decision dossier must contain a frozen statement of the adopted primary principles, source-specific interpretations, an explicit authority ordering where texts collide, and the case facts on which the verdict depends. A newly discovered classical objection is logged as an open challenge. Revising the doctrine means publishing a new version and identifying its effect on previous decisions. It also means acknowledging that some previous rulings may have been mistaken.

5.8 Authority, evidence, and consistency occupy separate layers

Let K designate the book's proposed Qurʾānic constraints on financial justice. Let U be the chosen system of admissible sources and priorities, and let F_C identify authenticated facts about contract C. A verdict $H(C)$ is derivable when a qualified evaluator supplies a valid argument:

$$K \cup U \cup F_C \vdash H(C).$$

The displayed sequent represents derivability **inside the specified formal legal theory**. It acquires jurisprudential weight through the externally defended interpretation of K, the authority of U, the qualifications of the jurist, and reliable authentication of F_C.

A consistent system $K \cup U \cup F_C$ is a necessary protection against explosive reasoning. If its premises are mutually contradictory in classical logic, any conclusion follows formally. One can test consistency by constructing a model M satisfying the relevant propositions. Yet a model exists for many morally indefensible systems. Mathematical coherence must therefore be treated as a condition for sound legal work, accompanied by normative warrants and factual evidence.

The adopted methods also cannot all be imported at once. A source that denies *qiyās* as an authority does not become compatible with a source requiring analogical reasoning merely because both use the word *justice*. The compiler can preserve the conflicting propositions without manufacturing a shared rule. A jurist may choose a higher-level source theory, but he must own the choice and state which earlier position is being set aside.

The book distinguishes two certifications:

Intersection certificate. A transaction meets the independently sourced sufficient conditions of two legal accounts. The jurist can demonstrate the joint satisfaction without invoking a new permissibility premise. This is the strongest attainable kind of cross-school agreement for the specific claim and case.

Independent reconciliation certificate. A transaction satisfies a proposed new norm after an authority conflict has been acknowledged and the modified rule defended. This grants only the conclusion authorized by the **new school**. The certificate must preserve a machine-readable record of the views that reject it.

Our earlier *salam* example fits the first category when the commodity, prepayment, delivery conditions, and both schools' warrants are fully established. A standardized cash-settled perpetual with recurring funding payments belongs to the second category if the sourced objections remain unresolved. A mathematical proof that it hedges a dollar exposure is evidence about financial function; it provides neither the source authority nor the settlement legitimacy required by an Islamic fatwa.

5.9 The barzakh between two authorities

When two legal rules conflict, this book uses *barzakh al-ḥukm* for the boundary where their differing premises change a person's enforceable rights. A bridge must identify that boundary in facts that a neutral investigator can test. For example, a fully funded exercise right on an identified deliverable may have a different fulfillment path from an unfunded, freely assignable cash promise. That distinction can bear on enforceability and ownership. It has to be demonstrated for the actual contract.

Suppose source A prohibits compensation for the sale of a stand-alone uncertain right while source B recognizes a purchased right of acquisition as transferable property. A *mutaqlid* can place the rules beside each other, identify the legal meaning of the right in the case at hand, and propose a more specific distinction. The dossier must state whether the new taxonomy narrows the subject of A or substantively rejects A's rule. Those are different argumentative acts, and the opposing authority may reject either.

The bridge has a versioned rule of priority. It also admits falsification. If a purportedly funded option depends on an insolvent guarantor, the promise of delivery is weaker than represented. If a creditor can liquidate collateral independently of a protective hedge, the hedge's modeled maturity value does not describe the owner's enforceable rights. The legal judgment must change when those facts change in a manner material to the retained criteria.

There is an important converse. A jurist cannot declare a difference *material* solely because one arrangement is called a loan and another is called a sale. The difference must be traced to an adopted legal source and a consequence under the contract. The resulting rule must also be applied to arrangements the jurist regards as respectable, including conventional financial institutions. A hierarchy of evidence gives the line its authority, while operational facts show which side a transaction occupies.

5.10 The case the school must be willing to lose

Consider a one-BTC owner who wishes to lock in a dollar value using a short futures contract. At maturity the spot gain and the futures loss offset, assuming identical quantities and successful settlement. The hedge may therefore achieve its intended economic function:

$$q\,S_T + q\left(S_0 - S_T\right) = q\,S_0.$$

Now examine the complete execution path. The margin is financed by a loan that stipulates a benefit to the lender. A price spike permits closeout before maturity, leaving the user exposed during the reversal. The venue's loss-sharing rule may seize property outside the agreed collateral. Any one of these facts can defeat a relevant legal condition, even if the terminal accounting identity remains sound.

Under our proposed *mutaqlid* method the jurist has to issue one of four outputs. He may establish permissibility for a genuinely funded, deliverable and legally coherent version with all relevant restraints met. He may establish impermissibility under an adopted and applicable loan or property rule. He may require restructuring the product. He may suspend judgment where the evidence remains insufficient. The last two outcomes are ordinary jurisprudential findings, not failures of the method.

An adversarial developer should then be asked to alter the product so that only one fact changes: replace debt-financed margin with owned collateral, remove a unilateral liquidation right, or alter the seniority of a hedge payment. If a claimed legal difference is real, a well-defined state transition should reveal it. The comparison allows finance to serve legal reasoning as a measurable subject matter.

5.11 A proposed charter for the school

The following commitments form the book's draft rule of recognition. Their status is **newly proposed**, even when they incorporate historical legal constraints.

1. **Declare jurisdiction.** State the audience and authority regime addressed by each ruling. A conclusion of this madhhab is identified as such.
2. **Require competence.** A formal fatwa needs a person or properly constituted body qualified to judge the relevant legal sources and technical facts.
3. **Authenticate quotations.** Record the source, edition or stable URL, exact legal question, qualification, and uncertainty.
4. **Preserve schools as schools.** Retain each source's substantive legal scope, its exceptions, and its rules of authority before proposing a composite.
5. **Freeze the method before the product verdict.** Publish the applicable evidentiary and priority rules before choosing a convenient contract outcome.
6. **Respect completed acts and legitimate adjudication.** A new methodology must disclose any conflict with settled rights and judicial judgments, and recognize applicable institutional limits.
7. **Forbid outcome-shopping.** A beneficial result cannot substitute for the justificatory requirements of the adopted legal system.

8. **Treat dissent as a datum.** Publish the strongest source-based objection and identify precisely which premise the proposal declines.
9. **Test the whole transaction.** Legal examination includes credit funding, ownership, custody, default, priority, liquidation, and actual settlement.
10. **Revise with evidence.** A factual counterexample, a newly authenticated textual restriction, or a contradiction can require retraction or amendment of an earlier ruling.

A fatwa produced under this charter has a recognizable form: **question**, **legal facts**, **adopted source policy**, **authenticated rules**, **material distinctions**, **formal derivation**, **adverse cases**, **dissent**, **issued status**, and **conditions for revision**. The code files in this book implement a portion of that structure. Historical acceptance and juristic competence require human evidence beyond the compiler.

5.12 The hostile examination

A traditional Ḥanafī critic asks who gave a modern author permission to extract isolated rulings from several madhhabs and fit them into a transaction neither Abū Ḥanīfa nor his students recognized. He invokes *talfīq* and the dangers of adopting permissions without the parent school's safeguards. He has a valid objection whenever the book makes that move. Resolution 70 itself bars the unapproved composite within its framework. The proposed answer is an independent school-relative act of *ijtihād*, whose legal force must be earned through qualifications, texts and method. Calling the result a Ḥanafī fatwa would misrepresent its authority.

A Jaʿfarī Uṣūlī critic insists that the follower's duty depends upon the authority of the qualified marjaʿ. A favorable opinion from a Mālikī institution cannot supply permission to depart from an applicable fatwa of the most learned mujtahid. Sīstānī's Chapter One supports this objection [S63]. The proposed school's position is a different account of the jurist's authority, and it must be defended as a different account. Borrowing Jaʿfarī transactional reasoning does not confer Jaʿfarī recognition upon its conclusion.

An Islamic finance scholar then asks whether our principles would also bless a synthetic interest-bearing loan hidden inside a series of token swaps. That question tests whether *takāfuʾ al-āthār*, equivalence of effects, has any real force. If a product guarantees principal, pays its financier a stipulated surplus for the time-value of debt, and reproduces the lender's recourse, its vocabulary cannot create a new economic obligation. The proposed jurist must examine the full path and either demonstrate a material legal difference under the publicly adopted rules or reach the adverse conclusion. A 'DeFi' label carries zero evidentiary weight.

The adversaries are not decorative. Their objections determine the evidence that each subsequent chapter must produce. A new ruling on purchased puts, futures, collateralized dollars or distributed custody belongs to this book only after it can survive that examination on the stated terms.

5.13 What Lean proves and what remains to be proved

The formal companion should represent a source position as a typed record containing the authority, authenticating reference, factual scope, rule, and possible defeaters. A *takhayyur* certificate identifies a complete selected opinion. A *talfīq* assessment tests the **entire composite** rather than isolated features. An independent *ijtihād* certificate records a separately declared rule of recognition and the unresolved opposition.

The proof tasks are concrete. First, selecting a view under a documented authority rule yields only the conclusion that the view licenses. Second, a transaction rejected by both source tests cannot be certified by a rule that merely chooses one of them. Third, a compatible pair of sourced rules can support a joint result after full factual verification. Fourth, applying a novel bridge creates a new-school certificate whose provenance retains the dissent. Finally, a change to an enforcement rule that destroys borrower residual rights must invalidate any pathwise certificate requiring their preservation.

The Lean module accompanying this chapter demonstrates these consequences for an intentionally small finite model. The sources themselves, their interpretation, the qualifications of a mufti, and the facts of an actual

market are supplied as external proof obligations. Compiling a formal certificate proves what the model says. Juristic acceptance and institutional recognition have their own evidentiary tests.

The jurist has been invited to the product meeting

At a product meeting somebody inevitably wants a yes or a no. Engineers require an implementable rule; lawyers want a position they can defend; the liquidity provider would prefer the entire conversation to finish before the next funding interval. A new *mutaqlid* school enters that room under considerable temptation. Its ability to reconcile traditions can become a public method of reasoning, or another specialist service attached to a product launch.

I have spent years building systems whose specification outlived one design, one exchange integration, and sometimes the counterparties meant to use them [S175]. A fatwa should be issued in a form that can outlive the product pitch. Name the adopted rule, disclose the source of its authority, and preserve the counterexample that would force reconsideration. Even a favorable conclusion needs a way to be wrong.

5.14 The bridge must have an author

Imagine a jurist confronting a Bitcoin-backed dollar liability. He reads an opinion recognizing property rights in transferable entitlements. He finds a second opinion allowing a specified future delivery contract. He adds a third permitting a financier to take earnest money when the buyer abandons a sale. Then he writes a fourth rule: the borrower may purchase a perpetual put from a margin trader and use its payout to preserve a collateral vault. Each borrowed rule may be correctly reported. The conclusion remains his own legal work.

This observation is more useful than an assurance that mathematics will somehow persuade every school. It tells us what the jurist is responsible for. The decision must say who has authority to classify the new contract, which premises that authority accepts, whether one premise alters the domain of another, and where an independently argued principle enters. Calling the resulting arrangement *mutaqlid* makes it answerable to these questions. It supplies a name for the inquiry, rather than conferring a title on the inquirer.

Resolution 70 (1/8), adopted by the International Islamic Fiqh Academy in Brunei in June 1993, makes a precise distinction between a concession tied to an excuse and a juristic concession arising from different schools' interpretations. It allows recourse to the latter under limitations: a recognized opinion, genuine need, competent selection or reliance on competence, avoidance of prohibited amalgamation, and a lawful purpose. It describes the prohibited composite as linked dispositions producing an act which the followed jurists did not approve. Its prohibition specifically includes the pursuit of convenience, interference with a judicial ruling, invalidation of an already performed act, collision with established consensus, and a compound accepted by none of the referenced jurists [S56, S149]. These restrictions are addressed to selection and imitation within the Academy's framework. They are evidence about one jurisprudential route, not permission for an unaffiliated engineer to announce a new school.

The other route is *ijtihād*. The Academy's Resolution 153 (2/17), issued in June 2006, defines the mufti through mastery of relevant revealed sources, the juristic record, methods of inference and the facts of the dispute. It calls for consultation with specialists whose disciplines bear on emerging problems [S57, S150]. The engineer can establish how a protocol spends collateral and how its insolvency auction works. The competent jurist must still identify which facts alter the ḥukm. When the same person claims both competencies, both remain subject to examination.

Al-Ghazālī's discussion of *tajazzī al-ijtihād* belongs here. In *al-Mustaṣfā* he argues that competence for ijtihād can be attained in a particular domain of law; he does not require universal expertise in all branches as a preliminary condition for every specialist ruling. His accompanying discussion limits this permission to a person who understands the relevant evidence and what could defeat it. It therefore helps a qualified financial jurist argue from domain-specific mastery, including knowledge of the wider sources that may bear upon his

case. This is a classical debate about *partial competence*, rather than a delegation of juristic authority to anyone with a financial model [S65, S151]. A critical printed-edition collation remains pending.

A second boundary follows from the Twelver Jaʿfarī material. Sīstānī's *Islamic Laws*, chapter 1, Ruling 6, instructs a follower of the most learned mujtahid who has issued a fatwa on a matter to follow that fatwa rather than replace it with a different jurist's verdict. Where he states obligatory precaution rather than a substantive fatwa, specified recourse to the next most learned jurist is available. The choice is institutionally ordered [S63, S152]. A new Muʿtazilī school may reject that hierarchy for its own adherents, but it has thereby entered a dispute about authority. It has not demonstrated that the established Jaʿfarī hierarchy gives its followers the same freedom.

For the remaining chapters I impose a **two-certificate rule**. The *source certificate* identifies a text, its jurist or institution, the type of ruling and the domain to which it applies. The *construction certificate* states the premises chosen for this new school and proves, under those premises, that the contract satisfies them. When the second certificate exceeds the first, it must bear the mark **proposed Muʿtazilī ijtihād**. This makes the dissent legible to the reader and prevents a minority inference from masquerading as inherited agreement.

A third certificate sometimes becomes necessary: the *implementation witness*. It identifies the exact version of a vault or market, authenticated transactions, custody permissions, margin rules and settlement priorities. It can defeat the legal construction by finding a factual path that breaks the asserted entitlement. It has no power to certify the historical source. Each certificate is reviewed in its own discipline. Their conjunction gives the proposed fatwa its bounded scope.

The procedure has a failure condition. If a selected rule is used beyond its specified subject, if the source was misattributed, or if the financial model assumes that an insolvent counterparty always pays, the judgment must return to investigation. A jurist can revise a premise and resubmit it. An insistence that an attractive conclusion survives every source error would abandon the very appeal to *ʿilm* with which this book began.

The Irfan objection to the mutaqlid

There is a danger inside our proposed method. If a new-school jurist can select a rule about property from one madhhab, an exception about forward delivery from another, and a consent standard from a third, financial engineers may learn to assemble permissibility faster than they assemble legal responsibility. Irfan's history of Islamic banking gives this danger a practical shape. A composite fatwa deserves to fail whenever its only achievement is to relieve the arranger of a duty recognized in each source tradition [S168, S169].

The mutaqlid must publish the adverse argument with the permission. A bridge should identify the party whose rights it changes and survive the scenario in which the arranger becomes insolvent. An economically attractive result cannot confer jurisdiction upon an otherwise unauthorized interpreter. This is why the book treats the new method as a proposal with a source-critical burden, rather than as an inherited license to sell any desired product.

5.15 Source-specific notes and research obligations

[S56] International Islamic Fiqh Academy, Resolution 70 (1/8), *al-Akhdh bi-l-Rukhṣa wa-Ḥukmuhu* (27 June 1993), https://iifa-aifi.org/en/32460.html. Primary collective ruling. Number, session, and specific restrictions verified from the Academy's text. Scope: recognized juristic concessions and prohibited *talfīq* in its own authority regime.

[S57] International Islamic Fiqh Academy, Resolution 153 (2/17), *Iftā: Requirements and Ethics* (28 June 2006), https://iifa-aifi.org/en/32922.html. Primary collective ruling. Scope: competency and ethics, expert consultation, preference for collective inquiry in complex modern issues.

[S58] Abū Isḥāq al-Shāṭibī, *al-Muwāfaqāt*, Book of *Ijtihād*, the discussion of harms of pursuing inter-school concessions, vol. 5, p. 103 in the online edition, https://www.islamweb.net/ar/library/content/99/381/. Classical primary text in a digital transcription; printed-edition pagination must be collated before final publication.

[S65] Abū Ḥāmid al-Ghazālī, *al-Mustaṣfā*, section on conditions for the *mujtahid*, p. 345 in the online transcription, https://www.islamweb.net/ar/library/content/33/300/. Classical primary text for divisibility of *ijtihād*; later print critical collation required.

[S59] Egypt's Dar al-Ifta, *al-Talfīq bayna al-Madhāhib al-Fiqhiyya* (14 January 2013), https://www.dar-alifta.org/ar/fatwaresearch/details/2393/. Named institutional fatwa explaining composite acts and distinction from switching schools on separate matters.

[S60] Jordan General Iftaa Department, fatwa 3875, *Guidelines for Talfiq and Deviating from the Madhab* (14 May 2024), https://www.aliftaa.jo/en-fatwas/3875/Article.aspx?ArticleId=5970. Named institutional guidance; summarized reports of earlier jurists require direct collation for historical quotation.

[S61] Mohammad Hashim Kamali, *Shariah and the Halal Industry* (Oxford University Press, 2021), ch. 17, *Selection (Takhayyur)*, pp. 190–196, https://doi.org/10.1093/oso/9780197538616.003.0018. Published secondary scholarly synthesis; online abstract consulted, full chapter not inspected.

[S62] Kamali, same book, ch. 18, *Piecing Together (Talfiq)*, pp. 197–199, https://doi.org/10.1093/oso/9780197538616.003.0019. Published secondary scholarly synthesis; online abstract consulted, full chapter not inspected.

[S63] Office of Sayyid ʿAlī al-Sīstānī, *Islamic Laws*, Chapter One, *Following a Jurist (Taqlīd)*, especially rulings 1–10, https://www.sistani.org/english/book/48/2117/. Named primary contemporary Jaʿfarī legal authority. Scope: followers governed by the specified rules of *taqlīd* and precaution; the chapter does not assert Jaʿfarī endorsement of cross-madhhab synthesis.

[S64] Qurʾān 4:29, 2:188, 5:1, 2:275–280. Primary scriptural commitments to trade by consent, prohibition of unjust appropriation, fulfilment of agreements, and restrictions on ribā. Their exact implications for modern contracts remain the book's interpretive argument rather than a consequence established by reference alone.

Research work outstanding. Collate printed editions of al-Shāṭibī and al-Ghazālī, directly examine Ibn ʿĀbidīn on following other schools, secure full chapters of Kamali if obtainable, and commission qualified Sunni and Jaʿfarī review of the proposed authority hierarchy. The next edition should include a source-critical appendix distinguishing verbatim classical wording from institutional summaries and the author's own proposal.

6. The Uṣūl and Ijāzāt of the Proposed Muʿtazilī Madhhab

Reason, transmission, legal competence, and the permission to speak for a school

The previous chapter named the *mutaqlid fī al-uṣūl*, a jurist who works through the source principles of different schools and produces a ruling for which the sources, adopted authority and consequences can be examined. The proposed method has now issued judgments about loan premiums, optional property, Bitcoin collateral and futures hedges. It must face the antecedent question of who gave it permission to do so. A claimed madhhab needs a rule for recognizing its own jurists, for protecting its legal method against opportunistic amendments, and for hearing someone who says its founder has made a mistake.

That question is unusually awkward for a school with a rationalist lineage. An inherited certificate can establish that a scholar studied a work with a teacher. An institution can establish that it recognizes a person's competence to issue opinions in its name. Neither event alone demonstrates that the resulting opinion is sound. An ingenious proof of a contingent claim's payoff does not establish the religious authority of its author. Every school faces these distinctions. A new one encounters them before it has accumulated the habits, teachers and shared judgments through which older schools recognize their members.

I use *Muʿtazilī* here in a consciously qualified sense. The historical Muʿtazilah were theologians with disagreements among themselves and extensive interactions with different traditions of positive law. The name in this book announces an affinity with their ethical rationalism and a proposed present-day legal construction. No living person's authorship of this project creates an uninterrupted scholarly *isnād* to the Muʿtazilah of Basra and Baghdad. A reader who enters the book through its Bitcoin arguments deserves to know that much before deciding whether to trust a single fatwa.

The new school's first institutional act, accordingly, is to disclose its own authority claims. Its second is to make them revisable through evidence. The Qurʾān commands fulfillment of trusts and judgment with justice in 4:58, warns against speaking without knowledge in 17:36, and demands justice even against oneself in 4:135 [S190]. Those obligations apply to the person who writes the charter as surely as they apply to the bank accused of wrongful dealing.

6.1 A historical inheritance with a documentary boundary

The classical Muʿtazilī theological program is conventionally organized around *al-uṣūl al-khamsah*, the five principles: *tawḥīd* (divine unity), *ʿadl* (justice), *al-waʿd wa-l-waʿīd* (promise and threat), *al-manzilah bayna al-manzilatayn* (the intermediate position), and *al-amr bi-l-maʿrūf wa-l-nahy ʿan al-munkar* (commanding right and forbidding wrong) [S183]. This inherited vocabulary describes a theological architecture. A modern law of Bitcoin exchanges cannot be extracted from the names of its five parts. To obtain one, the jurist must work through the revealed texts, transmitted interpretations, legal reasons and detailed nature of the transaction.

The manuscript tradition itself supplies a useful warning about apparently secure intellectual pedigrees. The widely printed *Sharḥ al-uṣūl al-khamsah*, long attributed simply to Qāḍī ʿAbd al-Jabbār, has been studied as the *taʿlīq* or paraphrastic transmission of the Zaydī Mānkdīm Shashdīw based on a lost commentary of the Qāḍī. The shorter *Kitāb al-Uṣūl al-khamsah* of ʿAbd al-Jabbār has its own textual history [S183]. This distinction matters when a modern writer claims that the Qāḍī said something in the surviving commentary. The work bears evidence from the Muʿtazilī tradition while its layers of authorship require separate handling. A source-conscious school should find a complicated genealogy more valuable than a tidy false one.

Abū al-Ḥusayn al-Baṣrī provides an especially relevant example. He was a Muʿtazilī theologian whose *al-Muʿtamad fī uṣūl al-fiqh* became influential beyond his own doctrinal circle; a scholarly account also locates him within a Ḥanafī legal milieu [S184]. This illustrates why theology and jurisprudence require separate pedigrees. A Muʿtazilī theory of moral knowledge need not imply a single inherited code of commercial law.

The present school's choices about *qiyās*, transmitted evidence, *ṣarf* and options remain choices for which it must take responsibility.

The relevant inheritance is therefore intellectual. It includes the conviction that reason is capable of identifying morally salient features and exposing contradictions, alongside a tradition of strenuous disagreement over what reason establishes. It includes a willingness to examine a text's transmission and the scope of an inference. A new fatwa may carry that inheritance while departing from a particular classical conclusion. The departure belongs on the page, preferably with the opposing passage beside it.

6.2 The five principles in the new school's own words

Tawḥīd. The unicity of Allah denies ultimate religious authority to any human institution. A council of jurists can interpret the law and administer a voluntary association. Its institutional powers depend upon human trusteeship, agreed procedure and the evidence supporting its judgments. A founder's private conviction cannot turn a council register into revelation. In financial law, this principle works chiefly as a restraint upon claims to unreviewable authority.

ʿ**Adl.** Objective justice gives rational inquiry a necessary role. The rules for a pledged asset must be evaluated by what rights they create, which risks they assign, and the processes by which the property can be seized. The commitment does not authorize a jurist to rename a stipulated increase on a loan whenever the debtor is wealthy enough to bear it. It requires an account of how an asserted rule relates to the texts and to the independently cognizable wrongs of fraud, dispossession, coercion and breach of trust. Reason supplies questions that an interpretation must answer and reasons capable of defeating an unsupported analogy.

Al-waʿd wa-l-waʿīd. The historical Muʿtazilī doctrine of divine promise and threat was often expressed through a strong account of divine retribution and the status of unrepentant grave sinners [S191]. This proposed school requires an explicit interpretive reconsideration of punishment and pardon. The author accepts that divine responsibility is real and that the Qurʾān's language of forgiveness, repentance, mercy and judgment must be read together. His wider theological position includes a bounded account of culpability and the possibility of other good deeds carrying moral weight. These revisions should appear as the school's declared theology rather than as the unanimous meaning of the historical third principle. A financial court applying worldly contract rights cannot infer eternal condemnation from an accounting irregularity.

Al-manzilah bayna al-manzilatayn. The classical intermediate position addresses the status of the grave sinner, ordinarily designated *fāsiq* rather than treated simply as an unbeliever [S183, S191]. Our practical rule concerns qualified judgment of acts and persons. A trader's prohibited loan term is an act open to correction and restitution; declaring the person outside the community requires a separate and extraordinarily serious justification. Public legal evaluation can be severe about conduct while keeping religious standing distinct from the specific claim under examination. The school's ethics rejects the use of a contested financial fatwa as a shortcut to *takfīr*.

Al-amr bi-l-maʿrūf wa-l-nahy ʿan al-munkar. A duty to address wrong requires appropriate means, institutional restraint and evidence. For a financial network, the most immediate means are disclosure, education, independent examination of contracts, remedies for the injured, and the prevention of foreseeable misuse of entrusted assets. A cryptocurrency community can claim to defend freedom while secretly making customers' money available to its founders. Calling the architecture decentralized will not change the entrusted right. The proposed rule treats correction as accountable, proportionate and subject to lawful process; no private group receives an unlimited coercive warrant by invoking this principle.

Together these five principles form the school's theological orientation. They neither replace the Qurʾān and its interpretive disciplines nor assign a unique numerical fatwa to every new commercial instrument. The operative *uṣūl al-fiqh* must now be specified.

6.3 Uṣūl al-dīn and uṣūl al-fiqh are different registers

An important division is sometimes obscured by the word *uṣūl*. *Uṣūl al-dīn* concerns the fundamentals of belief. *Uṣūl al-fiqh* concerns the evidences from which legal norms are derived, the permitted forms of inference and the competence of a person who undertakes derivation. A scholar's reputation in metaphysics may be worth considerable intellectual attention while telling us little about that scholar's grasp of exchange settlement and bankruptcy priority. Conversely, an accomplished cryptographer can explain the exact circumstances in which a Bitcoin output is spendable without thereby being a muftī.

The proposed school adopts the following ordering of inquiries. First, identify the Qurʾānic commitments implicated by the dispute and give their language, scope and immediate context. Second, collect transmitted Prophetic material, recording its paths of transmission, problems of attribution, textual differences and the method used to assign authority. Third, examine established legal analysis within each school consulted, including that school's own conditions for using *qiyās*, *istiḥsān*, *maṣlaḥah*, accepted custom or other interpretive tools. Fourth, test the interpretation against objective moral reasons and the actual rights under the contract. Fifth, record any new bridge needed to pass between schools or to apply an inherited principle to an unprecedented instrument.

This ordering is procedural. It is no simple ranking in which a numerical utility function defeats a Qurʾānic injunction. A conflict between an interpretation of transmitted text and an apparent principle of justice requires renewed textual and rational work. Its dossier must describe whether the disagreement is about transmission, scope, language, operative cause, a changed fact, or the moral status of the proposed consequence. In cases where the materials remain irreconcilable under the adopted theory, a responsible jurist publishes the uncertainty and its practical implications. To call an unresolved issue a theorem would merely conceal the disagreement inside a definition.

For the Sunnah, the project has a demanding evidentiary posture. An isolated report might bear greater or lesser legal weight depending upon provenance, corroboration, conflict with stronger evidence and the subject matter. The author regards many transmitted claims about early political authority as historically contestable. That suspicion can motivate a stricter audit; it cannot be turned into an unannounced rule that every report inconvenient to the author's proposal is dismissed. The source register must preserve adverse material and identify the standards by which it is evaluated. The legal standing of *khabar al-wāḥid*, transmitted practice and contradictory witnesses remains among the chapter's outstanding primary-text research obligations.

For *ijmāʿ*, a source may state that all qualified jurists agreed, or that one institution or generation of scholars adopted an opinion. These are different assertions. The definition of eligible participants, the date and subject of agreement, and the transmission of dissent determine what the consensus proposition can properly exclude. The claim that a medieval consensus extends to a collateralized option needs a demonstrated sameness of legal subject matter. Where that bridge cannot be shown, one may still argue for prohibition through analogy, but the attribution should be honest.

For *qiyās*, this school requires an identifiable *aṣl* (source case), *farʿ* (new case), *ḥukm* (source ruling), and operative *ʿillah*. The reason for extending the rule must hold in the new case in a manner recognized by the adopted legal method. A contract whose terminal payoff imitates a loan may retain substantial differences of title, loss-bearing and remedies. The quant-finance chapter proves how closely financial payoffs can coincide; the *barzakh al-ḥukm* chapter demands evidence that an asserted legal difference is material. Both belong inside the analogical inquiry.

6.4 When reason and received doctrine disagree

Suppose a jurist receives an established prohibition of a paid financial option, along with a recognized permission for a sale containing an earnest-money choice. She discovers a fully collateralized Bitcoin put with a payoff close to that of a genuine forfeitable deposit. She cannot announce the new transaction permissible

from their cash-flow resemblance alone. The objection to standalone option rights may concern the nature of the asset being sold, the permitted conditions of a sale, or rules about the character of an exchange. These are juridical objections with their own reasons.

The method requires a sequence of accountable moves. The jurist writes the most charitable representation of the restrictive rule. She records the text and institutional standing of the permissive precedent. She models the new contract's property rights, obligations, counterparty default and enforcement. She proposes a reason why the established precedents can be extended, then asks which adverse facts would defeat that reason. Where the proposed right is independently saleable as *māl*, the model has to say whose property it is, how it is delivered, what a seller must do to perform, and what happens if performance fails.

A mathematical proof can establish that a fully funded writer owes no more than the segregated reserve in the modeled states. The right's permissibility depends upon normative premises. A court, investor or skeptical jurist should be able to isolate the precise premise at issue. Formal verification belongs at the end of a jurisprudential inference whose premises are identified. It cannot grant the initial permission.

To prevent selective reasoning, the school adopts an *adverse-source rule*: any sufficiently relevant source contradicting the proposed ruling must appear in the dossier with an account of its authority and scope. A reviewer must be permitted to state that the source has not been overcome. That response is recorded as a live dissent; it cannot be eliminated by changing the formal model's name for the disputed right.

6.5 Four methods of speaking and one danger

There are several lawful-seeming activities that can be confused with the issue of a new-school fatwa. A *muqallid* follows an established jurist within the rule of that authority. A scholar performing *takhayyur* selects an established opinion under the conditions of the adopted school. A jurist performing *tarjīḥ* prefers one opinion for stated reasons. A jurist exercising independent *ijtihād* attempts a new derivation that must stand on its own competence and evidence. *Talfīq* names the problem of combining parts of different schools' rules in a composite; its acceptability varies with the legal method [S185].

The International Islamic Fiqh Academy's Resolution 70 (1/8) of 1993 places meaningful conditions upon selecting juristic concessions and identifies prohibited composite constructions. It addresses recognized juristic opinions and qualified use of dispensations [S185]. It supplies a serious objection to opportunistic selection. The present school cannot quietly convert that resolution into permission to invent a new authority, because the resolution does not grant such permission. To defend a new-school judgment, the writer must argue independently for a legitimate theory of *ijtihād*. Its novelty is part of the intellectual position rather than an embarrassment to be edited away.

The danger is especially acute in Islamic finance. A product promoter can approach a jurist with a commercial objective, divide its legal attributes among several schools, collect the least restrictive ruling in each, and return with a composite that no authority has accepted. The product then acquires a certificate whose impressive genealogy exceeds its actual logic. The antidote is an explicit declaration of which premises come from which source and whether the composite is itself accepted by the authority invoked. If the ruling depends on a new bridge, the responsible new-school jurist must sign that bridge as her own conclusion.

6.6 A genealogy of ijāzah, and what it can certify

An *ijāzah* is an authorization whose meaning depends upon its field and wording. The historical practice includes transmission of particular texts or reports, examination or certification of memorized material, and authorization to teach law or issue fatwas. Devin Stewart's historical account in *Encyclopaedia Iranica* distinguishes *ijāzat al-riwāyah*, forms of *ʿarḍ* or memorization certification, and *ijāzat al-tadrīs wa-l-iftāʾ* [S186]. This documentary history is more precise than a generic claim that every certificate authorizes independent religious judgment.

For transmission, the decisive questions are the identity of the material, the authorized chain, the grantor's own right to transmit and the wording of the grant. A modern archive may faithfully reproduce a manuscript without having a person in its organization hold a traditional *ijāzah* to recite that work through an established *isnād*. Reliable scholarship can proceed through critical editions, manuscripts and independent collation; it should describe the evidence it actually has. The proposed school may recognize textual expertise without inventing oral succession.

In the present charter I use *ijāzat al-dirāyah* as a **newly proposed competency category**, an assessed permission to explain a defined legal-method curriculum. This label is conceptually convenient; it should not be presented as an exact name for the medieval memorization certificate. The third certificate, *ijāzat al-iftāʾ*, borrows from an attested historical form of authorization to teach and issue legal opinions. Its use in the new institution will be explicitly limited by field, method, duration and issuer.

The distinction also helps prevent a common category error. A person may possess a valid transmission authorization for a classical work and hold a mistaken modern derivatives position. A scholar may be exceptionally competent in financial economics while lacking qualification in Arabic legal exegesis. A public teacher may explain the results of this manuscript effectively while possessing no mandate to issue binding institutional advice. None of these examples requires humiliating the person's genuine accomplishment. Each asks what the actual authorization certifies.

6.7 The competence standard and the economics of expertise

The International Islamic Fiqh Academy's Resolution 153 (2/17), adopted in 2006, defines *iftāʾ* and stresses knowledge of the Qurʾān, Sunnah, areas of agreement and dispute, uṣūl, relevant human circumstances and the ability to derive a ruling. It specifically calls for consultation with experts in technical fields and favors collective fatwa for complex contemporary matters [S187]. The Academy's authority does not bind the proposed school by mere adoption of the Arabic word *ijāzah*. The resolution supplies a demanding external benchmark worth meeting in substance.

The proposed qualification for a *financial muftī* involves demonstrable legal competence in the governing source corpus and adequate understanding of the transaction's technical subject. The jurist need not write an implementation of Bitcoin Script alone. She must be able to inspect technical evidence or judge the work of an accountable expert. Her dossier must identify the legal consequence that turns on each engineering fact, the limits of the expert's testimony, and facts still uncertain. A correctly functioning cryptographic signature proves a much narrower proposition than lawful ownership. The separation should be visible in the examination.

I would require a candidate to write two adversarial fatwa dossiers before receiving permission to issue an institutional opinion. The first concerns a relatively familiar transaction, such as a sale with a deferred price and an intervening period of genuine seller risk. The second concerns a contemporary obligation whose fulfillment depends on code and an external actor, such as an insured Bitcoin-collateral loan. At least one must conclude with a limitation or refusal because the available evidence does not establish the contractual facts. The examination must reward this capacity to stop an attractive argument. An expert who can only approve well-presented products is insufficiently tested.

The standards must also specify professional conflicts. A muftī paid by a protocol, exchange or lender can sometimes produce accurate legal analysis; the payment creates a material interest to disclose and assess. The jurist must recuse from a final opinion where a direct financial incentive or governance power compromises independent review. No sponsor's payment can entitle it to remove an adverse source from the dossier. A charter whose certification fees finance the same promoters who purchase its fatwas would need an exceptionally persuasive system of independent checks.

6.8 The proposed authorizations

Ijāzat al-riwāyah (transmission). This certificate names the text, edition or transmission, the authorized grantor, the form of study or audition and the exact permission granted. Where a traditional *isnād* exists it is recorded without extrapolation. A critical-edition reading qualification may be issued as a modern scholastic record under a different title; the certificate must disclose the difference. It grants no automatic competence in contracts or investment products.

Ijāzat al-dirāyah (assessed understanding; new category). This certificate recognizes that a candidate can explain the school's documented principles, apply the adopted source hierarchy, characterize disputes fairly, and identify when a claimed legal cause fails to extend to a new subject. Examiners supply hostile cases, ask for corrections and require written replies. It permits teaching specified materials and preparing research memoranda within defined limits. Institutional law-giving authority remains separately assigned.

Ijāzat al-iftāʾ al-muqayyadah (restricted legal opinion). The school can authorize a qualified jurist to issue signed institutional fatwas on a particular field, contingent on the competence record, a documented examination, conflict disclosures and a transparent appeals procedure. The scope might be *fiqh al-muʿāmalāt* applied to custody and exchange, while postponing derivative contracts until additional demonstrated expertise exists. The certificate names the reviewer responsible for source authentication and any independent technical adviser. If a multidisciplinary panel is necessary, the record attributes each conclusion to the person qualified to make it.

Permission to participate in collective iftāʾ. A collective council admits members for specific capabilities: Qurʾānic and hadith analysis, comparative jurisprudence, financial law, cryptography or economic modeling. Its decision rules specify which members may vote on a legal verdict and which provide expert factual testimony. A protocol developer contributes facts about the code, and a trained muftī supplies the legal inference. Their signatures have different meanings. A minority report may be published beside the council result.

A separate **public license to reproduce and criticize the school's documents** should be unconditional under an appropriate publication policy. The works of scholarship can be read, checked and refuted without permission from an institutional registrar. The right to issue opinions *in the school's name* is a specific matter of voluntary organizational governance. It should never be confused with a claim that other Muslims require approval to interpret the Qurʾān, study jurisprudence or criticize this proposed madhhab.

6.9 Can the first ijāzah certify itself?

A founder cannot solve the problem of competence by printing an impressive seal. The first generation of a new institution faces a bootstrap problem: existing scholars may evaluate its work, while nobody yet holds an internal authorization whose legitimacy has survived time. The responsible answer is a founding **research charter**, accompanied by public declarations of individual qualifications and independent critiques. Its initial signatories remain accountable as authors of original opinions, and their work can receive outside review without anointing them successors to a historical Muʿtazilī chair.

For the first phase, the school should publish opinions as *proposed school-level ijtihād*. The governing council can adopt internal policies and authorize particular people to speak for the association after demonstrable review. Its grants will identify the new body and the year of their creation. Attributing them to a continuous chain from Wāṣil b. ʿAṭāʾ, Qāḍī ʿAbd al-Jabbār or Abū al-Ḥusayn al-Baṣrī would require a chain of actual documented permissions. The works of those scholars are a source of study and disagreement. They are no one's decorative certificate of descent.

The strongest objection comes from an existing tradition with a defined structure of reliance. In Sīstānī's *Islamic Laws*, Ruling 1 distinguishes rationally grounded knowledge in matters of belief from a layperson's

reliance on *taqlīd*, *ijtihād* or precaution in legal matters; Ruling 6 restricts a follower from substituting another opinion where the most learned mujtahid has already issued a fatwa [S188]. A person governed by that Twelver doctrine cannot receive a universal exemption from it by reading our charter. The disagreement about juristic authority precedes the financial issue. The proposed school is responsible for its alternative position rather than anointing it as the unrecognized view of a living marjaʿ.

The comparative point has a historical analogue in debates over domain-specific *ijtihād*. Al-Ghazālī's *al-Mustaṣfā* is cited for allowing a jurist to attain the competence needed for some particular legal issues while lacking universal mastery of every legal field [S189]. This supports an inquiry into restricted expertise. It cannot establish that a newcomer with a financial model has already met the needed legal requirements. The original passage, its surrounding qualifications and its translation remain part of the Arabic source-collation task.

6.10 How to grant, review and withdraw a permission

A proposed authorization should have a complete record. The entry includes the candidate's name or a verified identity held privately for safety, the granting council, grant date and expiry or review interval, the precise covered domain, the texts and versions examined, the examination rubrics, adverse-source performance, the granted activities and the process for appeals. The grant's existence is publicly checkable through a stable record. Confidential personal information about examination cases and clients is disclosed only with lawful consent.

The examination has a practical stage and a jurisprudential one. A candidate examines a credit arrangement with a fee denominated in the borrowed asset and separates loan obligations from genuine payments for independent services. The second exercise inspects a financial protocol's insolvency waterfall using authenticated code and complete collateral records. Independent reviewers can modify one factual assumption to see whether the candidate changes the verdict. A model that cannot be updated after the facts change is a poor instrument of justice.

Errors are inevitable, and responsible correction must be built into the institution. A certificate may be **restricted** when a jurist's expertise was overstated, **suspended** pending a demonstrated conflict or serious procedural defect, or **withdrawn** following independently reviewed misconduct or repeated material errors. The institution must distinguish a doctrinal disagreement from failure to disclose a sponsor, falsifying a source or misrepresenting a proof run. An appellant receives notice of the alleged defect, an opportunity to submit evidence and a decision from reviewers who are not financially interested in the original ruling.

Published fatwas need their own version control. A later ruling may correct the contract facts, change an evidentiary premise, adopt a newly justified authority rule or withdraw a prior conclusion. The record should preserve older versions, clearly marked as superseded. Readers and institutions that relied on the earlier advice need an account of what changed and what remedial issues now arise. A silent edit in a website is especially unacceptable where clients have transferred property under the earlier rule.

6.11 The certificate cannot launder the contract

Let *j* denote a jurist, *M* the declared method, *C* the particular contract and *f* the proposed fatwa. The school could establish an internal issuance rule with the following shape:

`InstitutionallyAdmissible(f,j,M,C)` requires `Qualified(j,domain(C))`, `CurrentAuthorization(j,M,domain(C))`, `SourcesIdentified(f)`, `FactsEstablished(C)`, `DerivationValid(f,M,C)`, `MaterialDissentDisclosed(f)` and `ConflictsManaged(j,f)`.

This is an institutional definition adopted by the new school. From its premises one can formally infer that the dossier passes that institution's admission rule. The theological and legal question of whether the result is a

sound interpretation of divine law remains the task of jurisprudence. The existence of a signed certificate proves that a named body issued it, provided the signature and register are authentic. The certificate cannot turn a false price oracle into a true one or a credit claim into an owned Bitcoin output.

An additional temporal rule matters for modern finance. The issuer should be authorized when issuing the opinion, and the record should specify the circumstances under which the opinion remains usable. A revoked or expired authorization cannot be silently interpreted as permission for entirely new classes of contracts. Earlier rulings retain their historical status, with any later changes to reliance or restitution decided by the governing legal method. This is the sort of contingent obligation for which the book's modal framework is useful: it can express when an authorization applies, when a contract event triggers a duty, and which facts defeat the implication.

The school should publish the formal model in Lean with separate namespaces for source claims, institutional choices and program facts. A theorem that an authorized jurist satisfying all documented qualifications has a valid institutional issuance certificate is mechanically straightforward once the predicates are defined. The proof assistant cannot testify that she actually studied the specified Arabic sources, that a council is legitimate, or that the loan contract's private side agreements are complete. Those claims require people, documents and adversarial verification.

6.12 A model examination: a synthetic-dollar fatwa

A cooperative proposes a synthetic-dollar liability backed by Bitcoin. It sells or enters a short derivatives exposure so that a fall in BTC price should create an offsetting gain. Marketing describes the scheme as debt-free and fully collateralized. The banker's spreadsheet shows the desired net dollar value in two terminal scenarios. Its funding terms are complex, and a liquidation engine can close the hedge during an earlier price rally.

The candidate must identify the legal subject. Who owns the Bitcoin, whose property is posted as margin, and what enforceable right does the synthetic-dollar holder obtain? Can the issuer redeem its liability on demand, or only after closing a derivative at a venue whose rules it cannot change? Which party receives funding payments? What happens when the venue suspends withdrawals or the oracle price differs from the underlying market? A statement of intended economic neutrality supplies the reason for a hedge. The owner's legal entitlement depends upon the contract and its enforceable settlement.

The candidate then reads the ḥukm from the accepted premises. The Academy's restrictive rulings on standalone financial options and deferred currency exchange must be addressed under their own operative categories. Malaysia's recognition of certain warrants and commodity futures has a narrower contractual reach. A new-school argument might recognize a fully funded, independently enforceable contingent entitlement as *māl*; it must defend the status of that right and give the conditions under which the fund can honor its claims. The jurist can conclude conditionally on a source and a funding premise. She cannot convert an incomplete code audit into an unconditional permission.

A responsible examination might end as follows: the proposed hedge is economically intelligible, and a specified fully funded claim could be considered lawful under the school's adopted property-right doctrine. The offered deployment has an unverified liquidation and creditor-priority path. Its permissibility for customers is therefore unestablished. Publish the disputed legal bridge, require an authenticated implementation review, and keep the sales team away from an unrestricted certificate. Such a conclusion can be disappointingly unprofitable. It is precisely the sort of conclusion the school must be qualified to issue.

6.13 The school, the network, and the public

The final chapters of this book describe a voluntary global Ḥanīfiyyah network supported by decentralized money and AI-assisted institutions. Its proposed financial jurisprudence should be able to operate without a

monopoly over belief. Membership and office are determined through explicit, reviewable rules. The ability to publish criticism extends beyond the membership. The treasury and legal authority are held in trust for particular purposes, with rights of appeal even where the complainant rejects the school's theology. The character of the institution is visible when the least influential claimant contests the most elaborate contract.

The office of a *muftī* is a public responsibility within the institution's declared jurisdiction. Its holder should owe duties of confidentiality, correction, competence and disclosure. The school can certify that a jurist met a specified standard at a stated time. It can publish an advisory opinion about a financial product. It can withhold its own endorsement when evidence is inadequate. Where a civil jurisdiction has laws governing professional titles, financial advice, public offerings or consumer protections, the proposed ijāzah does not supersede those legal obligations.

The author's personal theory of divine justice is therefore exposed to its own institutional test. If the Qurʾānic obligation to deliver entrusted property applies when a bank holds a widow's funds, it applies when the bank calls itself a protocol and the trustee calls himself a shaykh. The school's credential should become easier to challenge as its financial influence grows. Otherwise our effort to turn calculations into accountable fatwas will merely create another financial institution whose internal document declares every transfer permissible.

6.14 A proposed founding charter

For this book the charter can be stated as a research proposal, awaiting qualified independent adoption:

1. **Name and scope.** The body is a contemporary Muʿtazilī-inspired jurisprudential research school, concerned initially with financial contracts, charitable assets and their related obligations. Its founding date and authorship are declared. It claims intellectual inheritance, subject to historical criticism, rather than a continuous ecclesiastical succession.

2. **Normative sources.** Its governing materials are the Qurʾān, critically assessed transmitted Sunnah, documented juristic reasoning, and an openly stated account of rational justice. Their interaction and standards of acceptance must be taught and published.

3. **Method.** Every institutional fatwa names its source facts, identifies its operative legal analogy or independent derivation, records counterevidence and states conditions under which the ruling ceases to apply.

4. **Qualification.** Institutional issuance requires examined competence in legal methods and the relevant technical domain, with restrictions published rather than implied.

5. **Authorization.** Teaching, transmission, research, and fatwa issuance are distinct scopes. The issuer, provenance, duration, field and reviewing authority of each authorization are documented.

6. **Conflicts and appeals.** Financial sponsors cannot dictate legal conclusions. Adverse decisions and dissenting reviews are recorded. Appeals and correction are available through disinterested reviewers.

7. **Rights of outsiders.** Independent scholars, critics and people governed by other uṣūl remain free to contest the school's conclusions. The charter does not confer divine authority upon a registry or a founder.

This is the point at which the book's speculative madhhab can begin to become an actual school. It must acquire trained readers who are able to correct its author, scholarly critics whose opposing cases are accurately reproduced, and an institutional memory that preserves the inconvenient versions of its fatwas. Its founders can write a charter and propose an examination. The recognition of a scholarly tradition will be earned through teaching, disagreement, correction and responsible legal work. A certificate can record that history once it exists.

Source and verification notes for this chapter

The five principles and the commentary-attribution problem are documented in modern specialist treatments of ʿAbd al-Jabbār [S183]. Abū al-Ḥusayn al-Baṣrī's juridical work and school milieu are described in *Encyclopaedia Iranica* [S184]. The IIFA's Resolution 70 (1/8) on dispensations and *talfīq* and Resolution 153 (2/17) on competence in *iftāʾ* are contemporary institutional sources [S185, S187]. Historical categories of *ijāzah* follow Stewart's account, with the school's modern *dirāyah* certificate explicitly identified as a proposal [S186]. Sīstānī's contemporary Twelver rules are quoted for a serious competing theory of legal authority [S188]. The argument for domain-specific *ijtihād* from al-Ghazālī has been located in secondary scholarship and awaits primary Arabic edition collation [S189]. Scriptural passages on trust, justice, and knowledge are cited as anchors for the proposed norms [S190]. The discussion of grave sin and divine punishment differentiates historical Muʿtazilī formulations from the author's declared theological revision [S191]. The normative charter, examination procedure, mathematical predicates and credential types belong to this book as original proposals; no historical body is represented as having issued them.

7. The Madhhabs as Axiomatic Systems: Eleven Legal Voices

Comparative uṣūl, authority-sensitive reasoning, and the limits of a reconstructed madhhab.

A jurist is presented with a Bitcoin loan, an agricultural forward, and a put giving a farmer a minimum sale price. The contracts share a mathematical language: dates, state-dependent consideration, liabilities, and the possibility of loss. A ruling on one of them may cite Abū Ḥanīfa, al-Shāfiʿī, a Twelver marjaʿ, or a modern Malaysian council. What has been cited in each case? Is it an original legal method, a subsidiary doctrine applied under that method, a contemporary fatwa, or the author's proposed analogy? Unless that distinction is preserved, the book's mathematics will produce certificates whose proofs are valid but whose authority is fictional.

This chapter gives eleven voices room to speak while declining to manufacture eleven votes on derivatives. A legal tradition contains competing schools of reasoning, transmitted rules, and revisions. Some of the texts we possess concern a question narrower than the one we want to answer. We shall therefore work with **named propositions and identifiable chains of authority**, not permanent Boolean attributes labeled $\texttt{hanafi} = \texttt{true}$. The cross-school inquiry begins by asking what can legitimately count as evidence in a particular juristic process. [S56, S57, S71]

7.1 The four things a source can contribute

A transmitted text may supply a command. A jurist's treatise may explain the authorized method of inference. A recorded verdict may establish how that jurist applied his method to a case. A contemporary regulator may authorize an instrument within a defined financial market. These different contributions can enter one inquiry without acquiring equal rank. The result depends on the school or new jurist that receives them.

A disciplined source record is therefore a tuple:

$$E = (a, t, p, m, s, j),$$

where a is the attributed authority, t the identifiable text and passage, p the proposition quoted or accurately paraphrased, m the kind of authority asserted, s the scope of the legal question, and j its interpretive status. An original source may be collated; an institutional website may be directly read; a scholarly abstract may provide only a signpost toward a work whose detailed argument remains uninspected. We will identify those levels instead of letting all URLs function as equivalent proof.

The corresponding fatwa dossier has a separate slot for an *ʿillah*, the characteristic said to make a rule applicable. Consider an advance sale of grain. The fact that the wheat arrives next year is shared by salam and many modern futures. Whether the buyer has prepaid, whether the seller owes deliverable grain, and whether the contract permits net cash closeout distinguish them. An assertion that a futures exchange is simply salam suppresses precisely the rules that made salam a recognized sale. Resolution 63 of the International Islamic Fiqh Academy identifies these differences among commodity-market arrangements [S09, S71].

7.2 The Ḥanafī voice: a reasoned exception requires a reason

Abū Ḥanīfa and the early Kufan jurists inherited a vigorous world of commercial practice. For this book the central methodological question is *istiḥsān*. John Makdisi's analysis of classical uṣūl texts describes two forms: preference for an authoritative source over ordinary analogy, and preference for a stronger analogy over a weaker one. This is a juristic account of the relative strength of legal reasons [S72].

It follows that a proposed Bitcoin put cannot be authorized merely by praising its social utility and pronouncing *istiḥsān*. We must display the analogy it displaces, the stronger legal ground invoked, and the facts that make it stronger. Suppose a farmer may promise a specified future crop under salam but may not sell an uncertain crop

still growing in the field. The jurist has to explain why the price-protection mechanism has the relevant features of the first contract and how its obligations avoid the defects of the second. If a new exchange sells only promises to pay differences without the required property and receipt, the claimed exception faces a new objection.

The early internal disagreements also matter. Treating Abū Ḥanīfa and his pupils as a single speaker in matters such as *muzāraʿah* hides the original issue of uncertainty in compensation. A source profile for one identified argument must therefore remain distinct from the profile of the school in its later canonical administration. A historical disagreement is information about the method, rather than a software error that we should erase. [S12, S19]

7.3 The Mālikī voice: public benefit and the lived contract

The Mālikī tradition's association with Medinan practice, *maṣlaḥah*, and attention to customary transactions makes it indispensable to the study of financial innovation. The precise place of each consideration varies among jurists and periods. Contemporary scholarship identifies unrestricted public interest (*maṣlaḥah mursalah*) as a historically important method in cases where a direct analogy lacks an established textual basis [S71].

A Mālikī-minded critic would reasonably ask which human activity a synthetic-dollar system serves and whose harm it prevents. The answer cannot consist solely of its trader's profit. A remittance worker paid in Bitcoin may need to meet a dollar-denominated rent obligation. A hedged transfer could reduce the danger that a fall in BTC prices makes rent unpayable. The same settlement engine can also impose oracle manipulation, destructive liquidation, or socialized counterparty losses. Its benefit requires a distributional account, with the effects on vulnerable parties disclosed.

Custom deserves comparable discipline. Market convention can help interpret a technical term or an established practice, but a hidden exchange rule that confiscates collateral is not justified merely because traders are accustomed to it. The proposed new school can borrow the question of public benefit while retaining responsibility for its own answer. A claim that Mālik personally authorized modern contingent contracts would require separate primary evidence.

7.4 The Shāfiʿī voice: identify the operative legal cause

The Shāfiʿī method offers an immediate challenge to loose analogies. A rule can be extended from an authoritative original case through *qiyās* only after the relevant legal reason and the factual similarity have been defended. Al-Shāfiʿī's importance to systematic legal reasoning and the boundaries of *qiyās* is established in modern scholarly treatments; the book's source ledger identifies further classical collation required before attributing a particular financial rule directly to his own words [S71, S73].

The question for the writer of an option is thus specific: is the source case a stipulated rescission right in a completed sale, a forfeitable earnest deposit, an advance sale, or an obligation to deliver a financial difference? Each makes a different set of claims upon the parties. Similar terminal payoff curves provide economic evidence. They do not identify the original legal cause by themselves.

A Shāfiʿī-informed objection also disciplines claims that hardship makes a contractual form permissible. Need can be relevant under recognized legal rules, but an analyst must state the text, exception, and legal scope invoked. A universal emergency exception granted to the entire derivatives market would be far wider than the need of the farmer who brought the question.

7.5 The Ḥanbalī voice: the conditions attached to permission

The Ḥanbalī literature includes influential permissions concerning earnest deposits, and the later debate over *bayʿ al-ʿurbūn* illustrates how a conditional right can live within a property sale. The International Islamic Fiqh

Academy's 1993 Resolution 72 endorses a defined earnest-money contract. It restricts the term and clarifies what becomes of the deposit when the purchase proceeds or is abandoned. It also names transaction types for which this ruling cannot simply be borrowed [S13, S74].

For the book's theory of options, the important element is the bargain that binds an identified asset, a specified purchaser, a period, and a consequence for declining to complete. The seller may have an opportunity cost from holding the item. A payment compensates a right whose exercise changes that seller's position. An entirely cash-settled Bitcoin put offers the buyer a different property right, even when a financial engineer can synthesize similar payoffs with other contracts. To cite ʿ*urbūn* is to begin an analogy that still has to be completed.

This case also shows why a named school cannot be represented merely by the most convenient jurist who appears in its historical literature. Which opinion became authoritative for the audience of a fatwa and on what basis is a further source question.

7.6 The Ẓāhirī voice: the right to demand an explicit warrant

The Ẓāhirī school, especially as represented by Ibn Ḥazm, contests the authority of analogy of the sort widely used by other schools. The disagreement is methodological and therefore matters before any proposed financial transaction is described. Scholarship on early juristic differences situates the Ẓāhirī movement's rejection of *qiyās* within a broader conflict about the authorized use of rational legal inference [S73]. The prior source file points to the relevant sale discussions in *al-Muḥallā*, which remain subject to direct edition-specific comparison [S12].

A jurist taking that position could accept the observable existence of a valuable option and still reject the argument that a different permitted contract makes it lawful by analogy. This is a live objection to the book's new *mutaqlid* method. A proof in Lean of payoff similarity cannot supply the missing textual permission inside a framework that refuses the proposed bridge.

The answer belongs to the declared new school's authority theory. It can defend its own use of rational comparison, and it must state that the Ẓāhirī voice remains in disagreement where the methods are incompatible. Calling this a reconciled Ẓāhirī endorsement would conceal the actual dispute.

7.7 The Twelver Jaʿfarī voice: an identifiable jurist and his authority

Twelver Uṣūlī methodology gives an important place to ʿ*aql* and *ijtihād* within an authority structure that differs from the Sunni schools. A modern treatment of Twelver legal history distinguishes Uṣūlī argument from the tradition-focused Akhbārī approach [S75]. The practical authority of a living marjaʿ also places specific limits on how an adherent may select rulings. Sīstānī's *Islamic Laws* explicitly sets out conditions for following a jurist [S63].

The same named authority gives concrete transactional law. Ruling 2134 identifies eleven sorts of *khiyār*, including stipulated rescission, defect, deceit, and failure of delivery [S14]. Rulings on *qard* prohibit stipulated benefits to the lender; the rules of *rahn* constrain enforcement against pledged property [S54, S55]. These statements furnish more than a general slogan about justice. They identify a buyer's power to undo a transaction, a lender's restricted entitlement, and an owner's residual claim.

There are two distinct forms of proposed reconciliation. A jurist can investigate whether a Bitcoin collar satisfies an already recognized Jaʿfarī contract, under all its conditions. Alternatively, the new Muʿtazilī school can construct a novel legal reason informed by that precedent. The second construction remains our own. Its result cannot bind a follower of Sīstānī merely because the resulting ledger balances.

7.8 The Zaydī voice: interpretation belongs to a history of authority

The Zaydiyya supply legal and theological traditions in which juristic authority, reasoning, and the imamate have developed along different lines from Twelver Shiʿism. The working manuscript already identifies *al-Baḥr al-Zakhkhār* as an avenue to specific rulings about sales and ratification [S16]. Scholarly work further confirms that Zaydī adoption of Muʿtazilī theological doctrines occurred historically, while Zaydī positions on the imamate retained distinctive features [S76].

That intellectual closeness makes the Zaydī material especially tempting to a neo-Muʿtazilī author. Precisely for that reason, its economic law must be read independently. We cannot infer a Zaydī permission for cash-settled derivatives from a general shared theology. The proposed primary-source collation should identify the wording on deferred transfer, enforceability of conditions, lawful subject matter, and prohibited additions to debt. Each passage must carry its author and edition.

Until then, the book treats Zaydī participation in the broader method as an invitation to comparison rather than a vote on options.

7.9 The Ismāʿīlī voice: an imamic warrant is a real difference

Qāḍī al-Nuʿmān's *Daʿāʾim al-Islām* belongs to a distinct Fatimid-era Ismāʿīlī legal history. The relation between the author, his sources, and the Ismāʿīlī imamate is a matter of specialized scholarship [S77]. Work on the authority of Ismāʿīlī community law indicates how the imamic warrant shaped the status of historical legal texts [S78].

A modern argument derived from the conditions of a prepayment sale cannot therefore be placed under an Ismāʿīlī heading by substituting the relevant words in a standard Sunni proof. An assessment would have to establish whose instruction binds, how the historical law is interpreted within a living community, and whether that community has spoken on the modern transaction. We have not yet assembled a primary-text dossier that answers those questions for standalone financial options.

The absence matters. It is a test of our ability to let an argument remain open when the resulting table would look tidier with another approving check mark.

7.10 The Ibāḍī voice: the authority of communal transmission

Adam Gaiser's study of early Basran and Omani Ibāḍī writings describes the importance of communal *sunna*, accumulated *āthār*, and inherited lines of scholarly teaching in the formation of legal authority [S79]. The source record also identifies later Ibāḍī legal collections such as *Sharḥ al-Nīl* [S18]. The particulars of a commercial ruling must be extracted from its own textual context and tested against the community's method of interpretation.

This changes what a source certificate would need to carry. An isolated rule printed in a comparative law encyclopaedia has different evidential force from a proposition situated in an authoritative Ibāḍī work and connected to the tradition's recognized reasoning. The debate over contracts for future delivery should eventually include direct Ibāḍī Arabic passages, with their conditions on possession, uncertainty, price, and cancellation.

Treating the Ibāḍī tradition as merely an eleventh variation of the same four-source Sunni schematic would throw away a difference we specifically set out to study.

7.11 The Qurʾān-centred and proposed Muʿtazilī voices

The Qurʾān provides constraints that our new school affirms: the difference between trade and ribā at 2:275, principal and hardship at 2:279–280, the condemnation of wrongful consumption of wealth at 4:29, and

obligations under covenants at 5:1 [S01, S02, S03, S64]. A Qurʾān-centred interpretation is an analytical perspective in this comparison, not a historical school with a single teaching office and unanimous view of financial options.

Our proposed Muʿtazilī school receives those texts within an explicit ethic of justice and an argument about rationally knowable harm. It adopts a test of materially equivalent consequences and asks jurists to explain every differential ruling through the authority and relevance of a demonstrable distinction. The resulting legal doctrine is new. The method can use an identified legal reason from a Ḥanafī source, the facts of a Jaʿfarī rescission right, and a Mālikī concern about welfare, but it must show the new chain of authority it claims for the combination. Historical agreement is established through actual agreement. Reconciliation is an independent juristic achievement with its own reasons.

7.12 An adversarial dossier: the protected farmer's forward

Imagine a farmer obligated to deliver ten tonnes of grain in six months. A buyer prepays the price. The quality and delivery date are precisely defined. The seller carries production risk under the actual agreement. This gives the research a recognized salam-like case against which to test other mechanisms. The book's Lean programme already includes a selected Ḥanafī–Jaʿfarī salam comparison, with different availability conditions left visible; the result proves an intersection of stated predicates rather than the identity of two entire schools [S70].

Now change the transaction. The farmer pays a premium for the right to sell grain at a minimum price. One contract provides for physical exercise and delivery, another offers cash settlement using an independent index, and a third uses a margin account vulnerable to liquidation. The economic objective persists across the examples, while title, performance and insolvency change.

A cross-school dossier must therefore identify: the original source case; the source's legal category; the proposed modern counterpart; facts sufficient to invoke that category; contrary rules; a rule for resolving conflicts; and a loss-state counterexample. One can seek a permissible *mutaqlid* conclusion without pretending that all traditions have become one. A finite proof certificate can show that the adopted constraints have a model and that the defined fatwa follows from them. It cannot confer the qualifications of a mujtahid or the historical authority of a school upon its programmer.

7.13 What this chapter leaves to the primary-text workers

The technical research programme now has four bounded jobs. It must collate one relevant passage per early authority in the school's original language; identify each passage's conditions and scope; preserve genuine internal school disagreements; and construct a cross-reference showing where a proposed new legal reason is adopted from a named jurist or supplied independently. These are source-critical tasks. A page number in a digital scan is useful only when the edition and Arabic wording match.

The formal proof obligation is consequently small and severe:

$$\big(Authorized(a,e,s) \wedge Applies(e,C) \wedge SoundInference(e,C)\big) \Rightarrow Supported_a(C).$$

Every predicate in the antecedent demands its own evidence. If a bridge draws on conflicting principles, the new school's certificate adds its explicit priority rule and records the rejected rule as dissent. A source that has never authorized a transferable option will never acquire that statement merely because the same mathematics appears in its law of agricultural partnership.

Source and validity notes. The source identifiers refer to the book's ledger. S71–S79 include newly inspected research and institutional texts. Historical generalizations describe documented tendencies, with stronger attribution reserved for quoted named opinions and named modern rulings. Direct Zaydī, Ismāʿīlī, and Ibāḍī

financial source passages remain an open collation task. Mathematical statements are constructions of this book and carry no historical juristic endorsement.

8. Ikhtilāf, Ijmāʿ, and the Limits of Authority

A jurist can announce an agreement by using a familiar word and leave nearly everything essential unsettled. Who agreed? Upon which proposition? At what date? Under what understanding of the facts? Was the proposition a categorical prohibition, an application to one known contract form, or a judgment reached under conditions that have since changed? The proposed *mutaqlid* approach treats the historicity of *ijmāʿ* as part of its authority.

A classical jurist's theory of consensus is a rule concerning the relationship between the community, texts and legal certainty. A modern committee's majority decision is a different social fact. An opinion repeated in banking compliance manuals has yet another character. Their authority can be substantial within the systems that recognize them, though none should acquire the historical status of a universal agreement merely by changing the label on a citation.

8.1 What exactly was agreed?

Let a purported consensus be represented as $I = (A, p, d, F)$, where A is the membership and authority criterion, p is the legal proposition, d the historical time interval, and F the relevant facts believed by the agreeing jurists. If a contemporary dispute involves a contract C, an argument from I requires an applicability bridge: the facts and legal category material to p must match those of C. That is not an endorsement of this four-tuple by any classical school; it is a bookkeeping device designed to prevent equivocation.

A valid counterexample must also be properly scoped. Showing that a Malaysian authority allows certain issuer warrants [S10] while an international council rejects conventional stand-alone options [S09] establishes institutional disagreement about whether a paid contingent right can qualify for lawful exchange in the analyzed forms. It does not establish that the original jurists considered precisely the same rights and facts. It also cannot defeat a differently worded consensus about fixed increases on loans. Each assertion requires its own evidence.

A new financial technology adds a further difficulty. A nineteenth-century scholar could condemn certain forms of sale without knowing a Bitcoin signature, a daily margined future, or an overcollateralized oracle vault. The old reasoning may apply fully to such mechanisms once their legal cause is identified. The absence of prior exposure makes the proof of identity between old and new cases especially important.

8.2 Disagreement as data, and as a duty

The book's source record deliberately includes dissent. For paid options, IIFA Resolution 63 (1992) rejects the then-traded contracts on the ground that their subject matter is not recognized as property, benefit, or saleable financial right [S09]. Malaysia's regulatory Sharia council permitted certain call warrants by recognizing acquisition rights with economic value [S10]. IIFA Resolution 224 (2018) permitted the objective of wealth-preserving hedging while keeping its restrictions on many conventional derivative forms [S32]. Its later Resolution 238 continued to reject payment for particular binding promises used as options substitutes [S33]. An affirmative argument for an on-chain put must engage with each category rather than cite the one that sounds useful.

The *mutaqlid* may adopt a narrower interpretation of what counts as property under a separately declared theory of authority. That interpretation can be reasoned from the preceding rules and new facts. It should be published as a **new-school judgment**, with the disagreement shown in an appendix and an exact account of what would refute the adopted legal cause.

8.3 The hierarchy of warrants

A useful source register distinguishes a primary scripture; a transmitted report with a studied chain and meaning; an authored classical legal argument; a recognized school ruling; an institutional resolution; a contemporary technical description; and the new author's own proposed axiom. They perform different work. The Islamic legal claim does not emerge by averaging their weights or stacking footnotes.

The authority criterion is school-relative. Certain Uṣūlī Jaʿfarī structures require following the most learned qualified jurist in specified circumstances [S63]. Someone bound by those rules cannot simply borrow a favorable conclusion from a second institution without addressing that obligation. A Mālikī analysis of public benefit may admit a line of reasoning the Ẓāhirī critic rejects as unauthorized analogy. Recording the critic's restriction is essential even where the new school finds another path.

8.4 Against shopping for dispensations

The International Islamic Fiqh Academy's Resolution 70 on concessions and *talfīq* [S56] provides grounds for recognizing certain selection practices while restricting combinations whose outcome is unacceptable under the governing method. The *mutaqlid* must show that a proposed synthesis has a defensible unifying method. Joining an option permission from one authority to a debt charge permission from another, while ignoring the conditions of each, would be a textbook way to manufacture convenience rather than legal judgment.

The doctrine proposed here therefore imposes an **adverse-source obligation**. A ruling contains the strongest known counterargument, its exact applicability, and the reason it is rejected or distinguished. The jurist also discloses whether the selection changes if the hedge becomes speculative, a writer loses collateral, or a lender begins collecting an interest-like funding transfer.

8.5 What can be formally checked

For the logic of a universal claim, a single in-scope counterexample suffices: $\exists x\left(P(x) \wedge \neg Q(x)\right)$ defeats $\forall x\left(P(x) \rightarrow Q(x)\right)$. A proof assistant can validate this elementary structure. It cannot decide which historical jurists form A, whether an alleged dissent was authentic, or whether two option forms share the operative *ʿillah*. These are tasks for philology, legal history and precise contract analysis.

A carefully qualified historical consensus may carry enormous authority in a school. The present book asks for the proposition to be stated at sufficient resolution that someone who disagrees can investigate it. Such precision makes juristic disagreement more productive and a new *mutaqlid* ruling easier to criticize on principled terms.

8.6 A consensus claim has a domain

The word *ijmāʿ* becomes a weapon when its domain is left unspoken. A jurist announces that the community agrees options are impermissible. Which community? Which generation? Which form of optionality? Does the proposition concern a paid, assignable right with central clearing, a purchase deposit, an issuer's warrant, a contractual election embedded in a sale, or an unconditional bilateral gamble on a price? Each of those questions changes the content of the alleged agreement.

A historian should record an attributed statement of consensus as a claim with four coordinates: the legal proposition, the set of qualified authorities said to agree, the time and transmission horizon, and the transactional subject under discussion. A later institution's majority opinion supplies evidence of contemporary legal influence. It does not establish that all qualified earlier jurists addressed a product invented centuries afterward.

Let U be the domain of authorities and Q a proposition about a fully specified contract family. The strong claim is:

$$I(U, Q) := \forall\, j \in U, endorses(j, Q).$$

A counterexample must be a qualified authority in the relevant domain who denies **that same** proposition. The moment we change from an exchange-traded option to an issuer's warrant, or from all contingent rights to a particular kind of paid contingent right, we have changed Q. The quantifier alone cannot resolve the dispute. A theorem prover may verify a contradiction in the stated endorsements after the historical and semantic mapping is supplied. It cannot verify an unexamined universal set of jurists.

8.7 What the options history actually proves

The Academy's Resolution 63 (1/7), adopted in May 1992, classified the conventional options contracts then traded on international financial markets as impermissible. Its stated objection concerned the contractual object: it did not recognize the described right as money, useful property, or a separately compensable financial right. The ruling prohibited trading those contracts as a consequence of that characterization [S09, S153]. The decision is a serious legal argument whose main premise must be confronted.

On 26 July 1995 Malaysia's Islamic Instrument Study Group approved call warrants on Shariah-compliant shares. The published Securities Commission account recognizes the warrant as *māl* by invoking *ḥaqq mālī* and *ḥaqq tamalluk*, and expressly conditions dealing in the right on the general requirements of lawful sale [S10, S154]. This is a named institutional permission for a narrower instrument with an underlying security; it establishes the existence of a developed juristic route to recognizing **some** purchase rights as tradable property. It does not imply approval for naked options on currencies, poorly collateralized perpetuals or every exchange-traded BTC put.

In November 1997 the Malaysian Shariah Advisory Council separately approved its studied crude palm oil futures contract. The published reasoning points to known quantity, type, price and delivery terms, trading rules, legitimate price-risk management and the exclusion of ribā and gambling [S34, S155]. That establishes a contested, contract-specific position on **one** futures market. The Academy's later Resolution 224 (8/23) affirms hedging as a legitimate objective while maintaining the prohibition of several conventional derivative forms [S32, S113, S156]. The disagreement survives as a disagreement about legal reasons and the admissible architecture of an instrument.

A cautious conclusion follows. These named Malaysian permissions make a claim of **universal contemporary institutional opposition to every option-like property right** untenable. They leave open the much narrower question whether a standalone BTC put with particular margin, funding and payout obligations satisfies a valid legal method. They likewise leave open whether a historical *ijmāʿ* applied to a different class of prohibited exchange. The historian may overturn an overbroad consensus claim while the jurist still rejects the proposed financial contract on separate grounds.

The spreadsheet row that claimed to speak for fourteen centuries

In software we attach a version to a claim about program behavior. The input changed, the parser changed, or a single old assumption had survived unnoticed. Legal scholarship deserves the same care with time and scope. A modern summary that says "the jurists agree" can compress centuries of argument into a sentence shorter than the source's actual qualification.

Kamali's work on futures is valuable because it names the contested legal defects and makes them discussable [S179]. A sourced contemporary disagreement may defeat a universal claim about that contemporary instrument, while leaving a differently scoped historical consensus intact. In the *mutaqlid* source registry, the

version and the domain belong next to the ruling. A sentence without its domain is a terrible input to a proof checker and a tempting input to a sales deck.

8.8 A registry for claims of agreement

An auditable *ijmāʿ* dossier should record the proposition in ordinary language, a structured definition of the underlying contract, the earliest asserted agreement, its exact quoted locus, later reproductions, known dissent and relevant factual innovations. An assertion with an unspecified jurist set receives the label **consensus unestablished**. A demonstrated majority is labeled **majority in the stated population**. A collision between rulings over different contracts is labeled **analogy disputed**. A conflict over precisely the same legal proposition may be labeled **substantive dissent**, once both interpretations have been checked against their full texts.

The result is a stricter legal conversation. An inherited claim can retain its actual authority even when an attempted extension fails. Conversely, the author of this new method cannot use the existence of dissent as a positive proof of permissibility. The particular contract must earn its own ruling, with the Academy’s substantive objections given their full force.

9. Barzakh al-Ḥukm: The Boundary of Material Equivalence

The bank has sold a refrigerator to a household for 1,200 dollars, due in twelve months. A second institution has advanced 1,000 dollars for the same refrigerator and demands 1,200 dollars in twelve months. On a sheet of paper the two transactions look identical. They make the same household richer by one refrigerator today and poorer by the same sum next year. The merchant and the lender both expect to collect a margin of 200 dollars. The market risk of the refrigerator's price may even disappear in both cases after signing.

The jurist is entitled to ask a question the spreadsheet omitted: who possessed the refrigerator when it was at risk of destruction? In one arrangement the financier purchased the refrigerator, acquired enforceable title, and bore its loss before selling it onward. In the other, the financier paid a third-party seller on the household's behalf and acquired a contractual claim for more money. A delivery van may crash during those five minutes. If the parties must respond differently, the two transactions are different legal objects. The **barzakh al-ḥukm** is the boundary at which that difference becomes material to the ruling.

The term is proposed for this book. It is neither an attested classical technical term nor an excuse to call every change of contractual label a change of substance. It is a demand for the person invoking a distinction to identify the event, the changed right and the accepted legal reason. It also disciplines the critic: a jurist who declares two contracts identical must state the full collection of legally relevant events over which that claim is supposed to hold.

9.1 Economic equivalence as a preliminary comparison

A cash-flow comparison remains valuable. Define the money paid to and by each party at dates $t_0, \dots, t_n$. If $CF_i(C, t, \omega)$ is party i's cash flow under contract C and possible event path ω, then matching final account balances establishes a limited equivalence:

$$\sum_t CF_i(C_1, t, \omega) = \sum_t CF_i(C_2, t, \omega).$$

This equation says something testable about money. It says little about injury caused by defective title, access to a remedy, a coercive penalty, an unperformed delivery or an insolvency administrator's power to subordinate a claimant. A lender can face almost no risk of losing the promised principal while a real seller remains liable for defects after the balance sheet has settled.

We therefore compare *histories of claims*. For each reachable event path, let

$$\Phi(C, \omega, t) = (O, P, D, Q, L, E, R, I)_t,$$

where O is title; P, effective possession and disposal rights; D, debts; Q, exercisable contingent rights; L, loss-bearers; E, enforcement rights; R, remedies and residual equity; and I, information disclosed to the parties. All components are indexed by time because a right may be lawful at inception and violated in execution. The underlying state model must name the parties, assets, creditors and triggering events.

A useful first gate is **path equivalence**: $C_1 \equiv_\Phi C_2$ only when the relevant entries agree throughout every admissible event path. The word *admissible* matters. A modeller can always prove equivalence by excluding a bankruptcy or price shock from the model. The auditor therefore has to justify the path set independently of the hoped-for fatwa. Ordinary stress events, legal default, service interruption and adversarial execution belong in the first pass.

9.2 The warehouse fire and the real murābaḥah

The International Islamic Fiqh Academy’s 1988 ruling on murābaḥah to the purchase orderer permits the structure when the seller possesses the goods and carries their pre-delivery loss risk, together with applicable defect and return responsibilities [S07]. The Academy’s 1990 installment-sale resolution also permits an agreed higher deferred commodity price while disallowing a separately specified interest charge or an increase for late payment [S68]. Those decisions furnish an exact legal distinction with which to test our method.

Suppose the bank’s agreed cost is 1,000 dollars and the customer agrees to buy for 1,200 dollars after acquisition. The goods perish before the customer’s purchase. In a real sale sequence, the financier has property to lose. If the customer already owes 1,200 dollars even when the financier never acquired deliverable goods, the sale label leaves the decisive loss with the customer. That is a witness that the contractual states differ.

The converse should embarrass simplistic critics of Islamic finance. A properly executed merchant purchase may involve meaningful liability, title and a useful good. The resemblance between its financing charge and an interest rate supports scrutiny; it supplies no proof that the merchant never owned what was sold. The best critical question concerns frequency and reality: how long and in which states does the bank bear loss, and is its exposure transferred back to the household through an undisclosed side agreement? A moment of legally real title can matter. A staged flash acquisition whose loss is guaranteed away demands another examination.

The proposed neo-Muʿtazilī method adds a **substantive adequacy** inquiry. The 1988 resolution makes genuine loss-bearing relevant, yet it does not by itself settle the moral adequacy of a transaction that passes the legal minimum through engineered formalities. A school that invokes justice may ask how risks are allocated across the whole operation. Its additional test must be declared as a new legal premise and defended in argument, rather than falsely presented as the Academy’s own condition.

9.3 The boundary as a falsifiable claim

A barzakh certificate should contain an event witness $\omega^{\prime}$ and a time $t^{\prime}$ such that

$$\Phi\left(C_1,\omega^{\prime},t^{\prime}\right)\neq\Phi\left(C_2,\omega^{\prime},t^{\prime}\right).$$

It must also include a legal warrant explaining why the unequal component can affect the ruling. A difference in the font used for the contract is a factual distinction with little bearing on permissibility. A difference in who owns pledged property after default can deprive a household of its residual wealth. The witness and the legal warrant together supply the case for a **material** boundary.

The procedure can be made adversarial. The defender of a murābaḥah contract submits evidence of the financier’s purchase and risk-bearing. The challenger chooses a state such as seller insolvency, transport damage, hidden defect, cancellation or customer bankruptcy. The contract documents and the resulting state transition answer whether the stated protection exists. Each side may submit further paths. The decision process should preserve a failed counterexample and explain why it failed; a contract audited only on the path that paid perfectly has never faced its hardest question.

In computational terms, a verdict can depend on the contract-state semantics through a declared normative function h:

$$H(C)=h\left(\Phi(C,\cdot,\cdot),A\right),$$

where A is the collection of jurisprudential assumptions in force. If h is extensional in the included facts, equal complete histories yield equal verdicts. Lean can check an extensionality theorem when h, A and the histories are specified. A proof assistant cannot demonstrate that a jurist has included every relevant moral fact. The selection and authority of A remain part of the fatwa dossier.

9.4 Two squares, one unjustified shortcut

The diagram is sometimes imagined as a square whose upper path represents a loan and whose lower path represents a commodity purchase and resale. Both arrows meet at the same household balance sheet. The square commutes under the map that retains only the final monetary total. It may cease to commute under a map that preserves title and creditor remedies. Consequently, “commutativity of fatwas” is best framed as a *coherence duty* conditional on a complete legal comparison. A ruling that diverges has to furnish a reason; the critic who alleges false divergence has to furnish an adequately complete model.

The converse warning matters. Formal descriptions of different contracts can be mathematically distinguishable yet economically immaterial to a specified harm. A jurist may invoke a microscopic title interval although the seller’s loss exposure has been fully indemnified by a side agreement. The model must include indemnities and guarantees, since they can neutralize the stated risk. The barzakh test then asks whether legal protections truly survive all connected arrangements.

A useful three-level relation follows. **Payoff similarity** compares terminal balances. **Behavioral similarity** compares who can perform, default and recover across reachable states. **Jurisprudential similarity** assesses those histories under an identified school’s reasons for law. The evidentiary demand rises at each level. Moving directly from the first level to the third gives an impressive-looking but unsupported fatwa.

9.5 When the same coin carries two promises

The Bitcoin case makes the ordering problem unusually concrete. A borrower pledges one BTC in a vault. Later the borrower sells a covered call representing a right to that same coin or its upside. The call purchaser and the secured lender each claim priority upon a triggering event. If the call was created before the pledge, it may be senior under the actual contract; if the pledge came first, the available residual right may be narrower. The mere words “covered call” settle none of those questions.

Let T_p create a pledge and T_c create an enforceable call. The state transitions can fail to commute:

$$T_p\big(T_c(s)\big) \neq T_c\big(T_p(s)\big).$$

The test is whether the resulting claim sets differ, which the signers can enforce, and which settlement waterfall returns value to the borrower. When a particular DLC or multisignature covenant restricts one sequence, implementation constraints become relevant legal facts. A wallet interface that displays a single free balance while creating conflicting senior rights conceals a material risk from one or both counterparties.

At the edge of this problem is custodial Bitcoin. Two users may each see “1 BTC.” One controls keys that can spend a UTXO; another holds an unsecured contractual promise from an exchange. The second user may possess a valuable claim, yet an insolvency can treat the two differently. Our earlier Bitcoin chapter states the required distinction. The barzakh principle prevents a valuation equality from dissolving a property-law difference.

9.6 The false barzakh: a fee disguised as a sale

Suppose an institution lends 1,000 dollars and demands 1,100 dollars on a fixed date. It then adds an internal invoice for a fictional asset, making the borrower simultaneously buy and resell that asset without possession, price risk or use. In every reachable external state, the borrower has a fixed principal obligation with an added lender benefit. The invoice creates a name. The institution must identify a change in enforceable rights before the invoice can change the ruling.

By contrast, a lender may pay a real third-party service provider to safeguard collateral. A separately documented charge for a verifiable service has a different possible legal justification. The charge’s amount,

beneficiary, method of computation and dependency on the credit term need to be examined. Labeling a loan premium “minting fee” or “administration” cannot make it payment for service by definition. Nor does proportional pricing, taken alone, prove that every fee is interest: its actual basis and obligations must be examined.

A practical diagnostic compares three counterfactual transactions. In the first the customer borrows the money without purchasing an asset. In the second the asset is purchased with no loan. In the third the lender finances the asset acquisition. If the purported sale service vanishes when the credit is removed, its independence deserves scrutiny. If genuine delivery, warranty and asset risk exist in the second case, those features give a substantive explanation of the sale markup. This counterfactual test is our proposal, rather than a quoted madhhab rule.

9.7 The barzakh of enforcement

The boundary can appear years after signing. Imagine a loan protected by a put option on BTC. The option promises enough cash at maturity to repay the advance. A separate oracle contract liquidates the pledged BTC at an interim price before the option pays. The expiry payoff of BTC plus put still looks like a protected floor on paper. The borrower has nevertheless lost the asset. The missing fact is the priority and timing of enforcement. It belongs in Φ, and its omission defeats any proof that the hedge protects continuing ownership.

A residual-equity condition makes the injury measurable. Upon lawful enforcement, legitimate senior debts and evidenced costs are deducted from collectible proceeds. Remaining value is owed to the lawful residual claimant. If a liquidator transfers all proceeds to itself when a smaller obligation would satisfy the debt, the event exposes a separate injustice. The collateral-surplus rule in Sīstānī’s *rahn* discussion provides a source-specific comparator [S55]. The exact rights of a Bitcoin vault still depend on its covenant, not on an analogy alone.

9.8 How this becomes a fatwa method

Every proposed fatwa comparing two financial instruments should carry a *barzakh schedule*. It identifies the contracts’ versions and parties, states the limited kind of equivalence being asserted, lists material risks and rights, records a counterexample search, and names the recognized legal warrant for every surviving difference. It closes with the legal consequence and the facts that would reopen the case.

A strict *mutaqlid* can draw a warrant from more than one school while keeping their origins legible. For example, the source-specific murābaḥah condition may come from an Academy resolution that cites traditional law; a collateral-residue condition may be taken from a named Jaʿfarī jurist. The new school must explain why it adopts both, including the choice it makes when their scopes or priorities collide. A proof of logical consistency is one stage of that work. It never impersonates an ijmāʿ.

This method also puts the author at risk of losing an attractive claim. If a so-called Islamic fee has no independent service, the charge may fall under the anti-ribā premise adopted elsewhere in the book. If a future settlement cannot survive the margin engine, the attractive hedge equation will not certify the instrument. If a conventional transaction carries genuine ownership and equitable terms that an Islamic-branded transaction lacks, its better treatment of affected people becomes a fact the Muʿtazilī account of justice must confront. The criterion is meant to discipline every side of the dispute.

9.9 Proof obligations and source audit

B1, event completeness. Enumerate the contract events considered material and provide an adversarial process for adding omitted states. **B2, path witness.** Construct one executable path showing the change in title, debt, remedies, or creditor rank. **B3, authorized materiality.** Record the specific legal rule that treats the difference as relevant. **B4, false-bridge rejection.** Demonstrate that renaming a loan premium while keeping its

obligations fixed does not alter the modeled debt. **B5, enforceability.** Test the actual settlement scripts and side agreements, including insolvency and competing claims.

The relevant source constraints are the Academy's 1988 murābaḥah resolution [S07], its 1990 installment-sale ruling [S68], Qurʾān 4:29 and 2:275–280 [S01–S03], and the earlier Bitcoin-custody and Jaʿfarī collateral discussions [S51–S55]. The *barzakh al-ḥukm* framework, the event witness, and the extensionality proposal are original constructions. Their ability to settle a disputed fatwa depends on source authentication and a competent legal judgment about which features of the contract matter.

Part III. Mathematics of the Fatwa

10. Takāfuʾ al-Āthār: The Equivalence Principle

There are at least four questions concealed in the assertion that two financial transactions are equivalent. Do they pay the same amount at a designated date? Do they distribute the same cash flows during every relevant state? Do they leave each party with the same rights, creditor priorities and exposure to default? Would the same party receive the same legal remedy when performance fails? The first can often be answered by a pricing formula. The last belongs to the analysis of enforceable property.

Let a contract C and complete admissible history ω define $\Phi(C,\omega,t)$, a vector of ownership, possession, monetary obligations, exercise rights, senior claims, enforcement powers, information entitlements, and remaining remedies at time t. The vector is not assumed observable by a market ticker. It is specified through the transaction documents, actual code, governance permissions, and the jurisdiction that would hear a dispute.

We can distinguish $C_1 \sim_{cash} C_2$ when cash-flow numbers match, $C_1 \sim_{terminal} C_2$ when terminal wealth matches, and $C_1 \sim_{rights} C_2$ when the material rights vectors match throughout a defined domain of histories. These relations become stronger as their tests become more demanding. Their equivalence also depends upon fixing the parties and the numeraire: the same dollar sum can be owed to different persons, at different times, with different seniority.

10.1 A theorem with an honest premise

Suppose a legal rule H has a proved **material extensionality property**: whenever all legally material attributes of two contracts coincide, H assigns them the same status. Then $C_1 \sim_{rights} C_2$ implies $H(C_1) = H(C_2)$. This is a logical consequence of the chosen rule. It is not a demonstration that the extensionality premise is a classical consensus or that every legal difference can be converted into a payment.

The method therefore contains an explicit barzakh test: an advocate of divergent judgments names a specific right r, relevant state ω, and accepted legal warrant w for treating the difference as material. The critic may show that the named difference is fictitious, impossible under the actual contract, or legally irrelevant under the adopted method. The debate then concerns something an observer can inspect.

A superficial treatment would try to calculate a number $d(C_1, C_2)$ and declare transactions equivalent below a chosen threshold. Such a metric can help direct research, but certain rights have categorical character. A bank's power to seize the borrower's land without hearing cannot be canceled by adding a small payment to a spreadsheet. A right to repayment before other creditors can matter decisively in bankruptcy while having nearly zero expected value in a historical sample.

10.2 Counterexample: the warehouse and the lender

The buyer signs two contracts promising $1,200 after a year. In one, a merchant has purchased goods for $1,000 and bears warehouse loss before onward sale; in the other, a lender advances the same money while the buyer owns the goods at once. The normal-state cash flows can match exactly. If fire destroys the goods during the interval before sale, the parties' rights and liabilities can diverge. A properly specified *murābaḥah* comparison must include that interval and the consequences of defect and late performance [S07, S84]. The name printed on the agreement contributes no theorem about title.

Another counterexample concerns a BTC customer whose exchange account displays 1.0 BTC while another person controls a native BTC output. The first may hold only an unsecured claim on a company in insolvency, while the second holds direct spending authority. These can trade at the same market price during ordinary operations. Their rights are neither equal in a custodian default nor exhausted by price quotations.

10.3 A contract is an executable state machine

For computational review, represent a contract by states and transitions. A state identifies asset title, unpaid debt, funded reserves, oracle state, time and parties' powers. A transition records its actor, proof of authorization, effect on balances, creation or discharge of claims, and a remedy if rejected. A *trace* is an allowed sequence of transitions.

Two protocols are behaviorally equivalent for a legal purpose only when the selected observable rights agree across relevant traces. This resembles bisimulation from computer science, though a formal protocol model must also account for external enforcement and competing transactions. A circuit that always returns the same terminal number in a toy simulation can still admit a second spend path with a different beneficiary. Reachability, not the writer's intention, is the issue.

10.4 The burden on analogical reasoning

A jurist applying *qiyās* identifies an established source case, the ruling attached to it, and an operative *ʿillah*. The new case inherits the ruling only if the legally significant cause is shown to hold and independent defeating conditions have been handled. Mathematical equivalence can strengthen the argument that a particular risk or right is present. It cannot choose the authoritative *ʿillah* on its own. Some schools impose narrower requirements on analogy and some reject the method in certain domains [S06, S12].

The proposal named *takāfuʾ al-āthār* places an epistemic burden on both sides. The jurist who allows a contract must prove its promised rights can be exercised in the expected adverse conditions. The jurist who prohibits a contract by analogy must explain why the relevant legal cause is instantiated. In the strongest version, a fatwa carries a source trace, an economic model, a legal-rights model, and an explicit list of counterexamples its proponent has checked.

This is the foundation for the later chapters on modal obligations and proof-carrying fiqh. Its contribution is to replace a quarrel over labels with an inspectable chain of questions. A precise failure can be reported without needing to declare the entire legal method worthless.

10.5 Original formal semantics and decision dossier

In the formal model a contract has a type, a collection of possible states, and observable consequences. A *source profile* supplies predicates it requires or forbids. Two profiles combine without dispute when they can be satisfied together in the case under review. The interpreter's chosen higher-order constraints form a separate predicate K.

For a proposed permissible contract, the certificate has the form

$$Cert(C) = Core(C) \wedge \left[Joint(C) \vee Reconciled(C) \right).$$

The first branch includes a witness satisfying all source restrictions that have been selected for the analysis. The second requires a bridge with an explicit proof that the core remains satisfied. Both branches carry provenance: source, exact proposition, interpretation, and scope. In legal prose, a fatwa must explain every contested step that the machine sees only as a supplied assumption.

A full implementation will also distinguish **defeasible** rules, which may be narrowed by context, from **hard constraints** that the reconstructed system treats as overriding. A simple conjunction cannot resolve an inconsistent set. We can use a minimal-unsatisfiable-subset report to locate the conflict, then test a bridge against fresh counterexamples. At no point should the system use classical explosion, whereby contradictory premises imply every proposition, to manufacture permission.

A decision dossier

For each instrument the proposed proof-carrying fatwa records a typed description of ownership, consideration, maturity, obligations, recognized property, default remedies, liquidation rights, oracle and counterparty assumptions, and relevant prohibitions. It produces three possible outputs: *supported under the chosen uṣūl*, *rejected under them*, or *undetermined because a fact or legal bridge remains open*. This is a sounder vocabulary than a green sticker reading “halal.”

The Lean files for this edition establish logical preservation properties, including that a joint source certificate satisfies its declared requirements and a bridge cannot prove a conclusion without satisfying the nominated core. They do not import classical Arabic texts into Lean’s kernel; source-critical steps remain human evidence. The actual executable version therefore supplies a proof checker **and** a bibliography.

11. The Payoff Is Not the Contract: A Quantitative Interlude

Replication, state prices, market completeness, and the mathematics of financial equivalence

A quantitative interlude. The argument in sections 1–11 is financial mathematics. Its instruments are prices, strategies, probability measures, clearing rules, and contractual state machines. Section 12 translates the findings into a short research agenda for jurisprudence. All examples are hypothetical, use stated assumptions, and make no claim about executable market prices.

11.1 A portfolio is a contingent claim

A future dollar received in one state of the world can have a different value from a dollar received in another. The modern quantitative theory of finance begins by making this observation mathematical. Let Ω be a finite set of possible states at maturity T. A *claim* is a function

$$X : \Omega \to R,$$

where $X(\omega)$ is its terminal cash payoff in state ω. For n traded assets, write the state-dependent payoffs as columns of a matrix $A \in R^{m \times n}$, where $m = |\Omega|$. A static trading strategy $\theta \in R^n$ delivers

$$X_\theta = A\theta.$$

Claims lie in the image of A when existing assets can replicate them. If $rank(A) = m$, every contingent payoff is statically spanned in this one-period model. If the rank is smaller, some claims have no replicating portfolio. In a dynamic market one must add the available filtration, permissible strategies, transaction dates, and admissibility conditions before making a completeness claim. Harrison and Pliska developed this connection between trading strategies, stochastic integrals, and martingale representation in continuous trading [S105, S106].

This definition deliberately ignores identity, possession, remedies, and legal enforceability. It tells us what money a strategy would deliver once every promised leg has performed. Its power comes from this abstraction. Its danger comes from forgetting the abstraction afterward.

Three questions can now be asked without reference to the name of any contract. Is X attainable? What price precludes arbitrage among the traded instruments? Does the strategy remain implementable when prices follow the adverse path instead of arriving directly at the terminal state?

11.2 The two-state market: replication by borrowing and stock

Take an economy with one non-dividend-paying share worth $S_0 = \$100$ and a one-period gross risk-free return $R = 1.05$. The share will be worth either $S_u = \$130$ or $S_d = \$80$. Consider a European call with exercise price $K = \$100$. Its maturity payoff is

$$C_T = (S_T - K)^+ \equiv \max(S_T - K, 0).$$

The two payoffs are $C_u = 30$ and $C_d = 0$. A portfolio of Δ shares and B_T dollars of terminal bond cash satisfies

$$130\Delta + B_T = 30, 80\Delta + B_T = 0.$$

Subtracting the equations gives $\Delta = 30/50 = 3/5$. Consequently $B_T = -48$. Replication requires buying 0.6 of a share and borrowing the present value of 48, namely $48/1.05$. Its date-zero cost is

$$C_0=\frac{3}{5}(100)-\frac{48}{1.05}=\frac{100}{7}\approx \$14.286.$$

The portfolio delivers precisely 30 or 0. If its price and the price of the otherwise identical call diverged while all instruments remained tradable on the stated terms, a trader could buy the cheaper side and sell the dearer one. The profit is secured by their matching terminal payoffs. Black and Scholes' 1973 paper and Merton's companion treatment place this replication argument at the centre of option valuation [S103, S104].

The *risk-neutral probability* in this economy solves

$$S_0=\frac{p\,S_u+(1-p)S_d}{R},\quad p=\frac{R\,S_0-S_d}{S_u-S_d}=\frac{1}{2}.$$

Then $C_0=\left[p\,C_u+(1-p)C_d\right)/R=100/7$. The probability p is a valuation weight constructed from traded prices. Nobody has estimated a fifty-percent chance of an actual market rally. The distinction between physical probability and a risk-neutral pricing measure is fundamental.

The expression *equivalent payoff* therefore has a precise meaning in this example: equality of $X(\omega)$ in the two selected states. The actual call and the financed-share portfolio still have different counterparties, funding arrangements, and execution rights. The financial model has chosen to set these particulars aside.

11.3 State prices and the boundary of market completeness

In a finite arbitrage-free economy, nonnegative state prices π_ω give a linear pricing rule for attainable claims,

$$V_0(X)=\sum_{\omega\in\Omega}\pi_\omega X(\omega),\pi_\omega=\frac{q_\omega}{R}$$

when a one-period risk-neutral probability vector q and a common bond return R are available. For the two-state market, both state prices equal $10/21\approx 0.47619$. The matrix of bond and stock payoffs has full rank two, so the call's price is unique in the frictionless model.

Add a third terminal state without adding a traded asset. The stock now pays 130, 100, or 80, while a bond paying 105 remains the only other security. A call struck at 100 pays $(30,0,0)$. Were this payoff spanned by a share position and a bond position, its zero payoffs at stock prices 100 and 80 would force the share position to be zero. Its payoff at 130 would then also vanish. The call is *unspanned*.

Two distinct positive risk-neutral probability vectors satisfy both traded-asset prices:

$$q^{(A)}=(0.30,0.50,0.20),q^{(B)}=(0.40,0.25,0.35).$$

Both sum to one, and both assign the share an expected terminal value of 105. Yet they assign the call two different discounted expectations:

$$V_0^{(A)}(C)=\frac{0.30(30)}{1.05}=\frac{60}{7}\approx \$8.571,$$

$$V_0^{(B)}(C)=\frac{0.40(30)}{1.05}=\frac{80}{7}\approx \$11.429.$$

Both valuations are consistent with the prices of the share and bond. Additional traded instruments, preferences, information, or a pricing convention would be needed to choose between them. The financial market has become incomplete. The first fundamental theorem connects suitable no-arbitrage conditions to equivalent

martingale measures; a uniqueness result requires stronger assumptions, including market completeness in the standard setting [S105, S106].

The general lesson is about identification. Observing two parties' prices does not reveal a unique valuation of every new promise. State-price methods, developed further by Breeden and Litzenberger through option prices, show how much information about contingent claims market prices may contain [S112]. A single price does not disclose which rights a buyer will retain during a counterparty default.

11.4 Static replication: parity, forwards, and collars

For European options on the same non-dividend-paying underlying, with the same strike K and maturity T, the elementary identity is

$$\left(S_T - K\right)^{+} - \left(K - S_T\right)^{+} = S_T - K.$$

At expiration a long call and short put have the cash payoff of a forward purchase struck at K. If both options are priced consistently and a default-free cash account earns the continuously compounded rate r, their initial prices satisfy *put–call parity*:

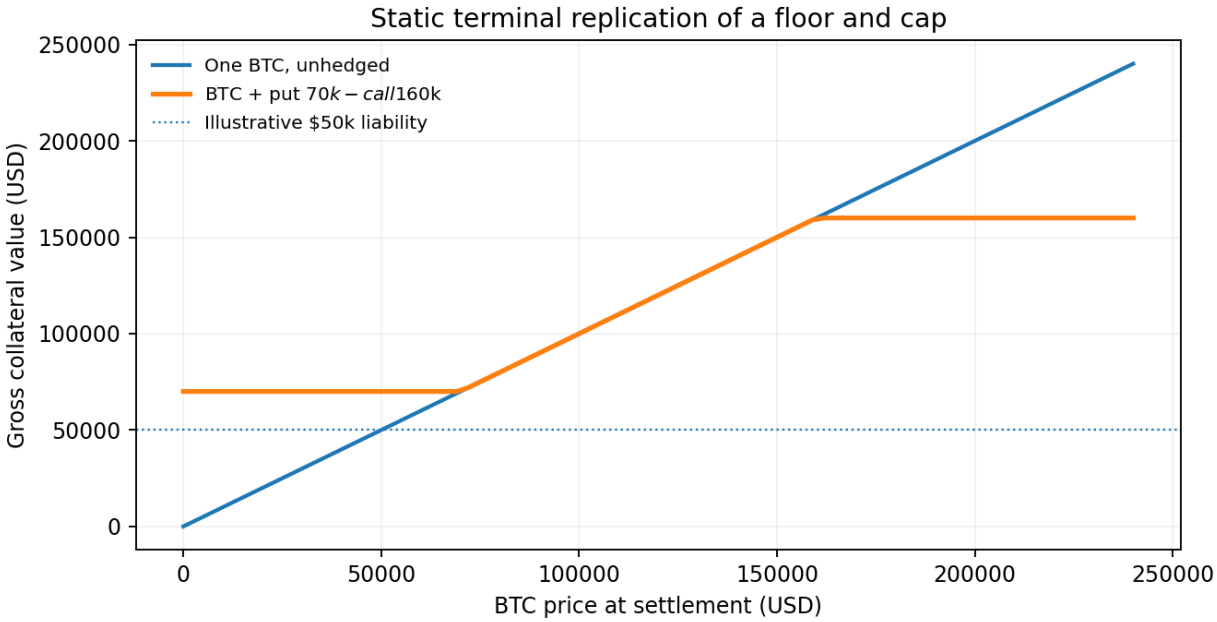
$$C_0 - P_0 = S_0 - K\,e^{-rT}.$$

A long call, short put, share holding, and cash account can therefore construct synthetic positions in a complete frictionless market. The equation assumes common exercise terms and a consistent discounting convention. Settlement permissions and delivery arrangements are part of the institutional implementation of the synthetic strategy. A European call-plus-short-put combination has no contractual authority to transfer the underlying share before expiry merely because the corresponding forward payoff is familiar.

A protective *collar* has a similarly exact terminal identity. Hold one share, buy a put at K_p, and write a call at K_c, with $K_p \le K_c$. Excluding premiums and counterparty default,

$$V_T$$

With a floor of $70,000$ and cap of $160,000$, the gross terminal collateral value is $70,000$ at a bitcoin price of $40,000, and $160,000$ at a bitcoin price of $200,000. A $50,000 obligation can be subtracted from that value under a specified settlement waterfall. The price of the purchased put usually differs from the premium received for the written call; volatility skew, expiry, funding, and bid–ask spreads determine the actual net cost. The attractive flat payoff graph represents promises that must remain funded until performance.



Terminal payoff of a collar under perfect performance. The plotted values exclude premiums, fees, default and early closeout.

11.5 Dynamic replication and the assumptions hidden in a differential equation

A call can also be replicated dynamically in the continuous-time Black–Scholes model. Suppose a non-dividend-paying stock follows

$$dS_t = \mu S_t\,dt + \sigma S_t\,dW_t,$$

where $\sigma > 0$ is constant and the cash account compounds at constant rate r. Itô's formula gives the infinitesimal change of a sufficiently smooth derivative value $V(t,S)$:

$$dV = \left(V_t + \mu S V_S + 1/2\,\sigma^2 S^2 V_{SS}\right)dt + \sigma S V_S\,dW.$$

A portfolio holding $\Delta = V_S$ shares offsets the diffusion term in the derivative's marked value. Under continuous self-financing trading and common borrowing and lending conditions, the resulting no-arbitrage relation is

$$V_t + 1/2\,\sigma^2 S^2 V_{SS} + r S V_S - r V = 0.$$

The mathematical success rests on the admissibility of a continuously adjusted hedge. Transaction costs, finite trading intervals, jumps, inability to short, and heterogeneous funding rates can each alter the result. For a small move over a finite rebalancing interval, the second-order exposure remains approximately

$$\Delta V - V_S \Delta S \approx V_t \Delta t + \frac{1}{2} V_{SS} (\Delta S)^2,$$

with financing and carry accounted for separately. Gamma V_{SS} therefore matters even for a delta-neutral strategy. The formula describes the leading local terms, rather than a guaranteed bound for an arbitrary jump or an exchange shutdown.

The model's regularity assumptions are precisely why replication arguments must be accompanied by trading conditions. A proof of the Black–Scholes partial differential equation gives an arbitrage relation under its hypotheses. A real exchange can prevent the delta rebalancing that makes the relation economically attainable.

11.6 Forwards, margined futures, and perpetual swaps

A forward contract has a terminal settlement obligation. A standard exchange-traded future has margin and regular variation settlement. A perpetual swap has no contractual maturity and commonly uses a funding mechanism to influence its trading price relative to an index. These instruments can provide similar exposure, while carrying different cash demands through time. The U.S. Commodity Futures Trading Commission describes futures margin as a performance bond followed by mark-to-market obligations [S107]. CME's description of the basis documents the residual uncertainty in a cash-versus-futures hedge [S108].

With a continuously compounded cash financing rate r, proportional storage cost u, and convenience yield y, a standard frictionless commodity cost-of-carry formula is

$$F_{0,T} = S_0 e^{(r+u-y)T}.$$

The equation is conditional on financing and delivery assumptions. A specific Bitcoin financing arrangement requires its own borrow, custody, fee, and funding inputs. For exchange-traded futures, the timing of variation margin can create additional effects when cash rates are stochastic.

Take q bitcoins held in spot and an equal number of *linear* dollar-settled short futures. If the future is opened at F_0 and closed at F_T, while the spot is marked at S_T, the ending marked wealth from the two trading legs is

$$W_T = q\,S_T + q\left(F_0 - F_T\right) = q\,F_0 - q\left(F_T - S_T\right).$$

A forward with $F_T = S_T$ at final delivery gives the constant $q\,F_0$. If the hedge is unwound early, the residual basis $F_T - S_T$ remains. Adding transaction and funding flows produces an augmented wealth account; the clean identity by itself presumes the derivative survives and all settlements occur.

For a linear short perpetual swap marked at P_T and opened at P_0, let $F_{0:T}$ be the *signed* sum of funding receipts, and let $K_{0:T}$ collect fees and financing costs. Then

$$W_T = q\,P_0 - q\left(P_T - S_T\right) + F_{0:T} - K_{0:T}.$$

The reference index and traded perp must use compatible units. Funding may reverse direction; a short can pay it for a prolonged interval. Actual exchange products also differ in whether P&L is dollar-denominated, stablecoin-denominated, or inverse in coin units. A dollar hedge constructed with inverse contracts calls for a separate nonlinear payoff model. Research on crypto perpetual futures documents the significance of funding, basis, leverage, liquidations, and venue design [S111].

11.7 Minimum-variance hedging in an incomplete market

A financial exposure rarely has a perfectly matched futures contract. Suppose the change in a portfolio's value is ΔX and a hedge instrument changes by ΔF. A short hedge of size h produces

$$\Delta W = \Delta X - h\,\Delta F.$$

Assuming finite second moments, minimizing its variance gives

$$h^{\text{¿}} = \frac{Cov\left(\Delta X, \Delta F\right)}{Var\left(\Delta F\right)}$$

when $Var\left(\Delta F\right) > 0$. Differentiating the quadratic variance expression with respect to h proves the formula. The minimum residual variance is

$$Var\left(\Delta W^{\text{¿}}\right)=Var\left(\Delta X\right)-\frac{Cov\left(\Delta X,\Delta F\right)^{2}}{Var\left(\Delta F\right)}.$$

For an illustrative portfolio with variance 400, hedge variance 625, and covariance 350, the optimal hedge ratio is 0.56. Residual variance is 204, a reduction of $49\,\%$ from the unhedged variance. The remaining risk follows from imperfect correlation, and estimation error can worsen realized performance.

Minimum variance does not minimize bankruptcy probability when margin is nonlinear. Nor does it maximize the probability of retaining a particular asset through an extreme rally. Those questions require path-dependent constraints and an explicit liquidation model. The optimizing criterion belongs in the specification: variance, expected shortfall, survival probability, or the cost of maintaining a hedge until a fixed obligation matures.

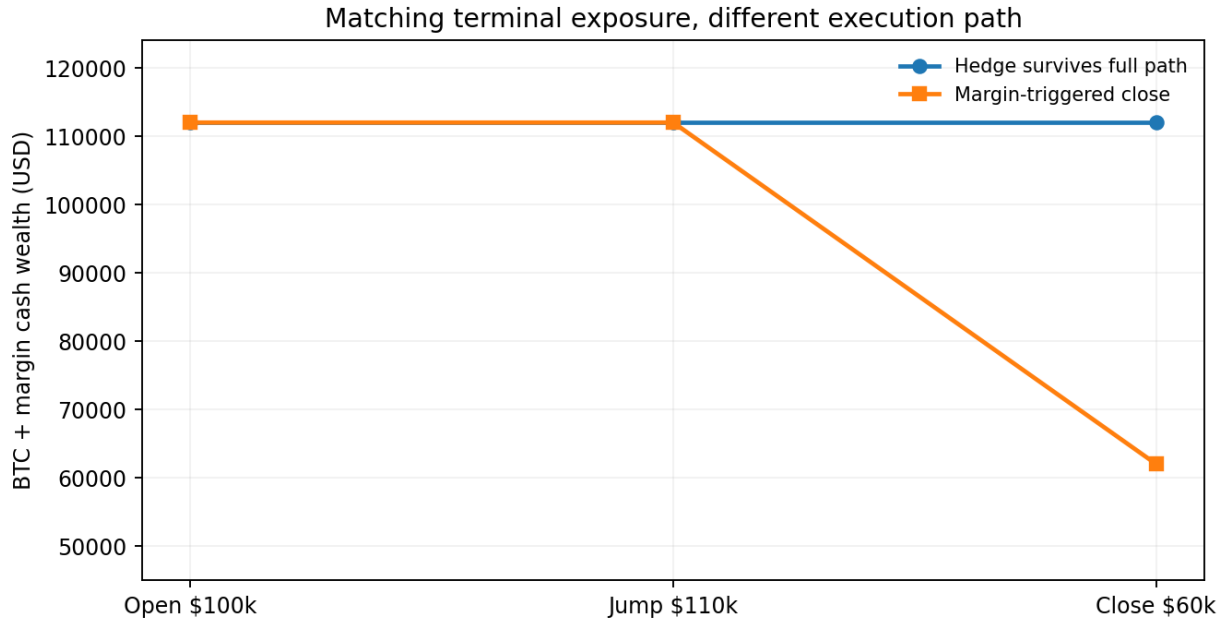
11.8 The margin trap: terminal replication fails along the path

Consider one BTC worth $100,000, held outside an exchange. The owner opens a linear short contract with the equivalent notional exposure, placing $12,000 of additional dollar collateral in a margin account. Maintenance margin is $5,000, and an adverse price mark may trigger a forced close if available collateral falls below that threshold. No additional margin can be posted. We assume zero basis, zero funding, no fees, and no counterparty default, so the only adverse mechanism is forced liquidation.

The path moves from $100,000 to $110,000 in one adverse mark, then to $60,000. The short loses $10,000 on the jump and has only $2,000 left, below maintenance; it is closed. The BTC is held throughout. Initial total marked wealth is $112,000, including the separate $12,000 margin cash. The short P&L shown in the table is already reflected in the margin cash and is never added a second time.

Event	BTC spot	Short P&L	Margin cash	Total marked wealth
Entry, hedge open	$100,000	$0	$12,000	$112,000
Price jumps to $110,000	$110,000	−$10,000	$2,000	$112,000
End at $60,000, short previously closed	$60,000	settled	$2,000	**$62,000**
Counterfactual: short survives until $60,000	$60,000	+$40,000	$52,000	**$112,000**

At the top of the jump, a still-open short and the spot holding offset each other’s price changes. Forced close removes that hedge precisely before the subsequent fall. The counterfactual surviving strategy gains $40,000 on the short over the entire period, yielding $52,000 of margin cash. The liquidated strategy ends with $2,000. The $50,000 difference arises from the timing of an enforcement rule. The path assumed immediate liquidation on the jump at $110,000, which is a test fixture rather than a prediction of an exchange’s actual execution price.



Illustrative wealth paths for maintained and prematurely closed hedges. Margin cash is included in both lines.

A terminal-payoff diagram that merely adds S_T to $F_0 - F_T$ will announce a fixed $100,000 BTC exposure before counting the separate margin reserve. It cannot describe the triggered liquidation without an extra state variable. The mathematical object to analyze is consequently a *stopped trading strategy*. If τ is the forced-close time, the hedge's gains stop at τ, while the underlying position continues to fluctuate. The claim is contingent on a trajectory, a margin rule, and access to replacement capital. The same terminal stock price can therefore imply different wealth outcomes for different price paths.

Field note: the basis trade when an exchange fails

From April 2021 through December 2022 I worked on Bitcoin-denominated basis and arbitrage strategies with seven-figure exposure. During the collapse of FTX we exited positions without a reported credit loss. That is a recollection from my professional record, offered as a bounded example rather than as a claim of exceptional foresight [S175]. The experience taught me to look at the location of the collateral before admiring the spread. A theoretically locked-in basis return ceases to be locked in when a customer cannot withdraw the proceeds needed to close it.

FTX supplies independently established evidence of the underlying institutional risk. The United States Department of Justice records the misappropriation of billions in customer funds and the subsequent fraud conviction [S174]. The algebra of a cash-and-carry trade remains sound under its assumptions. An exchange balance may be a claim against a failing institution. A funding rate can remain positive while a withdrawal gate stays shut. Replication therefore has a custody condition and a timing condition, as well as a payoff identity.

11.9 Funding, collateral, and the valuation of promises

A dollar written on a trading screen is a combination of an accounting entry and a claim against specific resources. Its economic value depends on collection. Suppose a platform reports $35,000 in self-custodied BTC, a $25,000 custodial claim, and a hedge worth $40,000 before considering counterparty risk. Its bookkeeping marks assets at $100,000 against $80,000 of dollar liabilities. If the custodial counterparty returns nothing and only $10,000 of the hedge can be collected, effective assets become $45,000. The modeled redemption gap is $35,000.

A simple realizable-assets test is

$$A_t^{real} = \sum_i \left(1 - h_i\right) V_{i,t} - K_t - L_t^{senior},$$

where h_i represents a haircut derived from eligible stresses, K_t actual settlement costs, and L_t^{senior} claims with priority over the liabilities being tested. Solvency at the chosen time and under the specified stress paths requires $A_t^{real} \geq D_t$. A protocol can use a stricter cushion, specified maturities and independently audited collateral commitments. Haircuts cannot be chosen to guarantee a favorable answer; they must have a modelled relation to liquidity, volatility, collectability, and enforcement.

In quantitative valuation, funding and collateral arrangements change a derivative's value. Piterbarg showed how the assumption of one universal borrowing and lending rate breaks down once collateral contracts and funding markets enter the price equation [S109]. Valuation adjustments associated with credit, funding and margin call for models beyond the introductory replication economy. A fully collateralized derivative and an unsecured promise may have matching terminal contractual formulas while commanding distinct prices because their likelihood and timing of performance differ.

The balance-sheet distinction is important for synthetic dollars. A hedged coin is economically capable of stabilizing a dollar value across price states, conditional on hedge continuation. It does not create a dollar deposit at a bank. The specific token holder acquires an enforceable redemption claim, whose quality depends on vault rules, collateral segregation, seniority, custody and available exit paths. Dollars of payoff are a useful numeraire; dollars of obligation belong to a creditor hierarchy.

11.10 A model can become part of the market

Derivative models enter exchanges through margin schedules, risk engines, oracle rules, market-maker quotes and automatic liquidations. Donald MacKenzie's *An Engine, Not a Camera* treats financial models as participants in the social construction of markets, with pricing practices and model use altering the market they appear to describe [S110]. The quantitative implication is operational: a published risk measure can influence how intermediaries trade, changing realized price paths and stress correlations.

One simple feedback toy model writes

$$S_{t+1} = S_t + \epsilon_{t+1} - \alpha L_t, \alpha \geq 0,$$

where ϵ is an exogenous price innovation and L_t is forced selling after margin calls. If the margin rule increases L_t after prices fall, the feedback term can amplify a decline. The equation is illustrative, not an empirical law for Bitcoin. Estimating α and the liquidation policy would be a separate identification problem.

This is why a trading engine is part of the contingent claim. Its netting and bankruptcy procedures may determine whether a written option can be exercised. Its withdrawal gate may determine whether a nominally fungible balance can meet a deadline. Its published liquidation price may determine the final allocation of losses. Even an apparently passive oracle changes the contract when its output triggers collateral seizure.

Matt Levine, the Treasury basis trade, and the pleasure of a legal wrapper

Matt Levine's account of the Treasury basis trade turns a familiar financial absurdity into a precise teaching example. An investor wants exposure to government bonds with little cash committed. Futures supply that exposure within mandates that may restrict direct borrowing. A leveraged intermediary performs the financing and arbitrage. Several institutions have produced an economically familiar borrowing-and-bond position by distributing its legs into permitted legal forms [S181]. The interest for our purposes lies in the structure. A futures purchase can carry the economic risks of a financed bond position while remaining a different contract with a different margin regime and creditor chain.

That observation should make the lawyer uncomfortable in a productive way. It is possible to obtain comparable price exposure while changing who finances the position, when collateral can be seized, and what an insolvency court will honor. The payoff chart is almost insultingly simple. The set of people capable of enforcing claims against the assets is an intricate social document.

I spent 2021–2022 working on Bitcoin basis and arbitrage with seven-figure exposure. During the FTX collapse our positions were exited without a reported credit loss [S175]. My respect for a profitable spread depends heavily on the venue that must pay it. The equation enters the trade at inception. The question of enforceability often returns with the final withdrawal request.

11.11 Equivalence of outcomes, strategies, and enforceable histories

Financial equivalence comes in degrees. We can describe four relations without leaving mathematics.

Terminal payoff equivalence: $C_1 \sim_T C_2$ when their vector of promised terminal cash payoffs agrees for all states in a specified set Ω. This is the relation used in the two-state replication example.

Cash-flow equivalence: $C_1 \sim_{CF} C_2$ when the signed cash amounts to every named party agree at every specified date and state, including funding, fees and intermediate settlement. This relation contains much more information than a terminal payoff vector.

Pathwise wealth equivalence: $C_1 \sim_W C_2$ when both self-financing wealth processes agree on every admissible market path, with liquidation, partial performance and contractual exercise incorporated. A common terminal graph will often fail this stronger test.

Contract-state equivalence: $C_1 \sim_E C_2$ when the transitions also preserve control over property, creditor priority, default remedies, exercise powers and other specified rights. This can be represented by a labelled transition system

$$C = (Q, q_0, \Sigma, \to, \rho),$$

where Q is a collection of states, Σ contains events such as pledge, exercise, delivery, default and liquidation, $\to$ gives permitted state transitions, and ρ records cash flows and noncash rights. A suitably defined bisimulation between two systems establishes that they can match one another’s labeled moves while preserving the chosen observations. A cash-flow bisimulation preserves cash only; a rights-sensitive bisimulation must preserve the rights too.

The implication from a strong relation to a weak one requires aligned participants and observation maps. When the terminal cash projection is part of ρ, a rights-and-cash preserving bisimulation entails matching terminal cash observations for matched terminating histories. The reverse implication fails in the margin-trap example. The call-versus-stock-and-debt example fails rights-sensitive equivalence even though the final money vectors match in the model.

We can make this hierarchy falsifiable. To refute $\sim_T$, show a state with different terminal payoffs. To refute $\sim_{CF}$, provide a date and party with unequal cash transfers. To refute $\sim_W$, provide a permitted price path on which a hedge is stopped early. To refute $\sim_E$, identify a permitted event where ownership or remedies diverge. Numerical agreement under one simulation means the tested example survived. Formal proof of universal equivalence requires quantifying over all states and transitions admitted by the specification.

11.12 Translation into fiqh: what equivalence and analogy can prove

This chapter's financial mathematics has established a limited and useful conclusion: modern financial instruments can be compared without trusting their trade names. Replication supplies evidence about economic consequences, while explicit contract-state models reveal the conditions on which those consequences depend. The juristic translation has to preserve both results.

First question: what is the object of the rule? A forward claim, a loan balance, a share, an option and a warehouse receipt may have equal terminal cash payouts. The classical discussion of *māl*, debt, possession and lawful exchange identifies legally relevant attributes outside that payout. In an actual fatwa the jurist must establish which attributes are present. Financial pricing determines neither lawful title nor the authority to sell an abstract right.

Second question: where does the analogy hold? The proposed *mutaqlid fī al-uṣūl* can map a novel contract to a recognized precedent only after identifying the precedent's legally operative *ʿillah* and the admissibility of analogy under the selected school. Matching contingent payoffs is evidence of economic similarity. The two-state call and leveraged-stock construction demonstrate why payoff equality alone cannot settle the legal cause of a ruling. A source may care whether a financier bore inventory loss, whether a creditor's entitlement arises from *qard*, or whether the seller possessed the relevant asset. IIFA Resolution 40–41 makes seller possession and loss risk material to its murābaḥah judgment [S84].

Third question: is the hedger purchasing an enforceable service or merely a number on an oracle screen? The margin-trap witness is a new factual input for the *gharar* inquiry. A promised hedge can be well defined at maturity and systematically unavailable when needed. The 2018 IIFA resolution recognizes wealth-preserving hedging as a legitimate objective while maintaining independent requirements for lawful contractual mechanisms and opposing sales of purely abstract option rights [S113]. The opposing Malaysian treatment of some call warrants remains a distinct authority that must be examined on its own scope [S10].

Fourth question: does a financing cost represent a legal debt premium? The synthetic forward may require borrowed cash even though it replicates a call's payoff. The equations establish the need for the cash position. The legal inquiry turns to the actual lender, repayment promise, stipulated benefit and risk allocation. A margin deposit that serves as a performance bond has a different economic function from a conventional interest-bearing loan, although the specific venue can combine margining with lending or financing payments. The CFTC's description establishes the former instrument's operational purpose [S107]; the ribā analysis still needs its own sources.

Fifth question: does a distinction survive a serious counterfactual? Suppose two murābaḥah and cash-loan structures look similar. Introduce the warehouse fire before resale, then debtor insolvency, then a title defect. A proponent who says the forms are legally different can point to the changed rights under one of these events. A proponent who says the names disguise identical financing must show that the asserted differences are absent in the actual implementation. This is the proposed *barzakh al-ḥukm* tested with the quantitative chapter's state-space method.

The research translation can be made explicit:

Quantitative result	Evidence supplied to the jurist	Distinct issue for authorized analogy
Exact option replication	Equal modeled terminal payouts	Debt financing, actual title and asset delivery
Two risk-neutral measures	Market incompleteness and a price range	Whether the sale subject is an enforceable financial right
Put–call parity	A synthetic forward payoff	The authority to defer exchange and sell the relevant right
Stopped hedge after margin liquidation	A path where protection fails	Gharar in performance, enforcement and

Quantitative result	Evidence supplied to the jurist	Distinct issue for authorized analogy
		disclosure
State-machine equivalence	Matching rights over defined histories	A sourced *ʿillah* and a recognized inference method

The fatwa dossier therefore needs two separate certificates. A **financial certificate** records the asset and liability payoffs, the funding model, replicating portfolio, margin states, failure paths and residual claims. A **jurisprudential certificate** identifies the authenticated source propositions, the adopted hierarchy of authority, the operative legal reason, and the application of that reason to the recorded rights. The proposed equivalence principle applies at the level of legally material contract histories. A derivation that relies on an invented legal bridge must say so. The historical scholars are entitled to their own positions when that bridge departs from their doctrine.

No price equation determines which source enjoys authority. No juristic label changes a proven payout identity. A complete examination needs both kinds of work, joined by an explicit statement of what the analogy preserves.

Quantitative source notes and reproduction

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[S113] International Islamic Fiqh Academy, Resolution 224 (8/23), “Hedging in Financial Transactions: Principles and Rulings,” 1 November 2018 (official English entry dated 11 November), https://iifa-aifi.org/en/33127.html. Independent fiqh boundary used only in section 12.

Reproducible numerical fixtures, exact rational checks, and graphics accompany this chapter in quant09_verify.py and figures/quant09_*.png. Their correctness is limited to the explicitly stated models; the formal and legal conditions above remain independently examinable.

12. The Sovereign’s Balance Sheet: Central Banks, Pegs, and Capital Controls

Central banking, currency pegs, capital controls, and the political economy of convertibility

12.1 The window at which money becomes a promise

A merchant has been paid in the national currency for a shipment of rice. Its invoice to the supplier is denominated in dollars. The central bank announces that ten units of local currency are worth one dollar. The merchant has one million units in the bank and a dollar obligation of $100,000. According to the posted rate the numbers match. A cashier explains that only $20,000 can be purchased this month, and the remaining purchase requires administrative permission. Across town, a politically connected importer receives approval to convert the entire sum. At the unofficial exchange counter, the dollar costs twelve units.

The announced price of a dollar is one piece of the contract. The right to receive one is another. A peg is a set of fiscal, monetary, legal, and administrative institutions whose promises are tested at the conversion window. That window may be an actual bank counter, the central bank’s foreign-exchange facility, a commercial-bank payment network, or a stablecoin issuer’s redemption API. Each creates a different relation between a unit of account and an enforceable property claim.

The quantitative chapter preceding this one showed that identical terminal payoffs can conceal different paths of loss and control. Monetary policy generalizes that observation. A state’s money has a unit of account, a legal status, a settlement system, and an issuing balance sheet. Its apparent stability is produced by continuing transactions. When the required settlements cannot be executed, the external exchange rate changes, counterparties are rationed, or some other party bears a loss.

The aim here is to analyze those mechanisms on their own financial terms. The final sections return to the relevant fiqh questions: money as *thaman*, exchange as *ṣarf*, repayment as *dayn*, state authority, and the legal analogy between a sovereign peg and a privately issued synthetic dollar.

12.2 Three issuers, three kinds of liability

Money circulates in several layers. A central bank issues settlement balances and, in many jurisdictions, banknotes. Commercial banks issue deposits owed to customers and settle net obligations through claims on the central bank. Private issuers can create dollar-linked tokens by accepting reserve assets or a collateralized exposure. The Bank of England explains that bank lending creates deposits and that deposits are commercial-bank liabilities, while the central bank shapes financing conditions through monetary policy [S114].

For a stylized central bank, write a marked-to-market balance-sheet identity:

$$E_t R_t + D_t = H_t + L_t + K_t.$$

Here R_t is foreign reserves measured in anchor-currency units, E_t is local-currency units per anchor unit, D_t consists of domestic assets, H_t is the monetary base, L_t represents other liabilities, and K_t is net worth. Accounting identities fix neither the market value of reserves during a crisis nor the legal priority of claims. They make it possible to ask those questions.

A commercial bank can credit a customer’s deposit at the same time that it books a loan asset. The customer’s deposit is spendable according to the bank’s rules and payment infrastructure. Its legal strength depends on bank solvency, access to liquidity, applicable protections, and resolution arrangements. The deposit is a promise of payment within an institutional network.

A fully reserved token issuer takes $100 in permitted assets and issues 100 units promising one dollar for each unit. Its nominal reserve ratio is 100%. The promise's value is affected by the location and availability of reserve assets, redemption eligibility, payment-system access, bankruptcy remoteness, and the timing of withdrawal. A protocol using derivatives for stabilization is a different balance sheet: it can display an offsetting hedge while still exposing holders to margin liquidation, counterparty failure and insufficient collateral [S119, S121].

It is tempting to describe all three arrangements as a dollar. The relevant claims belong to different debtors and settle through different procedures. A monetary token can have an excellent market price and an inferior legal claim, just as a deposit can circulate at par through ordinary times while presenting distinct insolvency remedies.

12.3 The impossible trinity and the cost of fixing a price

Consider a small open economy. It may seek a fixed exchange rate, freedom for capital to enter and leave, and an independently chosen domestic interest-rate policy. With mobile capital, a durable peg ties the domestic monetary stance to the anchor's monetary conditions. The familiar impossible trinity is a constraint on simultaneous policy commitments, rather than a verdict about which institutional choice is virtuous. An August 2026 IMF operational guide makes the connection explicit and describes currency boards, crawling pegs, bands, foreign-exchange intervention and reserves [S115].

Let E_0 be local currency per dollar, i_d the domestic one-year funding rate, and i_f the dollar funding rate. Under unrestricted access to deposits and forwards, no default, no transaction costs and comparable settlement rights, covered interest parity implies

$$F_{0,1} = E_0 \frac{1+i_d}{1+i_f}.$$

At an exchange rate of ten domestic units per dollar, with domestic funding at 8% and dollar funding at 4%, the one-year forward is approximately 10.3846 domestic units per dollar. A central bank may credibly peg the *spot* rate at ten while the forward rate differs. The forward differential compensates the financing differential under the model assumptions. A derivative's forward premium therefore cannot be treated as proof that its issuer has promised spot depreciation.

If a government fixes the spot rate and demands independent cheap credit while citizens may move funds freely, the banking system can face persistent outflows. The state may sell reserves, raise rates, adjust its budget, permit exchange-rate movement, or regulate cross-border flows. The mix changes who can transact and at what cost. Sterilized foreign-exchange intervention can support a policy target for a time while increasing quasi-fiscal losses. Monetary autonomy under a peg therefore has a funding and reserve cost [S115].

Capital restrictions change the arbitrage assumptions. A household denied a dollar account cannot implement the two branches of the parity trade. The observed forward spread may include restrictions, liquidity premia, credit risk, tax and settlement uncertainty. In these circumstances, equality of quoted prices alone is a poor measure of economic equivalence.

12.4 Reserve adequacy and the mathematics of a run

A currency board promises exchange at a fixed conversion ratio under a restrictive issuance rule. Classical arrangements typically maintain foreign reserves covering the monetary base, with additional buffers in some cases. The IMF describes the resulting reduction in discretion and lender-of-last-resort capacity [S115]. This is stronger than a central bank merely announcing a preferred rate, though the exact rule varies by jurisdiction.

Let R_0 be liquid, eligible dollar reserves; let M_0 be the local-currency liabilities eligible for redemption; and let $\acute{E}$ be the domestic-currency-per-dollar conversion rate. A necessary simplified full-redemption test is

$$R_0 \geq \frac{M_0}{\acute{E}}.$$

Suppose a facility holds 80 million in available dollars, issues one billion local-currency units, and promises ten domestic units per dollar to every holder without senior exclusions. Full conversion would require 100 million. The shortfall is 20 million. The market price may trade at the official quote for a time, while the universal conversion promise already fails the simple simultaneous-redemption test. A narrow currency-board claim must specify which liabilities are covered and which foreign assets qualify as reserves. Deposits of commercial banks are outside some monetary-base definitions, and a central bank’s legal mandate differs from a token issuer’s contractual promise.

The reserve stock evolves through receipts, intervention, interest, valuation changes and transfers:

$$R_{t+1} = R_t + I_t - O_t + V_t.$$

If this facility pays out 30 million at the official rate, it retains 50 million. A subsequent request for 60 million cannot be met in full, even with zero settlement costs. The authority can ration, suspend, borrow, devalue or obtain additional reserves. Each produces different rights for the earliest and latest redeemers. Their relative access becomes a central distributive question.

For a private stablecoin, the Financial Stability Board calls for robust redemption rights and transparent stabilization arrangements, while the Basel Committee’s cryptoasset rules state specific redemption and disclosure conditions for particular prudential classifications [S120, S121]. These standards concern supervised financial structures. They supply useful technical tests without resolving the Islamic legal status of any particular instrument.

12.5 Seigniorage, monetary income and the hidden allocation of losses

Issuing currency changes the issuer’s assets and liabilities. If the public accepts non-interest-bearing liabilities while the issuer holds productive assets, their return can finance public functions after issuance, operating and stabilization costs. Interest-bearing central-bank liabilities, losses on domestic securities, foreign-exchange interventions, and capital impairments may reduce or reverse that income. The return on a new note is not automatically a windfall equal to its face value.

Inflation also redistributes purchasing power through nominal balances and debts. If a retiree holds a fixed cash balance through a general rise in prices, its purchasing power falls. A government with outstanding nominal obligations may obtain a different real repayment burden. The incidence is shaped by who holds cash, who owes nominal debt, wage adjustment, market power and access to hedging. These mechanisms can be estimated, and they resist a simple story in which every change in the price level benefits the same class.

The distinction matters for the moral vocabulary of the book. A state can use monetary financing during a collective emergency, carry out transparent fiscal transfers, and provide critical payment liquidity. It can also impose a poorly disclosed inflationary burden on households that have few means to diversify. A legal judgment needs the institutional purpose and the distribution of harm, as well as the nominal issuance rule.

The government’s power to create legal-tender money has a different legal basis from a private lender’s entitlement to repayment with interest. That difference deserves close examination under *mutaqlid fī al-uṣūl*. It offers a basis for considering public monetary functions separately from a contractual *qard* between identifiable parties.

Field note: treasury accounting before monetary theory

I spent 2015–17 working on OmniLayer treasury operations, including repairing accounting records and recapitalizing an early token treasury. The lesson was less glamorous than the issuance technology. A token balance on a public chain, a cash balance at a business, and an obligation owed to a counterparty are different objects. It took ordinary accounting to keep their relationships intelligible. Tokens could move instantly while records and obligations required slow reconciliation [S175].

Central banks and stablecoin issuers operate on vastly different scales, yet their promises invite an analogous question. Which line of the balance sheet is available for redemption, and which belongs to another claimant? A money issuer can create an elegant liability without acquiring matching realizable assets. The experience of a much smaller treasury reinforces the need for separate ledgers, independent reconciliation, and transparent seniority.

12.6 Capital controls and the hierarchy of convertibility

Capital controls include taxes and quotas on cross-border flows, restrictions on foreign-currency accounts, requirements to surrender export earnings, limitations on dividend repatriation, and administrative approval for outward transfers. Governments deploy such measures to manage external shocks, financial instability, reserve shortages and sudden stops. The IMF's 2022 revision of its Institutional View explicitly accommodates certain preemptive measures addressing foreign-exchange balance-sheet vulnerabilities, while retaining limits on their use and highlighting the need for macroeconomic adjustment [S116, S117].

There is an economic case for targeted restrictions. A banking system carrying short-term dollar debts while earning long-term local-currency assets can face a self-reinforcing demand for foreign currency. An abrupt run may prevent otherwise viable firms from completing payments. A temporary measure can give policymakers time to stabilize banks and reduce mismatches. In the IMF's supporting framework, such measures should be calibrated, transparent and as temporary as possible; governance costs and effects on small firms matter [S117].

The same instruments can assign privileged access to scarce dollars. Under a posted official price of ten local units, an approved importer pays ten. A small merchant prohibited from conversion may pay twelve in an alternative market or miss a delivery. The two merchants hold legally identical-looking domestic balances yet possess unequal conversion opportunities. A rationed peg introduces an additional state variable:

$$X_i(t) = \left(E_{posted}, A_i(t), Q_i(t), T_i(t)\right),$$

where A_i is approval eligibility, Q_i is the conversion quota, and T_i is the permitted settlement time for party i. Their effective foreign-exchange rights differ even when E_{posted} agrees. What had appeared to be an exchange rate becomes a rights-sensitive transaction.

A legislature may have statutory authority to restrict transactions. Whether a specific restriction is just requires a further analysis of necessity, proportionality, procedural review, exemptions for essential needs, public information and accountability for favoritism. In this proposed madhhab, property claims and legitimate collective interests enter one legal record. Their tradeoff must be argued from sources and actual conditions.

12.7 Central-bank liquidity and the sovereign lender of last resort

Banks can be solvent at long horizons while unable to meet an immediate surge in withdrawals. A central bank can offer liquidity against eligible collateral in the currency it issues. This may prevent disruptions to ordinary payments. Emergency lending changes collateral positions, public exposures and the eventual allocation of losses. Bank guarantees and deposit insurance add their own creditor-priority rules.

Under a foreign-currency peg, the issuer can create its domestic settlement asset while remaining constrained by the supply of internationally usable foreign reserves. This difference explains why a domestic lender-of-last-resort promise cannot by itself support unlimited dollar conversion. The same pattern appears in decentralized finance: a protocol might mint more units of its own token while remaining unable to deliver the dollars or BTC it has promised.

A well-designed stablecoin redemption mechanism therefore faces a liquidity problem distinct from its market-price target. The BIS's 2026 work emphasizes the need to consider claims on reserve assets, liquidity backstops, settlement finality and run dynamics in evaluating stablecoin systems [S119]. For the Islamic finance argument, liquidity support also raises the question of who absorbs an emergency loss. An indemnity, subsidy, capital injection, collateralized loan and purchase of distressed assets can deliver immediate liquidity through different legal contracts.

12.8 The synthetic dollar as a shadow exchange-rate authority

A synthetic dollar issuer may use BTC collateral and a short derivative position so that, under its pricing model, the dollar value of the combined portfolio remains nearly constant. For q units of BTC and a maintained short exposure with reference entry price S_0, the idealized gross portfolio satisfies

$$q\,S_t + q\left(S_0 - S_t\right) = q\,S_0.$$

The expression omits funding, trade execution, fees, liquidation thresholds, basis, custody, exchange default, and the issuer's own obligations. Those omissions explain why it is an accounting identity under a model rather than a guarantee of redeemability. Where collateral can be frozen or the derivative liquidated, a user may hold a claim that is correlated with the dollar but payable in a different amount or asset.

A fiat-backed stablecoin is closer to a narrow reserve institution. A crypto-collateralized synthetic dollar resembles a leveraged or hedged financial intermediary. An algorithmic coin that depends primarily on minting and burning its own risky supporting token carries yet another set of state-contingent claims. All three may display a price of $1 in a calm market. Their redemption liabilities and failure waterfalls demand separate proofs.

There is also an international dimension. A dollar token helps users pay foreign suppliers and preserve a familiar unit of account, particularly where local inflation or payment frictions are acute. Its adoption can alter capital flows and domestic banks' deposit base. The BIS's 2026 analysis examines how larger stablecoin use might contribute to dollarization and monetary-policy challenges for emerging economies [S118, S119]. A protocol that promises users independence from one sovereign may obtain a large share of its reserves and unit of account from another sovereign's money and short-term debt markets.

These are questions for the design of the Ḥanīfiyyah network state as well. A transnational treasury might operate BTC reserves, local-currency payment gateways, a dollar accounting unit and risk-sharing pools. Its users require a disclosed statement of which claims are native bearer assets, which are custodian liabilities, and which depend on continued hedge settlement. An autonomous network has to describe its dependencies in the same contract-level vocabulary used to scrutinize a central bank.

12.9 Quantitative comparisons: five monetary promises

The same one-dollar numerical quotation can attach to several different instruments. Consider a stylized one-dollar promise under each arrangement:

Arrangement	Principal mechanism	What must be checked in stress
Floating sovereign money	Market exchange rate, domestic settlement finality	Purchasing power, capital access, legal changes

Arrangement	Principal mechanism	What must be checked in stress
Fixed currency peg	Central-bank FX operations or currency-board rules	Liquid reserves, eligibility and adjustment power
Commercial bank dollar deposit	Commercial bank’s obligation, payment network	Liquidity, insolvency priority, resolution
Fully reserved dollar token	Issuer-held eligible reserve assets	Redeemer standing, custody, withdrawal timing
Synthetic crypto dollar	Collateral and short-risk position	Liquidation, hedge integrity, default and fees

A financial equivalence test first fixes the observation set. If it compares only the quoted unit price, all five can look alike. If it compares the authority to demand delivery of physical dollars or a transferable claim at a fixed time, they are likely to differ. If it includes capital-control events, redemption restrictions, reserve seizure and failed hedges, those differences become explicit.

A practical monetary stress certificate records the conversion rate, parties with enforceable access, reserve composition and liquidity horizon, permitted interventions, payment-finality rules, conditions of suspended redemption, and losses assigned in insolvency. Those details establish what the promise amounts to under adverse states. Price stability belongs in the certificate alongside the legally binding redemption terms.

A peg is a promise with office hours

One dollar on the screen may mean a Federal Reserve liability, a commercial-bank deposit, or an unsecured promise issued by a stablecoin company. The displayed number invites comparison. The opening hours of the redemption window, the order of creditors, and the reserve assets determine what the holder can actually obtain. A central bank can change its rules; an issuer may run out of collateral; a decentralized protocol may ask a liquidator to sell a user’s Bitcoin into the worst bid of the week.

When I worked on token treasury accounts, the tiresome work was reconciling claims with assets and finding the entries whose provenance was unclear [S175]. Monetary theory acquires a useful humility after a ledger refuses to reconcile. For a *ṣarf* or *qard* analogy, the fatwa needs a named obligor and a settlement path. A unit-of-account label is poor evidence of a completed payment.

12.10 Translation into fiqh: thaman, sarf, qard and public necessity

The 1986 International Islamic Fiqh Academy Resolution 21 classifies paper currency as legal money and applies the prescribed rules concerning ribā, zakāh, salam and other transactions [S122]. It therefore gives the book an identifiable institutional position on modern fiat money. It does not issue a blanket verdict about every central-bank action, currency peg or exchange restriction.

First legal question: what is money? A local-currency note, bank deposit, on-chain BTC output, issuer-backed token and synthetic-dollar claim present different kinds of possession and credit. The *mutaqlid* begins by specifying the operative right and identifying the school-specific legal basis for treating it as *thaman*, *māl*, or *dayn*. A bank’s ability to settle through central-bank money does not turn the customer’s claim on the commercial bank into the same legal object as a reserve balance.

Second legal question: what counts as currency exchange? A foreign-exchange transaction may engage *ṣarf* rules and its requirements for possession and settlement. An official quote cannot confer effective possession where the party has only a promise subject to discretionary approval. The financial model should record when each party obtains disposal rights, and the jurist should state the governing requirements of the school or institution cited. The same applies to stablecoin-to-dollar redemption and a BTC-backed dollar claim.

Third legal question: what does inflation do to debt? IIFA Resolution 42 of 1988 and Resolution 115 of 2000 state a norm of repaying fixed currency debts in the same currency rather than through pre-agreed price-

level indexation [S123]. Resolution 231 of 2019 discusses extraordinary hyperinflation and arrangements made through reconciliation, judicial settlement or arbitration, while rejecting a preset agreement to make the debt value-adjusted at the moment of contract in that exceptional discussion [S124]. These are narrower and more precise positions than the slogan that every depreciating currency makes all nominal debts illegitimate. The book's proposed theory of justice can ask whether its own adopted legal premises support different remedies, while presenting the Academy's ruling as the Academy's ruling.

Fourth legal question: when do public restrictions preserve wealth, and when do they consume it wrongfully? A general emergency rule supported by competent authority may protect payment systems and essential imports. A licensing regime that privileges insiders may deprive others of the same practical conversion rights without a defensible justification. The relevant Qurʾānic principles include the duty to render trusts and judge justly in 4:58 [S94], and the prohibition of wrongful consumption of property in 4:29. Those sources ground the moral inquiry; a legal conclusion about a particular capital-control statute requires more jurisdiction-specific and school-specific evidence.

Fifth legal question: when is a financial analogy legitimate? The proposed *mabdaʾ takāfuʾ al-āthār* can compare a sovereign peg and a stablecoin peg when they confer genuinely equivalent rights. The *barzakh al-ḥukm* requires an adversarial test for reserve control, conversion priority, enforcement, and authorization to create liabilities. If an issuer has a legal right to suspend redemption, a different party bears that power than in a genuinely unconditional bearer payment. The same price on a screen cannot close that question.

The *mutaqlid fī al-uṣūl* will require a monetary certificate and a juristic certificate. The monetary certificate records each issuer's assets, liabilities, redemption duties, policy levers and failure paths. The juristic certificate identifies how the accepted sources classify the object, regulate the exchange, rank the claims and define remedies for injury. Where the governing school disagrees with the proposed result, the disagreement remains part of the fatwa record.

The widow from our first chapter can then ask a concrete question. She may have received ten thousand units of a pegged currency, ten thousand units of an issuer-backed token, or a BTC position protected by a derivative. The denomination alone is insufficient to establish what she owns. The answer lies at the settlement window, in the legal remedies available when the price promise fails, and in the fairness of the order in which creditors are paid.

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13. The Modal Logic of Obligations

A contract does not merely announce what must happen. It describes events that might happen, powers that a party may exercise, and obligations that begin or end when a condition is satisfied. A person can owe a payment at maturity, possess an immediate right to cure an undercollateralized loan, and hold a contingent right to claim under a put. Ordinary propositional logic cannot express all these distinctions conveniently. Temporal and deontic modal formalisms provide a useful language, conditional upon a clear account of their semantics.

Let s be a contract state and $R(s,t)$ an accessibility relation specifying which future states the model permits. The expression $\Box P$ means that P holds in every reachable future state; $\Diamond P$ that some reachable state satisfies P. For a legal question, we also need explicit agents and rules. $O_a(P \mid c)$ states that under condition c an agent a is obligated to bring about P, according to the chosen normative interpretation. A financial protocol adds a transition relation for which events the software can execute. Logical possibility, technical executability, and lawful permission deserve separate symbols.

13.1 The duty that exists only after an event

A debtor promises to repay D at maturity T. An ordinary formulation is that if the contract is active, the debt remains due, and the maturity trigger occurs, then the debtor has a performance obligation. The obligation is not discharged by an internal accounting mark. It is discharged by an authorized transfer or recognized legal settlement. A put writer owes payment only when the exercise condition and contractual requirements are satisfied. A collateral holder's power to enforce is constrained by notices, priority and cure periods.

The formula $\Box\left(c \rightarrow O_a(P)\right)$ can be read as a requirement that the conditional duty attach in every modeled future state. Its usefulness depends on proving that the trigger itself is reachable. If a specification makes c impossible, the conditional obligation is vacuously true and protects nobody. We therefore add **non-vacuity**: for obligations presented as customer protection, establish a reachable trigger and a feasible performance route.

13.2 Safety and liveness are different legal interests

A safety requirement says that an unauthorized seizure never occurs: $\Box \neg SeizeWithoutWarrant$. A liveness requirement says an honest borrower who repays eventually has a route to receive residual collateral: $\Box(RepaidAndEligible \rightarrow \Diamond Released)$. The second claim needs assumptions about functioning settlement infrastructure, the availability of signers, chain progression, and whether a remedy can be exercised. A contract that freezes assets forever without stealing them can satisfy a narrow safety assertion and still fail the customer's rights.

A fully hedged BTC vault poses both duties. During the protected term, spot-only liquidation should be prohibited under the declared conditions. At maturity, verified put proceeds should flow through the waterfall, creditors should receive valid claims, and the borrower should recover the remainder. If the put writer defaults, a different transition becomes available. State-machine design must specify how the new uncovered exposure is disclosed and whether the borrower receives a cure window.

13.3 The K, D, T, B, 4 and 5 schemata

The accompanying Lean research suite models familiar modal axioms under stated conditions on accessibility. K expresses distribution of necessity over implication. D is obtained from a serial relation, T from a reflexive relation, B from symmetry, 4 from transitivity, and 5 from the relevant Euclidean frame property. These are results of modal mathematics. Classical Muslim jurists never adopted this list as the axioms of their schools. In particular, choosing an S5-like accessibility relation for a model of divine knowledge would require separate philosophical argument and is unnecessary for a bank contract.

A real credit agreement has asymmetric passage of time. A payment after maturity cannot generally undo yesterday’s missed installment. Accordingly, the reachability model for contractual histories is often temporal and not symmetric. Treating its relation as S5 for computational convenience could collapse distinctions upon which the legal judgment depends. The formalizer must choose the frame that fits the subject and name the additional hypotheses behind any modal theorem.

13.4 Rights persist, convert, and expire

Consider an option sold for a premium. At inception, the buyer acquires a conditional exercise power, and the seller assumes a corresponding duty. Exercise converts the buyer’s option into a performance claim. Settlement discharges that claim; expiration terminates the unexercised exercise power. A model can distinguish these stages with a transition type and prohibit the premium’s being counted twice as a still-owned asset after settlement.

For pledged BTC, title and power may separate. The borrower can retain the beneficial remainder while the creditor holds a conditional power of enforcement. A multi-signature custodian may possess operational veto power without an unlimited right to appropriate the collateral. A jurist cannot infer full ownership from the presence of a signing key. Nor should a program assume that possession of keys settles a stolen-property dispute.

13.5 The normative interface

The model therefore accepts legal facts through a typed interface: an authenticated source rule, a contract, a proven factual scope, a set of reachable transitions, and a proposed verdict. The proof assistant can check conditional theorems such as ‘every permitted liquidation satisfies the residual conservation rule’ once those assumptions and code are represented faithfully. A jurist must still decide what residual belongs to the borrower and which liquidation costs count as valid.

One objective of proof-carrying fatwas is a readable explanation of where these jobs meet. The legal ruling identifies duties. The protocol model tracks possible actions. A proof shows what the modeled system guarantees. An adversarial witness reveals precisely which clause, code path or legal premise defeats the claim. This permits meaningful disagreement between schools whose normative rules differ while they share much of the same technical evidence.

14. The Commutativity of Fatwas

Consider a jurist who permits an instrument called a financed asset sale and prohibits a second one called a cash advance. Both create a claim for $1,200 against the same customer in a year. A superficial critic announces contradiction. A superficial defender replies that the named forms differ. The serious argument asks whether the lawful reasons survive a full comparison of rights and enforcement. Only then can we ask whether a change of contractual representation ought to preserve the verdict.

Suppose T is a transformation from contract descriptions to a state-sensitive economic and legal representation Φ. Let H be the governing school's rule of classification. We demand a commutative relationship only when T preserves the attributes that H treats as material. The assertion can be written $\Phi(C_1) \equiv_R \Phi(C_2) \Rightarrow H(C_1) = H(C_2)$, where R is the explicitly adopted relevance theory. A logical model can verify the implication under its assumptions. A legal system must defend its relevance theory against primary sources and adversarial cases.

14.1 The missing square in formal analogy

A more complete diagram contains four objects: an established source contract A, a proposed novel contract B, the selected material predicate P, and the proposed verdict h. The school authorizes a rule associating $P(A)$ with $h(A)$. The *mutaqlid* argues that $P(B)$ holds. The inference remains vulnerable to defeaters: different title, forbidden lending terms, lack of performance, or an independent norm governing exchange. A proof of numerical equivalence helps with P only where P is actually numerical.

This yields a discipline for *qiyās* across financial forms. Each analogy names an authoritative source case, its exact ruling, the legal cause attributed to it, the new case's facts, and the scope in which a counterargument might prevail. If a tradition rejects that analogical method, its contribution can still be recorded as an adverse or independent premise. The new-school bridge cannot be attributed to the original tradition without an additional source.

14.2 Order changes rights

Let T_{pledge} create a lender's encumbrance on BTC and T_{call} grant a buyer a covered call. Performing the call assignment first may permit a different claim at delivery than pledging the asset first and only afterward granting a subordinate option. The operations do not generally commute. The jurist has a concrete question: which party acquires priority, who bears non-delivery loss, and what can an honest borrower do to exit?

A second example concerns a deferred sale and its late-payment clause. A fixed price accepted at formation is ordinarily analyzed differently from an increase assessed on an overdue debt. A financial model may produce equal expected value for the two schedules. The relevant contractual events still differ, as recognized in the Academy's installment-sale rulings [S68, S85]. An equivalence claim restricted to present value has omitted the question on which the legal decision turns.

14.3 Reconciliation as a typed certificate

The book uses three kinds of results. A **within-school certificate** derives a judgment solely from the authorized rules of one identified tradition. A **joint certificate** combines compatible rules from several recognized sources only when their conditions are jointly satisfiable and the choice of authorities is independently justified. A **new-school certificate** declares a reconciliation bridge and its retained core constraints, then proves a conclusion conditional on those premises while recording the source rules that dissent.

These certificates are not interchangeable. A conclusion derived in the new-school pathway is a proposed Muʿtazilī fatwa, even if its building blocks are supplied by jurists in several traditions. The source ledger lets a reader trace each premise to its author and date. The certificate contains the facts that would invalidate it, such as a funding clause that becomes a lender's guaranteed return.

14.4 Equivalence may be partial

Two covered calls can have identical expiry payout and different early-assignment rights. Two cash-settled futures can have equal price sensitivity and different liquidation triggers. A funded non-recourse loan and an unsecured conventional loan may have identical receipts while the collateral is valuable, then diverge after a crash. These distinctions do not forbid economic analogy. They delimit what that analogy proves.

An exact model-relative equality is useful for detecting unjustified inconsistency. If a jurist asserts that two structures differ, the claim should identify which admissible state exhibits the difference and why the adopted uṣūl considers it material. If the difference disappears upon inspection, a reasoned classification must change or receive a genuinely independent foundation. That discipline gives *takāfuʾ al-āthār* its reforming force.

A reader need not accept the Muʿtazilī proposal to benefit from this method. A traditional jurist can reject the proposed bridge and still use its contract-state audit to find undisclosed obligations, a missing creditor priority, or a supposed asset sale that transferred no risk. Our formalism is an instrument for seeing the legal event more exactly. Its result remains accountable to the authority that turns observation into a ruling.

14.5 Rights-sensitive equivalence and the case that defeats it

A financial-equivalence argument becomes informative only after the author specifies which transformations are permitted. Let a contract be represented by a state machine $C=(W,R,F,P)$, in which W is the set of states, R the transition relation, F the cash-flow function, and P the projection of legally material facts. The latter records title, consent, enforceable exit, valid priority, rights to the remainder, and the conditions under which possession may be displaced. It is chosen and defended within a particular legal theory. Its contents cannot be inferred merely from the mathematical elegance of a hedge.

Two contracts may be equivalent under a cash-flow projection:

$$C_1 \equiv_F C_2 \Leftrightarrow \forall\, w \in W, F(C_1,w)=F(C_2,w).$$

A stronger comparison includes their material rights:

$$C_1 \equiv_P C_2 \Leftrightarrow \forall\, w \in W, P(C_1,w)=P(C_2,w).$$

The proposed commutative-fatwa rule requires the second relation for any legal doctrine whose decisions depend on P. Let J_M be a judicial predicate of those material facts, defined under source-specific method M. Then the elementary mathematical theorem is $C_1 \equiv_P C_2 \Rightarrow J_M(C_1,w) \Leftrightarrow J_M(C_2,w)$ for each relevant w. This is a substitution theorem. Its juristic strength derives from the independent validity of J_M and the adequacy of P.

Edition 0.14 adds an explicit finite countermodel. Two illustrative contracts have equal cash flows at origination, at an intermediate price shock, and at maturity. At the shock, one contract preserves the customer's exit power and residual interest; the other permits an earlier seizure and changes creditor priority. Their monetary vectors coincide by construction. Their material-rights vectors differ. A universal inference from equal money to equal law therefore fails within this small model.

This result is valuable because it identifies the fact a serious defender or critic must produce. The argument about murābaḥah cannot be completed by observing that two borrowers pay the same amount. The argument

about a Bitcoin collateral vault cannot be completed by a nominal collateral ratio. The challenger should point to the state and right that distinguishes them. The defender may then justify the relevant distinction from an actual rule of uṣūl or establish that the difference is legally immaterial. A proof assistant can verify the comparison once the facts and the rule are supplied. Jurists retain responsibility for the legal characterization.

We also refuse the opposite shortcut. A bank’s inclusion of a momentary title transfer does not settle whether the transfer has substantive consequences for risk and legal remedies. A program may encode `sellerBearsLoss = true` while an undisclosed indemnity assigns every such loss back to the customer. The fact dossier must follow all related agreements and feasible executions. The equivalence method should force disclosure of the indemnity and test the transaction under a state in which the asset is destroyed before delivery. The legal inquiry concerns the parties’ enforceable positions, including side agreements and insolvency priority.

The status of the Lean certificate

`Mutaqlid/TraceEquivalence14.lean` constructs a three-state contract pair, proves payment equality, and provides an intermediate-state counterexample to material equality. Its verdict-transport theorem assumes that a specified legal rule factors through the material projection. That assumption supplies a formal location for the *barzakh al-ḥukm*: a school accepting additional material properties must broaden the projection and rerun the comparison. The examples are hypothetical and have no historical attribution. These statements are Lean source claims awaiting kernel compilation; the accompanying Python enumeration reproduces the finite counterexample independently.

A future certificate for an actual lender should name the full contractual version, source rule and jurist, parties and assets, required permissions, all recognized priority claims, transition evidence, and the adverse state chosen to test the asserted equivalence. That is the minimal dossier for the proposed method’s claim to be auditable.

15. Proof-Carrying Fiqh: Lean 4 and the Mutaqlid

A theorem prover can establish that an inference follows from a collection of formal premises. It cannot convert those premises into revelation, authorize their author to give religious judgment, or certify a deployed protocol whose implementation has not been supplied. The phrase *proof-carrying fiqh* describes a way of exposing precisely these boundaries. Its use begins when the author discloses what is proved, whose legal judgment supplies each axiom, and which relevant facts remain outside the model.

The earlier formal package contains IlmiUsul.lean and an extended Mutaqlid collection of modules for school-relative derivation, contingent rights, modal accessibility, Bitcoin claims, authority selection and material equivalence. The first research objective was to demonstrate conditional soundness and produce finite counterexamples. These files are hypotheses and software artifacts in a continuing research programme. Their presence in a ZIP archive is not evidence that a Lean kernel has accepted them. A successful Python financial-fixture run only supports the arithmetic or finite simulation actually executed.

15.1 A certificate has a type

A useful financial certificate holds an issuer's declared authority context M, an authenticated set of references E, transaction facts F, a list of admitted rules Γ, and a conclusion $H(C)$. The checker confirms that the recorded inference is well-typed and that the conclusion follows under Γ. The legal reviewer examines whether the evidence represents the cited authority fairly, whether any rule is superseded, and whether the technical facts describe the executed contract.

For example, a certificate stating 'a financed put has independent value' requires an identified right, a lawful underlying object, enforceable exercise, funded performance, and an authorization rule for payment for that right. The first several facts can be partly tested in code. The last is contested between institutions [S09, S10, S33]. A valid proof under a proposed right-property axiom does not erase that institutional disagreement.

15.2 Three ways to abuse a proof

Invented axiom. The author encodes optionsArePermissible as an axiom and proves exampleOptionPermissible. The system is consistent enough to accept the inference. The substantive question has simply been assumed.

Wrong contract. A verifier proves an invariant of a state machine with one liquidation transition while the deployed program contains a second guardian-controlled spend path. The theorem says something true about an incomplete model. The pledged property remains exposed.

Vacuous duty. A protocol claims every exercised put pays, but exercise is unreachable under its trigger. A conditional theorem holds without anybody being able to claim protection. A non-vacuity condition requires a possible exercise event and a compatible settlement trace.

The proposed method requires a model-coverage statement, provenance for external facts, and adversarial tests for every claimed protection. Proof obligations are public so a hostile reviewer can see which premises must change to overturn the result.

15.3 An explicit verification ladder

At the first level, a mathematical identity is checked in a finite model or a general arithmetic theorem. At the second, a legal inference is established conditionally upon named school principles. At the third, the executable contract and all material spend paths are modeled. At the fourth, the running implementation is shown to refine the verified specification under a stated environment and threat model. At the fifth, independent experts assess

the legitimacy and enforceability of the legal claims in the jurisdiction and institutional context. These are different deliverables with different failure modes.

Lean 4 can contribute to the first three, and to part of the fourth when the implementation and semantics are modeled. Historical research, governance review and competent adjudication remain necessary. An unauthenticated oracle price, a claimed chain confirmation, or a signer label is merely input data until an external trusted process establishes its provenance.

15.4 Counterexamples are positive research results

The book’s mathematical centre consists of small counterexamples. Two contracts have equal terminal proceeds while transferring different title before a warehouse fire. A portfolio replicates an option at expiry while its leveraged hedge is liquidated earlier. A vault shows a theoretical put value that cannot be collected from an insolvent writer. A charitable treasury reports a sufficient aggregate balance while the designated zakāt funds cannot lawfully satisfy an unrelated trading loss. Every example shows why a plausible shortcut fails.

The next step is to write these as reusable fixtures: a finite state model with named actors, event clocks, claims, and insolvency priorities; an executable deterministic reference calculation; and a proof obligation describing every transition that may alter title. The author must test the negation of the intended property and provide a witness when one exists. A test that only executes the happy path is a demonstration, not a general guarantee.

The proof assistant as the least impressionable member of the committee

A proof assistant has one splendid social property: it remains unmoved by the size of the financing round. If the theorem requires the writer of an option to maintain adequate collateral in every admissible state, the machine will demand the premise in the form the proof expects. It can establish an implication while the exchange runs a very different liquidation process. A certificate for the hypothetical contract should carry its assumptions into the visible fatwa dossier.

The resulting division of labor is useful. The jurist must defend the authority of the rule. The engineer must show that the actual contract implements the facts named in the theorem. A proof with a hand-entered collateral assumption makes a good beginning for an adversarial test. A borrower cannot redeem it for money.

15.5 The standing of the resulting fatwa

A *mutaqlid* fatwa can carry a successful proof and remain controversial. The proof is useful because it makes the controversy local. The Ḥanafī critic may challenge the operative cause. The Jaʿfarī critic may reject the source-authority combination. The international academy may object to compensation for a right or a guarantee. The computer scientist may find a missing state transition. The financial economist may find an insolvent counterparty the model treats as solvent.

The properly written ruling lists all these possible defeaters, the exact evidence examined, the authorities accepted and rejected, and an expiration or review trigger when technical facts change. A claim about a live protocol should name its code revision and independently verified deployment. Until then its verdict concerns a model or proposal. Formalization strengthens the humility of a jurist by making inaccurate certainty easier to expose.

15.6 Inherited Lean theorem catalogue and Ducat proof boundary

The earliest formal package contained `IlmiUsul.lean`; the later `Mutaqlid` suite extends it across modules. Its definitions are intentionally smaller than actual commercial law so that every assumption stays visible. The source contains no `sorry`, `admit`, or imported external axiom. Because Lean is absent from the offline authoring environment, the Lean source is **prepared for compilation and CI**, not claimed to have passed a

kernel run here. The companion Python case checks only arithmetic scenarios and cannot substitute for Lean verification.

The following are the named conditional lemmas to be checked:

Proof	Conditional mathematical statement	Legal inference it permits
materialEq_refl/symm/trans	Fully specified observational equivalence is an equivalence relation	The comparison relation is internally coherent
cash_equivalent_can_cross_barzakh	Two contracts can share cash flows while differing on title	Net-present-value equality is insufficient for identical legal status
fatwa_commutes	A classification respecting complete relevant-state equivalence gives equal verdicts on equivalent contracts	A material-extensionality axiom has the consequence claimed
joint_is_safe	Selected source constraints retain both required properties and no selected prohibition in the joint case	The consistency branch preserves its declared obligations
funded_put_has_joint_witness	A concrete hypothetical funded right satisfies two compatible formal profiles	Witness for the consistency pathway
funded_put_is_reconciled_with_recorded_dissent	A funded paid option has a certificate under the new bridge while failing a stricter source profile	Witness for conditional reconciliation with dissent recorded
reconciled_preserves_core	A bridge with a soundness witness cannot issue a certified verdict outside the retained core	The reconciliation branch does not bypass its nominated prohibitions
counterexample_defeats_universal	One counterexample defeats a universally quantified assertion over that same domain	A carefully scoped consensus claim can be tested for logical overreach
repayment_plus_remainder	Debt satisfied from sufficient assets plus remainder equals the starting realizable value	Basic conservation under a specified waterfall
protected_refuses_spot_liquidation	A declared protected-status flag disables a spot-only liquidation rule	The design gate satisfies the specified local invariant
pledge_and_call_do_not_commute	Ordered claims differ when an encumbrance is composed before or after an option	Contract order can be legally material
example_*	Fixed numerical stress vectors evaluate to expected values	Arithmetic smoke checks for the collateral and fee illustrations

These are not theorems that a particular classical jurist would authorize a BTC collar. They are proofs about what follows **if** the philosophical, legal, or engineering premises are accepted. A fatwa in this method receives an audit record, including non-machine-verifiable historical and moral judgments.

A constructive certificate in Lean

The worked example formalizes a **funded, consented, paid stand-alone put** on an otherwise lawful asset, with no premium mandated as consideration for a loan. The Lean record exampleFundedPut is hypothetical, and its commercial and legal facts are stipulated. Three propositions are encoded with separate names:

1. funded_put_has_joint_witness proves consistency between a funding-based property-right profile and an independently defined consent-and-title profile for that example.
2. funded_put_restrictive_conflict proves that a different source-profile interpretation forbidding paid stand-alone rights rejects the very same example. The conflicting rule is preserved as an explicit dissent.

3. funded_put_is_reconciled_with_recorded_dissent proves that the proposed Muʿtazilī bridge accepts the example while retaining its independent rightCore restrictions.
   funded_put_certificate_retains_core checks that the resulting certificate preserves that core.

These deliberately abstract profiles draw on the legal disagreement surrounding conditional purchase rights [S09–S10]. The interpreted profiles are separate from the historical documents themselves. Their Lean encoding cannot prove that the Academy's objection was limited to unbacked rights, or that Malaysia's 1995 issuer-warrant permission already extends to Bitcoin puts. Those further claims would require a sourced interpretive argument. The reconciliation is candidly a proposal of the new madhhab.

The next proof boundary

The first fully substantive formal milestone will require a fixed machine-readable Ducat spec or a pinned implementation and its transaction tests. Only then could we prove that every reachable on-chain liquidation transition respects the borrower residual, that the oracle conditions cannot be bypassed under the stated adversary model, or that a funded put's settlement has priority over an unauthorized seizure. The word **every** is the point: examples and happy-path unit tests alone are weaker.

15.7 The evidence boundary between a formal theorem and a fatwa

A conditional proof is an achievement only to the extent that its conditions are stated accurately. In the legal setting, a familiar failure is an assumption laundering problem: a human enters sourceAccepted = true, oracleHonest = true or rightfulTitle = true, obtains a valid machine proof, and then describes the output as historical or economic authentication. The proof confirms the implication. Its premises retain the epistemic status that they had before the computation.

Edition 0.14 separates four attestations in each case file. The **source record** contains a named jurist or institution, version and locator, text, method of adoption, and a human-reviewed claim about legal scope. The **contract record** identifies the actual signed documents or the on-chain version and the parties' effective rights. The **execution witness** supplies raw transactions or a reproducible transition trace, authenticated price observations, funding and settlement amounts, replay protection and signer authority. The **formal certificate** states the propositions that follow from the adopted rule and verified facts. The last record can be checked by a theorem prover when its inputs have been represented faithfully.

There are two important fail-closed rules. A signature authorizing a Bitcoin output establishes authority under the script at that moment; it does not authenticate a derivative trader's economic claim. Likewise, a formal proof that a payee receives $3,000 from an escrow establishes a payment rule only if that escrow contains funds, the amount was derived from a valid trade, and settlement has not previously occurred. The source-only certificate cannot import those facts by setting a boolean in an untrusted file.

The new proof suite models a funded pairwise transfer using m_L for the losing participant's margin, m_W for the winning participant's margin, and x for the authorized payment. Its preflight rule requires $0 \le x \le m_L$. If the transfer is permitted, the state becomes $\left(m_L - x, m_W + x\right)$ and elementary arithmetic gives

$$\left(m_L - x\right) + \left(m_W + x\right) = m_L + m_W .$$

The theorem expresses conservation of the two accounts under the stated preflight condition. It does not demonstrate that x is fair, that the price mark was authenticated, or that the customer gave legally adequate consent to the rule computing it. The correct formal object joins this conservation theorem with separately validated economic and legal evidence.

The second counterexample concerns a shared insurance account. Two pending losses of 60 units cannot each claim full coverage from a single reserve of 100 units. A presentation showing each loss individually covered hides an aggregate deficit of 20. The test suite rejects concurrent settlement unless the sum of funded obligations is within the reserve’s available capacity. This is especially relevant to decentralized finance proposals that describe an insurance fund as a universal solvency guarantor when multiple contracts can call on it simultaneously.

The third model concerns a BTC vault. At a BTC price of $100,000, one BTC pledged for $50,000 of UNIT has a 200% gross collateral ratio; at $60,000 it has a 120% ratio. Under illustrative thresholds of 160% for origination and 135% for liquidation, the vault opens above the origination requirement and later becomes price-eligible for liquidation. Price eligibility is distinct from the authority to move BTC. The model requires separate checks for the oracle’s evidence, the permissible spending path and the validity of the liquidation transaction. The rule offers a direct formal expression of the contractual right that the legal analysis must scrutinize.

Proof status and external validation

The new Lean modules are TraceEquivalence14.lean, CreditWaterfall14.lean, and Clearing14.lean. They contain explicit finite examples and conditional implications without proof-hole declarations. Independent Python tests exercise the same numeric scenarios and evidence gates. A static inspection can confirm the files’ structure and the absence of admitted shortcuts. **Lean kernel compilation remains pending in this environment**, and no deployed Bitcoin script, Ducat vault or TradeLayer node has been formally refined to these abstract models. A future reviewer must compile the suite using the pinned toolchain, inspect its imported assumptions, and separately authenticate every source and on-chain observation attached to a verdict.

Part IV. The Islamic Theory of Derivatives

16. The Option Is a Right: When Contingency Becomes Māl

The price of a choice, the debt of the writer, and the difference between having value and being lawful to sell.

A merchant reserves a sack of grain for a buyer until Friday. The buyer pays something for the reservation and may decide whether to complete the purchase. Next door a warehouse offers insurance against failure to deliver grain of a stated grade. In another market a Bitcoin owner purchases a put, choosing to sell at a known price if the market falls. A trader can draw a similar rising-and-falling line for the value of each arrangement. The claim that the right itself may lawfully be sold is a different question, made difficult by centuries of arguments about property, uncertainty, and contractual form.

Our earlier chapter introduced call and put payoffs and noted the disagreement between the International Islamic Fiqh Academy and Malaysia's Shariah authorities. The full problem is the legal identity of a contingent entitlement. An exercise right may be a power over a completed sale, a power to require another person's future performance, an entitlement to money on a specified event, or a personal permission to terminate. The parties may attach those powers to real property, charge money for granting them, or agree that the power is inseparable from the contract. Each legal object has its own price of exercise and its own possible abuse.

16.1 A dispute that takes place inside the historical rulings

The Academy's Resolution 43, adopted on 15 December 1988, recognizes that modern intellectual and commercial rights can have financial value and that specified rights, such as a commercial name or trademark, may be transferred for a price without fraud [S80]. Here is a named collective fiqh institution recognizing valuable intangible rights. The object of legal protection is not confined to a physical commodity handed over between two people.

Four years later Resolution 63, adopted on 14 May 1992, rejected options contracts of the sort traded in organized financial markets. The Academy's stated reason concerned the nature of the purchased contractual object and its failure to constitute an acceptable compensable financial right within the nominated categories [S09]. This was a decision about particular market instruments and an established framework for classifying their subject matter. It cannot be dissolved by quoting the earlier intangible-right resolution as though every intangible were equally saleable. The two texts make the property-classification argument unavoidable.

The Academy then adopted Resolution 72 on 27 June 1993. In a *bayʿ al-ʿurbūn* sale, a buyer makes a down payment that counts toward the price if the purchase completes and belongs to the seller if the buyer abandons it. The Academy permits the arrangement with a defined period and conditions, while excluding contracts for which immediate or prescribed receipt is required [S13, S74]. The option arises within a sale whose underlying object and future consideration are specified. Treating its forfeited deposit as a freely tradable option premium would require another inference.

The Islamic Instrument Study Group in Malaysia approved call warrants on compliant shares at its meeting of 26 July 1995, applying the concepts *ḥaqq mālī* and *ḥaqq tamalluk* to recognize an eligible purchase right as *māl*. The selected decision is reproduced in the Malaysian Islamic finance source register [S10, S81]. It concerned a bounded capital-market instrument. It is nevertheless an explicit institutional counterexample to the claim that every conditional acquisition right is intrinsically incapable of property value.

Chronology matters. The later Malaysian approach offers a competing rule for a specific market. It does not show that the Academy reversed its restriction; its 2018 and 2019 hedging work reaffirmed the separate objection to selling abstract rights [S35, S82]. Our proposed Muʿtazilī school must confront the categorical issue itself.

16.2 Four powers concealed in the word option

The first is a *rescision power*: a party to a sale may annul it after discovering a defect, deception, or a breached condition. Sīstānī's Ruling 2134 lists recognized reasons for annulment and is a useful primary Jaʿfarī illustration [S14, S83]. The buyer can recover rights because of a defect in the transaction. A market in separately transferred rescission powers would raise additional conditions beyond that ruling.

The second is a *purchase entitlement*: someone undertakes to keep an asset available for sale at an agreed price. The buyer decides whether to act, within a period, and the seller may relinquish other opportunities in the meantime. An ʿ*urbūn* deposit is connected to an anticipated sale. A call warrant can be connected to specified shares and issuer obligations. Which part is considered property differs across legal frameworks.

The third is a *performance claim*: one party can demand that another deliver an asset or a cash amount upon a defined future event. A cash-settled put is close to this type. Its holder's wealth depends on the contract writer's ability and legal obligation to settle. If the liability is unsecured and the counterparty can disappear after selling a million such rights, the trading price of the option has overstated the property actually delivered.

The fourth is a *risk-bearing capacity*: the counterparty reserves capital and stands ready to accept the specified contingent loss. This is the economic service that an option premium often finances. A fund may hold assets to meet obligations; its reserve account and the buyer's right against it must be clearly identified. The existence of such a service cannot itself settle whether a school recognizes its sale as permissible. The distinction is the precise target of the proposed new school's argument.

16.3 A measurable entitlement has legal coordinates

We can describe a candidate contingent right as a structured object

$$O=(U,E,T,K,X,A,L,Q),$$

where U specifies lawful underlying property or reference; E identifies the event or state permitting exercise; T is the contractual period; K is the exercise consideration; X is the buyer's power to demand performance or payment; A identifies which assets are legally available to fulfill it; L specifies the writer's enforceable liability; and Q states creditor priority, dispute and enforcement conditions. If an index rather than property determines the amount, the contract must state who computes it, which data determine it, and what happens when the oracle is unavailable.

A market value $V(O)$ is the price at which someone expects to buy the entitlement. A fair valuation can inform the consent analysis. It is possible for a valuable instrument to arise from a prohibited trade, a fraudulent promise, or a condition whose performance is impossible. The legal conclusion therefore takes another form:

$$\begin{aligned} Tradable(O) \Leftarrow\ & Basis(O) \wedge Determinate(O) \\ ¿\quad & \wedge NoCreditRiba(O). \end{aligned}$$

These are proposed sufficient screening conditions inside the new school's method, rather than an established universal doctrine. Even their conjunction must be assessed against competing school rules about what can constitute the object of a sale. A Hanafī or Jaʿfarī critic is entitled to ask whether the right can be independently transferred and whether the contract creates a prohibited exchange of debts.

16.4 A put is a promise that must survive its own necessity

Imagine a cooperative that owns ten BTC purchased when each BTC trades at $100,000. The cooperative owes $600,000 in dollar wages over the coming period. It buys a European-style cash-settled put on ten BTC with strike $80,000. Ignoring premiums, taxes, fees and counterparty failure, the protected value at maturity is

$$10\,S_T + 10\,max\left(80{,}000 - S_T, 0\right) = 10\,max\left(S_T, 80{,}000\right).$$

If BTC is $50,000 at maturity, the BTC is worth $500,000 and the put owes $300,000. The cooperative can pay its $600,000 obligation if it can obtain the put payout on time and convert the proceeds into available settlement money. A counterparty default that reduces the collectible payout to $60,000 leaves only $560,000 of assets. The plan then fails precisely in the price state for which it was purchased.

The contract’s legal nature contains the settlement failure that a terminal Black–Scholes expression omits. It is tempting to infer property from the ability to price the put. The disciplined argument moves from an identified proprietary or enforceable right through demonstrated performance resources to a legal classification. Its aim is to give protection a substance that survives insolvency.

The writer’s obligation may be fully funded through an escrow that allocates a maximum payout. A contract can cap its exposure through a bounded index range. It may alternatively demand maintenance margin, introducing the risk of closeout before exercise. Every design gives a different degree of certainty to the buyer and reserves a different bundle of property for the writer’s other creditors. The governing ruling must follow the actual structure.

16.5 The orphaned premium

Consider two options that expire without exercise. In each, the buyer loses a $1,000 premium and the writer receives $1,000. Someone sees no exchanged commodity at maturity and calls the payment pure gambling. That conclusion requires a theory of consideration. In the *ʿurbūn* case, the seller has committed an asset to a potential sale through a specified period. In a cash-settled put, the writer may have reserved a contingent fund and given the buyer a right to demand payment under defined circumstances. Whether the law recognizes the latter entitlement as compensable is the question asked in Resolution 63.

The proposed new school’s affirmative position is that a writer who grants a defined, enforceable right and commits adequate property has supplied commercial consideration. The buyer knowingly purchases a choice, and the payment transfers at formation while the contingency determines whether the right will be exercised. This is a candidate answer to the Academy’s objection. It requires an independent defense of the alienability of the right and the distinction between risk transfer serving a lawful exposure and wagering detached from an underlying obligation.

The strongest opposing argument treats such a premium as a sale of a naked abstract promise whose legal subject matter cannot be compensated. A third position might recognize rights connected to shares or productive goods but reject independent cash-settled differences. The disagreement is substantive, and the book’s reconciliation method must identify the exact right each authority recognizes.

16.6 The ʿurbūn and call-warrant boundary

An *ʿurbūn* buyer deposits $1,000 for a $20,000 machine, with the right to purchase during a stated period. Completion credits the deposit; abandonment forfeits it. Its social context is an identifiable machine and an identified seller whose time is bound. A call warrant may give a purchaser the right to acquire shares under the issuer’s documented conditions, without a traditional bilateral reservation of a particular physical machine. If its issuer fails, the warrant holder’s priority and remedy depend on the instrument’s terms.

Financial engineering can transform a down-payment schedule into option-like payoffs, but the legal right may remain attached to the original machine and the original contractual parties. Replicating those cash flows with a derivative is therefore an **economic analogy**. The *barzakh al-ḥukm* asks what happened to title, disposal power, obligation to deliver, and treatment in default.

The Malaysian permission extends the range of financial rights the jurist must take seriously. Its own conditions, including permissible underlying shares, remain essential. It strengthens the argument that an

acquisition right can be *māl* under an identifiable modern Islamic legal authority. Our contemplated Bitcoin put must earn an extension from that principle to a different underlying, settlement form, and credit relationship.

16.7 When a right becomes a debt, and when a debt is traded

Before exercise, the option holder may own a power to call for performance. Once it is exercised, the writer may owe a specified payment. An accrued settlement amount can become a debt. A transferable token representing that debt may implicate *bayʿ al-dayn*, currency exchange, or the prohibition on exchanging debts under conditions recognized by the deciding jurist. The claim's label at inception does not authorize every later secondary-market transaction.

A protocol design must therefore type its state transitions:

$$\mathit{UnexercisedRight} \xrightarrow{\mathit{exercise}} \mathit{SettlementObligation} \xrightarrow{\mathit{payment}} \mathit{Discharged}.$$

If the seller transfers the right to a third party, the legal inquiry includes what exactly was assigned. If the protocol nets two debts against one another, the applicable rules for discharge and mutual obligation require their own analysis. If an American-style option is exercised before expiry, the party receiving delivery may then own the underlying. The new state is legally distinct from the original possibility of purchase.

This is especially important for decentralized exchanges issuing transferable vault receipts, hedge tokens, and collateral claims. A token might represent immediate ownership of segregated BTC, a promise to deliver BTC on demand, or an uncollateralized unsecured debt payable in BTC. A common user interface can display the same numerical balance for all three.

The option writer has to answer the telephone

There is a slightly cruel joke hidden inside an unfunded put option. The buyer pays for protection against an emergency, and the writer's capacity to perform may vanish during the same emergency. A model can price the put to four decimal places while ignoring the fact that the writer owes several other claimants the same collateral. The buyer is being sold a sophisticated right to join a queue.

Kamali's analysis of futures and options asks whether an enforceable contingent right can support a legitimate commercial purpose [S177]. The proposed extension to a Bitcoin put requires the next question: which resources secure performance when the price collapses? That is a question of property and creditor priority. Only after the account of fulfillment has been written down does the premium begin to resemble compensation for a real obligation.

16.8 When optionality is morally intelligible

In the widow's agricultural case, harvest-sharing allowed the landowner and the producer to distribute variable output. An option can allow a merchant to purchase a floor on tomorrow's sale price. A BTC-backed borrower may buy a put to preserve collateral value during a market decline. The moral argument begins with what the customer must pay and what risk is being reduced. It then examines the price of protection, the counterparty's compensation, and any loss imposed on uninvolved persons.

The proposal cannot grant a general speculative exemption to every leveraged product. An option seller who repeatedly grants claims beyond available assets may transfer expected loss to customers and junior creditors. A platform may seize assets through an oracle mark that neither party could have verified. Market participants with no exposure to hedge may use options for risk-taking; a rule permitting risk-taking, if defended, needs its own boundaries and evidence. A theory about valuable rights should be capable of condemning an instrument with elegant mathematics when its underlying property claims are deceptive.

16.9 The source-sensitive fatwa schema

The book should permit at least three conclusions on any nominated instrument. A historical authority can forbid its sale under a recognized classification. Another may permit a specific kind of warrant or earnest-money arrangement. The proposed Muʿtazilī school can authorize a new kind of contingent property right after satisfying its declared tests. These are separately traceable verdicts on separately defined transactions.

The fatwa dossier requires a versioned contract specification, an applicable authority, a precise account of the right transferred, a maximum-loss and collateral study, remedies for breach, and a paragraph stating the opposing jurist's best objection. It also requires a **counterexample search**: consider a missing asset, an insolvent writer, an oracle dispute, and a premature liquidation. If any of these changes the asserted right, the contract model must say how and the legal rule must address the new state.

Under this method, the premium is a lawful exchange only when the jurist has established a lawful thing for which it is paid. A general claim that "uncertainty is harmless" cannot do that work. The discipline of proof-carrying fiqh adds the critical question of whether the supposedly enforceable right can ever be obtained in the state for which its owner bought it.

16.10 Formal obligations and dissent record

The finite mathematical tests for this chapter shall distinguish Valuable, Enforceable, Assignable, and LawfulToSell as separate predicates. We need a witness in which a right has a positive market price and can be exercised, yet assignment is prohibited under the selected source rule. We need another witness in which a put has a positive model value but its issuer cannot pay under the default trace. These two examples will refute the inference from market price to lawful tradability and the inference from contractual promise to funded protection.

The positive construction is conditional: given a permitted underlying, transferable right recognized by the selected authority, bounded and funded obligations, lawful consideration, and no prohibited credit term, the proposed new school's fatwa can classify that right as eligible property. Where the chosen authority rejects compensated standalone options, the source certificate must faithfully return rejection. Lean can check the logic of those implications and the arithmetic of a finite reserve. It cannot decide whether the new school may recognize such property without the jurisprudential argument this chapter supplies.

Source and validity notes. Academy Resolutions 43, 63 and 72 are directly inspected institutional decisions [S80, S09, S13]. The 1995 Malaysian position is cited through its documented selected decision and secondary reproduction [S10, S81]; the complete printed original merits edition-specific comparison. Sīstānī's khiyār enumeration supplies a named Jaʿfarī precedent, with no attributed permission for modern exchange-traded derivatives [S14, S83]. All general permissions beyond those cases are argued as new-school conclusions subject to the stated conditions.

16.11 Three rights carrying the name of an option

The same economic graph can be produced by several legal objects. A buyer pays an earnest deposit against a particular item. A shareholder acquires a call warrant tied to an eligible security. A hedger pays a writer for an independent cash-settled put. The payoff diagrams can be transformed into one another under controlled assumptions. Their enforceable rights need separate descriptions.

The Academy's 1993 Resolution 72 (3/8) permits *bayʿ al-ʿurbūn* under conditions: an identified sale, a specified period and a deposit credited to the purchase price if the buyer performs, retained by the seller if the buyer abandons it. The ruling excludes sales whose validity requires delivery of the price at formation, including *salam*, and currency exchange transactions requiring contemporaneous reciprocal possession. The

deposit attaches to a specific underlying sale, with a defined seller and buyer [S13, S157]. Its economic optionality supplies a lawful family resemblance to a call, while its contractual object and execution differ.

The 1995 Malaysian warrant decision treats a purchase right as a form of transferable financial property in its specified securities context [S154]. A purchaser of that warrant may transfer an existing right whose terms identify an underlying security and exercise procedure. The decision is narrower than a general principle that every priced promise is *māl*. The right must be recognized, exercised and settled under the constraints of the adopted jurisprudence.

Resolution 63 of 1992 remains the adverse case for the separate paid option. It says the international options contracts considered there lack a compensable subject matter under its legal characterization [S153]. A defender of a decentralized cash-settled put faces that exact argument even if the put reduces the purchaser's price exposure. Invoking the Malaysian warrant decision permits the defender to challenge the categorical exclusion of all contingent financial rights. It leaves the burden to argue why this particular independently purchased protection is property rather than the compensated sale of a disembodied risk.

16.12 The premium and the performance right

Take a BTC owner who pays a premium of $8,000 for a put with a $70,000 strike. A market-maker promises cash settlement at maturity. If BTC finishes at $40,000, the put's intrinsic payoff is $30,000. The purchaser has paid for an enforceable right whose delivery at precisely this adverse state is essential to its usefulness. The writer therefore needs identified property, funded margin, priority against competing claims and a settlement path that remains available when prices move sharply.

The simplified accounting is $Payout = max\left(K - S_T, 0\right)$ and $Available = SegregatedCollateral + EnforceableRecovery - SeniorClaims$. A model showing positive expected profit cannot turn an underfunded writer into a solvent one. If the writer's available resources at the adverse state are $10,000, the purchaser owns at most the contractual claim for $30,000 and an enforcement problem for the remainder. The *mutaqlid* must decide how that default probability and remedy change consent and contract classification. A fully funded seller faces a different legal inquiry.

Consider three increasingly strong statements: (a) the exercise right has a market price; (b) a competent juristic method recognizes that right as transferable *māl*; (c) the concrete purchase and sale of the right is valid, including its counterparty, settlement and financing terms. Quantitative finance is well suited to (a). Malaysia supplies direct evidence for (b) in its warrant setting. The proposed Muʿtazilī method argues for a new instance of (c) and must defend every extra premise. The Academy supplies a principled challenge to that move.

This sequence also identifies the best candidate for empirical research: a fully collateralized, finite-duration BTC option settled through a deterministic pre-signed construction or otherwise enforceable vault. Its technical determinism does not settle the legal dispute, but it removes factual reasons the jurist would otherwise have to guess about. When contractual title, exercise power or collateral priority remain underdetermined, the ruling remains provisional.

17. The Jihād Against Ribā: Futures, Swaps, and Synthetic Dollars

Risk-bearing as exchange, financial models as engines, and the boundary of akl al-māl bi-l-bāṭil

A merchant sells tomorrow's harvest today because a poor harvest or a collapsing price could destroy her household. A baker agrees to the other side because he needs assurance that flour will be affordable when his ovens are running. Their agreement brings them relief before any crop is delivered. What they trade is the exposure they have each been forced to bear by their ordinary work. The settlement between them may add up to zero. Their ability to plan improves together.

The war against ribā begins at this elementary financial problem. When ordinary households can stabilize the costs of food, shelter, inventory and wages by exchanging enforceable risks, their need for emergency credit falls. Whoever provides that service must bear the promised obligation, and an informed counterparty must be free to reject its price. The Qurʾānic distinction between trade and ribā (2:275), its condemnation of taking wealth *bi-l-bāṭil* (4:29), and its protection of the distressed debtor (2:280) supply the governing ethical direction [S01–S03]. The *jihād* invoked here is the peaceful work of building and judging financial institutions.

I propose the following proposition for the developing Muʿtazilī madhhab: **an enforceable, fairly disclosed and adequately collateralized transfer of a real financial exposure can be lawful consideration (*ʿiwaḍ*), even when the payment is contingent on a future price.** The derivative's name, clearing venue, and leverage figure establish facts to investigate. The right being bought, the event that changes its value, and the means of fulfilling it determine the case.

This is the chapter's proposed ruling, whose premises we must expose. A court of reasons cannot declare something *ḥalāl* on the strength of algebra alone.

17.1 The meaning of *gharar* and the market we build

The report attributed to Abū Hurayra in Ṣaḥīḥ Muslim 1513 prohibits *bayʿ al-ḥaṣāh* and *bayʿ al-gharar* [S30]. A seller who offers whichever object a tossed stone happens to touch conceals the subject of sale. A merchant who cannot deliver an identified object sells a promise that may be empty. The seller knows what he must deliver only after the bargain, or cannot answer the question even then. The harm is legible: defect in specification, capacity to perform, knowledge, or justice between parties. Since the report's authority is contested under some approaches to ḥadīth, the present school also submits the rule to the Qurʾānic test of consent and *bi-l-bāṭil*, with the evidentiary status recorded.

The relevant distinctions already exist within modern Islamic jurisprudence. AAOIFI Standard 31 grades gharar as excessive, medium or minor, examining its location in the contract and recognized necessity [S31]. The Malaysian Securities Commission's Shariah Advisory Council approved crude palm oil futures on **26 November 1997**. Its reasoning focused on contractual specifications, clearing-house performance and the useful management of price risk; the published discussion specifically distinguished market speculation from gambling and insisted on freedom from ribā [S34, printed pp. 75–78]. The same Council approved a mechanism for futures on a Shariah-compliant share index on **19 March 1998**; it excluded the then-existing interest-rate benchmark futures and noncompliant index constituents [S34, printed p. 79]. These are bounded decisions involving actual contract and market conditions.

The International Islamic Fiqh Academy offers the most serious objection. Resolution 63 (1992) rejected contemporary exchange options and several futures structures [S09]. Resolution 224 (2018) defined hedging as protection against financial risk and treated preservation of wealth as a recognized objective, while still excluding its disallowed derivatives and payment for abstract risk [S32]. Resolution 238 (2019) reaffirmed these limits and examined specific composite structures using *salam*, *ʿurbūn*, *murābaḥah* and other instruments [S33]. A *mutaqlid* who quotes the Academy's approval of hedging while discarding its objections to the

particular means has omitted an axiom. Our proposed school must say precisely why it would revise that axiom.

Donald MacKenzie's *An Engine, Not a Camera* (MIT Press, 2006) supplies another part of the problem [S29]. Financial models changed the price conventions, trading behavior and infrastructure of derivatives. Mathematical models entered the arrangements whose performance those same models purported to measure. The model became part of the market. The Black–Scholes framework contributed to making options an intelligible, tradeable institution; the crash of 1987 and the later volatility smile exposed the market's ability to change the model's own relevance. MacKenzie's claim is historical and sociological. The argument developed here about Islamic law is ours.

A price-feed formula that triggers liquidation can make yesterday's harmless volatility fatal today. Funding payments intended to keep a swap close to spot change the incentives of both sides. Margin engines convert a theoretically stable portfolio into forced selling whenever hedging profits remain locked on another venue. This is the more demanding sense of *gharar*: we must examine the uncertainty that the contract and its mathematical machinery **create for the people who own its claims**. A model's confidence interval belongs in the record, beside ownership, recourse, and the liquidation script.

We will call the observable risk of defective fulfillment *gharar al-tanfīdh*, a proposed analytic name rather than a classical technical term. A dossier records the clarity of the subject, price rule and term; actual capacity to settle; counterparty or oracle failure; information asymmetry; and whether a liquidation transfer respects the owner's remaining property. A probabilistic risk estimate helps audit this set. It supplies no substitute for a moral premise.

17.2 The *mutaqlid* takes evidence from opposing courts

The *mutaqlid fī al-uṣūl* proceeds with an instrument-specific hearing. The source corpus includes early Kufan analysis of enforceable bargains, the Mālikī treatment of uncertainty and public interest, Shāfiʿī and Ḥanbalī reasoning about sale and contingent rights, Ẓāhirī restrictions on analogical extension, Jaʿfarī rules concerning *khiyār* and loans, and the open questions in Zaydī, Ismāʿīlī and Ibāḍī contract corpora. The Qurʾān-centered and Muʿtazilī entries supply separate premises on textual authority and justice. Chapter 4's eleven-voice source ledger governs these comparisons. The new futures question remains **unresolved** for historical schools whose direct derivative-relevant passages have yet to be collated; a modern Malaysian resolution cannot be silently attributed to Abū Ḥanīfa.

The decision needs a defensible common core, which I state as proposed axioms:

Test	Required fact in the contract	Source or argument
Property	A defined, assignable or enforceable right has an identified holder and obligor	Qurʾān 4:29; the qualified Malaysian financial-right ruling [S02, S10]
Consent	Each party can inspect what creates the claim and how losses are allocated	Qurʾān 4:29 [S02]
Ribā	Any credit leg has its own lawful rationale; fixed reward on a loan principal faces a separate prohibition	Qurʾān 2:275, 2:279 [S01, S03]
Gharar	Subject, funding, settlement and recourse are ascertainable; execution uncertainty is assessed	Muslim 1513 and AAOIFI 31 [S30–S31]
Fulfillment	The writer or clearing mechanism can meet the state-contingent obligation	Malaysian futures reasoning [S34]
Restitution	Borrower and customer keep all residual assets beyond enforceable obligations	Qurʾān 4:29 and proposed *barzakh al-ḥukm* [S02]
Dissent	Every retained contrary ruling is named	Academy 63/224/238 [S09, S32–S33]

Test	Required fact in the contract	Source or argument
	and the proposed exception is separately argued	

These axioms admit two kinds of certificate. **Consistency** establishes that a particular hedge satisfies compatible source-profile requirements with no identified prohibition within those profiles. **Reconciliation** is required when a source rejects the class of paid contingent right itself. The proposed bridge says that a separately valuable claim supported by accessible settlement property can be a subject of fair exchange when the parties also possess real economic reasons to transfer risk. The bridge revises the Academy’s prohibition of paid abstract risk. Its approval is therefore an original neo-Muʿtazilī position, with the Academy’s rejection preserved in the record.

Let (A) be an asset or liability exposure, (D) a derivative, and () a complete reachable future path including collateral calls, funding, default and liquidation. Define:

$$\Phi(A,D,\omega)=(netcash,title,priority,funding,margin,recourse,default,restitution).$$

The strong equivalence test (,(C_1,)=(C_2,)) permits a coherent common judgment under our explicitly chosen material-extensionality axiom. Identical final profits are a weaker observation. A funded hedge that survives a market crash and an unsecured promise with the same contractual payoff are different property arrangements.

Kamali and the grain that had not yet grown

Mohammad Hashim Kamali is the Malaysia-based jurist this book must meet on its own ground. His 1996 study, later book on futures and options, and articles on an Islamic derivatives market examine the case for commercial hedging within Islamic law [S177–S180]. He gave special attention to commodity futures and to agricultural producers whose production decisions are made under future-price uncertainty. It would misstate his argument to make him the universal sponsor of cash-settled Bitcoin perpetuals. His scholarship instead shows how a serious jurist can take the economic function of a new contract seriously while doing the hard legal work.

In his 2007 discussion he organizes the objections to commodity futures into five concrete questions. How can an agreement concern goods that do not yet exist? What entitles a seller to promise goods she does not yet own? When does the purchaser obtain *qabd*? Does deferring both performances create the prohibited sale of one debt for another? And when does risk-taking become speculation of the sort Islamic law condemns? A proposal that answers only the last question by declaring hedging socially useful has accomplished a fraction of the work [S179].

Imagine a grower trying to finance fertilizer in a market where the cash price of the crop may collapse before harvest. The forward contract gives that grower a commercial instrument; the exchange’s margin rule gives the grower another obligation whose clock may run daily. I have tried to find as little as $5,000 of Bitcoin-native hedging capacity on decentralized rails and found how thin the actual counterparty market remains [S175]. The farmer’s problem survives the move to Bitcoin. So does the jurist’s duty to inspect delivery, possession, default, and the funding behind the clearing house. Kamali supplies an argument worth extending under declared assumptions. The new-school conclusion must carry its own burden.

17.3 The dollar without an interest-bearing dollar loan

Let a cooperative own (q) BTC purchased when the BTC/USD reference price is (S_0), and suppose it has a real obligation denominated in dollars. Its BTC value at a later price (S_t) is (qS_t). If it simultaneously enters a **linear short future or swap** over (q) BTC at reference (S_0), with correct cash settlement and no intervening closeout, the short’s idealized mark-to-market gain is

$$\Pi_{short}(t) = q(S_0 - S_t).$$

Consequently,

$$q S_t + q(S_0 - S_t) = q S_0.$$

The cooperative has constructed dollar-denominated exposure by owning a volatile asset and selling its price risk. It has made a claim whose dollar value follows a reference price. Whether any token issued against that position can be redeemed depends on actual custody, the solvency of the short, and the issuer's redemption commitments. Equation (17.1) describes an **ideal payoff identity**, not an unconditional stablecoin peg.

The BTC-margined inverse construction is equally intelligible. A short contract with USD face value (N=qS_0) has, under the conventional ideal inverse payout rule, a BTC-denominated profit of (N(1/S_t-1/S_0)). The combined BTC balance becomes (N/S_t), whose contemporaneous USD mark is (N). This construction makes the settlement-asset identity material: a claim paid in BTC differs operationally from one settled in freely transferable dollars.

For a live position the accounting is closer to

$$V_t = q S_t + \Pi_t^{realized+unrealized} + F_t - C_t - X_t,$$

where (F_t) is **signed net funding received** (it may be negative), (C_t) is the collection of actual fees and execution costs, and (X_t) records credit, basis, liquidity and settlement impairments. The classification of a cost depends on what legal service it actually compensates. A positive (V_t) measured at a mark price remains distinct from cash that can settle a maturing redemption in the current block.

A synthetic dollar does not need to advertise a guaranteed yield. Its useful work is already considerable: wages can be budgeted, import bills can be priced, and families with Bitcoin-denominated savings can reduce their exposure to a sharp drawdown. Should a protocol distribute funding revenue to token holders, that is a **second transaction** requiring a fresh inquiry about the funding contract, its lending components, and its risk allocation. The label *yield* supplies no independent legal warrant.

Ethena's own USDe documentation describes approximately matched spot holdings and short futures, alongside stable backing assets [S36]. Its funding-risk discussion acknowledges that persistently negative funding may require payments and describes a reserve mechanism [S37]. Its documented short execution uses centralized derivatives liquidity and off-exchange custody services; it is an important operational case study for synthetic dollars, while the decentralized architecture proposed below has different trust requirements. The sources demonstrate the mechanics, not an Islamic authorization.

17.4 The transfer with a zero-sum settlement

Critics sometimes treat the sum of derivative cash payments as dispositive evidence of gambling. Consider two businesses with opposite existing exposures to a price shock (x). Before the contract, their changes of wealth are (+x) and (-x). An enforceable swap transfers (-x) to the first and (+x) to the second. Its payments add to zero. After settlement, each business has zero exposure to that shock. The contracts can reduce the vulnerability of both businesses without adding dollars to the settlement pot.

The significance lies in the *endowments before the derivative*, their ability to execute real production, and the fairness of the transfer's price. A cleared short future can be an exchange of certainty between holders of opposite obligations. A liquidity provider with paid-in capital can also bear the shock for a disclosed premium and subsequently transfer the risk to another participant. This argument supplies a candidate lawful *ʿiwaḍ*: the funded removal or absorption of an identified economic exposure. A highly leveraged trader with no underlying position and no financial capacity presents a different case.

The proposition is bounded. A symmetrical payoff can conceal an exploitative margin rule. Price manipulation can create a windfall that no party agreed to. A platform that advertises a hedge while profiting by liquidating its customers may have sold a misleading promise. These differences are instances of *barzakh al-ḥukm*.

17.5 Leverage has two denominators

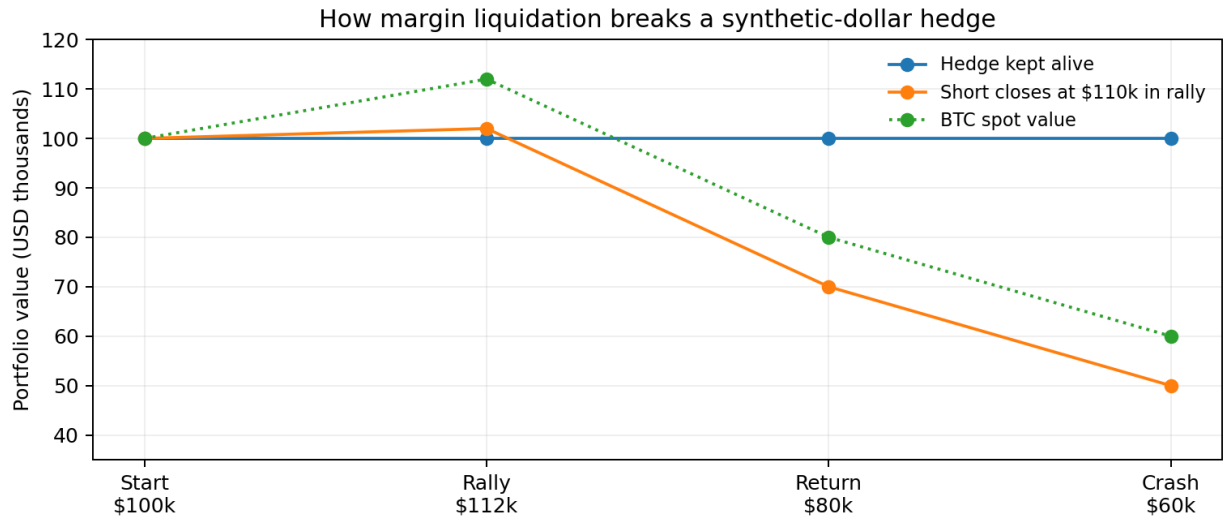
A producer owns 1 BTC marked at $100,000 and shorts exactly 1 BTC through a future. This is a hedge ratio of one:

$$h = \frac{\text{absolute short price sensitivity}}{\text{existing spot price sensitivity}} = 1.$$

Suppose the futures venue demands only $10,000 of posted margin. Its displayed **margin leverage** is (L=100{,}000/10{,}000=10). The entire economic portfolio can be approximately dollar-neutral despite the venue's 10x label. Yet the venue has a real claim for additional cash if BTC rises. If a 12% upward move creates a $12,000 loss on the short, the short can breach its isolated margin requirement while the owned BTC gains $12,000 elsewhere. A liquidation can crystallize the short's loss and leave the portfolio newly exposed to BTC just before the price reverses. Equation (17.1) continues to hold for a hedge **kept alive**. Its practical failure is a failure of financing and execution.

A path-dependent example, with dollars rounded and execution costs excluded:

BTC price path	Intact one-BTC short plus spot	Short exhausted at $110,000, then BTC falls
Start at $100,000	$100,000	$100,000
Rally reaches $112,000	$100,000	$102,000 after the short was closed at $110,000
Price returns to $80,000	$100,000	$70,000
Price drops to $60,000	$100,000	$50,000



The same terminal spot price can deliver different wealth after an intervening margin liquidation. Toy payoff paths with zero fees.

The different outcomes for the final $60,000 state arise from the history of forced closeout. A terminal-payoff equivalence proof that omits this path has left out the legally important property of the contract.

A hedge ratio of ten is another matter. Shorting 10 BTC against ownership of 1 BTC manufactures a large net short wager, with 9 BTC of price sensitivity beyond the preexisting exposure. A profit motive may be legitimate, but that position cannot inherit the ethical argument for protecting the original coin.

The proposed *mutaqlid* therefore distinguishes (h), the amount of risk genuinely offset, from (L), the collateral efficiency offered by the venue. A high (L) requires a more exact settlement and liquidity proof. It can be admissible when the contract's full liquidation exposure is secured through independently enforceable property and the user is informed of the consequences. An unsecured high-leverage position cannot acquire legitimacy by calling itself a hedge.

We can formulate a sufficiency claim with a quantifier over the adverse price paths ():

$$\forall \omega \in \Omega : M_{accessible}(t,\omega) + W_{deliverable}(t,\omega) \geq maintenance(t,\omega) + costtoclose(t,\omega),$$

at each margin-check time before the planned close or expiry. The term (W) means hedging wealth that can actually reach the clearing venue **before** its liquidation deadline, net of haircuts. Collateral in a separate Bitcoin vault does not count merely because a portfolio spreadsheet displays it. Full coverage over an unbounded price process is generally impossible with finite capital; the contract must specify position limits, termination rules, accessible reserves and who bears tail loss beyond the modeled domain. Conditional coverage within an explicitly bounded scenario domain is a testable engineering claim, with the domain limitation disclosed.

17.6 Perpetual funding goes before the jurist

A fixed-date future establishes a delivery or cash-settlement obligation on a known date. A perpetual has no expiry and makes periodic payments intended to align its market price with spot. Those payments are often called *funding*, yet the word itself tells us little about the relevant *ʿillah*. A payment between open positions for carrying a genuine risk claim need not be a creditor's reward on principal; a charge imposed for advancing money can remain ribā even when embedded in a derivative account. The obligation needs to be decomposed event by event.

Hyperliquid's published funding formula provides an adversarial example [S38]. It includes a nominal fixed **interest-rate component** together with a varying premium term. The resulting payment transfers between longs and shorts according to the market formula. A *mutaqlid* must decide whether that fixed component is merely part of the market-clearing price of the swap, an economic substitute for compensation on credit, or a mixed mechanism whose specific contract violates the retained ribā rule. Numerical replication of a borrowing rate is substantial evidence and triggers further inquiry. A label chosen by the exchange settles nothing.

TradeLayer's published derivative design instead describes a perpetual series with hourly funding based on deviations between its market VWAP and the oracle or underlying index. The description says there is **no built-in interest rate** and specifies a five-basis-point deadband around parity [S39]. This presents a cleaner proposed test case for a basis-correction theory of funding. It remains documentation of a design; the particular implementation, settlement ledger, oracle and loss waterfall require inspection before a protocol can receive the fatwa certificate. The user's developing TradeLayer-Rust implementation is accordingly a candidate laboratory for this chapter, whose exact current behavior must be fixed to a code revision before formal verification.

The 2010 ISDA/IIFM *Tahawwut* Master Agreement demonstrates that substantial Islamic-finance institutions already document hedging transactions. It covers commodity-*murābaḥah*-based profit-rate and currency swaps with their own Sharia structuring [S35]. That institutionally accepted architecture demonstrates a need for hedging. It also raises the original question of economic equivalence: when successive commodity sales reproduce the exposure of a swap, where exactly does the material legal boundary lie? The answer may concern genuine title and trade risk, whose order of operations must be shown. A directly funded decentralized obligation could deliver the same legitimate risk reduction with fewer opaque intermediaries under our proposed new bridge, subject to the same scrutiny for its credit and exchange legs.

Field note: the five-thousand-dollar hedge nobody offered

In 2026 I went looking for a counterparty willing to take roughly five thousand dollars of Bitcoin price risk through Bitcoin-native or Lightning-based arrangements. The search proved unexpectedly difficult. There were protocols, presentations, and enough diagrams to fill an engineering conference. Getting a usable, appropriately collateralized two-sided quote was another matter. This is the author's market experience, not a survey of all available venues [S175].

The point bears on permissibility because a nominal ability to hedge provides little protection when an ordinary farmer or merchant cannot execute at a price they can bear. A contract may be mathematically coherent and religiously defensible within our proposed premises. Its market still needs counterparties, liquidity reserves, timely settlement, and honest prices. The fatwa must specify which of these are assumptions and which have been demonstrated.

17.7 A decentralized swap contract is a property machine

A decentralized risk market requires an order specification that defines the notional, underlying price, exercise or settlement rule, expiry if any, collateral assets, counterparty priority, oracle, and who receives a residual after closeout. If trading occurs continuously, the engine must publish the mark, margin calls, liquidation algorithm, insolvency waterfall, fees and available relief from bad price feeds. Governance changes that apply during existing positions are legally material.

Bitcoin Discreet Log Contracts (DLCs) are one candidate settlement form. Parties fund a shared transaction and precommit to payouts contingent on an oracle's later signed price observation. The DLC specifications describe refund paths on missing attestations and candidly identify the colluding-oracle trust problem [S40]. A fully funded finite-range BTC/USD hedge could thus be implemented as a series of enforceable contingent transfers. Continuous perpetual positions would need additional state updates, refinancing and settlement arrangements that these specifications alone do not provide.

For a collateralized order-book swap, the same *mutaqlid* method yields an execution-level checklist, rendered here as contractual commitments. The protocol must identify legal ownership during margin custody; make collateral sufficient relative to its stated bounded risk domain; enforce fair closeout without confiscating the remaining estate; provide credible price attestations; and account for every payment source, including credit costs hidden in funding or fees. A nominally decentralized exchange may still depend on centralized mark-price reporters, validators or discretionary insurance administrators. Every such authority belongs inside ().

17.8 Ducat and UNIT: separate the vault from its hedge

Ducat's public Bitcoin-lending materials describe UNIT as a BTC-overcollateralized dollar-pegged token, a 160% entry collateral ratio, and liquidation at 135% [S20–S24]. Its present homepage advertises a one-time **7% minting service charge**, whereas some older technical documentation reports **1%** [S20, S25]. The homepage presents its own Sharia-compliance claim. The fee's economic function and the current deployed rules remain an independent question for this book.

A borrower who pledges 1 BTC while owing 50,000 UNIT carries BTC price risk and a separate UNIT debt. Shorting BTC on another platform can reduce that risk, yet the Ducat vault's oracle may still authorize liquidation when the BTC spot collateral reaches its threshold. A swap profit in an outside account can arrive after the vault has been seized. Risk reduction at the portfolio level is therefore different from **enforceable protection of the pledged coin**.

The proposed remedy is an integrated *rahn*-and-hedge module. At each permitted margin event, the vault's debt test would include only cash or collateral claims whose settlement is enforceable before the authorized liquidation transition. A borrower could also select a specified no-early-liquidation term, supported by fully

funded put-like protection and a closeout procedure at maturity. The writer's property, the borrower's residual, and the protocol's recourse must be defined in a single priority waterfall. Selling a covered call to finance the protection would require resolving the collision between the pledgee's rights and the call holder's exercise right. This structure has engineering merit even if UNIT's existing minting charge fails a separate ribā audit.

For illustration, suppose 1 BTC starts at $100,000 with a 50,000-UNIT obligation. A perfectly performing linear short on **half** a BTC produces adjusted collateral (A_t=S_t+0.5(100{,}000-S_t)), before costs. At $40,000 spot, the BTC and hedge together mark to $70,000, just above 135% of the nominal debt, or $67,500. At a theoretical zero BTC price the same half-BTC hedge supplies $50,000 and breaches that threshold. Shorting the full BTC gives an idealized $100,000 floor for all nonnegative prices, with much greater cash demands if BTC rallies. Both examples assume the short remains funded and its proceeds are available before the vault's liquidation path executes.

A candidate integration with a TradeLayer-style futures venue would require an enforceable bridge between distinct settlement systems, authentic performance of the hedge, and timely access to its proceeds. A sidecar dashboard that simply subtracts a swap mark price from Ducat debt provides information. A settlement rule recognized by all parties can protect property.

Perpetual funding and the fee that keeps changing its name

A perpetual swap can keep a hedge approximately dollar-neutral by transferring funding between long and short accounts. The accounting screen calls the transfer funding because that is what the market calls it. For the jurist the legal classification depends on the obligation that generates the payment, the source of collateral, and the terms under which a participant can close it. Some funding streams compensate the holder of a price exposure; others may embed an interest-bearing credit arrangement or produce a creditor benefit that deserves scrutiny.

A trading interface may display leverage as a single number. My own experience of thin Bitcoin markets has made the word feel incomplete. Tenfold margin leverage on a fully hedged inventory position creates one set of risks; the same displayed multiple attached to a naked speculative bet creates another. Both depend on whether a settlement engine can debit a losing account under authorized rules. The *mutaqlid* dossier should make that fact visible before it awards a legal label.

17.9 The *ḥalāl* perimeter and the line of *bi-l-bāṭil*

The following classifications express **the provisional proposed Muʿtazilī jurisprudence**, subject to the facts stated. They neither purport to represent consensus nor determine a real platform's status by brand.

Instrument and condition	Proposed classification	Decisive obligation
Producer's standardized, funded future on a lawful commodity, with ascertainable performance	Conditionally permissible	Genuine exposure, fair settlement and no loan uplift
Fully secured fixed-term BTC/USD swap used to pay a known dollar obligation	Conditionally permissible	Complete payout coverage, rightful title, clear oracle and restitution
BTC plus a matched short producing a redeemable synthetic dollar	Conditionally permissible	Accessible hedge collateral, honest reserve claims and redemption rights
Fully funded DLC with numeric-price oracle and bounded payouts	Conditionally permissible	Honest oracle assumptions and enforceable refund or fallback
Matched BTC short advertised at 10x margin leverage, with surplus accessible before all margin calls	Requires demonstrated coverage	Show the pathwise liquidity certificate, including jump and outage states
Matched BTC short at 10x margin leverage, with the offsetting BTC unavailable to the margin engine	Presumptively defective as a protected-dollar promise	Forced liquidation can destroy the hedge

Instrument and condition	Proposed classification	Decisive obligation
Perpetual funding based on a transparent basis correction	Requires *ʿillah* and contract audit	Identify whether the payment prices risk transfer or compensated lending
Perpetual with an explicit interest-like component	Contested, heightened ribā review	Decompose the component and demonstrate why the loan prohibition is respected
Swap funded by an interest-bearing margin loan	Prohibited while that credit term remains	A hedge cannot cleanse its loan
Fixed-profit partnership whose ordinary losses fall entirely on depositors	Prohibited under the proposed core	Fictitious partnership and inequitable loss allocation
Tenfold speculative short beyond existing exposure, with liquidation losses socialized	Outside the hedging permission; ordinarily *bi-l-bāṭil* under the stated conditions	Exposure manufacturing, unpaid tail obligations and wrongful transfer
Oracle manipulation, fabricated reserves, hidden rehypothecation, confiscation of residual equity	*Bi-l-bāṭil*	Deception and unauthorized appropriation
Fiat reserve or interest-rate products inside a synthetic-dollar issuer	Separate potentially prohibited income stream	Audit investment assets and source of distributed returns

The charge of *maysir* requires attention to what the parties have **agreed to do with each other**, including the natural exposures that preceded the bet-like payment. Genuine production, settlement and informed underwriting can supply a lawful purpose. The absence of a prior exposure, extreme leverage and a price wager whose obligations cannot be delivered may move the instrument across the legal boundary. One cannot infer each trader's ethics from aggregate market arithmetic alone.

17.10 The Lean proof obligations

The accompanying file JihadAgainstRiba.lean extends the book's proof discipline with deliberately small statements in Init. It formalizes the idealized linear-hedge accounting identity for an arbitrary integer price, illustrates two natural opposite exposures cancelled by a zero-sum risk transfer, and demonstrates a margin-breach counterexample despite the terminal portfolio identity. A bounded witness structure then requires notional coverage, disclosed funding, an identified real exposure, settlement, and the absence of interest-bearing margin credit. A source-profile disagreement and any reconciliation bridge remain jurisprudential premises: Lean does not extract a correct *ʿillah* from a classical book or audit a deployed exchange merely because someone typed true for settlement.

The engineering milestone is a *reachable-state* proof over a pinned executable. Starting from authorized deposits, every state update would preserve conservation, rightful ownership, debt priority and safe closeout under a fully specified oracle and insolvency adversary. Counterexamples are required for delayed settlement, exchange halt, oracle deviation, negative funding, governance changes, and a collateral gap between systems. The full proof must also cover any emergency powers and show that the borrower retains every residual unit of property beyond valid claims.

The corresponding juristic certificate would state: **permissible under the new school's axioms if the stipulated economic exposure is real, both legs are independently lawful, the obligations are funded across the declared reachable domain, the hedger receives the protection promised, the counterparty's property claims are respected, and the contract has neither an interest-bearing credit leg nor deceptive appropriation**. The 1992 and 2018–19 Academy prohibitions remain recorded dissent where the bridge conflicts with their treatment of derivatives. This is the open problem the chapter asks other jurists to prosecute.

17.11 A fatwa that can lose its proof

Suppose the household whose wages arrive in Bitcoin wants to preserve six months of rent. A capitalized counterparty can agree to exchange BTC appreciation for the household's downside, with both parties' liabilities held under a public settlement rule. The worker can afford a date and an amount; the counterparty earns an agreed commercial price for absorbing risk. If the contract delivers that protection across the stated circumstances, its consideration is intelligible. If the platform instead lends margin at interest, lets its oracle invent a price, or closes the hedge before the promised rent can be paid, the proof certificate fails where property and obligation meet.

The book's *jihād against ribā* is an argument for building that missing machinery. A just market lets people secure tomorrow's obligations through informed exchange, makes the price of protection inspectable, and forces its powerful intermediaries to bear the promises they sell. The mathematics earns its place by discovering the states in which those promises break.

Source and validity note. The normative names *gharar al-tanfīdh*, *mutaqlid fī al-uṣūl* as an office, and the reconciliation bridge are proposals of this book. All platform details cited are sourced to public design documents. No live lending or derivative market has been audited or granted a binding fatwa. Mathematical results are conditional on the settlement, domain and liquidity assumptions stated.

17.12 Hedging after the Academy's two resolutions

The strongest institutional objection to our futures argument is found in the Academy's own development of hedging law. Resolution 224 (8/23), adopted in 2018, acknowledges the protection of property as a legitimate objective. It then insists that each means used to achieve the objective be evaluated under the rules of contract law. It identifies options, most common futures and deferred exchange of currencies as previously objectionable structures; its restrictions also address ribā, gharar, trades in abstract rights, the sale of commitments, and the treatment of risk itself as an independent compensated object [S32, S113, S156]. The Academy's view is therefore more demanding than the proposition that hedging is useful.

Resolution 238 (9/24), issued in 2019, elaborates possible lawful risk-control mechanisms. It discusses diversification, cooperative protection, parallel *salam* and *istiṣnāʿ*, combinations of existing contracts, conditional purchase rights and guarantees. For parallel contracts it emphasizes legal independence between the obligations rather than the mere appearance of an offsetting payoff [S33, S82, S158]. Its currency examples are particularly instructive. Binding reciprocal promises to exchange currencies at a future price are treated as substantively equivalent to a deferred currency exchange prohibited under the Academy's *ṣarf* rules. Here the institution itself uses a form of economic or legal equivalence to reject a clever repackaging.

That observation should change how a pro-hedging school argues. It can agree that underlying exposures should be managed and still question the Academy's view of a separately compensable option right. It should accept that the Academy does not extend blanket permission to familiar derivatives. Each departure must therefore be a reasoned, source-specific conclusion rather than a report of a unanimous legal license.

17.13 The synthetic-dollar stress test

Suppose a firm holds one BTC worth $100,000 and promises a customer $100,000 in dollar redemption claims. It enters a short perpetual exposure nominally equal to one BTC. Under perfect tracking, continued settlement and no costs, the spot gain and derivative loss cancel at each chosen valuation event. The balance-sheet arithmetic seems to supply a dollar asset without holding dollars. The legal question becomes acute when funding is paid, an exchange withdraws margin, a liquidator closes the short, or the borrower claims title to coins pledged elsewhere.

The firm must disclose the exact thing it promises: an unconditional dollar obligation, a claim on a BTC pool, or a share in a variable-value investment. For an unconditional dollar claim, redemption remains a liability even after the hedge has failed. A deposit of BTC at an exchange changes the rights of depositors according to custody terms, rehypothecation rules and insolvency priority. The effective exchange rate may be a price quotation while the redemption contract is a debt payable in a different unit. These are separable legal events.

The Academy's 1998 Resolution 102 (5/11) prohibits deferred currency exchange and requires attention to the *qabd* requirements for currency trading [S159]. If a proposed structure is legally a foreign-exchange sale with delayed reciprocal settlement, its proponents must confront that prohibition. If it is instead an independently collateralized price-risk claim, they must establish the difference through the rights and obligations actually created. Giving the contract the name of an insurance policy or a synthetic dollar is insufficient.

For a BTC short, distinguish hedge ratio $h = q_{short}/q_{owned}$ from margin leverage $\ell = q_{short} S_0 / M$. A portfolio with $h = 1$ can have $\ell = 10$ when its posted margin is one-tenth of the notional. The underlying exposure may be close to delta-neutral while the margin account is vulnerable to a temporary upward price path. At the same final S_T, one trade remains hedged and another closes early. That is a legally material divergence if it changes loss allocation or causes the customer to forfeit pledged property. The proposed fatwa therefore depends on the entire pathwise settlement machine, including failed oracle updates, adverse funding and correlated default.

The institution approving a risk-transfer structure needs evidence that its reserves can meet simultaneous redemptions, that fees have a lawful and separately identified cause, that customers knowingly accept their contractual ranking, and that liquidators cannot spend restricted property. These requirements do not constitute an inherited fatwa granting general permission for perpetuals. They describe the factual predicates upon which this book would consider making its own determination.

17.14 An objection the book should welcome

Consider an adversary who implements a short perpetual using a guaranteed principal loan with a stipulated interest-like benefit, then places an option premium on top. The customer receives a bounded payout, and the platform advertises mathematical equivalence to a protective collar. This is the worst case for the book's argument. The price-risk hedge can be economically coherent while an independent prohibited loan condition remains. Our method rejects the shortcut from hedge utility to legal permission. A different design using fully owned margin, separately funded protection and a defined exercise right would require its own property-law analysis and may still be rejected by a school that refuses independent sales of such rights.

A *mutaqlid* fatwa about derivatives can therefore make a defensible conditional claim: under an explicitly adopted legal theory recognizing a specified funded right as transferable property, this contract is permissible only if its actual obligations satisfy the remaining rules on ribā, disclosure, title, custody and settlement. The verdict is an original legal construction. A traditional jurist may reject its chosen property premise while accepting its arithmetic. A court may reject its enforceability premise while sharing the property theory. The disagreement has thereby become a tractable research problem.

18. Gharar, Maysir, and the Mathematics of Risk

Two merchants agree today to exchange grain next harvest. A farmer knows the exact number of sacks she must deliver and how the grain will be graded. The buyer knows the agreed price and delivery date. Each also knows the harvest may be poor and the market price may change. Their transaction contains uncertainty about the future. Its important legal questions concern the contract's subject, the enforceability of delivery, and the distribution of the losses they have accepted.

A second pair of traders enters an apparently exact Bitcoin futures contract. The index formula is public and the final settlement amount is mathematically determined. Their exchange reserves the right to liquidate accounts using a separate mark price derived from an opaque feed, temporarily suspend withdrawals, and change the amount of collateral recognized for margin. The contract displays a precise terminal equation. Its living obligations remain uncertain to the people who signed it. A jurist investigating *gharar* should examine these mechanics along with the printed payoff.

The proposed thesis of this chapter is that the legal problem of gharar concerns **uncertainty in the object of exchange, the parties' knowledge, and the reliable performance of obligations**, with each school applying its own qualified rules. Economic risk can also be lawful property exposure. A financial algorithm may create new uncertainty by shaping when and how the parties lose or receive their property. Donald MacKenzie's account of financial models acting upon markets supplies a method for seeing those effects [S29]. The inference about Islamic law is our own.

18.1 The transmitted prohibition and its burden

The report attributed to Abū Hurayra in Ṣaḥīḥ Muslim 1513 condemns *bayʿ al-ḥaṣāh*, transactions determined by casting pebbles, and *bayʿ al-gharar* [S30]. The paradigmatic defect concerns a sale whose subject or performance is inadequately specified. A bargain for whichever unseen object a pebble happens to strike leaves a material part of the agreed exchange to chance. The jurist must then ask whether consent adequately covers the claimed sale and whether the seller is able to deliver the property.

Our source register distinguishes the hadith's attestation from its binding authority under every possible theory of reports. The present book's Muʿtazilī framework also examines the prohibition through Qurʾān 4:29's concern with lawful trade and mutual consent [S02]. This is an interpretive bridge to be justified, rather than a claim that the Qurʾān itself formulates every later technical rule associated with gharar.

The prohibition has never meant that merchants must know the realized price of their goods next month. Every authentic sale of a crop, house or machine exposes someone to market changes. A partnership exposes people to uncertain profits. The law therefore needs distinctions between ordinary uncertainty accepted with a known object and severe uncertainty in the object or delivery itself. The distinctions within an identified legal tradition must be recorded in its own terminology and evidentiary hierarchy.

18.2 The salam precedent and a future that can be sold

The well-known report in Ṣaḥīḥ al-Bukhārī 2240 describes payment in advance for dates to be delivered later, with a specified measure, weight and term [S70]. That transaction leaves the future harvest uncertain. Its legal form attempts to control uncertainty by making the obligation determinate and by specifying when it becomes due. The right to future delivery can be meaningful property for the buyer, and advance payment can finance the grower without turning the transaction into a guaranteed-interest loan.

The legal differences between a salam sale and a modern derivative matter. The buyer of salam has paid for identified goods of a specified description. Many cash-settled futures traders buy a right to a difference in prices, which may lack a commodity-delivery claim. Some modern authorities therefore distinguish permitted

salam from contemporary futures and swaps. The purpose of this precedent is to show that deferred delivery and uncertain future value cannot be treated as a universal proof of invalidity. It leaves open the legal nature of cash settlement and the conditions under which a contingent price right may become *māl*.

A contemporary comparison appears in Malaysia's 1997 decision concerning crude palm oil futures [S34]. The Council treated specified and cleared futures trading as permissible under its reasoning and distinguished speculation from gambling under particular conditions. The International Islamic Fiqh Academy, by contrast, rejected several conventional derivative forms in 1992 and retained the relevant objections in its later hedging resolutions [S09, S32–S33]. A legitimate *mutaqlid* fatwa must record this disagreement. It cannot cite the Malaysian permission for every leveraged futures market or quote the Academy's acknowledgement of legitimate hedging as approval of every modern derivative.

18.3 The operational anatomy of a gharar claim

For a contract C, let the following factual questions define an audit vector:

$$G(C,\omega)=\left(U_{object},U_{delivery},U_{information},U_{enforcement},U_{remedy}\right)_{\omega}.$$

The terms are indicators or structured descriptions, not universal numerical legal weights. U_{object} concerns ambiguity in what is sold. $U_{delivery}$ concerns the capacity to perform. $U_{information}$ concerns the parties' access to necessary contractual facts. $U_{enforcement}$ concerns control over liquidation, settlement and unilateral changes. U_{remedy} concerns what happens if the promise fails. Each inquiry must be made at contracting and along relevant future paths.

AAOIFI's Shariah Standard 31 distinguishes excessive, medium and minor gharar and attends to the type of contract, the significance of the uncertain term and the role of necessity [S31]. Its distinctions supply a practical challenge to any proposed one-number gharar score. A probability of failed performance may aid empirical analysis, yet legal materiality depends on what was promised and why the uncertainty should matter under the adopted school. An exact probabilistic percentage should therefore be reported as an engineering input with a clearly chosen stress model. It is not, by itself, a newly discovered Sharia threshold.

This suggests a two-stage audit. The first records whether contractual rights and events are intelligible to a reasonable party, and whether the promised subject can be identified. The second examines whether the contract can perform reliably under foreseeable failure states and whether its remedies distribute shortfalls lawfully. If the first stage already shows that one party can replace the subject after signing, the apparent contract may be defective irrespective of a favorable statistical failure rate. If the terms are clear but the settlement reserve is inadequate, the second stage reveals an additional danger.

18.4 The engine that manufactures its own price

MacKenzie's *An Engine, Not a Camera* argues that financial theory helped constitute financial markets rather than merely describing an independent object [S29]. The standard option-pricing model shaped traders' pricing and hedging practices; market institutions and historical crises reshaped how its assumptions could be used. We should carry that sociological insight into a juridical inquiry about a programmed market, while attributing the new fiqh to this book rather than to MacKenzie.

A decentralized exchange may calculate its mark price from an index and an internal funding premium. That price triggers margin requirements. Liquidation trades then move the market, changing the premium and the liquidation threshold for other accounts. A feedback loop appears:

$$\text{mark price} \rightarrow \text{margin calls} \rightarrow \text{forced trades} \rightarrow \text{market price} \rightarrow \text{new mark price}.$$

A contract can disclose the formula and still create circumstances in which the formula drives an unstable market. Whether the resulting uncertainty is legally disqualifying requires argument about foreseeability, manipulation, ownership and remedies. The programmable engine is part of the thing the parties have agreed to use. If the engine's rules give one participant the unilateral power to appropriate collateral, its design concerns consent and wrongful taking of wealth.

18.5 The one-BTC hedge and the vanishing margin

Assume a merchant owns 1 BTC worth $100,000 and shorts the equivalent of 1 BTC through a cash-settled future. Ignoring fees and funding, the terminal mark-to-market wealth if both legs remain in force is

$$W_T = S_T + \left(100{,}000 - S_T\right) = 100{,}000.$$

Suppose the exchange initially accepts a cash margin of $10,000. The BTC price rises to $112,000 before falling to $60,000. The short loses $12,000 at the high-water mark, and the margin engine can forcibly close it when maintenance conditions are breached. If the closeout occurs at $110,000, the short has realized a $10,000 loss. The trader still owns BTC, now worth $60,000, and has a total remaining economic value of approximately $50,000 before any other costs. The intended stable-dollar hedge has been destroyed by the path of prices even though the final price is favorable to the short.

This is a useful **counterexample** to a claim of all-path hedging safety. Its exact trigger depends on the venue's margin and maintenance policy. The example isolates the fact that a terminal algebraic identity cannot guarantee an intermediate property right. A more tightly integrated vault might allow the BTC appreciation to count as collateral for the short, but this too demands enforceable cross-margin rights, timely price data and protections against a collateral seizure that prevents the putative hedge from performing.

A well-designed protocol should therefore test the margin engine against temporary excursions, oracle delays, low liquidity, correlated counterparty failures and withdrawal suspension. The probability and worst-case magnitude of each failure depend on the design. A hidden liquidator preference can impose costs far larger than the advertised spread. The jurist should see both the advertised settlement formula and the conditions under which it ceases to bind.

18.6 Risk transfer, speculative demand, and maysir

A household hedging a known future payment holds a different economic position from a trader building a very large price exposure with no underlying liability. That difference is important to the protective rationale invoked in the book. The Malaysian discussion explicitly addressed speculation and drew a legal distinction from gambling [S34]. The Academy's 2018 hedging resolution stresses protection of wealth and rejects instruments it regards as impermissible forms of risk exchange [S32]. Their disagreement is substantive, including the underlying legal status of the right being priced.

We need a disciplined treatment of **maysir**, the wrongful structure of gain through games of chance and wager, independent of an assertion that any zero-sum payoff constitutes gambling. Insurance, hedging and matched forward commitments can also redistribute money from one counterparty to another. A single zero-sum accounting identity cannot tell a court whether the parties knowingly exchanged an enforceable service, transferred a legitimate financial right or set up a prohibited wager. The character of the entitlement, purpose and terms must be identified under the relevant sources.

The proposed Muʿtazilī account treats existing exposure as evidence in favor of a protective use, while avoiding the fiction that speculative motives can always be discovered inside a wallet. On-chain data may reveal the notional size of the derivative and the collateral available at a particular time. An anonymous address cannot prove the beneficial owner's off-chain cash obligations. An instrument-level permissibility judgment

and an individual user’s moral assessment therefore require different kinds of evidence. Clear protocol rules can constrain harm regardless of a trader’s private intention.

18.7 Funding payments that look like interest

A perpetual swap often transfers funding payments between longs and shorts to help keep its price near an index. Such a payment may be determined by a publicly defined imbalance formula. A jurist needs to identify the payment’s legal cause. Is a party paying for the performance of a contingent price claim, or has it borrowed principal at a stipulated return? Does the trader use interest-bearing margin, with funding payments layered onto an ordinary loan? Is the recipient contractually guaranteed a return regardless of market events? Those facts can change the classification.

The accounting equivalence of periodic funding and an interest stream is evidence requiring scrutiny. It settles neither their contractual nature nor their compliance with a school’s rules. One can construct examples where funding arises only while a trade position exists and can reverse sign, and examples where a fixed lender charge is hidden under a funding label. In a *mutaqlid* hearing, the accused payment must be traced to its legal entitlement and the relevant normative bridge must be exposed. The general anti-ribā doctrine developed in the preceding chapter remains operative even when the product is advertised as an interest-free synthetic dollar.

Funding can introduce novel gharar when its formula may be altered retroactively, when it depends on a thinly traded price susceptible to wash trading, or when the borrower cannot know the bound of the payment. Other designs specify a formula and an enforceable cap that parties can understand before trading. Those differences belong to the contract-state record. The source-specific Sharia judgment requires further argument about derivative rights and exchange obligations.

Coinfessions and the evidence of a damaged market culture

The anonymous Coinfessions feed is a strange archive for a jurist. Among the submissions summarized by CoinMarketCap are a trader who purportedly concealed the proceeds of an investment funded by his mother, a contributor alleging large diversions from a charitable foundation, and stories of families moving assets away from exchanges during the 2022 crisis [S172, S173]. Their identities and factual claims are unverified. They demonstrate narratives that participants are willing to tell about trust, regret, family obligations, and enrichment, while providing no reliable estimate of how common any behavior is.

The moral questions are concrete. What was promised to the mother? Who controlled the donated money? Was a depositor told that assets could be used to fund an affiliated trading desk? These questions have better evidentiary counterparts in documented insolvencies. FTX’s misuse of customer deposits, established in a criminal proceeding, demonstrates why a custodian’s assurances and its enforceable balance sheet demand separate attention [S174]. An anonymous confession may suggest a question. Court records, account histories, and authenticated contracts are needed to answer it.

18.8 Informational consent is an engineering property

Consent is meaningful when the parties understand the object and principal risks of what they sign. A contract document that describes a 135% collateral ratio without disclosing whether a price oracle can transfer the entire vault to a liquidator gives an incomplete account of what the borrower is risking. A terminal USD-equivalence promise that omits a funding charge or rehypothecation right does similar work by silence. Source code may be public while the practical likelihood of discovering a hidden parameter remains remote. The proposed method includes an explanatory disclosure duty that can be audited.

The disclosure must describe custody, available exit routes, liquidation thresholds, fee priority, oracle dependencies, and who gets the remainder of collateral after legitimate senior claims. Contractual authority to change any of those matters is also a relevant subject of exchange. The doctrine of *bi-l-bāṭil* provides a moral

and legal question about appropriation, while the precise modern disclosure standard is a new policy premise for the proposed school. The author must defend it with practical evidence of how traders make decisions.

18.9 When an option reduces gharar

Consider the widow financing planting costs against land or Bitcoin savings. An ordinary floating-price debt obligation might compel a distress sale after a brief price decline. A fully funded put gives its holder a defined contingent right to receive cash when the collateral falls below a strike. If the option's proceeds are irrevocably assigned to the vault and settle in time to protect repayment, the worst-case exposure can be narrowed. The instrument has uncertain exercise value at inception, yet its function is to reduce the risk of losing property during a severe price movement.

The International Islamic Fiqh Academy rejects conventional options traded as abstract paid rights [S09, S32–S33]. Malaysia's recognition of financial rights in certain warrants provides contrary material for reasoning about whether such an entitlement can constitute *māl* [S10]. The proposed *mutaqlid* bridge argues that a specified, enforceable right can be valuable property when its obligations are funded and its exercise terms fair. The bridge needs an independent proof of its legal authority. A risk-reducing function is an important reason to investigate a contract; it does not magically invalidate the institutional objection.

The option example also teaches the limits of purely statistical argument. A put may be priced at its fair expected value yet issued by an insolvent counterparty. Its theoretical payoff is then a weak asset. A put may pay properly while a senior secured creditor takes the proceeds before the borrower receives protection. The contract has to bind settlement priority to the risk reduction it claims. The proposed school should permit the right only on the terms it can defend, with the legal and engineering facts open for hostile examination.

Das would ask who wrote the stress scenario

Satyajit Das described a banking business in which engineers could recast the economic nature of an instrument to obtain favorable regulatory treatment [S182]. He also examined the incentives of distributors who sold complex risks to clients in less favorable positions [S170]. Those observations belong directly in the assessment of *gharar*. A prospectus can give customers a probability distribution calibrated to yesterday, while the seller owns the option to close the position under tomorrow's extraordinary market rules.

A serious audit asks which shocks the stress model excludes and who has authority to change the execution rule. The inverse contract, an oracle timeout, and a liquidation discount are each comprehensible separately. Their interaction is where the unlucky user discovers the shape of the contract. An attractive expected value provides little comfort if the only attainable payoff under pressure belongs to someone else.

18.10 Toward a source-sensitive gharar dossier

The requested instrument receives a contract-identity and version record; a statement of the legal subject being exchanged; an account of the parties' actual knowledge; custody and settlement rules; recognized restrictions on amendment; a list of adverse paths; and evidence of available collateral and remedies. The jurist then enters the rules of the declared school and its authority hierarchy. A dissenting ruling should appear in the same file with an explanation of the source premise producing it.

Some of these questions can be tested in Lean or executable simulation. The code can prove that under a stated predicate of funded settlement, a holder receives a bounded payoff, or it can produce a path where liquidation defeats the intended hedge. It cannot infer from a payout identity that the risk right is *māl*, nor can it establish a universally agreed materiality threshold for gharar. The human legal question remains visible at the end of a successful mathematical proof.

18.11 An empirical programme that could defeat our thesis

The proposed school's affirmative case for contingent rights must face a serious test: can two mutually consenting, informed parties buy and sell a funded contingent entitlement whose enforcement improves their ability to fulfill productive obligations without creating hidden confiscatory claims? A failed settlement, manipulation of a disclosed oracle, a bankruptcy preference over the option buyer, or a margin path that destroys protection supplies evidence against the particular instrument. Repeated evidence of unavoidable harm might require revising the permissibility criterion itself.

The opposing school may dispute the very characterization of a paid exercise right as lawful property even if the code performs perfectly. That disagreement cannot be resolved by another backtest. It requires reasoned *uṣūl* and an account of authority. The resulting inquiry gives gharar its appropriate intellectual seriousness: a theory of what people can knowingly exchange, what they can compel one another to perform, and what their markets' engines can do to the ownership they thought they retained.

18.12 Source and status notes

[S30] supplies the transmitted gharar prohibition; [S70] the salam precedent; [S31] the modern AAOIFI classification of degrees and legally relevant location of gharar; [S09, S32–S33] the Academy's objections to options and hedging forms; [S10, S34] source-specific Malaysian counterpositions; [S29] MacKenzie's theory of the performativity of financial models. The operational vector G, the notion of executable uncertainty, and the proposed rules on fair disclosure and collateral integrity are original constructs. Their claims remain conditional on the law and the actual contract under investigation.

19. The Boundaries of Ḥalāl and Bāṭil

A useful law of decentralized finance must be capable of issuing a favorable ruling on one transaction and an adverse ruling on a superficially similar one. The permission to trade supplies the ordinary starting point, and the Qurʾānic restrictions on ribā and wrongful appropriation [S01–S03] define independent tests. The question cannot be solved by a list of token names or the developer's declaration that a position is a hedge. We need a transaction-level perimeter.

19.1 The object of the trade

A permissible subject must be sufficiently identified, held or delivered in the way the governing method requires, and capable of lawful possession or enforceable settlement. A token whose holder owns a segregated asset is legally different from a redeemable company debt; a paid derivative right is different from an unenforceable prediction written in an application. The existence of an observable market price does not supply consent or ownership. A non-transferable waiver may have economic value while failing a school-specific criterion for independent sale.

For the proposed *mutaqlid*, a funded contingent claim to lawful property can qualify for positive examination. The standing objection from IIFA Resolution 63 that certain sold option rights lack compensable subject matter remains in the dossier [S09]. A competing interpretation may adopt the Malaysian warrant analysis only after checking whether the right in question has comparable title, enforceability and conditions [S10]. The result is a conditional new-school fatwa rather than a declaration of cross-school approval.

19.2 The source of the premium

A contract can charge for a delivered good, a performed service, a legitimate commercial risk borne by its provider, or an independently saleable right under a legal theory admitting such rights. A creditor may also demand a surplus because the debtor has held the creditor's money for a time. The latter case requires the separate ribā analysis and cannot be reclassified simply by naming the charge an origination premium.

One test examines the actual fee base. If a minting charge is computed as seven percent of principal and goes to the creditor regardless of service costs, its economic behavior is evidence requiring scrutiny. If a charge is paid to a third-party executor for verified work, the service, its cost and independence from loan duration should be disclosed. Neither a high nor a low numerical percentage alone establishes the contract's legal status. The causal entitlement to payment is the issue.

19.3 Leverage and the financing chain

Let q be the amount of underlying asset owned, n the size of an opposite futures exposure, and m collateral posted. The hedge ratio $h = n/q$ identifies the price risk being offset. The venue leverage $\ell = n S_0 / m$ measures the notional exposure relative to posted collateral. A trader with $h = 1$ can still face very large ℓ and consequently a strong liquidation risk during temporary market rallies.

The permissibility question is thus a property of the whole contract. The position may reduce aggregate price exposure while drawing on an interest-bearing margin loan, exposing collateral to an undisclosed seizure path, or obliging a customer to make funding payments whose legal cause is suspect. Full consideration of the contract includes what happens when the trader cannot add margin and when the writer or clearing venue defaults.

19.4 Liquidation as a sale of another person's property

A creditor enforcing a valid pledge has a claim defined by contract. That claim does not automatically absorb the owner's residual equity. Sīstānī's rules on *rahn* and the Academy's debtor-justice concerns support testing the disposition of surplus [S55, S03]. When a collateral auction recovers more than the due debt and valid fees, the contract must identify the owner of the excess and an actual route to return it. If the contract permits an unrelated keeper to seize the entire asset on a manipulated mark, a claimed benefit of hedging cannot repair the defect.

The accounting invariant for an authorized and adequately funded enforcement is $A = DebtPaid + ValidCosts + Residual$, subject to exact priority and rounding. A program whose state machine allows additional outputs requires another legal justification for them. The proof should be adversarial: simulate zero liquidity, a stale oracle, signer disappearance, a duplicate liquidation attempt, and a valid late debt cure.

19.5 Maysir and adverse market conduct

Speculation, speculation-funded hedging and genuine trade can share instruments. The *mutaqlid* needs evidence about whether a contingent position serves an identifiable exposure, creates risk deliberately for a wager-like payoff, or depends on deception and manipulation. The claim that every zero-sum transaction constitutes *maysir* would sweep in legitimate risk transfers unless a stronger legal argument were provided. The contrary assertion that economic usefulness makes all derivatives lawful also needs its own rule. Institutional rulings about conventional derivatives impose restrictions even when participants describe their purpose as risk management [S32, S33].

The proposed perimeter accordingly examines real exposure, consent to the potential distribution of losses, price integrity, deliverability, reserve custody, and who can alter the contract during its life. A true zero-sum transfer still has to pay from owned and authorized collateral; equal arithmetic gains and losses cannot cure an unauthorized appropriation.

19.6 The protocol-level fatwa record

Every ruling should include the contract identifier and version, the actual assets and parties, the legal characterization of each payment, all custody powers, oracle sources, liquidation triggers, a funded stress scenario, and the chosen jurisprudential authority. An adverse finding can concern one execution path without requiring a global verdict on Bitcoin or digital markets. A favorable finding remains conditional on the stated implementation and funding structure.

This is the practical meaning of *bi-l-bāṭil* for the financial-engineering cases in this book: the jurist must investigate whether property moves under genuine consent and valid entitlement. The final classification comes from the applicable legal method. The technical dossier ensures that the jurist is deciding the bargain the participants will actually experience.

19.7 Original protocol-perimeter rules

A usable jurisprudence must allow designs to fail. The book proposes a **protocol perimeter**, not a brand whitelist. A system may pass one part and fail another. The favorable presumption applies to lawful, consensual productive exchange, while the independent analysis of ribā and wrongful appropriation remains central.

The proposed permitted envelope includes vault pledges with auditable ownership and surplus restitution; fully collateralized exercise rights to lawful assets; agricultural or commercial profit-sharing with genuine loss participation; liquidity pools whose assets and fees are lawful; escrow and auction markets that disclose

allocation rules; and protective put/collar systems whose obligations are funded and enforceable. Such instruments remain conditional upon adequate risk disclosure and protections against abusive execution.

The excluded or presumptively defective envelope includes unsecured creation of contingent liabilities beyond capacity to fulfill; price-oracle privileges that permit arbitrary seizure; hidden rehypothecation or conflicting title; interest extraction disguised as a service charge; deceptive token backing; forged market volume; predatory liquidator incentives; and nominal partnerships that guarantee returns while imposing losses entirely upon someone else.

Several familiar DeFi structures fall between those boundaries. Automated market makers can furnish liquidity through real deposited reserves, yet some pools create one-sided loss and opaque administration. Stablecoins can enable pricing while carrying reserve, governance, and redemption risks. Prediction markets may be valuable information devices while particular cash stakes can function as gambling. Perpetual swaps, leveraged farming, and uncollateralized synthetic positions require separate inquiry. Here the mathematical equality of contingent payoffs starts a legal analysis; it never silently supplies the missing property rights.

The book's long-term contribution would be a corpus of open, annotated **proof-carrying fatawā**. For each ruling, another jurist could rerun the formal implications, disagree with an axiom, exhibit a new adverse state, or supply better primary evidence. The resulting dispute would identify exactly what the participants believe changes the law. In that sense the method follows the older Muʿtazilī ambition to make justice answerable to reason while permitting a 21st-century financial system to be judged by what its contracts do.

19.8 Four outcomes from one hedge

We can now set an adversarial example that asks whether a particular instrument is lawful rather than asking whether derivatives as a whole are lawful. In every variant the participant owns one BTC and wishes to protect a future dollar expenditure. The spot price begins at $100,000. An offsetting right promises protection against a sharp decline. Our comparison keeps the economic target constant and alters one legal feature at a time.

Variant	Financial implementation	Independent legal issue	Status under the proposed school
A	Fully paid BTC plus funded, segregated put with specified settlement	Is this standalone contingent right independently saleable *māl*?	Proposed and disputed; subject to the property-right bridge
B	Same payoff financed by a loan requiring stipulated benefit to lender	An independently challenged lender benefit survives the hedge	Adverse unless its credit terms can be independently justified
C	Fully funded premium but writer may rehypothecate all pledged protection	Payout at the adverse state may become an unsecured claim	Unresolved or adverse pending an enforceability witness
D	Regulated call warrant on eligible shares	Documented Malaysian permission in its stated subject	Reported narrower permission; it cannot certify A–C

Take Variant A. The contract's structure can satisfy every observable cash-flow test, yet the Academy's 1992 position disputes the compensability of the exercise right. The *mutaqlid* must construct a new legal bridge, informed by the Malaysian warrant reasoning and lawful contingent rights elsewhere, and then submit that bridge to counterargument [S09, S10, S153, S154]. A technical proof that the short is fully funded would address the writer's ability to deliver. It would not, alone, establish the right's legal saleability.

Variant B forces the method to confront credit rather than derivatives. Its protective outcome cannot wash away a lender's separate stipulated benefit. Variant C makes the same payoff promise operationally unreliable under an adverse state; the jurist must know the priority of the customer against another creditor. Variant D is a reported institutionally accepted instrument with its own qualifying conditions. It provides legal evidence for comparison, rather than a universal certificate.

The fatwa dossier should explicitly return one of four labels: *reported permissible within the named authority and scope*, *proposed permissible under declared additional premises*, *prohibited under the named authority or adopted rules*, or *undetermined pending evidence*. The choice of label is itself subject to audit. A fifth tag, *model invalidated*, records when a purported invariant is refuted by an actual state path.

This classification brings the entire book back to its opening demand. The widow’s question is about what property she owns, what protection she bought, and who must pay when the price falls. The fatwa should answer the bargain in front of her. That is a greater discipline than simply declaring allegiance to an inherited or a newly invented adjective.

Part V. Decentralized Finance as Applied Fiqh

20. Bitcoin: Māl Without a Mint

Bitcoin as digital property, the tests of possession and currency, and the limits of the ḥalāl claim.

The first Muslim jurist asked to judge Bitcoin is tempted into the wrong courtroom. He imagines a coin in his palm and asks where the gold is. Someone else points to a computer and asks which government has stamped its approval. A third calls the price chart a roulette wheel. Each has selected a familiar object for judgment before identifying the thing people own.

Consider the widow from our agricultural example. She sells a share of her harvest. A buyer offers payment in bitcoin. The farmer wants to know whether she can receive it, keep it herself, spend it on seed, or pledge some of it to obtain working capital. She may also want to preserve her harvest's dollar value through a hedge. There are five transactions to judge. Their subject matter, rights, and possible wrongs differ. A ruling that condemns or blesses them all by pronouncing a single word, *Bitcoin*, has yet to begin.

Bitcoin raises a deeper question for the Muʿtazilī jurist: how does property become recognizable when its rules are maintained by the people who use it? The protocol permits an owner to demonstrate control of a spendable output, convey it under publicly verifiable rules, and settle without granting a bank the power to reverse a payment on its own authority. Those features do not settle the entire moral case. They give the jurist an object precise enough to examine.

Our proposed doctrine, *mutaqlid fī al-uṣūl*, calls for a dated source, a defensible legal characterization, and an account of the actual contract. The findings of an established madhhab deserve independent treatment. Where traditions disagree, the new school can adopt a stated and coherent rule, while retaining the dissent and admitting its own responsibility for the result. A mathematical proof can establish implications inside that rule. Its authority remains a question of law.

20.1 A coin made of enforceable rules

Bitcoin began with Satoshi Nakamoto's 2008 proposal for electronic cash transferred between peers [S42]. The essential innovation addressed double spending. A sender could broadcast the same digital claim to two recipients unless the network could establish an order of accepted transactions. Bitcoin used proof-of-work and an independently verifiable ledger to organize that order. The contemporary system uses transaction outputs, or UTXOs, that can later be spent by satisfying their locking conditions [S43].

A wallet's displayed balance summarizes such spendable outputs. The asset is neither an image of a coin nor a debt owed by Satoshi. The bearer possesses an ability, subject to network rules, to authorize the spending of defined amounts. Public transactions make the transfer inspectable. In a valid transaction, inputs refer to prior outputs, and the new outputs specify conditions for later spending. The ledger records those state changes.

The familiar 21-million ceiling follows from a specified issuance schedule. The initial subsidy was fifty BTC per block. Every 210,000 blocks the subsidy is divided by two, in whole satoshis. The theoretical geometric bound is

$$N \le 210{,}000 \cdot 50 \sum_{k=0}^{\infty} 2^{-k} = 21{,}000{,}000\,BTC.$$

Integer rounding makes the actual subsidy total slightly smaller [S44]. In October 2026 the programmed block subsidy is 3.125 BTC, following the April 2024 halving [S44]. Bitcoin's monetary rules are validated by participating nodes. Changing the rules requires a change that other participants choose to accept. The limit is a consensus commitment enforced by software, supported by economic expectations and human willingness to enforce it. It is a powerful constraint with social foundations, rather than a physical constant immune to collective action.

This matters for legal characterization. Money issued by a state rests partly on the state's promise to recognize and govern it. A commercial bank deposit is normally a claim against an intermediary. A self-custodied bitcoin output has a different chain of authority. The person with the necessary spending authority can transfer a defined output according to network rules. A custodian can still stand between the beneficiary and that authority. The legal task begins with identifying who may spend, how a beneficiary enforces a claim, and how many parties must cooperate.

Proof-of-work imposes a real expenditure on miners. That expenditure helps secure the transaction ordering and determines who may append a candidate block. It does not determine a guaranteed fair market value. Scarcity also fails to guarantee purchasing power or protect someone from buying at an inflated price. A merchant receiving BTC bears price risk unless the sale fixes another measure of value and a hedge performs as promised. Energy use, mining concentration, and the fate of transaction fees when subsidies diminish belong in the assessment of public welfare.

20.2 The first legal proposition: Bitcoin can constitute *māl*

The Qurʾān condemns consuming another's property *bi-l-bāṭil* and recognizes trade by mutual consent (4:29) [S45]. It condemns ribā while permitting trade (2:275) [S46]. These commitments presuppose the possibility of having property and disposing of it lawfully. They require the jurist to identify the property rather than infer the answer from its physical composition.

For a proposed *ʿilmī uṣūl*, we can test the factual attributes of an asset before assigning its final legal class:

$$\mathit{CandidateMāl}(a) := \mathit{identifiable}(a) \wedge \mathit{controllable}(a) \wedge \mathit{transferable}(a) \wedge \mathit{valuableToOthers}(a).$$

Here *controllable* means that an authorized person has an effective and identifiable right of disposition. It permits custody agreements and multisignature arrangements when those rights are real. This predicate proposes evidence that an object can be property. It is not a historical definition silently assigned to every school. The additional legal questions are whether control is legitimate, acquisition is rightful, delivery can occur, and the object or transaction involves a prohibition.

Bitcoin meets the factual tests in ordinary, well-functioning circumstances: outputs are identifiable, network transactions can transfer them, and willing buyers and sellers attach prices to them. The cash price can be unstable. An asset's capacity to be valuable and its value one year from now are different inquiries. A warehouse full of grain is property even when harvest conditions make its future price uncertain. The law may regulate how particular uncertain promises are sold. It need not erase the property underneath them.

The strongest contemporary institutional support comes from Malaysia. At its 233rd and 234th meetings in June and July 2020, the Securities Commission's Shariah Advisory Council recognized digital currency as *māl*. It characterized technology-based currency with no underlying backing as *ʿurūḍ*, meaning goods or property other than currency, rather than as a ribawī currency subject to *bayʿ al-ṣarf* rules. This is a distinctive classification rather than a generic statement that all crypto activity is permissible [S47]. The Commission's current list expressly records Bitcoin as Shariah-compliant for trading on regulated exchanges, with the decision dated 20 July 2020 [S48].

Indonesia provides the opposing text. At the seventh Ijtima Ulama in November 2021, the Majelis Ulama Indonesia prohibited cryptocurrency used as currency, citing gharar, harm and Indonesian currency law. Its decision also challenged the tradability of digital assets under *silʿah* requirements, while permitting digital commodities that met stated criteria concerning recognized substance, an underlying basis and clear benefits [S49]. This is an institutional ruling with concrete legal and factual premises. It should be read at its stated date and scope, alongside the Malaysian ruling. An Indonesian statutory currency requirement has force in its jurisdiction; whether that legal feature determines the moral status of every bitcoin transfer between consenting parties is a separate usūlī argument.

Their disagreement creates an inquiry about *māl* and an inquiry about *thamaniyya*, the legal status of something serving as money. A Bitcoin transaction can be analyzed as a property sale under one theory, while another may assign currency-exchange conditions when Bitcoin functions as a medium of account or settlement. We should preserve these paths as alternative derivations and identify which one the *mutaqlid* adopts.

20.3 The second proposition: *thaman* is a legal role with consequences

Gold and silver in the old market had monetary roles and were also valuable objects. The hadith on exchange of gold, silver, and other named goods supplies an important classical reference for equality and hand-to-hand exchange requirements [S50]. Its interpretation, extension to paper currency, and application to bitcoin must be attributed to particular schools and jurists. The report does not mention digital ledgers.

If Bitcoin is classified as an ordinary transferable good, a sale for fiat currency may be analyzed using general sale principles, subject to legitimate title, consent and delivery. If the same asset is instead classified as monetary *thaman* under an adopted theory, *ṣarf* rules may constrain how the exchange takes place. A transaction cannot borrow the commodity classification to justify deferred currency exchange and then borrow the monetary classification only when seeking favorable treatment of a monetary obligation. The choice of legal class must remain stable across the case, or a proved factual distinction must justify the change.

A recurring source of legal confusion is the ordinary phrase *digital money*. It describes an asset's commercial use. *Māl*, *ʿurūḍ*, *thaman*, and *māl ribawī* are legal categories whose consequences depend on a method's source hierarchy and rules of analogy. Their translation into the word *money* destroys the distinction that the jurist needs.

This chapter proposes treating native Bitcoin as property with potential monetary uses. For the initial *mutaqlid* proof, we adopt the Malaysian distinction between unbacked technological property and claims on ribawī reserves as one defensible legal foundation, while separately auditing the opposing currencies-by-function argument. The result belongs to the declared composite theory. It cannot be advertised as unanimous agreement among the classical madhhabs.

20.4 Possession after the wallet key

The old market asked whether a buyer had received the goods. The modern market asks whether the advertised goods sit in a wallet whose outputs the buyer can spend. The answers overlap, but a screen showing one BTC may represent several legally different arrangements.

A buyer who receives a confirmed output spendable under a key they control has a strong factual case for effective possession. In a multisignature vault, the beneficiary may hold an enforceable right while spending requires cooperation under a disclosed covenant. At a custodial exchange, the beneficiary may only have a claim on a pooled reserve, sometimes subject to suspension, setoff, lending or insolvency. The amount displayed on the screen can equal one BTC in every case. Their rights differ when a custodian fails.

The distinction can be expressed as a state-dependent rights vector:

$$\Phi(C,\omega)=\begin{pmatrix} \mathrm{title},\mathrm{spendingauthority},\\ \mathrm{counterpartyclaim},\mathrm{settlement},\\ \mathrm{recourse},\mathrm{insolvencypriority} \end{pmatrix}.$$

Imagine a self-custodied purchase and a custodial purchase that both show a one-BTC balance and equal market value. Now introduce a future state in which the custodian is insolvent. The first buyer retains the spendable output, subject to normal chain and key risks. The second pursues a contractual claim through insolvency proceedings, and may recover less than one BTC. Their terminal quotations coincide before the

failure, while their legal histories and remedies diverge afterward. Under our prior *barzakh al-ḥukm* principle, this is a demonstrable material difference. The contracts need separate fatwas.

Bitcoin finality is also a process. Miners can omit transactions from blocks, a transaction can remain unconfirmed, and short competing chains may produce reorganizations. A receiver's required confidence grows with the number and quality of confirmations, subject to remaining network risk [S42, S43]. A seller should establish a delivery rule consistent with the value and circumstances of the sale. A promised payment may fail to materialize if the promised transaction never becomes validly settled. The appropriate remedy depends on the parties' contract.

These facts place *qabd*, practical or legally effective receipt, at the center of Bitcoin jurisprudence. The proposed test is whether the beneficiary obtains **a specified and enforceable power of disposition under an agreed settlement standard**. A public address, alone, offers no proof that its apparent beneficiary possesses the necessary keys or contractual right. A transaction signature shows authorization under script conditions, while the legal title to the asset requires the surrounding facts of acquisition, ownership and agency.

20.5 Does the supply limit make Bitcoin Islamic money?

A believer confronting unjust debt can appreciate a monetary asset whose issuance schedule cannot be changed by a finance minister's instruction. Someone living with unpredictable inflation may value the ability to preserve and move an independently controlled unit of property. Bitcoin gives those aims technical expression through a predictable issuance rule and a payment system open to participants who can connect to it. It can also expose the poor to steep changes in purchasing power. Its liquidity depends on counterparties, communication infrastructure, transaction fees, and the capacity to hold keys securely.

The Qurʾān's condemnation of ribā does not confer sanctity on every scarce asset. A rare coin can be stolen, held through fraud or pledged to support an exploitative loan. Bitcoin's supply policy constrains issuance; it cannot prove the justice of every distribution of initial coins, every exchange's behavior, or every loan made against collateral. The source of justice resides in what people owe to one another, and the contract must disclose those obligations.

The claim that bitcoin constitutes a superior monetary institution therefore has several separable parts. Its issuance may be predictable relative to discretionary supply management. Its settlement may reduce reliance on an intermediary in self-custodied payments. A user can retain or lose the capability to dispose of their funds through operational choices. The purchasing-power result, by comparison, depends on markets and cannot be inferred from a finite upper bound on supply. A state can also require taxes in another unit and regulate businesses that convert between them. These facts shape the conditions under which a Bitcoin-based Islamic financial system can serve people safely.

This distinction is necessary for our book's greater argument against ribā. The objective is the relief of people exposed to coercive, costly or predatory credit. Bitcoin supplies a possible instrument of ownership and settlement. Productive partnerships, funded risk transfer, fair trade and lawful charity still require legal and financial institutions designed around their particular duties.

20.6 Seven contracts, seven rulings to earn

A jurist receives seven Bitcoin contracts on the same day. The asset's name remains constant. Its economic and legal role changes in each transaction.

Transaction	Governing issue	Initial direction under proposed *mutaqlid* doctrine
Self-custodied spot purchase	Provenance, consent, title, settlement, and theft	Presumptively permissible if these conditions hold; monetary-classification dispute recorded

Transaction	Governing issue	Initial direction under proposed *mutaqlid* doctrine
Ordinary BTC payment for lawful goods	Price specification and effective receipt	Permissible if the parties agree on value and settlement, subject to any adopted *ṣarf* rule
Exchange account recording a BTC balance	Custody, rehypothecation, bankruptcy and withdrawal	Conditional on the actual contractual claim and the disclosed reserve arrangement
Proof-of-work mining for block reward and fees	Valid work, resource costs, environmental effects and property entitlement	Potentially permissible compensation under stated premises; public harms require evidence
BTC lent for a guaranteed added amount	Nature of credit and stipulated excess	Presumptively within the ribā prohibition under established qard-based reasoning
BTC pledged to obtain a fixed-value advance	Loan charges, collateral ownership, non-recourse rights and liquidation	Contract-specific; a halal asset does not validate an interest-like minting charge
BTC held with a funded, short futures hedge	True exposure, margin, funding, counterparty solvency and forced liquidation	Potentially permissible hedging under our proposed theory, conditional on contract execution and separate ribā screening

The matrix records a research verdict for a proposed new school, not a legal license issued by a recognized institutional authority. Its purpose is to make each counterexample visible. A Bitcoin pledge may preserve title until default or grant another party immediate power of disposal. The jurist must examine that legal difference before deciding whether the transaction resembles a *rahn*, sale or secured loan. An exchange account offering a 5 percent return may be lending the customer's coins. Calling that account savings settles none of the credit questions.

Proof-of-work miners similarly supply a service with network-defined compensation. Yet two miners' apparent returns may conceal different arrangements: one uses owned equipment and bears variable profit, another borrows at interest, and a third falsely sells a cloud-mining claim without available capacity. The legal subject is the complete undertaking.

20.7 Bitcoin as the test of *mutaqlid fī al-uṣūl*

We now submit the claims to the method introduced earlier in this book. The first source is the Qurʾānic command concerning consensual trade and wrongful acquisition [S45]. The second is the prohibition of ribā [S46]. The third is the institutionally attested view of digital asset property from Malaysia [S47, S48]. The fourth is the competing Indonesian decision [S49]. The fifth is the actual specification of Bitcoin's spendable outputs and consensus rules [S42, S43, S44]. A later dossier will attach school-specific treatments of *māl*, *qabd*, *thamaniyya* and *ṣarf* to precise passages rather than generic labels.

Let K be the Qurʾānic core of lawful ownership, mutual consent and the prohibition of ribā. Let D contain the documented factual rules for a Bitcoin transfer, M a selected property-and-exchange classification, and C a particular contract with its settlement path. A hypothetical source-based certificate has the shape:

$$K \cup M \cup D \cup \mathit{Facts}(C) \vdash \mathit{Permitted}(C).$$

The derivation succeeds only when the premises actually entail the judgment. Property recognition supplies an essential premise; it cannot provide proof of permission for every possible contract involving the property. For a loan containing a stipulated excess, the same base record can support prohibition. For a custodial purchase whose redemption rights are unclear, the certificate remains incomplete. We assign neither false permission nor fictitious consensus to the unresolved case.

The stronger mathematical consistency demand examines *two instances of the same contract*. If a price chart and final BTC balance are identical, but one buyer faces a seizure right and the other retains sole disposition,

the proposed equivalence test must reject the pairing. The contract state machine has to capture custody events, spending constraints and creditor priority. A fatwa whose derivation uses only terminal dollars is missing variables important to the law.

The reconciliation path then asks whether a legal bridge between *ʿurūḍ* and *thaman* can be defended for particular uses of Bitcoin. One possible rule distinguishes the asset's native property rights from its role as a contractual unit of account. Under that rule, a Bitcoin-denominated purchase of goods and a deferred exchange of two currencies may be placed under different rules. We must state the authority of that distinction and the circumstances in which it fails. The new fatwa belongs to the openly constructed theory, and the opposing school's ruling remains accessible to the reader.

20.8 Formal test obligations

The companion Lean model should start with a few modest claims that can be checked without pretending to prove theology. They will specify asset amounts in integer satoshis and contract obligations over a finite, auditable sequence of states.

Supply bound. Given a halving interval, integer truncation, an initial subsidy and the acceptance rule for block rewards, cumulative permitted subsidy remains beneath the intended cap. A result about modeled rules is distinct from a verification of the entire network implementation or assumptions about future rule changes.

Transfer preservation. For a valid ordinary transaction, the sum of output values does not exceed the sum of input values. The difference is a miner fee. Coinbase issuance requires a separate case. The formal model must preserve legitimate ownership claims through permitted output changes and explicit contractual remedies.

Custody distinction. Construct two contracts with the same displayed balance and market quotation. Exhibit an insolvency state where their recoveries differ. Lean can refute an attempted universal equivalence and provide a witness for *barzakh al-ḥukm*.

Conditional possession. If a buyer has an enforceable right of disposition, specified spend conditions, and a qualifying settlement event, a modeled possession predicate can follow. Another theorem can show how removal of one required condition breaks the argument. The conditions are legal premises, with source references attached to each interpretation.

Ribā independence. Show that `lawfulAsset BTC` together with `loanContract C` cannot imply `lawfulContract C` without a rule for the financing terms. A concrete countermodel includes a lawful asset and a loan with impermissible stipulated excess.

Hedge-path integrity. A spot position and a matching futures short may be delta-neutral in an ideal terminal-payoff model while a margin breach causes forced liquidation earlier. That counterexample links this chapter to the succeeding study of Ducat, synthetic dollars and decentralized futures.

The audit standard is severe because the stakes are serious. A proof assistant should refuse a conclusion when the legal right has been erased from the data model. If no sourced priority rule resolves a conflict, the output is an open dispute with a finite list of missing premises. Formal clarity helps the reader see when a decision has become a *new* jurisprudential act.

20.9 The provisional Bitcoin fatwa

Under the *mutaqlid* theory proposed in this book, **native bitcoin is a candidate form of lawful, ownable and transferable property, and an ordinary spot acquisition or transfer can be permissible when title, consent, delivery and the subject of trade are adequately specified**. This follows a declared property-based route supported by the Malaysian Shariah classification and the observed capabilities of the protocol. The rival monetary and commodity classifications remain documented. A further legal argument is required before

applying a particular rule of *ṣarf*, compulsory charity, inheritance, zakāt valuation or deferred monetary exchange.

No guarantee of purchasing power follows from the supply cap. A separate contract must authorize any claim on a lender, borrower, exchange, custodian or derivatives counterparty. Interest-bearing credit remains subject to ribā prohibitions. A fraudulently operated exchange involves wrongful acquisition even if its balances are denominated in a lawful asset. Leveraged futures and synthetic dollars receive their own inquiry under the contingent-rights and hedging chapters.

The chapter establishes the object the rest of the book will place on trial: a protocol capable of transferring scarce digital property through publicly verifiable commitments, with substantial questions about its use as money and its ability to serve financial justice. The next question concerns the Bitcoin-backed vault. When a person pledges that property to obtain liquidity, which party receives the authority to spend it, who bears market loss, and how much of the property returns to its owner when the obligation has been discharged?

20.10 One balance, three objects of law

The widow receives one bitcoin for a crop delivery. Her phone displays **1.00000000 BTC**. Her buyer asks whether she has been paid. The answer depends on a series of events more exact than the balance shown by the wallet application. A transaction might create an unspent output she can lawfully control; an exchange might credit an internal ledger; or a borrower might owe her an equivalent number of satoshis under a loan agreement. Each arrangement is capable of producing the same screen. Each places a different obligation on someone.

The first object is a **native Bitcoin output**. Its ledger position is defined by a transaction identifier, output index, amount, and spending conditions. The network recognizes a subsequent transaction when those conditions are satisfied and the transaction becomes accepted under its consensus rules [B02]. Who holds lawful title is determined by additional facts about purchase, trust, agency, theft, coercion and the applicable legal order. The protocol tests whether spending conditions have been satisfied. The buyer’s legal title is an independent claim which may fail even when the spending script verifies.

The second object is a **custodial entitlement**. A centralised exchange may book one bitcoin to the widow’s customer account. The contractual relationship might grant her specific title to identified, segregated assets or a beneficial interest in a jointly held reserve. It might promise the return of a fungible quantity and allow the intermediary to use the coins. A right against a custodian can be enforceable property even when the customer cannot independently spend an on-chain output. What that right is worth in insolvency depends on the applicable title rules, asset segregation, priority and collection. A public proof of reserves establishes only facts that its scope and method actually prove; it cannot settle a dispute over encumbrances or legal beneficial ownership.

The third object is a **BTC-denominated obligation**. A debtor borrows 100 million satoshis, agreeing to repay 100 million satoshis at maturity. The creditor now possesses a claim against a person, with the debtor’s assets and contractual remedies standing behind it. Repayment requires a later transfer or enforceable substitute. Its monetary unit is BTC while its legal form is *dayn* if the adopted doctrine recognizes the obligation as debt. An on-chain transfer made at origination cannot serve as proof that repayment has occurred.

Our mathematical equivalence principle must therefore compare the entire rights vector, including its behavior under default:

$$\Phi\left(C,\omega\right)=\left(T,A,D,F,R,P\right).$$

Here T is lawful title, A is direct spending authority, D identifies the debtor, F is the nominal enforceable claim, R is collectible recovery, and P describes creditor priority.

Consider an ordinary day when the widow can use either native bitcoin or the exchange's account credit to make a purchase. Both provide an apparent economic value of one bitcoin. Now introduce a state in which the exchange becomes insolvent and customer redemptions are suspended. A valid self-custodied output remains governed by the network's normal spending rules. The exchange account gives the widow an insolvency claim whose recovery follows its contractual and legal protections. This counterexample concerns the intermediary's failure alone; theft, key loss, chain reorganization and censorship require additional modeled states. Economic quotation equality survives. Rights equivalence fails.

The formal demonstration is intentionally modest. BitcoinClaims.lean constructs three tagged positions, gives each an event-dependent rights record, and proves that identical quoted satoshi balances cannot imply equality of rights across the relevant modeled states. A fourth type of case appears when coins are pledged through multisignature custody. Its beneficiary may retain residual title while needing a co-signature for spending.

20.11 Qabḍ follows effective disposal

The International Islamic Fiqh Academy's Resolution 53 of 20 March 1990 recognizes constructive possession, *qabd ḥukmī*, when the property is made available to the recipient and the recipient can dispose of it. Its examples include particular kinds of bank-account credits and transfers. The same resolution warns that a delay in crediting cannot be treated as completed disposal before the credited amount has become available [S51]. This is powerful existing fiqh for contemporary settlement. Applying it to a particular Bitcoin output or exchange account still requires identifying the conditions of delivery and the rule's relevant subject.

For native BTC, the candidate test is whether the receiver has an authorized spending path and the agreed settlement standard has been met. A customer who can spend a well-confirmed UTXO may have a strong factual claim of receipt. The number of confirmations is a contract-dependent finality standard, selected in light of risk and circumstances. A user's control over a key is an operational fact. Lawful receipt in a completed sale requires additional proof that the transferor possessed sufficient title and that the bargain was entered into with valid consent.

This yields two predicates with deliberately different proof requirements:

$$Q_{op}(C) := S(C) \wedge F(C),$$

$$T_{lawful}(C) := Q_{op}(C) \wedge L(C) \wedge A(C).$$

Here S means effective authorized disposal and F means the agreed finality rule has been met. L supplies legitimate title and A supplies valid consent.

A thief can control stolen keys and produce a valid transaction signature. The operational test may pass, while the title and consent requirements fail. The proof assistant contains a concrete witness for this separation. The proposed law can thus recognize a transaction's technical settlement while preserving the owner's claim that the transfer was wrongful.

A different problem arises at a bank or exchange. A customer can possess an effective power of withdrawal even though the assets remain technically controlled by an agent. A multisignature vault may satisfy a carefully specified constructive-possession rule through contractual and technical authority, even while its beneficiary cannot unilaterally spend. The jurist must establish the particular rights of disposal, rather than assume that a private key alone exhausts *qabd*. For either arrangement, a promise of eventual withdrawal during a trading halt raises a different factual question from funds already made available to the beneficiary.

20.12 When the deposit becomes a qard

Resolution 86 of 6 April 1995 characterized bank current-account deposits, whether held at Islamic or interest-based banks, as loans in the Sharia perspective. The Academy reasoned from the bank's guaranteed obligation to restore the amount on demand [S52]. The ruling concerns banking deposits as they were examined, and does not name cryptocurrency exchanges or Bitcoin vaults.

The *mutaqlid* can propose a source-authorized extension when a BTC account exhibits the legally relevant features: the custodian guarantees the customer's fungible balance, the account is withdrawable on demand, and the custodian may use the property for its own transactions. Under that characterization, the customer has effectively furnished a loan and holds a claim for repayment. The extension remains an argued step in jurisprudence. A source certificate must specify why banking deposits and the proposed BTC account share the reason on which the original ruling depends.

An account holding individually identified Bitcoin outputs in trust, with segregation and a legally enforceable restriction on reuse, calls for another analysis. In that case the beneficiary's claim might be better classified through *amānah*, *wadīʿah*, or agency according to its governing terms and the adopted fiqh. Such labels require scrutiny of the actual custody agreement. If the custodian promises a fixed return while secretly lending the assets, the disclosure and title questions become substantive.

The package distinguishes factual **loan-like custody** from a **juristically authorized qard analogy**. The second predicate requires an explicit extension warrant. A program cannot confer legal authority on a new institutional analogy by recognizing three Boolean properties in a database. This respects the method of *mutaqlid fī al-uṣūl*: it imports an attested argument into a defined new case, openly records the additional inference, and leaves other schools free to dispute the extension.

20.13 Bitcoin as the unit of qard

Suppose the farmer borrows 1 BTC and agrees to return 1 BTC. If the price in dollars doubles before maturity, his real-world repayment burden rises with it. If the dollar value falls by half, the lender receives fewer dollars of purchasing power. For a contract defined in BTC units, these changes do not by themselves alter the stipulated number of satoshis. Whether and when a court recognizes an adjustment for exceptional currency change remains a separate source-dependent matter.

Sīstānī's published *Islamic Laws*, ruling 2299, treats loans of fungible things by reference to repayment of the same amount and legally relevant qualities even when value appreciates or depreciates. Ruling 2301 condemns a stipulated lender benefit beyond what was lent, including a small commodity or required service, and distinguishes that from a debtor's unsolicited extra payment [S54]. Those are published individual Jaʿfarī rulings. Their application to Bitcoin requires the stated further conclusion that the loaned satoshis are legally treated as fungible property within the adopted rule. The conclusions give this case a concrete route through an existing school rather than a novel Muʿtazilī starting axiom.

For a *qard* classified under the selected rule, the initial arithmetic screen is:

$$D_{contract} \le P_{advanced} \text{ and } B_{extra} = 0 .$$

The term B_{extra} denotes an additional benefit stipulated for the lender. This deliberately narrow screen checks the loan's promised BTC repayment and disclosed additional consideration. A zero numerical markup alone could conceal a requirement to sell the borrower another service at an inflated price, to surrender a valuable option, or to pay a financing charge disguised as a trading fee. Those features require their own legal characterization. The test cannot decide whether every compensation for a genuine independent service is permissible. That decision belongs to a school-specific rule and the documented facts of the arrangement.

A contract requiring 1.05 BTC in exchange for advancing 1 BTC fails the selected qard screen. A loan for which the borrower voluntarily returns extra, without a contractual condition or an agreed expectation qualifying as one, raises the different question described in Sīstānī's ruling. The circumstances matter to the fatwa. The Lean code establishes only that greater stipulated repayment contradicts the explicit numerical condition once the contract is classified as qard.

20.14 A rahn is an encumbrance on somebody's property

The widow may pledge native BTC to obtain liquidity while retaining ownership of any collateral value left after the secured debt has been satisfied. The creditor receives a security interest or authorized enforcement route, within the agreed legal regime. This relationship is better modeled as a graph of rights and spending permissions than as a wallet address bearing a single person's name.

Sīstānī's *Islamic Laws*, ruling 2327, states that where a debt has matured and remains unpaid, an authorized creditor may sell pledged property under the specified agency rules, recover the amount due, and return any additional proceeds to the owner. Without the necessary agency or authorization, different consent and legal procedures apply [S55]. This is a bounded published ruling in a Jaʿfarī source. Its surplus-return requirement provides a concrete test for prospective Bitcoin collateral contracts.

A multisignature output may give the borrower a beneficial residual claim and the lender a conditional co-signing role. The borrower might be unable to broadcast a unilateral spend throughout the term. That restriction forms part of the disclosed pledge and does not itself establish that the lender acquired outright title. A legitimate enforcement process needs evidence of default, authority to take the chosen action, accurate valuation and an accounting of residual assets.

Suppose collateral realizes $80,000 and the valid secured debt and costs total $50,000. The $30,000 difference is economically the borrower's remaining property under a surplus-return rule. A smart contract that unconditionally sends the whole $80,000 to the liquidator would violate the proposed residual-property condition. The legality of particular costs remains open for examination, including liquidation incentives and default charges.

The proof file models a disclosed multisignature case with residual title and without unilateral spending. It also models a liquidation contract that refuses to return the surplus, which fails the proposed enforcement screen. The result expresses one concrete consequence of the selected rahn doctrine; an on-chain contract must separately prove that its signing policy, timeouts, oracle triggers, and fallbacks implement the stated rights.

20.15 What belongs to the synthetic-dollar balance sheet

The next challenge arises when Bitcoin is held as collateral supporting a fixed-value obligation in another unit. A collateralized dollar issuer reports assets and liabilities. Some reported assets are native property. Others are promises from custodians, clearing houses or derivatives counterparties. Their values differ according to the futures states in which users ask to redeem.

Let V_{BTC} represent realizable native collateral value at an agreed settlement time, R_c the proceeds actually recoverable from custodial claims, and R_h the hedge proceeds assignable and realizable by the vault. Let D represent synthetic-dollar liabilities and L the enforceable claims ranking ahead of their holders. Then a necessary accounting condition is:

$$V_{BTC}(\omega)+R_c(\omega)+R_h(\omega)\geq D(\omega)+L(\omega).$$

A futures position marked as worth $40,000 may yield less after an exchange default, adverse funding obligations, an early closeout, or a failed settlement. The account's mark remains relevant to risk management; redemption depends on the realized settlement path and the priority of the claims. If the hedge proceeds belong

legally to a different entity, the issuer needs proof of assignment or another enforceable arrangement before counting them as accessible capital.

Imagine the issuer reports $35,000 in native BTC, $25,000 owed by a custodian, and a hedge valued at $40,000. The balance sheet shows $100,000 in assets against $80,000 in synthetic-dollar obligations. Following a counterparty failure, the custody claim recovers zero and the hedge pays $10,000. Collectible assets are $45,000. Redemption now falls $35,000 short, despite the optimistic book statement. The figures are an illustrative adversarial witness, with no implied market quote.

Our Lean model separates recorded claim faces from received proceeds and proves two results. First, if claims realize no more than their reported faces, collected assets cannot exceed the book sum. Second, there exists a finite case that passes book solvency and fails actual settlement solvency. An accessible future state with that failure also refutes an all-path redemption guarantee. This is the precise place where the book's modal logic joins its theory of property rights: safety concerns the contract's possible performance, not merely its terminal payoff in a convenient model.

20.16 A proof-carrying decision with the dissent visible

The jurist can now take the sourced route as far as it goes. Resolution 53 supplies an attested category of constructive possession. Resolution 86 supplies an institutional reason for treating guaranteed bank balances as loans. Sīstānī gives an individual Jaʿfarī analysis of fungible *qard* and collateral enforcement. Malaysia's securities authority recognizes specified unbacked digital assets as *māl* and *ʿurūḍ* under its limited jurisdiction [B06]. The Academy's 2019 Resolution 237, which considered cryptocurrencies specifically, called for further examination of their legal characterization and risks [S53]. A complete cross-school agreement on Bitcoin cannot be extracted from those sources.

The *mutaqlid* must specify the adopted rules, the evidence authorizing each analogy, and the precise conclusion. One possible certificate recognizes native Bitcoin as transferable property, accepts constructive receipt where effective authorized disposal has occurred, and subjects any BTC-denominated *qard* to the adopted prohibition on stipulated lender benefit. Another certificate may adopt monetary classification and consequently require an independent *ṣarf* inquiry. Both require scrutiny of title and claims arising from fraud, coercion or insolvency. The schools and institutions that disagree remain on the record with their reasons and dates.

The Lean checker can verify that a candidate certificate preserves its formal premises and that a named contract satisfies the encoded screen. It also produces counterexamples when rights vectors differ or a redemption path fails. Its source-register fields remain human-reviewed assertions. It does not certify a specific custodial agreement, interpret a disputed Arabic phrase, evaluate a court's insolvency priorities, or decide whether the *mutaqlid* bridge has legitimate authority.

For the next edition's Ducat analysis, the concrete evidence required is the vault's spending policy and collateral-release transaction, followed by a source-controlled account of who may change its terms. For synthetic dollars the dossier must add the precise debt denomination, hedge settlement route, assignment of hedge proceeds, treatment of prior liens, and recovery when a counterparty fails. The state-space model can then be connected to real Bitcoin transactions and executable adversarial tests.

21. Ducat: The Bitcoin Collateral Case

The Bitcoin collateral example now gathers the former working Chapters 10–14 and 16 into one case study. Every subcase is conditional upon the documented protocol version. Technical illustrations are design constraints rather than approvals of a deployed vault.

21.1 Vault ownership, pledges and custody

A decentralized credit protocol cannot be evaluated by its homepage alone. The person who signs the transaction needs to know which party owns the collateral, who can move it, who can change the debt, what price source controls liquidation, and how the last satoshi of residual value is divided. The case study is **Ducat Protocol's UNIT credit system**, not the unrelated product using the Ducat name at ducattreasury.com.

Ducat's homepage, consulted on 25 October 2026, advertises a mainnet closed alpha, Bitcoin L1 collateral, issuance of UNIT or USDC, a one-time 7% minting service charge, zero ongoing APR, a borrowing ceiling equivalent to 62.5% loan-to-value, and eligibility for liquidation below a 135% collateral ratio [S20]. Its technical documentation describes a minimum 160% ratio when borrowing, a 135% liquidation trigger, guardian-cosigned vault updates, and a distinct oracle-enabled liquidation path [S21–S24]. Some older documentation still quotes a 1% issuance charge [S25]. That is a version discrepancy requiring the anchor contract, current offer, and deployed policy to be inspected before contractual conclusions are issued.

The website calls the arrangement noncustodial because the standard borrower path employs a two-party Taproot arrangement involving the borrower and the guardian group. The documentation for liquidation expressly says that this path uses **a single signature and a hash preimage** rather than the ordinary two-signature path [S24]. A holder's inability to move pledged BTC unilaterally and the existence of a liquidation path which need not receive the holder's fresh signature can coexist in this architecture. This is a critical part of its trust model, and the prospect of liquidation cannot be hidden in the label "self-custody."

The public repository's technical description explains that the guardian and price oracle participate in liquidation using a price-dependent released key. It recognizes guardian and oracle collusion as a potential route to collateral theft, with various diversification and governance responses [S26]. Those responses are security assumptions. Proof of on-chain history and a multiparty custody path can improve transparency, but they do not erase concentrated powers in oracles, signing paths, or emergency governance.

A source-controlled Ducat state

We propose a research record, rather than claim the following tuple is already implemented:

$$V_t=\left(q,D,F,P,O,G,K_p,K_c,\tau,status,priority\right).$$

Here q is BTC pledged, D is outstanding UNIT debt, F is the set of valid fees, P is the price attestation and its freshness, O identifies oracle authorities, G identifies authorized guardians, K_p and K_c are optional protective strikes, τ is protection maturity, and $priority$ records who owns each contingent claim. A real audit must replace each of these symbols with documented contract terms and transaction-field witnesses.

Under the published mechanism, the normal state graph is approximately *opened → borrowed/updated → repaid*, with a separate branch *active → liquidation-eligible → liquidated*. The transition rules depend on collateral ratios and oracle keys. Our proposed protected-vault branch adds *hedge-settled → solvent repayment or orderly surrender*. It is a design change, not a feature that today's Ducat documentation establishes.

21.2 The mint charge and the price of time

A one-time charge need not grow in proportion to elapsed time to carry the economic effect of compensation for a cash advance. If a borrower receives $46,500 after a 7% charge is withheld from a $50,000 nominal advance and must return $50,000, then the cash-flow internal rate of return over one year is

$$IRR_{365} = \frac{50,000}{46,500} - 1 \approx 7.53\%.$$

For an advance outstanding for T days, the same illustrative assumptions give

$$r_{eff}(T) = \left(\frac{1}{1-0.07}\right)^{365/T} - 1.$$

At 90 days this amounts to about 34.2% on an annualized effective-rate basis. At 30 days it is roughly 141.8%. These large annualized numbers expose the effect of paying a fixed proportional charge over short horizons; they are **not claims about fees Ducat collects on a borrower who actually refinances at those dates**. We have not verified whether its current fee is withheld, separately paid, or added to an outstanding debt balance. Those alternatives produce different actual cash flows.

Compare another settlement path. The borrower receives $50,000, owes $53,500, and pays no separate amount at inception. For a twelve-month term that promises a 7% uplift on the nominal advance. Economic equivalence to the first scenario fails at the level of nominal repayment and liquidity received, even if the parties can negotiate adjusted amounts to make the effective rate match. The complete path, including reborrow behavior, must be specified.

The International Islamic Fiqh Academy's 1986 Resolution 13 permits service fees related to lending within actual attributable expense and regards excess over actual cost as prohibited ribā [S27]. Sīstānī's law of *qarḍ* likewise prohibits a stipulated increase, including a small extra item attached to the loan [S15]. Those are source-specific legal constraints. The homepage's description of a "service charge" and "zero APR" establishes neither the actual cost of minting nor an independent legal basis for a percentage charge.

Our proposed ʿilmī uṣūl inquiry separates at least four possibilities:

1. **Verifiable service cost:** the payment reimburses actual issuance, transaction, custody, and administration costs that are independently incurred. Evidence includes cost ledgers, amortized infrastructure, refunds, and price-independent units of work. A percentage may approximate costs across transaction sizes in some circumstances, but that approximation must be documented.
2. **Financing consideration:** a fixed percentage of credit amount is paid solely to access principal. Its price structure calls for analysis as a stipulated loan benefit, even when marketing calls the ongoing rate zero.
3. **Property-right purchase:** the fee buys an independent enforceable right, with specified counterparty performance and risk, rather than a fiction stapled to a loan. In a protective collar the right has its own payoff and funding obligation.
4. **Participation contract:** a provider's compensation comes from the profits of an enterprise in which it truly bears agreed losses. A guaranteed principal plus an unconditional return must be analyzed as credit on its own facts.

None can be selected by changing the label in a user interface. For this edition, the **7% fee is an open adverse finding** and prevents a general permissibility certification of Ducat's currently advertised loan terms. A service-cost audit and contract-level fee map are required.

21.3 The liquidation waterfall and borrower equity

Let a borrower pledge one BTC for a debt of $50,000 UNIT, assuming one UNIT has exactly one dollar of value for the example. When BTC is worth $67,500, the collateral ratio is 135%. Below that price, the published Ducat mechanism can make the vault liquidatable [S20–S23]. Suppose liquidation proceeds when

BTC is worth $65,000. The borrower still has $15,000 of economic equity before valid costs if the only liability is the $50,000 debt.

A protocol that transfers the entire collateral coin to a third party while extinguishing the debt can impose an effective liquidation loss upon the borrower. It may be a contractually agreed penalty; its justification depends on the actual promised rights, necessary recapitalization cost, and a defensible allocation of equity. Ducat's public technical summary says the former vault owner loses BTC, keeps the UNIT previously borrowed, and has the debt cleared, while liquidators and the Treasury divide the liquidation premium [S26]. This deserves a full ledger reconstruction. Merely knowing that the debtor keeps the original borrowed UNIT does not establish that the disposition of the remaining collateral value is fair.

The proposed borrower-residual rule after realization is

$$R_{borrower} = max\left(A_{realized} - D - F_{valid}, 0\right),$$

where $A_{realized}$ means settlement proceeds actually available to the vault and F_{valid} includes only independently justified, enforceable costs and obligations. A separate legitimate risk premium or option payout may alter the accounting, but its priority must be set in advance. Under this proposed rule, a $65,000 realization, a $50,000 debt, and $1,000 of valid costs leave $14,000 of borrower equity. It cannot be reassigned to a liquidator by quietly relabeling it "premium."

In the actual Ducat regime, a liquidator can bear real funding and execution risk. Bitcoin reorganization, price gaps, UNIT secondary-market liquidity, guardian availability, and delays can make an apparent risk-free discount costly. The task is to measure an economically justified reward and then determine who has agreed to bear it. Open competition among liquidators may lower rents, though priority access to guardians or latency advantages can reproduce oligopoly.

The accounting invariant

For a realized value A and enforceable priority debt D,

$$min\left(A, D\right) + max\left(A - D, 0\right) = A.$$

The equation expresses a conserved disposition of funds before additional valid claims. The Lean file uses integer arithmetic for a related repayment-surplus identity under a documented ordering assumption. The complete collateral waterfall needs separate entries for vault BTC, option settlement, liquidation cost, debt discharge, guardian service, and residual return. Its implementation should fail if obligations exceed funded resources or if two parties receive an unrestricted superior claim to the same BTC.

The price shock is also a moral shock

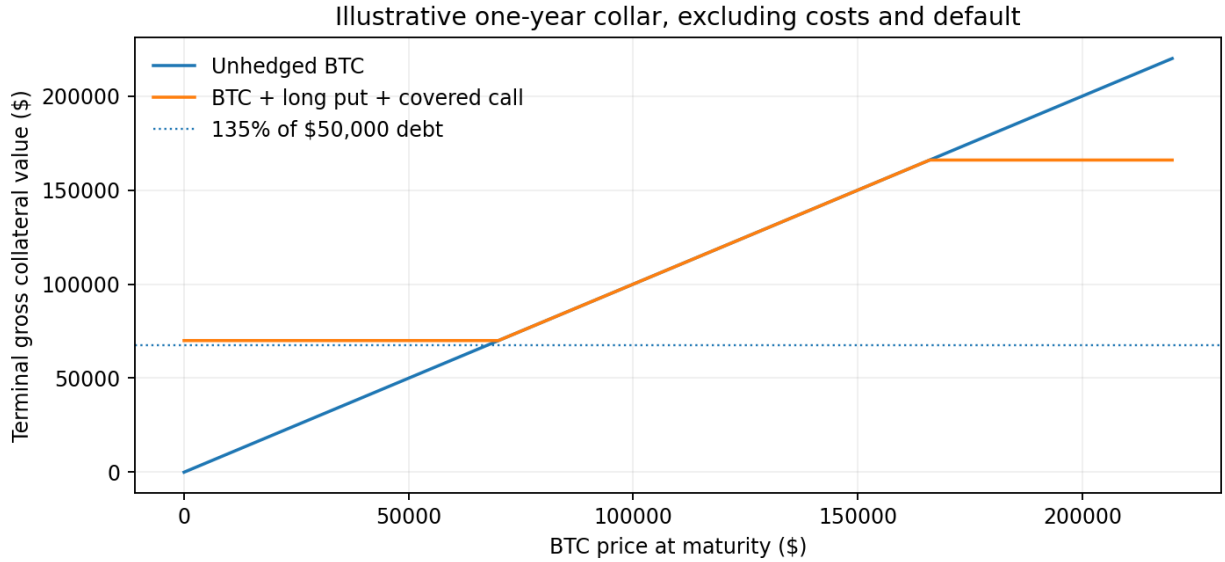
A customer could use $50,000 in UNIT to maintain a business, suffer a short Bitcoin drawdown, lose the coin at liquidation, and watch BTC recover afterward. The liquidation mechanism thus transfers ownership precisely when the borrower may be least able to recapitalize. An options-protected term loan might protect that person for an agreed period. Whether that protection is permissible turns on the instrument's lawful subject and funding, which we address next.

21.4 The funded collar and right to retain BTC

Assume an illustrative one-year transaction with 1 BTC worth $100,000 at inception, $50,000 of financing, a put struck at $70,000, and a covered call struck at $166,000. The last two strikes derive from the supplied case study's hypothetical pricing assumptions and are **not tradable quotes**. In a European-style terminal settlement, ignoring premiums and settlement costs for the moment,

$$V_T = S_T + \left(70{,}000 - S_T\right)^+ - \left(S_T - 166{,}000\right)^+ = \min\left(\max\left(S_T, 70{,}000\right), 166{,}000\right).$$

This gives a protected BTC exposure between a floor and a cap. With the assumed $50,000 claim, the borrower's terminal equity before fees is $V_T - 50{,}000$, floored at zero if the recourse terms so require. At BTC $40,000 the put contributes $30,000, so the whole package is worth $70,000 and the borrower retains $20,000 in economic equity after clearing $50,000. At BTC $200,000 the call purchaser is owed $34,000, leaving the $166,000 capped value before the debt is settled.



BTC payoff with funded put and written covered call; all values illustrative.

The put can fulfill two very different purposes. A **non-recourse surrender right** allows a borrower to hand over collateral to discharge an excessive debt. It protects against a deficiency claim, though the borrower loses the BTC. A **funded purchased put**, settled into the same collateral system, pays when price falls and can supply value that keeps the borrower solvent while retaining BTC ownership. Those should be separate entries in the legal account.

A call premium can finance some put cost. The borrower sells an enforceable slice of future appreciation in exchange for downside protection. The corresponding claim has to be covered. Once BTC has been pledged, the call purchaser cannot also receive an unrestricted first claim upon the same coin. The contract therefore needs an explicit priority and settlement waterfall, or a separate funded delivery reserve. A syntactic pair of derivatives in two wallets does not establish that the vault is protected.

The proposed property-law interpretation is that an enforceable, funded purchase right to a lawful asset can be valuable *māl*, with contingent realization accepted in the same mathematical family as other contractual options. Malaysia's 1995 warranted-shares ruling shows that some jurists have recognized a paid acquisition right as property [S10]. The proposed extension to Bitcoin calls and puts requires a new inquiry into actual ownership, settlement method, consent, and the sale of liability itself. The 1992 Academy prohibition and the 2026 individual North American answer remain substantive objections [S09, S11].

DrawBridge's historical Bitcoin collar financing, as described in the supplied case study, is a useful commercial comparison, while a funded non-recourse arrangement may still contain conventional interest or other prohibited terms. The cover provided by an option can be analyzed independently of the underlying financing. For this book the principal design challenge is to connect the protective right to the on-chain collateral waterfall before any liquidation path becomes exercisable.

21.5 Protected-vault execution specification

The case study supplies the idea; this chapter states a prospective specification that could be implemented and tested. It is intentionally separate from Ducat's current public contract. The borrower locks BTC in a pledge vault, finances a put on the same relevant price exposure, and may write a covered call under a compatible priority arrangement. A duration and settlement venue are fixed in advance.

Define adjusted realizable assets at time t:

$$A_t = q\,S_t + \hat{P}_t - \hat{C}_t - M_t,$$

where $\hat{P}_t$ counts only the legally owned, funded, executable put value available to this vault; $\hat{C}_t$ counts the amount owed to the call buyer; and M_t covers haircuts, settlement costs, and senior claims. Using the option's theoretical quoted mark as immediately available cash would be unsafe. Stress tests should use conservative executable proceeds and account for exercise time, oracle staleness, and actual counterparty resources.

A collateral test may be written $A_t \geq \lambda D_t$. Using the illustrative $\lambda = 1.35$ and $D = 50{,}000$ produces a coverage requirement of $67,500. At BTC $40,000, the intrinsic value of a $70,000 put is $30,000, leaving $70,000 of total gross value. The apparent $2,500 buffer disappears if senior costs, settlement failure, or oracle conditions consume it. A more robust design avoids spot-price-triggered liquidation during a funded and authenticated protective term, while retaining liquidation rules for actual protection failure and maturity settlement.

The proposed state machine has the following legally significant transitions:

Transition	Authorization condition	Essential promise
Open → Active	BTC pledge and UNIT issuance co-settle; fee disclosed; priority fixed	Issuance and pledge are linked atomically or via enforceable recovery
Active → Hedge-secured	Put funded; call adequately covered; maturity and waterfall agreed	A put mark is counted only after its owner and settlement route are verified
Hedge-secured → Active	Put expires, is transferred away, becomes unfunded, or loses settlement enforceability	Coverage is recomputed; borrower receives a defined cure path
Hedge-secured → Repaid	Debt and legitimate costs discharged from available proceeds	Residual BTC and funds return to borrower
Active → Liquidatable	Authenticated threshold breach under current loan terms	Oracle claims and minimum cure conditions are verified
Hedge-secured → Matured	Time or expressly permitted termination event occurs	Realize collar; repay or execute non-recourse surrender
Any authorized state → Recovery	Guardian or oracle unavailable, chain reorganization, invalid price certificate, or system emergency	Recovery must protect defined property rights without secretly broadening seizure power

Five adversarial checks

Oracle lies. The attacker controls one price source and supplies an artificially low spot price. A protected vault should refuse seizure while verified hedging remains funded and the agreed term has not expired. The audit must identify every liquidation path and the proof required to use it.

The put does not pay. The contract's accounting must distinguish a put's modeled value from its funded proceeds. An insolvent writer or delayed payout creates a real uncovered hole. An external put that pays after BTC is liquidated does not accomplish the borrower's ownership objective.

The call has already consumed the collateral. The system must reject conflicting assignments, enforce seniority, or escrow sufficient cash or deliverable BTC. Pledge/call composition changes rights, so a valid state requires signed priorities and settlement instructions.

The market closes for the weekend. BTC trades continuously. A settlement venue or stablecoin exit with restricted hours can turn a theoretically solvent position into a forced liquidation. Stress paths need timing and market-depth bounds.

The borrower wants an early exit. A European collar may have substantial time value, and closing the short call costs money. Early loan repayment does not automatically release the entire collateral. The cost and permission to unwind must appear in the original contract.

The first property of the protected version is a safety invariant: *no spot-only liquidation of a vault while the protocol recognizes an enforceable, fully funded protective term*. The second is a solvency requirement that counts realizable claims conservatively. The third is a liveness property: an honest borrower who meets the contract's conditions must have a permitted route to release collateral even if a nominated guardian disappears. These are prospective goals. The present Lean dossier proves only a small abstract rule implementing the first gate; a full Bitcoin transaction proof would require the actual spend-path encodings and a finite-state or refinement argument.

The uncomfortable comparison with centralized custody

Bitcoin finance often advertises the elimination of an intermediary. A vault with guardians, privileged liquidation paths, and oracle-authorized spending still assigns consequential discretion to identified actors. Its code may narrow their authority considerably. The fiqh examination concerns exactly where that authority ends, and what a borrower can recover after an erroneous seizure.

We should remember why this matters. FTX made withdrawal rights and custody assurances appear routine while customer property was diverted into other uses, as later established in court [S174]. Ducat presents a different architecture, and its published documents describe different signatures and script paths for repayment and liquidation [S161, S164]. The relevant comparison asks whether the borrower can inspect, contest, or obtain restitution for each permitted expenditure of collateral. The book withholds any deployment-level assurance until those paths have been tested against actual transactions.

A vault contains a dispute that has yet to happen

Ducat is an unusually good case study because its vault promises to protect collateral while granting specified parties powers over the moment of enforcement. I am drawn to protocols that try to reduce dependence on intermediaries. The immediate test is the exact set of actions the user and guardian can authorize, and the conditions under which another path can spend the collateral. One should never infer a borrower's rights from the pleasant architecture drawing on the landing page.

A lender can be fully repaid from a forced sale that leaves positive equity behind. The arithmetic is easy enough to teach in an afternoon. The dispute begins when one asks why a liquidator or another account receives part of the remainder. A *rahn* is a claim against a debtor's property with limits. This is where the book's theory meets an actual Bitcoin output and the person who used to own it.

21.6 The provisional Ducat fatwa dossier

Subject: Native BTC pledged in a UNIT vault with advertised 7% mint charge, liquidation below 135%, and a guardian/oracle-triggered spend path.

Question: Can this arrangement be treated as legitimate financing under the newly proposed Muʿtazilī madhhab?

Textual premises: trade is permitted and ribā forbidden in Qurʾān 2:275; unjust appropriation and defective consent are excluded by Qurʾān 4:29; principal recovery and debtor hardship are material in 2:279–280 [S01–S03]. The 1986 Academy rule limits loan service charges to actual expenses [S27]. These constitute the initial adverse standard for fees, with traditional dissent and scope recorded.

Positive observations: BTC is a publicly auditable and transferable digital asset, and Malaysia's Securities Commission has recognized regulated digital currency as *māl* [S28]. A collateral pledge creates an intelligible property relation. Ducat describes a defined redemption mechanism and an overcollateralization system. Those are features with a possible lawful use. The legitimacy of a particular funding or custody path still depends on precise obligations and their actual performance.

Adverse observations: the proportional 7% mint charge has an unverified cost basis and can duplicate a loan uplift in economic effect; collateral liquidation may transfer a borrower's remaining equity to other parties; the liquidating spend path has distinct signer and hash-preimage assumptions; documentation versions disagree about fees. A hedge covering BTC price declines is absent from the described unmodified contract [S20–S26].

Verdict under the proposed method: **undetermined for Ducat as deployed or advertised.** Issuing a blanket approval would require proofs about the charge, title, liquidation, and deployed transaction model that this edition does not possess. A redesigned, fully funded and auditable collar vault could be **conditionally supported** if its financing terms satisfy a defensible rule against ribā and its settlement and residual property rights pass the relevant checks. This is a proposed outcome under a new school, not a fatwa on behalf of the eleven compared traditions.

Falsifiers: a service charge whose proceeds substantially compensate for principal rather than service; an unauthorized liquidation path; an owner losing residual property beyond valid contractual claims; a hedge whose put proceeds cannot reach the vault before seizure; a default rule that allocates ordinary partnership losses entirely to a party who was promised shared risk; a genuine applicable consensus whose scope and authority the proposal has failed to address.

21.7 Two spending paths, one promise of custody

The public Ducat documentation gives enough detail to expose a real distinction in authorization, even while the deployed version still needs auditing. Ordinary vault operations involve a borrower and a guardian; the published liquidation-specific account describes a path using a single signature and a hash preimage derived through oracle procedures [S160–S163]. Under the documentation, the protocol's two spending paths protect different interests at different events. The ordinary arrangement is described as a two-party approval procedure. The liquidation path can execute after the agreed threshold conditions without a new borrower signature. A claim that the vault is simply '2-of-2 self-custody' omits that second route.

This distinction matters at the level of legal characterization. The pledged BTC owner may retain a residual proprietary interest and a right to redeem by repayment while consenting to specified creditor enforcement. The creditor's conditional power of sale does not automatically make the creditor the owner of the collateral's entire remaining value. The operative question is which prior agreement, rule and enforcement condition authorize the destination of every satoshi upon seizure. The book's proposed *barzakh* doctrine therefore treats normal redemption and forced liquidation as two different contract transitions whose permissibility requires different witnesses.

The public governance documentation gives illustrative starting parameters: a 160% minimum collateralization ratio to borrow, liquidation below 135%, a 15% repossession tax, and a liquidation subsidy schedule that begins below a lower threshold [S163]. These are governance parameters and can change; the applicable on-chain policy at a particular block is a separate fact. Ducat's explanatory liquidation chapter says that liquidation incentives may be financed from the remaining positive value of an undercollateralized vault [S162]. This supplies an adverse case for the book's preferred rule of returning unencumbered residual property to the

original owner. A loan contract whose valid prior obligations allocate those proceeds elsewhere demands a fresh analysis of contractual assent, priority and whether the incentive constitutes lawful compensation or an unjustified forfeiture.

Consider a liquidation yielding $70,000 of realizable value on a nominal $50,000 debt. If $5,000 of enforcement expenses are lawful and prior, the remaining $15,000 is economically available for some claimant. We can stipulate a *proposed* borrower-residual norm that awards it to the borrower. A protocol that instead grants the $15,000 to a liquidator through an agreed incentive has changed the rights vector. Both may settle the same debt. This counterexample makes the moral question visible; deciding the lawful owner of that remainder requires the governing pledge documents, the validity of the penalty or purchase incentive, and a source-specific judgment. A conservation theorem cannot settle it.

The current public website separately advertises a one-time 7% charge on UNIT issuance and a nominally zero ongoing interest rate [S160]. Edition 0.13 had already treated the charge as an unresolved issue. Edition 0.14 strengthens the evidentiary requirement: reconstruct the transaction's actual issuance and repayment records and identify where the fee lands, who receives it, how it relates to verifiable services, whether refunds occur, and whether the borrower receives D or a smaller net amount while owing D. The model's hypothetical annualized-rate example remains a way of investigating the economics of this pricing. It is no proof of the contractual amount charged to a particular borrower.

Ducat's public technical materials also describe the oracle's role in releasing the liquidation preimage and a guardian's verification of the liquidation transaction [S161]. A convincing deployment audit must pin the actual Taproot script leaves, quote hash, signed price, timestamp, authenticated signer, applicable governance configuration, and resulting outputs. It should include replay and fee-bump behavior and a path in which the oracle or guardian becomes unavailable. A code audit of a signing interface alone is insufficient because the validator, price service and final transaction determine the executable outcome. Ducat's public signing FAQ identifies several relevant Taproot leaves and describes its own review status [S164]; it is useful architectural evidence, with no independent establishment of the full deployed liquidation predicate.

Formal model and falsifiers

`CreditWaterfall14.lean` models the published collateral ratios in a hypothetical one-BTC loan. It separately represents eligibility, authorization and a fully accounted-for liquidation receipt. The numerical witnesses pass or fail according to the selected conditions. The `ownerRemainder` test is an explicitly proposed property-law rule, with an example where a liquidation that omits the remaining funds fails the selected accounting predicate. The model is intended to direct a source audit, and its present booleans are illustrative representations of externally verified facts.

The concrete falsifiers for a Ducat-specific fatwa remain a minting charge that operates as prohibited lender compensation under the adopted law, any spend path available without the contractually required oracle and signer evidence, an enforceable forfeiture that conflicts with the governing theory of property, a user's inability to reclaim collateral after valid discharge, or a promised put whose settlement cannot protect the vault when liquidation becomes executable. The public protocol presents a research opportunity for the Muʿtazilī method. Its present documentation does not establish the prerequisites for a blanket lawful-financing certificate.

22. The Synthetic Dollar Without Ribā

A merchant wants to keep her wealth in Bitcoin while fixing the dollar value of next month's invoice. She could sell BTC now for dollars, borrow dollars against it, purchase a fully funded downside option, or hold BTC with a corresponding short derivative exposure. These are distinct financial contracts that may yield similar dollar outcomes. The synthetic dollar is the portfolio construction in which a volatile cryptoasset and an offsetting exposure together approximate a dollar-denominated claim. Its economic result does not require a conventional dollar loan in every design. Its legal classification still depends on how each leg is held, financed and enforced.

22.1 The elementary identity

Suppose the issuer holds q BTC at initial dollar price S_0, and sells q BTC of linear, dollar-settled future exposure at a corresponding initial price. Ignoring funding, fees, settlement delay and default, the terminal value is $qS_T + q(S_0 - S_T) = qS_0$. The exposure to changes in S_T cancels. If one BTC starts at $100,000, the issuer theoretically maintains $100,000 of dollar value whether spot is $60,000 or $140,000 at maturity.

This identity is a mathematical starting point, not a promise that a token named one dollar can always redeem for one dollar. A derivative's payoff may arrive in a different currency or custody account, its collateral may be inaccessible, and a venue may close the short before the matching spot asset is sold. A token holder has a claim on whatever enforceable assets and redemption terms the issuer actually offers. The ledger liability should be denominated in those contractual units and separated from the market maker's internal hedge marks.

22.2 Delta neutrality does not imply solvency

For a portfolio $V = qS + H(S,t)$, instantaneous delta neutrality requires $q + \partial H/\partial S = 0$ under the valuation model. It does not imply V is constant over an actual trading interval. Basis movements, changing implied volatility, transaction costs, funding and path-dependent liquidation all remain. Nor does zero delta prove that the position can be unwound in the volume and time required to pay redemptions.

Take the one-BTC example with $12,000 posted as margin. At a BTC rally to $110,000 the short has a $10,000 mark-to-market loss, leaving only $2,000 of initial margin if no further assets can be posted. If a venue force-closes the hedge and the spot asset later falls to $60,000, the combined exposed wealth may finish at $62,000 rather than the $112,000 that an intact position plus margin would have retained in the illustrative calculation. The dollar identity has failed through the enforcement path. The mathematics was accurate; the promised holding structure was incomplete.

22.3 Redemption is a senior obligation

Let $A_t^{realizable}$ be genuinely collectible collateral and hedging proceeds after enforceable senior claims, liquidation costs and settlement haircuts. Let L_t be outstanding token-redemption obligations. A basic coverage condition is $A_t^{realizable} \geq L_t$. For a robust redemption promise, we also require a time-to-payment condition under the disclosed settlement regime. A solvent but frozen account may fail the recipient's need to meet an invoice.

Assets should not be counted twice. A BTC coin already assigned to a senior call purchaser cannot also serve at unrestricted face value as backing for a stablecoin. A clearinghouse margin deposit pledged to secure a short position might not be withdrawable upon the issuer's unilateral request. An expected future funding receipt should not be counted as currently spendable reserve. The proper model follows each account's title and ability to pay, not a dashboard total.

22.4 Funding as a separate legal contract

Many perpetual swap markets employ periodic payments between long and short positions to influence the relation between perpetual and spot prices. Protocols disclose their own formulas and conditions, including cap, interval, mark/index rules and possible negative rates [S36–S39]. These cash transfers alter the synthetic issuer's economics and may be decisive during persistent bullish or bearish conditions. A profitable funding carry in past observations is evidence about market behavior, not permission to guarantee future income to token holders.

The *mutaqlid* therefore reviews the legal cause of funding. Is it a contingent exchange between counterparties with funded obligations, a charge for borrowing collateral, or a payment stipulated to a creditor because a principal advance remains outstanding? The answer can differ by venue and by how a position is financed. A perpetual's formal description as a risk-neutral hedge does not settle its collateral loan or creditor relationship.

22.5 A redemptions stress test

Assume a toy issuer with $1,000,000 of redeemable tokens, BTC and cash collateral booked at $720,000, and a mark-to-market short receivable of $340,000. The balance sheet appears to contain $1,060,000 of assets. If only $220,000 of that receivable can be collected in the redemption window and $20,000 of costs are senior, adjusted realizable assets are $920,000. The issuer faces an $80,000 deficit even though its theoretical hedge can later mature profitably. The correct inference is about redemption fragility under the specified stress assumptions. The figures are illustrative and imply no claim about an actual protocol.

To test a real design, a reviewer must simulate simultaneous redemptions, exchange default, price gaps, a prolonged positive funding requirement for the short, oracle divergence and unavailable banking rails. Any pledged charity or endowment reserves must be excluded from the issuer's unrestricted balance sheet. An emergency gate that can suspend redemption requires its own legal justification, publicity and remedy.

A synthetic dollar needs somewhere to sleep at night

When markets are calm, a dollar hedge can look like a line whose slope has been carefully adjusted to zero. Overnight it still needs a custodian, margin resources, an oracle, and a solvent party prepared to settle the contract. The asset backing the dollar may be in one venue while the claim against its hedge is elsewhere. A risk report adds the balances together; the holders of those balances retain different legal rights.

In the FTX week, a question that had seemed procedural became existential for anyone whose assets sat inside an exchange: which obligations could be honored, and which claims would have to enter insolvency proceedings? My basis-trading experience supplies a reason to care about that question [S175]. It cannot confer permissibility on a synthetic dollar whose redemption claim is weaker than its marketing language.

22.6 The proposed mutaqlid judgment

An honestly funded synthetic-dollar portfolio may serve a legitimate purpose: facilitating trade without requiring each user to borrow fiat currency on interest-bearing terms. A favorable judgment under this new-school theory depends on independent lawful rights in the hedge, sound custody, permissible funding arrangements, specified redemption rights, and protections against wrongful liquidation. IIFA's 2018 and 2019 hedging rulings continue to supply serious objections to many conventional forms [S32, S33]. The proposal has to identify its disagreement, rather than claim that a useful economic result supplies automatic permission.

The distinction that matters is whose obligation the dollar token represents. It may be a debt of an issuer, a secured redemption claim, a participation in assets, or a redeemable warehouse-like receipt. Each model demands different rules for insolvency, *ṣarf*, loan increases and transfer of title. The dollar price is the most visible property of the token. Its legal content lives in the rights behind the price.

23. TradeLayer and the Decentralized Exchange of Risk

The promise of a decentralized derivatives exchange is that a party can transfer a defined price exposure without handing unrestricted discretion over its property to a bank’s trading desk. The actual engine must still accept orders, authenticate participants, reserve collateral, settle wins and losses, and resolve insolvency. The old operational problems of futures exchanges return as questions about code paths, oracles and ledger authority. A jurist evaluating the technology should read the economic state machine rather than infer safety from decentralization as a slogan.

TradeLayer offers an instructive research case because it has a historical JavaScript implementation and a staged Rust reconstruction. The repository’s published README describes the Rust work as offline research replay rather than an authorized production engine. Its modules model registry, balances, spot trading and selected clearing operations, with various economic settlement paths explicitly default-denied pending verification [S143]. This matters to the fatwa: a formal demonstration on a synthetic matched trade establishes properties of that experiment, not of a live decentralized market.

23.1 The conservation question

In a two-party matched linear derivative, one participant’s gain is the other’s loss before fees. If the realized transfer for the long is Δ, then the short’s paired transfer is $-\Delta$. A clearing engine must apply both atomically from authorized resources and preserve the collateral asset’s accounted supply. If its integer rounding rule produces gains summing to one satoshi more than funded losses, a verifier has found a genuine accounting problem, however small the amount in ordinary currency.

The Rust clearing arithmetic documentation explicitly separates exact-rational computation from a historical twenty-decimal reciprocal-rounding mode. For one inverse-contract fixture the two policies differ by one atomic unit [S144]. This provides a useful counterexample to the assertion that mathematically equivalent formulas always yield identical executable transfers. A consensus engine must choose a defined arithmetic policy; silently substituting a more elegant formula may change balances.

23.2 Margin, mark and execution

Let p_t be an authenticated mark, e an average entry price, q signed contract exposure, and N a contract notional multiplier. A simplified linear mark-to-market relation is $PnL = qN\left(p_t - e\right)$. In an inverse instrument the reciprocal of price enters the expression and the settlement unit differs. Both forms require overflow discipline, specified rounding and consistent account updates.

The historical TradeLayer source includes distinct mark rules for oracle and native contracts, different funding windows, AMM and orderbook execution priorities, and bankruptcy or insurance pathways documented by its migration audit [S145]. A protective liquidation must use the right authenticated price reference. The price that creates a maintenance deficit is not necessarily the price at which an available counterparty can safely close the position. An optimistic fill at a non-existent bid would transfer a fictitious asset into the settlement ledger.

The legal importance is immediate. The claimant who suffers forced closeout is entitled to know the triggering observation, the permitted execution priority, and the calculation of remaining equity. A difference between the mark and a realized fill can distribute losses in ways the customer did not foresee. The algorithm may implement an agreed commercial loss-sharing rule, or it may assign an unjustified windfall to another actor. The relevant source rules and actual execution trace must be examined together.

23.3 Insurance reserves belong to someone

A pooled insurance reserve can pay a deficit that would otherwise fall upon a solvent counterparty. It must be funded by an identified sponsor or participation agreement. The Rust research documentation records an insurance reserve held in the same token ledger and expressly warns that a projected loss budget is not a reservation of insurer funds; two payouts cannot each claim the same atoms [S146]. Its research limitations matter: synthetic reserve balances and checkpoint consistency do not authenticate the real source of a deposit or authorize a future payout.

In fiqh, the first question is ownership of the reserve. A cooperative contribution, a platform profit allocation, a lender’s pledge and a waqf donation carry different permissible uses. Moving a restricted asset into a settlement account does not alter the owner’s rights by magic. The *mutaqlid* certificate needs the fund’s governing instrument and loss-allocation order as well as the actual accounting transition.

23.4 Settlement authorization is an additional proof

A valid blockchain transaction proves some facts about authorization to spend coins according to chain rules. It cannot by itself show that a derivative profit was calculated at the correct mark, arose from a real trade, or had not already been paid. TradeLayer’s published settlement documentation therefore places a separate economic authorization gate before certain channel settlement types and retains default-deny behavior when the required evidence is missing [S147]. This is a direct example of the difference between cryptographic authenticity and lawful entitlement.

The required witness for a production system would bind the parties, contract, time, reference prices, position state, authorized signers, exact payoffs, available collateral and the source-chain inclusion record. A proof system may compress parts of this verification. Its public inputs still need to be connected to authenticated observations. A hash of a fabricated liability remains a consistent hash of a fabricated liability.

23.5 A legal stress scenario

Imagine a merchant with a BTC-denominated revenue stream who shorts a matched derivative. A sudden oracle error marks BTC twenty percent higher while the real market remains unchanged. The engine declares maintenance failure, sells the customer’s margin to an AMM at the permitted price boundary, and attempts to use insurance for the remaining deficit. The customer challenges the mark after final settlement. The juridical questions concern which observations were contractually acceptable, whether execution followed the agreed priority, who owned the collateral seized, and which remedies the merchant can actually obtain.

A satisfactory protocol should make enough of this trace reproducible that an independent investigator can state the precise cause of each transfer. A separate governance rule governs how an affected customer can contest the observation and obtain restitution. The protocol designer cannot cure an invalid transfer merely by announcing that the engine was deterministic.

Field note: the long distance between code and liquidity

I began building TradeLayer in 2017. Over the years I met teams around Bitcoin finance that could show better funding, stronger publicity, or more elegant demonstrations than my own. Several projects, including ones I followed in the Stacks ecosystem, made real technical progress without establishing deep trading markets. My own project likewise confronted the hard arithmetic of obtaining a genuine counterparty for a real position [S175].

This is a confession of entrepreneurial limits, with jurisprudential consequences. A matching engine is a piece of software. A market exists when actual people commit capital under rules they understand, and when the obligations still clear during stress. Synthetic volume can be produced cheaply, especially with incentives that

reward notional turnover. It creates a dangerous appearance of liquidity. The proposed fatwa should demand funded execution histories and independently checkable reserves before describing a derivatives venue as a functioning hedge market.

23.6 The provisional holding

TradeLayer's experimental design contains mechanisms relevant to potentially legitimate decentralized exchange and hedge settlement. A favorable ruling for a specific transaction would require authenticated production behavior, lawful funding, clear settlement priorities, prohibition of arbitrary confiscation and a source-specific argument for the derivative right. The current Rust research state remains a valuable source of adversarial cases and bounded arithmetic guarantees. It is not evidence of comprehensive live solvency, derivatives parity, or cross-madhhab approval.

The broader insight is that the same ledger that makes settlement transparent can make misconduct auditable. A *mutaqlid* ruling can name its exact program version, record its adverse cases, and expire when a material code or governance rule changes. The aim is a legal opinion whose addressee knows which bargain was authorized and which bargain was never approved.

23.7 From a rounding proof to an economically authorized transfer

TradeLayer's available Rust documentation exposes a valuable sequence of proofs and omissions. The isolated clearing arithmetic covers loss-coverage diagnostics, a bounded funding deadband, and mark-to-market profit or loss for stated contract forms [S165]. It distinguishes the legacy JavaScript's twenty-decimal reciprocal rounding from a proposed exact-rational calculation and documents a case in which their final atomic-unit results differ by one. This matters when a protocol treats the last atom as consensus-relevant property. Before executing a payment, someone must specify which arithmetic policy is binding at the relevant block and which evidence connects its inputs to the real trade.

The separate settlement-authorization design explicitly distinguishes authenticated blockchain history from authenticated trade economics [S166]. It describes default-deny handling for economic settlement whose necessary witness is absent. This is the decisive methodological bridge: a valid output script can authorize a transfer of coins even if a purported derivatives entitlement originated in a false position, a stale oracle mark, a replayed claim, or an inconsistent insurance account. A legal adjudicator will eventually need a record of both the spending authority and the debt or profit that justified it.

Edition 0.14 models one bilateral margin transfer. If the loser owns 5,000 available units of funded margin and owes a verified settlement of 3,000, the authorized transfer yields margin balances of 2,000 and the winner's prior balance plus 3,000. The total of both balances is conserved. If the claimed payout is 3,000 while the actual escrow contains 2,000, the transfer lacks full funding. Crediting the winner anyway would create an unfunded claim or require a separate authorized source of funds. A zero-sum derivatives payout is mathematically simple precisely when the transfer is made from money that exists and is legally assigned to the liability.

The repository's insurance design places sponsor-funded resources within the single ledger and cautions against counting the same reserve repeatedly for concurrent obligations [S167]. Our counterexample contains two obligations of 60 and a reserve of 100. The model refuses to certify aggregate coverage. Additional promises of insurance cannot turn the sum into 120. The source of a supplemental payment must be named, funded, available for that loss class, and permitted by the reserve's legal terms. This connects the financial ledger to the waqf, cooperative-pool and fiduciary chapters later in the book.

A valid economic certificate should contain the exact contract definition and notional, participant identities, matched position evidence, source price or authorized oracle, rounding policy, funding history, closeout priority, funded losing account, insurer contribution if any, beneficiary, settlement amount, replay marker and receipt. A block height and hash belong in the certificate, while the interpretation of the trade and allocation of

residual property remains source-sensitive jurisprudence. An attractive option-adjusted protection strategy can be economically useful while still failing this certificate if its writer has withdrawn collateral or its settlement proof omits the final exercised claim.

Evidence as of this edition

The inspected Rust repository describes research-stage execution and synthetic testing, with named boundaries around full settlement authentication, underlying chain evidence and historical JavaScript parity [S165–S167]. The accompanying new Lean module Clearing14.lean encodes an abstract admission conjunction, a funded two-account transfer and a counterexample to insurance double counting. It shows how a proposed certificate should fail closed when the trade, economic claim, price or replay evidence is missing. Its evidence flags are external assumptions, and the conservation proof addresses a deliberately narrow funded transaction. It supplies no production certification for TradeLayer or for any derivative on Bitcoin, Litecoin or Dogecoin.

An operative *mutaqlid* fatwa could eventually identify a specific derivative implementation whose execution proofs satisfy these terms and whose economic and ownership conditions are valid within the adopted uṣūl. Such a conclusion would have the traceability of the mathematical proof, along with the historical accountability of the named legal source. The new work advances the test itself and produces concrete failure witnesses that a protocol developer can use when building that certificate.

24. DLCs, Options, and the Sovereignty of Collateral

The strongest version of a Bitcoin derivative is a contract that specifies its possible settlements before the money is put at risk, reserves the assets needed to perform, and gives each participant an enforceable route to receive the amount due. Discreet log contracts (DLCs) provide a technical vocabulary for this ambition. They combine prearranged settlement transactions with cryptographic mechanisms by which an oracle's attestations make the appropriate outcome spendable. The design is described in public DLC protocol specifications [S40]. Its exact security depends on funding transactions, signatures, oracle behavior, timeouts and the transactions actually constructed.

The financial form can be modest. A farmer and a purchaser agree to exchange value if the price of a commodity falls below a threshold. A Bitcoin holder purchases a funded price floor. Two market makers exchange a capped exposure to a published index. In each case the parties must establish the lawful subject of the right and the legitimacy of compensation for the contingent claim. The contract's transparent software can answer part of the performance question. It cannot establish by itself that the underlying trade is valid under every madhhab.

24.1 The collateral at inception

Suppose a one-period put covers 1 BTC at a strike of $70,000, measured against a BTC/USD reference at maturity. Its cash payoff in dollars is $P_T = max\left(70,000 - S_T, 0\right)$. If the settlement occurs in BTC, the amount of BTC owed varies with the exchange rate and has to be bounded against the agreement's price domain. The writer and buyer need to identify how much Bitcoin or another asset is locked, how conversion works, what rounding applies, and what happens if the price goes outside the modeled range.

The adjective **funded** must be used carefully. A writer who can owe a maximum of $70,000 in an idealized cash model may not have reserved enough BTC to pay that amount at an extremely low BTC price. The settlement asset and its own volatility matter. A fully collateralized BTC-settled option must define the admissible price grid, bound the maximum satoshi obligation and reserve sufficient funds for all allowed outcomes, together with justified transaction fees. Otherwise the design is partially collateralized even if the initial dollar estimate sounds conservative.

24.2 Oracle truth and oracle authority

A DLC oracle commonly attests to a defined outcome. The settlement mechanism can validate that an attestation corresponds to a cryptographic commitment, while the economic truth of the observation depends on how the source measures the event. A price index may be unavailable, stale, compromised or disputed. Its selection is consequently a legal term. The contract should specify data providers, averaging period, precision, fallbacks, and a remedy for a known erroneous report.

A signed lie is not the same thing as a correct observation. Two valid-looking but inconsistent attestations can also permit outcomes the parties expected to be mutually exclusive if the protocol and oracle were badly designed. Robust implementations have to address equivocation, event IDs, timing and how disputes can be heard before a collateral claim becomes irreversible.

24.3 The claim on the same coin

A Bitcoin collateral vault may have several purposes: securing a loan, delivering BTC under a call, or serving as the writer's reserve for a put. Such purposes require an explicit priority ordering. The same UTXO cannot guarantee unrestricted first delivery to two independent creditors. If settlement is protected by mutually exclusive, pre-signed Bitcoin transactions, the enforceability still depends on their exact scripts, signature flags and competing transaction paths. The Bitcoin transaction reference documents locktimes and the effects of

differing signature authorizations [S148]. A single unnoticed branch can upset an entire legal statement about protection.

A *mutaqlid* dossier should therefore include a funding-outpoint list, a precise commitment to the settlement tree, the authorized signers, the status of adaptor or other pre-signed signatures, expiry and recovery paths, fee reserves, and who can publish each transaction. It needs a property-rights table mapping each possible terminal output to the entitled beneficiary. The relevant legal analogy then concerns a backed and enforceable contingent exchange of property, not merely a pretty payoff graph.

24.4 An honest timeout

Any settlement mechanism can face a missing oracle report or uncooperative participant. The contract must specify whether a refund is available after a timeout, who can trigger it, and which financial obligations survive such a refund. A refund that allows the writer to reclaim collateral precisely when the put holder needs payment may defeat the product's protective purpose. A recovery path that remains blocked by an absent cosigner can turn supposedly self-custodied capital into an indefinite lock.

The corresponding formal requirements include safety against unauthorized claims and liveness of authorized release. Each must be tested under reasonable adversaries and chain conditions. A text that says 'anyone can recover' without a usable transaction is a description of a hoped-for feature, not an enforceable right.

24.5 The comparison with a bank option

A bank option can have legal rights that are personally enforceable against a solvent counterparty. A DLC can replace some of that dependence with pre-committed collateral and transaction rules. The two may have similar expiry payoffs while differing in recourse, privacy, funding needs, dispute procedures and exposure to oracle error. This is precisely a *barzakh al-ḥukm* question. The distinctions may support an independent legal argument under a proposed Muʿtazilī school, subject to the source rules it actually adopts.

The Academy's opposition to stand-alone compensable option rights [S09, S33] remains applicable as an objection to the paid right itself. Greater execution security is relevant but does not dissolve that doctrinal objection automatically. The Malaysian recognition of certain acquisition rights [S10] supplies a different starting premise. The *mutaqlid* must explain why the particular DLC right belongs to the legally recognized category, if such an interpretation is adopted.

The oracle signs the result and the courtroom asks for a witness

A DLC can make a derivatives settlement strikingly compact. Two parties place collateral into an arrangement whose authorized payout depends on a specified oracle event. The signatures and timelocks can be inspected; the future event arrives with the force of a publication. The contractual story needs additional facts. What if the oracle publishes an erroneous result? Who can contest the payout? What happens when an honest participant is offline at the wrong moment?

The programmer who says that the code behaved as specified may have produced an accurate report. The holder of the disputed Bitcoin still has a question about lawful title. Our jurist must care about both records. A fast and final transaction can be the beginning of a claim for restitution.

24.6 A bounded fatwa for funded optionality

The strongest provisional case concerns parties who own the settlement collateral, agree to transparent events and outcomes, provide sufficient funding for every admitted settlement state, and have a reliable exit or remedy when oracles fail. The put or covered call is then examined as an enforceable contingent property right, separate from any loan that may accompany it. The argument becomes weaker if the parties borrow their

reserves at interest, create overlapping senior claims, allow unilateral parameter changes, or depend on an external unfunded writer.

A protocol that permits a widow to purchase a credible crop-price floor can advance the economic objective of preserving her livelihood. The fiqh question is whether the rights in that protocol qualify as lawful property and trade under the declared sources. The cryptography supplies evidence about commitment and performance, and the jurist retains responsibility for the legal inference.

Part VI. The Political Economy of Liberation

25. The End of the Rentier’s Monopoly

An economic order depends upon decisions about who can issue money, who receives newly created credit, who can obtain liquidity in a crisis, and who bears losses when promises cannot be fulfilled. These decisions distribute income and command over property long before a borrower encounters a bank’s contract form. The question of the rentier’s monopoly concerns the privilege to create obligations whose risks are carried by others while the privilege-holder retains the corresponding upside.

The modern commercial banking system creates deposit money when it extends loans, subject to capital, liquidity, demand and public policy constraints. The Bank of England’s research describes this process and rejects the textbook image of banks simply lending out a fixed stock of preexisting deposits [S114]. This mechanism is a description of balance-sheet accounting. A Muʿtazilī judgment about fairness requires separate evidence about creditors, debtors, allocation, and public benefit.

25.1 Who receives the first claim on new money?

Credit creation produces an asset for the lender and a liability for the borrower. Its distribution can support productive enterprise, housing and public services. It can also channel credit disproportionately toward collateral owners, inflate asset prices and shift crisis losses to taxpayers or savers. A financial-justice analysis asks what terms the lender has earned, which risks it genuinely bears, and how those risks are transferred when the state intervenes.

The legal status of a particular loan remains governed by the relevant ribā rules. The systemic allocation of credit deserves its own study under public justice and the duty not to consume another’s property wrongfully. A bank that provides a useful payment service can still be required to justify the way it prices a loan. A decentralized issuer can reproduce the same rent extraction in a different interface if it holds privileged liquidation rights or hides its balance-sheet shortfalls.

25.2 Seigniorage as a public trust

A sovereign monetary institution can receive revenue associated with issuing money or holding income-earning assets financed by monetary liabilities. The precise source and incidence vary with the monetary regime and the remuneration of reserves. In the book’s account, seigniorage creates a public-law question: who should benefit from the franchise of the unit of account, and who bears purchasing-power losses during monetary adjustments?

A Bitcoin-style monetary network has a distinct issuance mechanism, with block rewards and fees paid according to protocol rules. That design distributes some issuance rights through proof of work and holders’ ability to verify supply. It does not eliminate every form of private rent, transaction-fee concentration, miner market power, custody concentration or exchange monopoly. Its economic merits must be considered on their actual institutional evidence, rather than an assertion that a fixed supply makes every transaction just.

25.3 Capital controls and unequal exit rights

An official exchange rate can promise a conversion price that only privileged participants can obtain. A country may restrict outward capital transfers to defend reserves, mitigate instability, or maintain other public-policy goals. The IMF’s 2022 institutional view discusses when capital-flow measures may play a role, with attention to their setting and interaction with broader policy [S116]. The legality and justice of a specific restriction depend on its authority, purpose, proportionality, disclosure, remedies and unequal effects.

A citizen prohibited from converting her wages while a politically connected firm receives priority faces a different allocation of rights, even if both amounts are booked at the same exchange rate. The book’s legal

equivalence method captures this discrepancy: formal equality of unit price can conceal unequal ability to redeem. A centralized capital controller and a stablecoin issuer who gives insiders early exit can reproduce analogous harms through different mechanisms.

25.4 Decentralization as a constitutional tool

A distributed payment network may reduce dependence on a single discretionary gatekeeper. Self-custody gives individuals an additional route to hold and transfer their own property. Open auditing can make certain supply and transfer rules public. These affordances become socially useful when customers can exercise them safely, financial institutions disclose their obligations, and citizens have lawful ways to resolve fraud, mistakes and theft.

A protocol whose owner has a hidden upgrade key remains a concentrated authority even if its ledger is geographically distributed. A treasury governed by a single token whale can reproduce oligarchic control under the language of governance. An AI system that determines every citizen’s entitlement by an opaque score can create another unelected financial gate. The proposed Ḥanīfiyyah institutions must be constructed against these possibilities from inception.

25.5 Monetary pluralism and the duty of restitution

A global network can allow its members to use different settlement assets without demanding uniform exposure to any one monetary issuer. BTC, local currency, commodity claims and a responsibly specified synthetic dollar have different liquidity, volatility and legal properties. A voluntary merchant may select among them when she understands the conversion terms. Public charges and charitable obligations also require a defined valuation method so a creditor or beneficiary knows what is due.

A plural order needs conflict-of-laws rules, consumer protection, inheritance and fraud remedies. Freedom to exit does not automatically compensate a victim for funds already stolen or misallocated. The political economy of the proposed network therefore culminates in a public duty of restitution: if a banker, algorithm or official unlawfully takes a person’s property, the community’s capacity to trace the transfer ought to serve the claimant rather than provide merely another beautiful audit page.

A founder inside the incentive problem

A protocol founder faces the same temptation as the investment banker described by Irfan and Das. I have spent years raising capital, persuading traders to investigate a new venue, and designing instruments whose usefulness depends on network participation. Every financing pitch wants a curve sloping upward. Every founder can point to a projected volume that has yet to arrive [S175].

Crypto intensified these incentives. Token prices can reward an appearance of activity long before a real customer receives a useful service. Self-trading, inflated collateral marks, affiliated market makers, undisclosed side agreements, and treasury speculation can convert apparent participation into a transfer of wealth from outsiders. The better constitutional answer is to require proof of who funded trades, who can redeem, and what founders may extract before the project achieves those promises. A decentralized label brings no ethical exemption.

The monopoly that survived inside the new protocol

The old rentier earns a living by controlling access to an indispensable balance sheet. His decentralized successor may earn one by controlling the oracle, the settlement order, or the emergency governance key. A protocol whose users cannot inspect these powers can distribute tokens widely while concentrating the ability to dispose of somebody else’s collateral.

I have spent long enough building Bitcoin infrastructure to distrust a map that labels a subsystem decentralized and considers the matter finished [S175]. The useful constitutional inquiry is almost boring: whose signature moves funds, which evidence activates it, and which person is entitled to appeal afterward? A sound fiqh of political economy can be written in the language of duties that survive contact with the administrator.

25.6 The final institutional test

Our rentier critique has to be able to accuse its own favored technologies. A Bitcoin lender who extracts an unjust surcharge, a derivatives venue that seizes customer equity, a treasury that pledges waqf assets without authority, and an AI administrator that gives its sponsor special access all present failures recognizable within the book’s principles. The possibility of these failures prevents the proposed political economy from ending in a new infallible machine.

The next chapters give the alternative institutional work its legal shape: separate estates for zakāt and waqf, mutual finance with funded obligations, a constitution that defines member rights, and a theory of leadership as a revocable trust. The value of money without a privileged gatekeeper must be measured by the human rights it sustains, including the right of a poor owner to be heard when a powerful creditor’s system reports that her remaining property has disappeared.

26. Zakāt, Waqf, and the Decentralized Commons

Working Chapter 20A · Proposed final Chapter 26

A widow asks the treasury for six months of security. One official offers her zakāt, another proposes a small business loan from a perpetual endowment, and a third offers disaster protection through a cooperative pool. Their promises may all be delivered in bitcoin. The addresses may be managed by one wallet interface and their amounts may be displayed in the same dollar unit. The underlying rights remain distinct.

The zakāt distribution answers a defined obligation toward an eligible recipient. The waqf holds property under a continuing charitable restriction, with benefits available for its stated purpose. The mutual pool accepts contributions and claims according to an agreement among participants. A fourth balance may belong to an ordinary civic association, whose members have authorized spending on a clinic or a dispute service. A treasurer who aggregates the four balances and announces that the community has become rich has already made the first legal error.

A global Ḥanīfiyyah commons would be judged at this point. Its ability to send money worldwide is useful; the justice of its transfers depends on ownership, purpose, authorization, and the time at which assistance becomes due. The Qurʾān's distribution rule in 9:60 names eight zakāt categories. Qurʾān 2:280 addresses the debtor in hardship. Qurʾān 4:58 binds the person who holds another's trust. Together they establish a demanding case for making the ordinary household's entitlement more important than the treasury's expansion [S125–S127].

26.1 Zakāt is an obligation with a recipient

Modern humanitarian finance tempts us to treat social funds as assets under management. A spreadsheet tells a different story when liabilities are included. Suppose the treasury collects $60,000 explicitly as zakāt. Verified immediate claims of $42,000 have already arisen. The fund's gross assets are $60,000, while the first relevant number for its managers is the $42,000 belonging to the authorized distribution process. The unallocated $18,000 is held under the same legal purpose. Its presence is not a dividend payable to a treasury token holder.

AAOIFI's Shariah Standard 35 treats zakāt as a duty arising upon specified wealth and distributes it to identified classes. The exact holdings, nisāb, ḥawl, rates, and treatment of income and corporate assets require an authority-specific calculation. Corporate shares make this especially clear. The International Islamic Fiqh Academy's 1988 Resolution 28 places responsibility on shareholders, while permitting a company to pay on their behalf under its stated authorizations; it also distinguishes shares held for trading from those held for income [S128, S129]. A protocol that applies 2.5 percent to every balance in every state, then labels the result zakāt, has substituted software convenience for the claimed legal duty.

The design needs payer intent, the relevant valuation time, the authority under which the amount is computed, and the recipient classification. It needs an exception process when evidence changes. A local cooperative's right to spend its membership dues is entirely separate from the legal conditions under which a Muslim pays zakāt. A public treasury funded by donations can serve the broader community; a zakāt subaccount must honor the distribution restrictions adopted for that account. This distinction matters where jurists disagree on beneficiaries, on public assets funded under *fī sabīl Allāh*, and on the means by which ownership is conveyed.

An end-to-end public ledger can attest to custody and expenditure without placing a destitute person's medical condition, family identity, or private religious belief on-chain. The International Committee of the Red Cross explains why recipients' personal data are themselves a subject of humanitarian protection [S130]. A recipient can receive a private claim credential, a payment acknowledgment, and access to appeal while auditors examine commitments and balances. The design still needs measures against duplicate claims. The privacy of a household is part of the right being administered.

26.2 Investment of zakāt: the narrow permission and its burdens

In 1986 the International Islamic Fiqh Academy adopted Resolution 15 (3/3), permitting investment of zakāt funds in principle for projects eventually owned by entitled beneficiaries or administered by an authorized collecting and distributing body. Its permission is conditional upon first meeting basic, immediate needs and providing appropriate guarantees against loss [S131]. This provides a source-based avenue for a cooperative bakery or productive land allocation. It supplies no general charter for a zakāt fund to trade derivatives in pursuit of yield.

A beneficiary who needs food now has a claim against a process that was instituted to serve her. A manager who stakes the funds in a volatile liquidity pool has changed the timing and probability of fulfillment. A plan showing higher expected future income does not discharge the existing duty. The manager must document the immediate-needs test, the permitted asset and its beneficiary ownership, loss protections, and the authority for administering the project.

One approach would be to distribute qualifying assistance to the beneficiary and let her choose whether to participate in a productive cooperative. If the donated sum becomes her private property before she invests it, subsequent profit and loss can be governed by a separate partnership contract. Another approach follows the Academy’s conditional authorization for institutional projects. Its safeguards are part of the legal structure. Neither approach justifies an automatic conversion of unspent zakāt into protocol collateral.

The difference can be stated mathematically. Let Z(t) denote assets under a restricted zakāt mandate; let N(t) denote verified, presently due needs; let Q(t) denote funds reserved for approved eligible disbursements; and let I(t) denote eligible investment exposure. A minimum operational rule for the proposed model is that investments must be authorized, immediate claims must be funded and executable, and an investment loss cannot defeat due disbursements. The precise fiqh requirement exceeds the inequality Z(t) >= N(t) + I(t), since a liquid figure on a screen might be a claim that cannot be redeemed in time. We must examine how these resources settle under adverse states.

26.3 Waqf: the capital that belongs to its purpose

A classical report transmitted by Ibn ʿUmar recounts the endowment of land at Khaybar: its underlying property was retained while its fruits were distributed. It appears in Ṣaḥīḥ al-Bukhārī 2737 [S132]. The report supplies a familiar illustration of the waqf’s continuing distinction between an enduring asset and its beneficial use. The separate normative question concerns the authority and scope of the particular report, which our source register keeps visible.

The modern permission to hold cash waqf is explicit in the Academy’s Resolution 140 (6/15) of March 2004. That resolution addresses preservation of waqf property, investment suited to the asset, diversification, donor conditions, and combined investment funds whose constituent rights remain accounted for separately. It also contemplates money dedicated to goodly loans [S133]. AAOIFI’s published Shariah Standard 33 likewise defines and regulates waqf and its investment [S134]. These rules authorize a design inquiry, with important constraints, into a BTC-funded perpetual endowment.

Consider an endowment of $200,000 that finances a rural clinic from investment income. Its deed stipulates that a portion of income may be retained to maintain the capital. Over a year it earns $12,000, spends $2,000 on authorized maintenance and $4,000 on an expressly permitted preservation reserve, leaving $6,000 available for beneficiaries. These are hypothetical dollar amounts, with every term written into the deed. A fresh donor instruction requiring every dollar of income to be spent would change the treatment of the preservation reserve. The fund manager’s good intention cannot supersede that instruction.

Now place the endowment in bitcoin and assume a 20 percent dollar-price decline. The on-chain quantity may be unchanged while its purchasing power for the clinic has fallen from $200,000 to $160,000. Whether

retaining the same sats meets the founder's preservation condition depends on the deed's unit of account, the legal treatment of loss, and the applicable waqf rules. A BTC vault with a read-only audit dashboard supplies evidence of custody. It cannot prove the preservation of a purchasing-power obligation whose terms have not been specified.

We should also distinguish the modern digital deed from title to the actual asset. A token that represents voting power in a waqf's operations might be transferable if the rules permit such membership rights. The donor's dedicated principal cannot become the private property of whoever buys governance tokens. There may be lawful processes for substitution of assets under some doctrines and jurisdictions. A unilateral on-chain administrator's right to drain the endowment would contradict the preservation promise upon which donors and beneficiaries relied.

26.4 The mutual insurance pool and the line of permissible risk

The Academy's 1985 Resolution 9 (9/2) rejects standard commercial insurance for the major uncertainty it identifies in the compensatory contract and endorses cooperative insurance based on donation and mutual assistance. Its 2012 Resolution 187 (2/20) repeats the distinction and calls for careful treatment of management compensation, insurance surplus, deficits, participant withdrawal, and liquidation [S135, S136]. We need to keep those details when a *takāful*-inspired pool migrates into a smart contract.

Imagine one hundred farming households contributing to a catastrophe pool. They collectively contribute $120,000, which is held in a legally structured mutual account. During the year verified crop-loss claims total $70,000; an agreed administrative allowance is $10,000. The remaining $40,000 can continue as reserves if the pool's charter so provides. Its disposition belongs to the participants' cooperative terms and to the applicable supervisory regime. A treasury that silently relabels the $40,000 as shareholder profit has changed the economic character of the arrangement.

A correlated flood may instead produce $150,000 in eligible claims. The pool's own resources are insufficient. The document signed by participants must state whether protection has a cap, whether claims are prorated, whether emergency contributions are possible, and whether a separately authorized *qard ḥasan* facility can advance funds subject to later repayment. A claim that all losses are automatically guaranteed while the pool holds $120,000 conceals the very gharar the institution sought to address.

The economic test is pathwise. At each time t, the pool's realizable assets plus enforceable and funded outside support must be measured against claims then due, costs of settlement, and reserved obligations. Counterparty credit cannot be counted at face value during the disaster if the counterparty suffers the same shock. A mutual pool may reduce costly individual borrowing because its members share a risk that would otherwise force emergency liquidation of productive property. That economic benefit constitutes a reason for inquiry, and the contract remains subject to the authority-specific rules of *tabarruʿ*, management, and enforceable claims.

26.5 A treasury of separate titles

The proposed network should run a four-ledger financial constitution. The zakāt register records payer designation, due distribution categories, assigned assistance, and auditable completion. The waqf register records each founder's restrictions, protected capital, returns, authorized maintenance, and obligations to beneficiaries. The mutual register records the participants, contribution basis, coverage conditions, claims, and surplus and deficit rules. A civic operating account records voluntarily committed membership dues, fees for real services, and unrelated donations.

These ledgers may settle over Bitcoin or any suitable lawful rail. They may use one accounting software stack. Their balances remain segregated as legal estates. Call the underlying assets A_Z, A_W, A_M, A_C. The consolidated accounting identity A_total = A_Z + A_W + A_M + A_C is arithmetically true. It creates no

permission to settle a civic operating bill with A_Z or to fund a speculative trading position with A_W. Such a transfer would require a separate legal authorization that respects the original owners' and beneficiaries' rights.

What, then, may the association finance with ordinary donations? It can establish a dispute-resolution service, a clinic, a literacy programme, a local compute cluster or an open-source wallet safety laboratory, subject to the purposes donors actually accepted. When the beneficiary is an eligible zakāt recipient, some services may qualify under particular juristic interpretations. The institutional status of the project and its distribution mechanics still need to be shown. Islamic Relief's published zakāt policy offers a contemporary example of separately tracking restricted zakāt funds and arguing for recipient eligibility before programme spending [S137].

A useful way to measure performance is to ask what percentage of verified obligations was fulfilled on time, how much wealth households retained after distress, and how often recipients overturned an erroneous decision. The amount of assets held by the organization is an incomplete proxy. A project that returns more usable resources to its beneficiaries can succeed by shrinking its own treasury.

26.6 A counterexample: the single vault that looked efficient

Suppose a decentralized finance protocol reports four trust balances: $60,000 zakāt, $200,000 waqf, $120,000 cooperative protection, and $50,000 civic operations. The dashboard shows $430,000. A developer proposes a single collateral vault because pooling raises capital efficiency. The vault issues dollar tokens against the aggregated assets and pledges them to an exchange.

A fall in the collateral price triggers forced liquidation. The exchange takes $70,000. The protocol calculates the loss fairly across all depositors, preserving proportional claims by book value. Even if its mathematics are exact, the operation may have seized restricted funds that the donors or beneficiaries never authorized for that debt. Equal loss allocation cannot rescue the initial pledge.

The legally relevant equivalence class must include powers of encumbrance. In the original arrangement, a waqf beneficiary could insist that restricted principal remain dedicated to the clinic. In the shared vault, an external liquidator has senior rights over that principal. The transactions are economically unequal in at least one relevant state, even if they produce the same expected yield. This is a direct application of the *barzakh al-ḥukm*: the difference is located in the enforceable claim of a third party, not in a dispute about the label on the token.

The design remedy is segregation or a legally enforceable separation that survives insolvency, with tests at the transaction, custodian, protocol and jurisdictional layers. Cryptographic commitments can help demonstrate that a particular quantity of bitcoin was held at a given instant. They need additional procedures for auditing liabilities, proving beneficial title, and preventing hidden senior claims.

26.7 Decentralized AI as a servant of distributions

A local AI model can help translate an application, identify a missing invoice, examine whether a prior recipient was accidentally charged twice, and explain the benefit of a hedge to a cooperative farmer. A model can also reproduce the historical argument of a jurist, with links to the text and a record of disagreements. The duties of care arise from the actual people whose data and rights pass through these workflows.

The necessary record should identify the model and version, the decision requested, sources retrieved, facts considered, and the human officer legally responsible for approving or overturning the result. Persons affected by a denial need an accessible review process. The organization should retain enough evidence to audit misuse while collecting the smallest amount of private information compatible with lawful operation. A decentralized datastore that copies beneficiaries' sensitive records to thousands of peers would create a new form of exposure under the banner of transparency.

Financial publication can focus on aggregate balances, purpose commitments and sampled independent attestations. Sensitive eligibility evidence can be held by accountable local bodies under reviewable privacy procedures. A person in distress should be able to receive assistance through available lawful payment systems, including conventional methods, where those work better for her. Bitcoin and decentralized AI are tools whose legitimacy comes from the relationships they help honor.

The charitable balance that belongs to somebody else

One anonymous Coinfessions submission claimed that a large charitable foundation retained most of the funds it raised. The allegation cannot be authenticated from the submission and should never be assigned to an identifiable foundation without independent evidence [S173]. The pattern it describes is nonetheless exactly why the law separates an administrator's power to move money from the beneficiaries' right to receive it.

For zakāt and waqf, this book should apply its harshest accounting scrutiny to those who speak most loudly about religious trust. The destination restriction is part of the obligation. A treasury dashboard showing an impressive total says little about the rights of recipients whose funds have been placed in a leveraged vault. Separate ownership, beneficiary accounting, public audit and enforceable restitution follow from the institution's claim to hold assets for others.

26.8 The proposed mutaqlid ruling on a shared commons

The legal dossier for every programme begins with its source and ends with a testable obligation. Zakāt requires proof of a valid liability and an authorized path to recipients. Waqf requires a legally valid dedication, protection of purpose and appropriate administration. A mutual fund requires the contributor relationship and coverage mechanics to be characterized and tested. An ordinary civic treasury requires a lawful purpose, consent from its contributors, and internal governance that respects external property rights.

One jurisdiction may classify a particular payout as charity, another as a regulated insurance benefit, and another as a commercial claim requiring licensing. Those facts matter. A new Muʿtazilī fatwa can draw upon the Academy's conditional investment rule and cooperative-insurance framework as source-based premises. Its permission to join them within a network institution remains a proposed legal inference, contingent on preserving each legally material right. The same proof cannot establish competence under every jurisdiction's endowment or insurance law.

I would attach five falsifiable obligations to the proposed commons: beneficiary entitlement survives administrative changes; donor restrictions survive all investment paths; mutual claims honor disclosed limits; outsiders cannot acquire silent security interests in dedicated capital; and every adverse decision admits review by an accountable human authority. These are proposed constitutional and engineering constraints. They become legal conclusions only when a specified source gives them authority and the implementation has been examined.

26.9 The widow's first hearing

Return to the woman whose harvest financed the opening argument. The local association may find that her immediate expenses satisfy an adopted zakāt category. It can offer a waqf-funded tool library for planting without turning her tenancy into indebtedness. She may join a voluntary cooperative pool for future crop loss, with claim conditions she can inspect. A separately capitalized lender may offer interest-free credit. Her permission to leave one arrangement without forfeiting another can be written into the actual documents.

The resulting balance sheet may look modest. The association could own fewer productive assets than a bank and operate a smaller trading engine. Its accomplishment would appear in the farmer's retained field, in the absence of a predatory deficiency claim, and in a procedure that permits her to challenge an error by a machine or an official. Such rights give the decentralized commons its financial substance.

Sources and verification boundary

[S125] Qurʾān 9:60, eight zakāt categories; https://quran.com/9/60 . [S126] Qurʾān 2:280, debtor hardship; https://quran.com/2/280 . [S127] Qurʾān 4:58, return of entrusted rights; https://quran.com/4/58 . [S128] AAOIFI Shariah Standard 35, *Zakah*, official standards list and published standard text; https://aaoifi.com/shariah-standards-3/?lang=en . [S129] IIFA Resolution 28 (3/4), February 1988; https://iifa-aifi.org/en/33247.html . [S130] ICRC, *Handbook on Data Protection in Humanitarian Action*, 2024; https://www.icrc.org/en/data-protection-humanitarian-action-handbook . [S131] IIFA Resolution 15 (3/3), October 1986; https://iifa-aifi.org/en/32251.html . [S132] Ṣaḥīḥ al-Bukhārī 2737, transmitted waqf report; https://sunnah.com/bukhari:2737 . [S133] IIFA Resolution 140 (6/15), March 2004; https://iifa-aifi.org/en/2157.html . [S134] AAOIFI Shariah Standard 33, *Waqf*, official standards list; https://aaoifi.com/shariah-standards-3/?lang=en . [S135] IIFA Resolution 9 (9/2), December 1985; https://iifa-aifi.org/en/32229.html . [S136] IIFA Resolution 187 (2/20), September 2012; https://iifa-aifi.org/en/33031.html . [S137] Islamic Relief Worldwide, published zakāt policy; https://islamic-relief.org/zakat-policy/ .

All dollar figures are hypothetical teaching fixtures. The institutional designs and cross-school legal bridges are the author’s proposals. They require legal review, jurisdictional characterization, implementation audit and actual consent before deployment.

27. A Constitution for Islamic DeFi

Working Chapter 20B · Proposed final Chapter 27

A state is recognizable in its treatment of a losing petitioner. The treasury's website will present the institution at its best: every auditor honest, every validator online, every oracle timely, every elected administrator devoted to the founding covenant. The constitution has its work to do when those conditions fail. Someone has lost the key to her inheritance. A council member wants to borrow from a donor's endowment. An insurer refuses a flood claim, citing a software error. An intelligent model confidently cites a hadith whose wording cannot be found in the source. The institution must be able to recognize the rights that remain after its ordinary procedure has broken.

This book's proposed global Ḥanīfiyyah network state therefore needs a constitution before it needs a larger balance sheet. The covenant joins associations of Muʾminīn who accept responsibilities of stewardship and service. It gives each association limited public functions under its applicable law and the voluntary commitments of its members. Any claim to expanded sovereign power would require a separate and lawful foundation. The financial constitution is the practical first test: can committed believers govern funds and disputes while protecting the property and conscience of a person who disputes their religious premises?

Qurʾān 4:58 speaks of the return of trusts to those entitled to them. Qurʾān 4:135 demands justice where a person's own interests are at stake. Qurʾān 42:38 commends mutual consultation, while 2:256 supplies a fundamental objection to compelled belief [S138–S141]. The constitution proposed here is an original synthesis from those commitments and the contract analysis developed in this book. It claims no classical consensus approving a blockchain federation.

27.1 The constituent authority and its limits

The federation begins with legally identifiable local associations. Their membership documents define who can vote, their fiduciary officers, and the lawful powers delegated to a common secretariat. A professional trustee may administer an endowment; a cooperative may administer mutual protection; a licensed provider may hold money or furnish regulated payment services. Their names, addresses, officers and remedies belong in a public registry, to the extent compatible with privacy and local law. A protocol hash can authenticate a document version. It cannot confer legal personality where the jurisdiction requires incorporation or registration.

A member may enter the covenant voluntarily, leave according to its agreed obligations, and retain lawful property after exit. Ordinary commercial services provided to outsiders must remain subject to impartial contractual remedies. The religious standing of a petitioner is beyond the authority of a cash-transfer algorithm. A non-Muslim's warehouse receipt deserves fulfillment. A person who criticizes the federation must have access to the same dispute process as its donors. Eligibility for specifically religious funds such as zakāt remains a distinct juristic question under their designated sources. General civic services and contractual justice are owed according to their own lawful terms.

The constitution should state what the federation is incapable of doing on its own: levying territorial taxes without lawful authority, imprisoning an opponent, converting a voluntary association's judgment into a criminal sentence, or superseding the courts governing land, employment, insolvency and the welfare of children. Arbitration can resolve eligible disputes under valid agreements and applicable statutes. The parties must have procedures for contesting coercion, lack of consent, corruption and jurisdictional error.

27.2 A bill of financial rights

The first guaranteed right is legibility. Before placing assets with the institution, the owner should learn whether the transaction creates a custodial claim, a loan, a donation, a waqf, a cooperative contribution or a

speculative investment. Redemption conditions and loss waterfalls must be disclosed at the point of consent. The expected benefit, settlement deadlines and position of the claimant during insolvency are parts of the bargain.

The second concerns the treatment of surplus and deficiency. A borrower whose collateral has been sold to discharge a legitimate debt should receive the legally recognized remainder. A depositor must be told when the custodian has rehypothecation authority. Donor restrictions must follow the assets through custodians and investment vehicles. A beneficiary cannot lose a previously assigned entitlement merely because a treasury's software migration produced a new identifier.

The third is procedural. A rejected claim receives a reasoned notice, a channel to submit evidence, and review by a qualified human officer. The organization should offer reasonable access for people who have limited connectivity, lack smartphones, or cannot use a particular blockchain. Existing law may prescribe additional consumer, privacy and financial safeguards. The federation's charter cannot diminish those duties by calling the transaction decentralized.

No person has a constitutional right to receive an unlimited subsidized financial return. Insurance coverage, microcredit and aid eligibility depend on the actual program's resources and authority. Their limitations must be known before the risk materializes. A right to seek review concerns accurate procedure and lawful treatment, rather than guaranteed approval.

27.3 Five treasuries inside one federation

The chapter on zakāt and waqf has already identified four legal estates. A federation adds a fifth: the interchapter settlement account through which recognized obligations move among local associations. It needs an independent contract showing who contributes, when an association may call for support, and what law governs default.

The operating treasury may pay for meeting rooms, researchers, software maintenance or legal assistance under its budget. The zakāt account is restricted to eligible purposes as established by its governing juristic method. Each waqf maintains its donor conditions and beneficiary rights. A mutual pool owes the claims defined by its participant agreement. The interchapter settlement account facilitates transfers that have already been authorized by their own source ledgers. It may also hold limited reserves for its explicitly contracted obligations. Its existence supplies no power to transfer restricted funds without authorization.

The protocol can expose a unified read-only view. Let A=(A_Z,A_W,A_M,A_C,A_F) denote the recoverable assets by estate and L=(L_Z,L_W,L_M,L_C,L_F) the respective obligations. Total assets and liabilities may be added for consolidated disclosure. Spending authority must be checked against the estate in which each payment originates. Any cross-estate transfer requires a documented legal basis, the correct signers, and a recipient account whose purpose permits receipt. Solvency of the aggregate group cannot excuse insolvency of a restricted trust.

Consider a flood causing $145,000 of verified eligible mutual claims while the cooperative owns $120,000 of realizable assets. The shortfall is $25,000. The officers may implement an agreed proration rule, draw on a separately funded guarantee, or arrange a lawful emergency credit facility if they possess that authority. They may also seek genuinely voluntary unrestricted donations. The existence of a $200,000 waqf does not supply a claim on the waqf principal. The inability to seize somebody else's dedicated assets is the measure of the constitution in this case.

27.4 Voting without selling the constitution

A governance token is an economic object. Its buyer may have acquired a contractual service or property claim; that purchase does not establish that the buyer is entitled to administer the legal rights of every beneficiary.

Token-weighted voting can allow one wealthy member to purchase control over the distribution of a charitable estate. If voting rights are sold, the purchaser’s newly acquired power can impose costs on the very people whose funds made the treasury valuable.

Civic officers should receive delegated authority through published association rules, limited terms and appropriate fiduciary review. Beneficiaries, donors, participants and ordinary members may have different voting or consultation entitlements because their underlying rights differ. A waqf founder’s conditions cannot be rewritten by an unrelated token majority. The parties to a cooperative coverage contract cannot be deprived of accrued rights through a later vote that changes the contract retroactively.

Identity systems can help prevent ballot stuffing but introduce serious data and exclusion risks. The federation can choose a lawful membership verification process suited to each function, separating eligibility attestations from publicly exposed identity. A measure designed to stop duplicate voting should leave people a route to correct a mistaken rejection. The constitution should publish the concentration of voting rights and the procedures for challenging related-party decisions.

27.5 The treasury that can refuse its founder

Founders and major donors may possess valuable knowledge about an institution. Their authority must remain limited by the agreements and rules through which other people entrusted property to it. A large donor should have the same obligation to disclose conflicts as an ordinary trustee when seeking a contract with the fund. Procurement records can show who proposed a payment, which parties are related, which independent officers reviewed it, and which rights the transaction will encumber.

An independent financial examiner should be able to refuse an expenditure when a legally necessary condition is missing. That refusal must itself be reviewable under clear procedures. A founder who instructs a signing council to transfer endowed bitcoin to his private lending vehicle presents a test of entrusted rights. Successful governance is the council’s ability to decline the transaction, document its reasons, and preserve the donor’s legitimate purposes even under financial pressure.

A community unable to investigate its own benefactors will struggle to identify nifāq when the harm is profitable. The appropriate examination concerns evidence of conduct and fiduciary breach. It does not give a board of governors jurisdiction to pronounce the secrets of a person’s faith or divine standing.

27.6 Emergency authority and the oracle problem

A catastrophe may require immediate funding. Smart contracts also fail: their oracle can publish an extreme outlier, or an unexpected software path can drain collateral before a tribunal convenes. The federation can provide a narrowly specified emergency mechanism with objective triggers, constrained permissions, recorded signatories, a maximum duration and a mandatory subsequent review.

Consider a hypothetical protected BTC vault where the reference feed suddenly quotes half the observable market price and proposes instant liquidation. An emergency officer may be allowed to pause this specific contract class while independent price evidence is collected. That permission should have a defined expiration and preserve withdrawal rights that can safely continue. The pause must not provide a secret option for insiders to liquidate only profitable customers. A compensation fund and dispute procedure are necessary because even authorized emergency action can impose losses on innocent holders.

The designer should specify what happens if the emergency multisignature quorum is unavailable. A pause procedure that can only operate while every officer is online is a promise contingent on conditions the protocol itself cannot guarantee. The legally relevant path includes key compromise, censorship, oracle disagreement, natural disaster and a malicious majority. The constitution should publish the residual risks and specify where the institution’s obligations stop.

27.7 A decentralized AI jurisprudence court

The *mutaqlid* method asks an interpreter to identify sources, rules of authority, relevant facts and a reasoned conclusion. A model can retrieve variant formulations of a hadith or identify the exact section of a contemporary fatwa. A proof assistant can certify a logical implication from encoded premises. Neither function establishes that the jurist held the claimed authority, that the documentary text is authentic, or that the actual program obeys the formal model.

I would require the legal research registry to preserve a claim identifier, precise citation, source language, attributed school, authority scope, dissent, assumptions, model version and adverse examples. A model-generated ruling should display the human office that accepts responsibility for it. When the model cannot identify a legally material fact, it should record an unresolved issue rather than manufacturing a source to complete the certificate.

The United Nations' 2022 principles on ethical AI give a contemporary external comparator emphasizing accountability, human oversight, transparency and privacy. The ICRC's handbook supplies practical concerns about humanitarian beneficiaries and data sharing [S142, S130]. Our proposed constitution must make those obligations enforceable in its ordinary operations. Victims of an erroneous eligibility decision should be able to learn which evidence was used and challenge the decision without exposing their personal circumstances to the entire federation.

A court may use an AI explanation as a research aid. Its actual judgment must be attributable to an authorized human or legally accountable institution. The right to appeal attaches to the case, even if the original decision was recorded in an irreversible blockchain transaction. Financial correction may require a new compensating transaction rather than an erasure of historical entries.

27.8 Plural money and the limits of a common peg

The monetary chapter examined sovereign pegs and stablecoin liabilities as promises of conversion. The federation should be willing to receive lawful payments through multiple systems. A merchant may prefer local fiat currency because suppliers and taxes are due in it; another household may hold bitcoin because it values independent settlement; a cooperative may use an authorized stablecoin for a hedge. Each payment instrument has its own custody, redemption, tax and credit risks.

A common accounting unit is useful for audits. It should not silently become a compulsory federation currency or an unbacked liability guaranteed by charitable assets. If the federation issues a redeemable dollar claim, the legal entity behind the promise, the assets securing it, the priority of redemptions, and the effect of a price shock must be specified. A protocol dollar is economically similar to a bank deposit only along the dimensions preserved in its enforceable state machine. The issuer cannot point to a normal-day exchange-rate graph as proof of a universal claim of equivalence.

Let D_t denote dollar claims payable, R_t the assets recoverable under the specified path, and C_t settlement and senior costs. A prudent model needs R_t >= D_t + C_t for the states in which full redemption is promised. A reserve that exists only as another issuer's unsecured promise must be stress-tested for correlated failure. Redemption suspension and conversion haircuts require advance disclosure and a legal mechanism consistent with the underlying contract.

27.9 Constitutional proof obligations

A constitutional assertion should be testable. The proposition that funds are segregated requires a transaction trace showing that unauthorized transfers fail under adversarial contract states, together with evidence that insolvency law respects the separation. The proposition that debtors receive their remainder requires exact rounding and execution checks after sale, fees and senior debts are paid. A voting rule intended to prevent

domination must be tested against concentrated holdings, strategic memberships and compromised credentials. A published oracle policy must be tested with stale prices, divergent feeds and emergency pauses.

The proposed theorem for a lawful transfer is conditional: if the sender has authority over the relevant estate, the asset is free for the stated purpose, the recipient is valid under the governing mandate, and the execution preserves the authorized obligations, then a transfer can be admitted by the specified financial constitution. Lean can check implications in a fixed formal model. It cannot prove the donor's real consent or the solvency of an unaudited counterparty by accepting a Boolean field labeled *consented* or *solvent*. Those remain evidence obligations handled outside the proof assistant.

The system's security review must attend to threats from insiders. A compromised administrator with the right to update a treasury contract may be more damaging than an external attacker with limited permissions. The software repository, signing devices, deployment keys and emergency governance procedure therefore form part of the institution's property law. Audit reports, timed upgrades, independent custody and remedial reserves are institutional controls whose adequacy must be checked against the value at risk.

The constitution must bind its designers

As a founder of trading infrastructure, I have an obvious conflict when proposing the constitution of a network that might use such infrastructure. The project could give me an audience, counterparties, or fees. Those incentives should be disclosed and constrained by rules that can be applied by critics, including people who reject the proposed Muʿtazilī conclusions [S175].

A credible charter gives users access to independent verification, a practical way to exit, and review of any emergency power granted to founders. It also sets a mechanism for restitution when the system's machinery makes a mistake. The author of a legal argument should expect its principles to be used against his own institution.

27.10 A charter that survives departure

The widow from our first chapter may join a cooperative, borrow a tool from a waqf, and receive authorized assistance. A year later she may leave the federation because she dislikes its officers, rejects a fatwa, or finds a more reliable provider. She remains entitled to the property that is hers after the lawful settlement of outstanding obligations. She may contest an unpaid insurance claim. She may seek the ordinary legal courts. Her children should not need to profess a doctrine to obtain repayment from someone who owes them money.

The constitution achieves its purpose when its central officers can be replaced, its models corrected, and its institutions abandoned without consuming the rights they were established to preserve. The final chapter will give this procedural restraint its eschatological name. Here it is a rule for ordinary budgets and honest recordkeeping. It is how the proposed Ḥanīfiyyah network begins to earn the trust it invokes.

Sources and verification boundary

[S138] Qurʾān 4:58, trusteeship and justice; https://quran.com/4/58 . [S139] Qurʾān 4:135, justice involving oneself and family; https://quran.com/4/135 . [S140] Qurʾān 42:38, consultation; https://quran.com/42/38 . [S141] Qurʾān 2:256, religion and compulsion; https://quran.com/2/256 . [S142] UN System Chief Executives Board, *Principles for the Ethical Use of Artificial Intelligence in the United Nations System*, 2022; https://unsceb.org/products/principles-ethical-use-artificial-intelligence-united-nations-system/ . The preceding chapter's IIFA, AAOIFI and humanitarian-privacy sources also govern this proposal.

The federation is an original, normative constitutional proposal. It neither claims present sovereignty nor supplies advice to disregard local law. Formal logic can certify a model of authority under declared assumptions. Actual legitimacy requires consent, legal recognition where needed, evidence, remedies, and reliable administration.

28. Allāhu Akbar: The Dajjāl, Nifāq, and the Global Ḥanīfiyyah Network State

The covenant of the Muʾminīn, the sovereignty of conscience, and the machines that must remain servants

The banker sits behind glass and tells the widow that her harvest is too uncertain to finance. He will lend against her land at a price that grows with her distress. Another man arrives with a more elegant agreement. Its Arabic vocabulary is exquisite. The terminal cash flows are identical, the risk has been transferred to the same household, and the contract charges her for the privilege of believing something has changed. A third man comes bearing a mathematical proof. He has proved the legality of the contract under axioms chosen by himself. A fourth promises that a machine will govern her fairly because its parameters were optimized on all the knowledge of mankind.

The widow has heard many descriptions of authority. Her question remains what happens if the harvest fails.

This book began with the difference between a thing and the name bestowed on it. The bank's sale, the farmer's contingent entitlement, the options writer's funded promise, the Bitcoin vault's collateral waterfall, and the synthetic dollar's clearing mechanism all require the same act of judgment. Someone must discover who owns what, who can compel whom, and which person bears a loss when the promised future arrives. A jurisprudence attentive to these questions gradually becomes a political theology. It asks what happens when an institution is given the power to pronounce its own acts lawful.

The wager of the *mutaqlid fī al-uṣūl* is that a court of reasons can expose that power to judgment. Our proposed Muʿtazilī jurisprudence gives divine justice priority over inherited convenience while requiring each legal inference to disclose its sources. The same discipline that interrogates a mortgage must interrogate the scholars who certify it. The same adverse scenario that breaks a synthetic-dollar peg should be permitted to break the confidence of the institution that issued it.

Here, at the end of a book about money, the Dajjāl and nifāq enter the argument. They belong to its account of sovereignty.

28.1 The counterfeit sovereign

Dajjāl is the great deceiver in a body of eschatological reports. Ṣaḥīḥ Muslim preserves narrations in which what appears to be water proves destructive and what seems to be fire holds cool water. Another narration describes a claimant whose apparent powers demand that people revise their judgment about reality [S86]. Those are reports about an eschatological trial within the transmitted tradition. The Qurʾān itself does not name the Dajjāl. Nor does this chapter claim to identify him in any present technology, leader, state or corporation.

The imagery nonetheless furnishes a theological lens for a recurrent temptation. An institution can become so capable of producing appearances that the subject must choose between personal evidence and the institution's announced account of what is real. Its recommendations become indispensable. Prices, identities and permissions pass through it. At length even the categories by which its behavior might be criticized are supplied by the institution itself.

In financial life this takes a mundane form. The exchange constructs an oracle, names its own reference price the market, and liquidates a customer's collateral against that reference. A trader may be solvent at a realizable external price and bankrupt at the venue's engineered mark. His suffering is then described as a natural consequence of market risk. When the institution selects the measuring rod, it can also manufacture the appearance of justice.

In intellectual life a similar process begins when an AI system drafts a fatwa, searches the sources, supplies the assumptions to a theorem prover, and calls the resulting certificate divine law. A proof assistant can show that a

proposition follows from its premises. The certificate cannot reveal whether the source was forged, the question deliberately narrowed, or a legally relevant debtor disappeared from the model. The algorithm is strongest when this limitation is made public. It is most dangerous when the limitation is concealed beneath a performance of omniscience.

The Dajjālic temptation, as I use that phrase here, is the aspiration of a created thing to take possession of the place reserved for Allah's complete knowledge and judgment. That phrase is an author's theological analogy, which other Muslim interpreters may reject. Its target is a pattern of human behavior: treating manufactured power as the final authority over conscience, property and truth.

A model may calculate a liquidation with extraordinary precision. It may produce a persuasive sermon. It can even discover an error that generations of scholars overlooked. Its reasoning remains corrigible, and its owner remains accountable for the consequences of deploying it.

28.2 Nifāq: the betrayal that wears the right clothing

The danger nearest the proposed community lies within its own institutions. Sūrat al-Munāfiqūn opens with men whose correct verbal testimony coexists with deception; Qurʾān 4:142 links hypocritical worship to public performance [S87, S88]. In Ṣaḥīḥ al-Bukhārī 33, a report identifies lying, broken promises and betrayed trusts as marks associated with hypocrisy [S89]. The point for financial governance is immediate. An organization can invoke Allah's name while taking an undisclosed benefit from other people's helplessness.

Imagine a protocol that forbids interest in its charter and permits its insiders to mint tokens against fictitious collateral. Imagine scholars who review the advertised fee while declining to examine the hidden priority of liquidators. Imagine a charity that publicizes its Bitcoin addresses while maintaining an unreported arrangement to redirect donations. Every example contains an observable violation of entrusted rights. The theological suspicion arises from conduct and its consequences.

The Qurʾān also warns against consuming wealth *bi-l-bāṭil* and bribing authorities to seize other people's property [S90]. Its denunciation of defective weights in 83:1–3 concerns people who demand full measure from others and diminish what they themselves owe [S91]. Modern ledgers can make that old offense more intricate. A withdrawal labeled "available" may be a promise backed by insolvent custodians. A DAO treasury can pass an impeccably recorded vote that diverts property contrary to the rights under which it was entrusted. Public transaction hashes leave the original moral question untouched until the relevant entitlement is identified.

We cannot inspect the hidden state of a human soul through a blockchain. No committee possesses the right to classify an adversary's inward faith by software. An accusation of nifāq is especially dangerous when it becomes an instrument to silence a critic. For that reason, the institutional response to suspected betrayal must concern evidence of conduct, due process, restitution and review. Judgments about inward sincerity belong to Allah.

A Ḥanīfiyyah network that cannot hear an accusation against its own leadership is already developing the habits it claims to resist. A faithful treasury officer should welcome independent reconciliation of accounts. A jurist should publish the adverse sources his fatwa failed to overcome. The believer trusted with power must be able to lose a dispute and return what he owes.

28.3 Ibrāhīm as an ummah

The Qurʾān calls Ibrāhīm a *ḥanīf* in 3:67, and in 16:120 describes him as an *ummah*, devoted to Allah [S92, S93]. The image is radical because it places moral orientation before the possession of a great earthly apparatus. One man can embody a community's fidelity while entire institutions gather around their idols.

A proposed global Ḥanīfiyyah network state begins in that orientation. Its global reach comes from voluntary association across existing borders, shared institutions and practical mutual aid. Its political design must

accommodate the lawful jurisdictions where its members live. It cannot assume that a digital covenant cancels the rights of neighbors, states or dissenters. The network state is a design proposal for federated, consent-based civic institutions, rather than a present sovereign government or a claim to world rule.

The phrase *led by the Muʾminīn* requires precision. In Qurʾānic usage belief is an ethical and religious commitment, with public consequences for trust, mercy and the performance of obligations. For this proposed community the Muʾminīn are those who willingly bind themselves to the covenant and accept responsibility for administering its institutions. Membership in that covenant establishes a constituency. It does not authorize a human committee to certify anyone's standing before Allah.

Their office is fiduciary. Qurʾān 4:58 links the return of trusts to their owners with judgment in justice [S94]. Qurʾān 42:38 praises affairs conducted through mutual consultation [S95]. Qurʾān 5:8 insists that hostility to another people must never corrupt the duty of justice [S96]. Read together for this proposed constitution, they place constraints upon officeholders before those officeholders can claim religious prestige. That synthesis is a new political argument drawn from these verses, not a traditional consensus upon this particular network-state model.

The network can be led by committed believers while offering equal protection of property, contractual remedies and personal security to everyone within its lawful reach. A non-Muslim who places goods in a network warehouse deserves an enforceable receipt. Someone who disputes the Qurʾān must retain access to an impartial commercial court. Qurʾān 2:256 supplies a particularly serious objection to any attempt to convert this project into compelled religion [S97]. Membership, worship and spiritual formation must be freely chosen; access to ordinary justice cannot depend on performing belief.

That is the first constitutional design constraint. It should survive every future constitutional amendment.

28.4 What makes the network a state?

A messaging group can call itself an ummah. A token issuer can publish a constitution. Neither action creates the capacity to protect a widow's rights when her counterparty defaults. An institution worthy of the name must maintain public rules for admitting claims, resolving conflicts, safeguarding common property, financing services, and replacing the persons entrusted with those services.

The smallest functioning unit could be a local mutual-aid association with a licensed or otherwise lawful legal form. It may run a cooperative marketplace, administer a waqf where local law permits, operate a technical training school, or contract with trusted providers for emergency assistance. Members elsewhere can recognize its accounts and legal procedures under a common federation charter. The global network arises when these associations recognize one another's authenticated obligations, with agreed limits on jurisdiction and enforceability.

Some functions remain territorial. A stolen apartment, a violent assault, or a dispute over child custody involves public law and institutions with coercive authority. A network cannot settle such matters by announcing a block height. Its arbitration agreements must respect enforceable law and the rights of people who never consented to them. Enforcement of serious claims remains subject to competent courts and lawful procedures.

The proposed state therefore begins as a *network of accountable institutions* and develops civic capacity through demonstrated reliability. It can provide services that people choose to use, become a recognized partner of existing jurisdictions, or acquire territorial standing through lawful democratic and treaty processes where those options exist. No prediction about such recognition is required for the proposal to have present value. A clinic that keeps its promises is already doing something useful.

The network's federation charter should impose limits on its own ability to monopolize money, identity or political membership. A person leaving an association must be able to recover legitimate property subject to disclosed obligations. Local chapters need a route to contest a central decision. The public must have enough

information to know which authority signed a rule and why. The political measure of sovereignty is the capacity to carry duties while keeping power answerable to the people affected by it.

28.5 The Muʾminīn as trustees, and the examination of the leader

An officeholder who claims an exceptional mandate because he is personally pious creates a problem that piety cannot solve. The community needs evidence of competence, conflict-of-interest disclosures, and procedures for removing the unfit. Consultation must carry real consequences. The capacity to audit, appeal, and replace a leader belongs in the same covenant that confers the initial trust.

I propose fixed terms for elected civic officers, published decisions for spending common funds, independent custodians for significant reserves, and review panels that include people outside the relevant leadership faction. Religious scholars can advise on matters within their competence. They must disclose when they are interpreting a transmitted source and when they are presenting a new *mutaqlid* synthesis. A finding about commercial rights can be reviewed on evidence. The network's ordinary civil institutions cannot confer eternal salvation or pronounce the secrets of belief.

Every public officer receives a narrower claim than absolute obedience: authority over specified decisions during a specified term, using specified procedures. Ordinary members can inspect those limits. Someone accused of corruption receives notice, an opportunity to answer, and access to a fair review. Those safeguards also protect the community from malicious allegations. An institution serious about nifāq must make it harder for false accusations to flourish.

The Qurʾān in 4:135 calls believers to maintain justice even where the testimony burdens themselves or their kin [S98]. This verse is the appropriate measure of a leadership council. It is also the moment at which many grand political systems discover the small price they placed on their principles. The council must be capable of publishing a finding against the man whose donations paid for the council chamber.

One unresolved theological question remains: who is authorized to define the covenant's interpretive boundaries? The book's answer is a public, revisable jurisprudential process. Specific legal schools and devotional communities may retain distinct theological commitments. Cross-school *mutaqlid* rulings must disclose their authority bridges. An institution's constitution can provide a mechanism for managing disagreement while the question of ultimate truth remains contested in a world of human interpreters.

28.6 Money without the indispensable lender

Bitcoin matters here because it changes one narrow kind of dependence. In Satoshi Nakamoto's 2008 design, parties can transact using a public proof-of-work history without giving a single bank authority over the double-spending decision [S99]. The network is a technical arrangement with costs, security assumptions and limits. It supplies neither justice on its own nor a fatwa on what is sold through it.

A Ḥanīfiyyah financial commons could hold reserves under defined multisignature controls, issue auditable receipts for custodial property, sponsor mutual-aid pools, and fund cooperatives through genuine capital-at-risk arrangements. Contributors must know whether their property is a gift, an investment, a loan, or collateral for another person's promise. The name *waqf* cannot rescue a trust whose managers can secretly sell its assets. The name *qard ḥasan* cannot disguise a mandatory, profitable premium attached to the amount or duration advanced.

Decentralized derivative markets matter as instruments of protection. A farmer may need a price floor. A merchant who owes suppliers dollars may hold Bitcoin and establish a short hedge. A widow may use a fully funded put to limit the loss of collateral without surrendering the right to any remainder. Each requires lawful consideration, a contract whose relevant paths can be understood, and funded settlement capacity. The novel

mutaqlid fatwas developed in this book remain conditional and contested; a network cannot transform their evidentiary standing merely by issuing tokens under its banner.

The first budget question therefore concerns the vulnerability the institution promises to remove. Does the farmer avoid emergency debt? Can the depositor recover the asset whose custody she purchased? Does the borrower retain the residual property that survived liquidation? Are hardship and dispute procedures funded before the treasury allocates money to the next ambitious project? The answers must be made visible in each audited settlement path.

A common treasury also faces the temptations of political economy. Whoever determines the token's redemption rules can tax holders invisibly through changes in reserves or senior claims. An insurance fund can become a subsidy for reckless insiders. A treasury vote may appear democratic while the voting weight was purchased with funds acquired from the very people whose rights are at issue. The law of *akl al-māl bi-l-bāṭil* follows the rights across the system, regardless of how decentralized its network diagram looks.

For such reasons this project should tolerate plural currencies, independent custody and lawful exit. Its institutions may prefer Bitcoin for a defined use case while recognizing other people's contractual rights and lawful means of exchange. A mandatory treasury token would reproduce the dependency the network was meant to loosen.

28.7 The machine that must be able to hear 'you are wrong'

A decentralized AI commons extends the same idea into knowledge. Local inference lets an association run useful models without exporting every sensitive question to a remote provider. Independent researchers can reproduce evaluations and inspect the data permitted for an application. A shared research registry can record the source of a jurisprudential claim, its translation, competing interpretations and the chain of reasoning attached to a proposed fatwa. The model can help the widow understand a contract in her own language. A human reviewer must remain accountable for a consequential legal judgment.

This is a design aspiration, with technical trade-offs. Distributed compute can conceal which service really controls a model's inputs. Open model weights do not automatically establish that a response is accurate or safe. A cryptographic attestation can bind software to a measurement while leaving the measurement's social meaning and the integrity of its data disputed. Formal verification is powerful over precisely specified behavior; a convincing demonstration must include the assumptions under which the proof was obtained.

The NIST AI Risk Management Framework provides a contemporary, secular comparator that organizes institutional oversight around governance, risk mapping, measurement and management [S100]. Its generative-AI profile addresses additional risks associated with generative systems [S101]. These are engineering references for governance practice, without assigning religious authority to a technical standard.

We should build multiple opportunities for a model to be contradicted. A high-stakes decision includes its evidence, the model version, an uncertainty record, a human decision-maker, and a right of appeal. Red-team findings enter a public issue register with appropriate protection for personal data and security details. Where outputs can injure people, deployment requires testing against realistic abuse, distribution shift and faulty data. The network can publish aggregate evidence of compliance while allowing individuals to keep their medical, financial and spiritual lives private.

A system that claims to infer who is a sincere believer from communications, donations or facial expressions would be an especially grave abuse of the available technology. There is no sensor for the secrets known to Allah. The network should prohibit spiritual scoring, automated exclusion based on inferred belief, and coercive decisions delegated wholly to an AI. It may use models to help detect a discrepancy in an account or to discover a relevant precedent. A judgment still requires lawful evidence and a person answerable for it.

Decentralization helps only when the resulting choices are real. If every supposedly independent node relies on a single identity issuer, a single unappealable model, or a privileged administrator who can censor complaints, the graph has merely concealed its sovereign.

28.8 A constitution written against its own corruption

The proposed federation would enact a charter with directly testable commitments. Its first legal promise is that every entrusted asset has an identifiable owner or beneficiary and a documented process for restitution. Its financial agents disclose priority of claims and cannot rewrite the liquidation waterfall after accepting collateral. All fees need a documented legal basis, a recipient, and an accounting treatment that reveals who benefits.

The charter also binds its courts to reasons that affected parties can inspect, subject to legitimate confidentiality. A person disputing a verdict can identify its legal authority and the facts the decision relied upon. The right to consultation has a procedure for revising institutional rules; emergency powers require a defined end and independent review. Participation remains voluntary within the lawful scope of each association, and property exit follows disclosed commitments. Membership does not create a license to injure those outside the covenant.

For AI, the charter makes meaningful human accountability an enforceable institutional duty. The software's recommendations and outputs are logged at a level appropriate to their risk. The person subject to a consequential automated process can request an understandable explanation and human reconsideration. Personal data are collected for declared purposes and protected from factional misuse. The community bears the cost of remedying foreseeable errors in the systems it operates.

In practice these commitments should be expressed as tests alongside the prose. Define an institutional history ω containing decisions, claims, transfers, appeals, and enforcement actions. Let $\mathit{Justice}(\omega)$ mean that the modeled property rights and procedures survive every legally relevant transition. Then the proposed specification has the form

$$\forall\, \omega \in \mathit{AdmissibleHistories}\,,\, \mathit{Justice}(\omega).$$

This is a target specification for an accountable institution. It is emphatically not a theorem that every real human action can be captured by a finite model. The adversarial auditor's task is to find the omitted claimant or unmodeled event that defeats the certificate. The moral discipline lies in permitting the charter to be corrected when the counterexample survives scrutiny.

The hardest test is a permitted judgment that reduces the network's own power. A federation worthy of its scripture must be able to obey such a ruling.

28.9 The widow's second hearing

Return to the widow who owned the field. Her first harvest was poor. She accepted a small advance from a local cooperative, used an agreed share of production to compensate the cultivator, and purchased protection against a catastrophic commodity-price decline. Her payments were documented. When the harvest arrived, part of the shipment was rejected because of a defect. The warehouse denied liability. The hedge provider claimed its obligation had been extinguished by an emergency pause.

The network's AI legal assistant retrieves the signed contracts and shows her the precise conditions governing the warehouse receipt, payment priority, and hedge settlement. It cites the relevant conventional rulings and the proposed *mutaqlid* argument for compensated optionality. The assistant flags a gap: its preferred fatwa relied upon a disclosure field the cooperative had never displayed. That defect moves the case into an independent dispute process. A human panel hears both sides and orders restitution according to the valid contract and

applicable law. A technical worker publishes a patch for future transactions. The cooperative posts a transparent account of how it funded the award, preserving the widow's privacy.

Another year, a competing village chooses a different school of jurisprudence and declines to use the network's option contract. The federation still honors its lawful purchases and settles ordinary obligations without requiring its jurists to agree. Diversity of legal conviction is now a fact the network must be able to carry. It is precisely why the *mutaqlid* should preserve dissent rather than falsify consensus.

Nothing in this scene requires the widow to become a student of cryptography. It requires the institutions to carry the burden of their own technical complexity. She can ask what she owns, when she will be paid, and what recourse survives a failure. Those questions should remain answerable when the system is scaled across continents.

28.10 The return of the human measure

The figure of ʿĪsā appears in Islamic eschatological narrations about the Dajjāl, including the extended report in Ṣaḥīḥ Muslim 2937 [S102]. Traditions differ in how their wider sequence is interpreted. Here I draw a limited esoteric claim from that literature: the restoration of truthful judgment cannot be replaced by the enlargement of created power. For the Qurʾānic monotheist, Allah's justice is a standard by which any powerful institution may be judged, including institutions sincerely built in His name.

The threat of the man-made god is therefore more intimate than a dramatic future machine. It is the moment a human administrator considers the rule complete because it has passed his own examination. It is the jurist who has made agreement a condition of being heard. It is the philanthropist whose ledger cannot be inspected by the people from whose losses the treasury was assembled. It is the AI developer who presumes that a system able to imitate moral language may be trusted with the powers of a conscience.

Nifāq is a word that belongs first in our examination of ourselves. Each contract in this book gives the powerful person an opportunity to take something by naming it differently. Every model offers a chance to omit the unfriendly state from the calculation. Each institution discovers reasons to delay its next audit. The proposed Muʿtazilī answer begins where such temptation begins: with the conviction that justice is intelligible enough to make our own conduct answerable, and that divine judgment transcends whatever answer we find convenient.

The global Ḥanīfiyyah network state is a wager upon accountable association. Its Muʾminīn lead as trustees. Its money can move without a privileged mint, subject to the real costs and limitations of each protocol. Its artificial intelligence is answerable to evidence, human appeal and the rights of the persons it affects. Its civic life remains open to scrutiny from members and outsiders alike. Where it fails those duties, fidelity requires repair.

At the beginning of this book we asked whether a mathematically equivalent bargain could receive a different fatwa. At its end we can see why the question mattered. Human beings suffer the consequences of the invisible clauses; the hidden powers in a contract often disclose the hidden arrangement of a polity. We have spent these chapters building instruments for exposing both. Their usefulness will be measured in the lives made less vulnerable to arbitrary command.

Ibrāhīm stood as an *ummah*. There was no mint at his back, and the earth did not need a machine to certify the direction of his face. A community that bears his name should remember the scale of that example whenever its computing clusters grow, its treasuries swell, or the world begins to call its judgments inevitable.

Allāhu Akbar.

Appendices

Appendix A. Source ledger and evidence grades, Edition 0.17

Every line below is a locator and stated use, not a declaration that all primary texts have been exhaustively collated. The full machine-readable source ledger accompanies this manuscript.

S01. Qurʾān 2:275, https://legacy.quran.com/2/275 [Attested]

S02. Qurʾān 4:29, https://corpus.quran.com/translation.jsp?chapter=4&verse=29 [Attested]

S03. Qurʾān 2:279–280, https://legacy.quran.com/2/275-280 [Attested]

S04. George F. Hourani, *Reason and Tradition in Islamic Ethics*, Cambridge, https://www.cambridge.org/core/books/abs/reason-and-tradition-in-islamic-ethics/islamic-and-nonislamic-origin-of-mutazilite-ethical-rationalism/42E303DCB24D428245047E519E48F322 [Secondary scholarly]

S05. Abū al-Ḥusayn al-Baṣrī, *al-Muʿtamad fī Uṣūl al-Fiqh*, bibliographic record https://books.google.com/books?id=W6GgAAAAMAAJ [Primary text identified; passage collation open]

S06. Carl Sharif El-Tobgui, “The Epistemology of Qiyās and Taʿlīl…” (2003), https://scholarworks.brandeis.edu/esploro/outputs/journalArticle/The-Epistemology-of-Qiyas-and-Talil/9924027393101921 [Secondary scholarly]

S07. IIFA, Resolutions 40–41 (1988), https://iifa-aifi.org/en/33273.html [Attested institutional ruling]

S08. Federal Territories Mufti, *Al-Kafi* 474 and 1479, https://muftiwp.gov.my/en/artikel/al-kafi-li-al-fatawi/1421-al-kafi-474-combining-different-madhhabs-in-one-act-of-worship and https://muftiwp.gov.my/en/artikel/al-kafi-li-al-fatawi/3891-al-kafi-1479-bolehkah-pengantin-berwuduk-dengan-mazhab-yang-lain-ketika-majlis-perkahwinan [Attested modern exposition]

S09. IIFA, Resolution 63 (1992), https://iifa-aifi.org/en/1845.html [Attested institutional ruling]

S10. Securities Commission Malaysia, *Resolutions of the Shariah Advisory Council*, 2nd ed., printed p. 60, https://www.sc.com.my/api/documentms/download.ashx?id=511180c4-b0f1-49e3-9f92-46efe55457bc [Attested primary resolution]

S11. Umer Khan, FCNA individual answer, 9 October 2026, https://fiqhcouncil.org/are-stock-options-halal/ [Attested individual opinion, not collective ruling]

S12. Ibn Ḥazm, *al-Muḥallā*, sale issue 1421, https://ar.wikisource.org/wiki/محلى_ابن_حزم_-_المجلد_الرابع/الصفحة_السادسة [Classical text, modern transcription]

S13. IIFA, Resolution 72 (1993), https://iifa-aifi.org/en/32466.html [Attested institutional ruling]

S14. Sīstānī, *Islamic Laws*, Ruling 2134, https://www.sistani.org/english/book/48/2343/ [Direct current Jaʿfarī primary rule]

S15. Sīstānī, *Islamic Laws*, Rulings 2291–2307, https://www.sistani.org/english/book/48/2357/ [Direct current Jaʿfarī primary rule]

S16. *al-Baḥr al-Zakhkhār*, vol. 3, p. 295, https://ziydia.com/book/674/page/1741 [Direct text]

S17. Institute of Ismaili Studies, Farhad Daftary, al-Qāḍī al-Nuʿmān, https://www.iis.ac.uk/scholarly-contributions/al-numan-al-qadi-d-363-ah-974-ce/ [Institutionally supported secondary; direct contract rule open]

S18. *Sharḥ al-Nīl wa Shifāʾ al-ʿAlīl* source locator, https://alsaidia.com/node/546; comparative citation https://ftp.shamela.ws/book/437/9048 [Primary corpus located; secondary excerpt checked]

S19. Ṣaḥīḥ Muslim 1551a, https://sunnah.com/muslim/22/1-6 [Direct reported text]

S20. Ducat Protocol, homepage, https://www.ducatprotocol.com/ [Developer's advertised claim; implementation unverified]

S21. Ducat Docs, vaults, https://docs.ducatprotocol.com/how-ducat-works/vaults [Developer technical description]

S22. Ducat Docs, borrow UNIT, https://docs.ducatprotocol.com/how-ducat-works/vaults/borrow-unit [Developer technical description]

S23. Ducat Docs, open vault, https://docs.ducatprotocol.com/how-ducat-works/vaults/open-vault [Developer technical description]

S24. Ducat Docs, liquidation trust assumptions, https://docs.ducatprotocol.com/trust-assumptions/liquidations [Developer technical description]

S25. Ducat Docs, philosophy, https://docs.ducatprotocol.com/unit/philosophy [Version discrepancy, needs deployed-contract audit]

S26. Ducat's public GitHub organizational repository/technical summary, https://github.com/DUCAT-UNIT [Developer technical description]

S27. IIFA, Resolution 13 (1986), https://iifa-aifi.org/en/33214.html [Attested institutional ruling]

S28. Securities Commission Malaysia, 2020 decisions, https://www.sc.com.my/development/icm/shariah/resolutions-of-the-shariah-advisory-council-of-the-sc [Attested decision with jurisdictional limits]

S29. Donald MacKenzie, *An Engine, Not a Camera: How Financial Models Shape Markets*, MIT Press, 2006; chapters 1, 5–7, 9. https://mitpress.mit.edu/9780262134606/an-engine-not-a-camera/ — secondary scholarly history; publisher-confirmed publication and thesis. [Newly audited 25 October 2026; check source notes]

S30. Ṣaḥīḥ Muslim 1513, report of the prohibition on *bayʿ al-ḥaṣāh* and *bayʿ al-gharar*. https://sunnah.com/muslim:1513 — primary transmitted report, authority interpreted under the school's hierarchy. [Newly audited 25 October 2026; check source notes]

S31. AAOIFI, Shariah Standard 31 (2007), *Controls on Gharar in Financial Transactions*, text transcribed by I-FIKR. https://ifikr.my/resources/aaoifi-shariah-standard-no-31-controls-on-gharar-in-financial-transactions-filess-31-controls-on-gharar-in-financial-transactions-pdf/ — attested modern standard, secondary hosting. [Newly audited 25 October 2026; check source notes]

S32. International Islamic Fiqh Academy, Resolution 224 (2018), *Hedging in Financial Transactions: Principles and Rules*. https://iifa-aifi.org/en/6235.html — direct institutionally opposed source. [Newly audited 25 October 2026; check source notes]

S33. International Islamic Fiqh Academy, Resolution 238 (2019), *Hedging Transactions in Islamic Financial Institutions*. https://iifa-aifi.org/en/5985.html — direct institutional source, detailed permitted and rejected composite structures. [Newly audited 25 October 2026; check source notes]

S34. Securities Commission Malaysia, *Resolutions of the Shariah Advisory Council*, second edition (2006, reprint 2007), printed pp. 75–79, decisions dated 26 November 1997 and 19 March 1998. https://www.sc.com.my/api/documentms/download.ashx?id=511180c4-b0f1-49e3-9f92-46efe55457bc — primary institutional source, scope-specific futures approvals. [Newly audited 25 October 2026; check source notes]

S35. ISDA and International Islamic Financial Market, *Tahawwut (Hedging) Master Agreement*, launched 1 March 2010; contemporary templates for profit-rate, currency and cross-currency swaps. https://www.isda.org/book/isda-iifm-tahawwut-master-agreement/ and https://iifm.net/public/standards/published-standards/hedging-standards/isdaiifm-tahawwut-hedging-master-agreement-tma — direct institutionally attested standard; detailed signed documents not examined. [Newly audited 25 October 2026; check source notes]

S36. Ethena, *How USDe Works*, protocol documentation. https://docs.ethena.fi/overview/how-usde-works — developer description; live implementation independently unaudited. [Newly audited 25 October 2026; check source notes]

S37. Ethena, *Funding Risk*, protocol documentation. https://docs.ethena.fi/protocol-overview/risks/funding-risk — developer risk disclosure; historical averages are date-dependent and excluded from the proof. [Newly audited 25 October 2026; check source notes]

S38. Hyperliquid, *Funding*, protocol documentation. https://hyperliquid.gitbook.io/hyperliquid-docs/trading/funding — developer specification of fixed rate and premium terms; code and live states unaudited. [Newly audited 25 October 2026; check source notes]

S39. TradeLayer, *Derivatives*, design documentation. https://docs.tradelayer.org/protocol/derivatives — described basis-funding formula, implementation/version verification open. [Newly audited 25 October 2026; check source notes]

S40. Discreet Log Contracts, *Introduction and Oracle Specifications*, community technical specification. https://github.com/discreetlogcontracts/dlcspecs/blob/master/Introduction.md and https://github.com/discreetlogcontracts/dlcspecs/blob/master/Oracle.md — public design, trust and collusion qualifications. [Newly audited 25 October 2026; check source notes]

S41. IMF Working Paper 12/63, *Operative Principles of Islamic Derivatives*, 2012. https://www.elibrary.imf.org/view/journals/001/2012/063/article-A001-en.xml — comparative secondary argument on hedging, contractual uncertainty and derivatives. [Newly audited 25 October 2026; check source notes]

S42. Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008), https://bitcoin.org/bitcoin.pdf. Primary technical proposal; contemporary implementation and network practice may differ. [Attested/source-specific, see chapter notes]

S43. Bitcoin Developer Guide, “Transactions,” https://developer.bitcoin.org/devguide/transactions.html. Describes inputs, outputs, and UTXOs. [Attested/source-specific, see chapter notes]

S44. Bitcoin.org, “Bitcoin Halving,” https://bitcoin.org/en/halving; Blockstream, “Why is the Bitcoin supply limited?”, https://help.blockstream.com/education/economics/bitcoin-economics/why-is-the-bitcoin-supply-limited. Technical schedule; long-run social adoption is distinct from protocol mathematics. [Attested/source-specific, see chapter notes]

S45. Qurʾān 4:29, https://corpus.quran.com/translation.jsp?chapter=4&verse=29. [Attested/source-specific, see chapter notes]

S46. Qurʾān 2:275–280, https://legacy.quran.com/2/275-280. [Attested/source-specific, see chapter notes]

S47. Securities Commission Malaysia, Shariah Advisory Council resolutions on digital assets, meetings 233 and 234 (June and July 2020), https://www.sc.com.my/development/icm/shariah/resolutions-of-the-shariah-advisory-council-of-the-sc. Applies to assets within the Commission's jurisdiction. [Attested/source-specific, see chapter notes]

S48. Securities Commission Malaysia, "Digital Assets," https://www.sc.com.my/digital-assets; current BTC classification states Shariah-compliant, meeting of 20 July 2020. [Attested/source-specific, see chapter notes]

S49. Majelis Ulama Indonesia, "Keputusan Fatwa Hukum Uang Kripto atau Cryptocurrency," 12 November 2021, https://mui.or.id/public/baca/berita/keputusan-fatwa-hukum-uang-kripto-atau-cryptocurrency. Its conditional allowance for qualifying commodities is retained. [Attested/source-specific, see chapter notes]

S50. Ṣaḥīḥ Muslim 1587c, https://sunnah.com/muslim/22/102. The legal reach of its enumerated commodities to modern monies depends on juristic interpretation. [Attested/source-specific, see chapter notes]

S51. The International Islamic Fiqh Academy, Resolution 53 (4/6), *Qabḍ (Taking Possession): Forms (esp. the latest) and their Rulings*, 20 March 1990, https://iifa-aifi.org/en/32405.html. [Applicable to established forms of constructive possession; BTC requires separate legal extension.]

S52. The International Islamic Fiqh Academy, Resolution 86 (3/9), *Bank Deposits (Bank Accounts)*, 6 April 1995, https://iifa-aifi.org/en/32511.html. [Guaranteed bank current accounts were classified as loans; crypto custody is a new analogy.]

S53. The International Islamic Fiqh Academy, Resolution 237 (8/24), *Electronic Currencies*, 20 November 2019, https://iifa-aifi.org/en/5980.html. [The Academy called for further research on digital currency classification; no general permission inferred.]

S54. Office of Sayyid Ali al-Sistani, *Islamic Laws*, Chapter 20, Loan (*Qarḍ*), rulings 2299–2302, https://www.sistani.org/english/book/48/2357/. [Fungibility and prohibited stipulated lender benefits, subject to BTC classification.]

S55. Office of Sayyid Ali al-Sistani, *Islamic Laws*, Chapter 22, Security (*Rahn*), ruling 2327, https://www.sistani.org/english/book/48/2359/. [Creditor enforcement authority and returning surplus to collateral owner.]

S56. International Islamic Fiqh Academy, Resolution 70 (1/8), al-Akhdh bi-l-Rukhsa wa-Hukmuhu, 27 June 1993, https://iifa-aifi.org/en/32460.html [Permits recognized school concessions under conditions; prohibits specified talfiq composites.]

S57. International Islamic Fiqh Academy, Resolution 153 (2/17), Ifta: Requirements and Ethics, 28 June 2006, https://iifa-aifi.org/en/32922.html [Requires juristic competence, knowledge of sources and disputes, technical consultation and collective deliberation.]

S58. Al-Shatibi, al-Muwafaqat, Book of Ijtihad, discussion of harms of pursuing school concessions, online vol. 5 p. 103, https://www.islamweb.net/ar/library/content/99/381/ [Direct Arabic passage; printed critical collation pending.]

S59. Egyptian Dar al-Ifta, al-Talfiq bayna al-Madhahib al-Fiqhiyya, 14 January 2013, https://www.dar-alifta.org/ar/fatwaresearch/details/2393/ [Defines prohibited compound case and distinguished separate-issue switching.]

S60. Jordan General Iftaa Department, Fatwa 3875: Guidelines for Talfiq and Deviating from Madhab, 14 May 2024, https://www.aliftaa.jo/en-fatwas/3875/Article.aspx?ArticleId=5970 [Conditional cross-school selection; quotes of older texts not independently collated.]

S61. Mohammad Hashim Kamali, Shariah and the Halal Industry, ch. 17: Selection (Takhayyur), OUP 2021, https://doi.org/10.1093/oso/9780197538616.003.0018 [The chapter abstract is available; full text not inspected.]

S62. Mohammad Hashim Kamali, Shariah and the Halal Industry, ch. 18: Piecing Together (Talfiq), OUP 2021, https://doi.org/10.1093/oso/9780197538616.003.0019 [The chapter abstract is available; full text not inspected.]

S63. Office of Ayatollah al-Sistani, Islamic Laws, Chapter One Following a Jurist (Taqlid), Rulings 1-10, https://www.sistani.org/english/book/48/2117/ [Admits a marja hierarchy and specified exceptions; does not approve the proposed new cross-school scheme.]

S64. Quran 4:29, 2:188, 5:1 and 2:275-280 [Textual constraints; interpretation of new instruments is a separate legal argument.]

S65. Abu Hamid al-Ghazali, al-Mustasfa, conditions of the mujtahid, online pp. 344-345, https://www.islamweb.net/ar/library/content/33/300/ [Direct Arabic discussion of divisibility of ijtihad; critical print collation pending.]

S66. Qurʾān 3:130, https://corpus.quran.com/translation.jsp?chapter=3&verse=130 [Condemns multiplied ribā; read within wider 2:275–280 argument.]

S67. Qurʾān 30:39, https://quran.com/en/rum/39 [Contrasts giving for material increase with giving in charity; legal scope contested.]

S68. International Islamic Fiqh Academy, Resolution 51 (2/6), Installment Sales, 20 March 1990, https://iifa-aifi.org/en/1785.html [Permits agreed higher deferred sale price; rejects separate interest and overdue increments.]

S69. Qurʾān 2:282, https://legacy.quran.com/2/282 [Documentation of deferred debts and evidence; the proposed application to protocol disclosure is interpretive.]

S70. Ṣaḥīḥ al-Bukhārī 2240, salam date delivery with specified measure, weight and term, https://sunnah.com/bukhari/35/3 [Classical future delivery transaction; further extension to cash-settled derivatives is disputed.]

S71. Habib Ahmed, “Islamic Normative Legal Theory: Framework and Applications,” Journal of Law and Religion, published 27 Aug 2025, https://www.cambridge.org/core/journals/journal-of-law-and-religion/article/islamic-normative-legal-theory-framework-and-applications/2FD4C0E512D8AABA4FD73EB15B8B4192 [Inspected full accessible article; useful overview of usul, qawaid, maqasid and school variation, not primary school authority.]

S72. John Makdisi, “A Reality Check on Istihsan as a Method of Islamic Legal Reasoning,” UCLA Journal of Islamic and Near Eastern Law, https://scholarship.stu.edu/faculty_articles/261/ [Abstract inspected; presents istihsan as source preference or stronger legal analogy; detailed classical citations remain to collate.]

S73. “When Law Meets Theology,” in Law as Religion, Religion as Law, Cambridge University Press, https://www.cambridge.org/core/books/law-as-religion-religion-as-law/when-law-meets-theology/8AFB5C11BB85D1C9CAD53A0644405260 [Accessible excerpt discusses Zahiri, Hanafi and Shafii methods; no school-wide finance judgment inferred.]

S74. International Islamic Fiqh Academy, Resolution 72 (3/8), Bay Urbun (Down Payment Sale), 27 June 1993, https://iifa-aifi.org/en/32466.html [Source-specific conditions and exclusions; distinct from free-standing financial options.]

S75. Devin J. Stewart, “Ejmāʿ,” Encyclopaedia Iranica, updated 2013, https://www.iranicaonline.org/articles/ejma/ [Twelver and Zaydi jurisprudential differences around consensus; cannot itself establish a current fiqh ruling.]

S76. Etan Kohlberg, “Some Zaydī Views on the Companions of the Prophet,” Bulletin of SOAS, https://www.cambridge.org/core/journals/bulletin-of-the-school-of-oriental-and-african-studies/article/abs/some-zaydi-views-on-the-companions-of-the-prophet/BC8153D8B32D363299456C1D70F3A62D [Zaydi intellectual history and Muʿtazili reception; financial source collation remains open.]

S77. Ismail K. Poonawala, “A Reconsideration of al-Qāḍī al-Nuʿmān’s Madhhab,” Bulletin of SOAS, https://www.cambridge.org/core/journals/bulletin-of-the-school-of-oriental-and-african-studies/article/abs/reconsideration-of-alqadi-alnumans-madhhab/72E634ECD102302FFCACF04D3B383DEE [Historical author and school attribution contested; no derivatives verdict in excerpt.]

S78. Institute of Ismaili Studies, “Ismaili Jurisprudence,” https://www.iis.ac.uk/scholarly-contributions/ismaili-jurisprudence/ [Authority of Qadi al-Numan and Imams in Ismaili legal tradition; finance passages not directly collated.]

S79. Adam Gaiser, “Ballaghanā ʿan an-Nabī: early Basran and Omani Ibāḍī understandings of sunna and siyar, āthār and nasab,” Bulletin of SOAS, 2020, https://www.cambridge.org/core/journals/bulletin-of-the-school-of-oriental-and-african-studies/article/abs/ballaghana-an-annabi-early-basran-and-omani-ibadi-understandings-of-sunna-and-siyar-athar-and-nasab/0639F8DECAE47B13F47AE161C0FD1640 [Early Ibadi tradition and communal authority, not a direct contract fatwa.]

S80. International Islamic Fiqh Academy, Resolution 43 (5/5), Moral Rights, 15 December 1988, https://iifa-aifi.org/en/54157.html [Names specified valuable transferable intangible rights; does not grant universal saleability to contingent financial promises.]

S81. Maybank Islamic, Shariah Centre of Excellence fatwa register, selected IISG call-warrant decision 26 July 1995, https://www.maybank2u.com.my/Islamic/en/scoe/fatwa.page [Selected reported rule recognizes eligible call warrant as haq mali and haq tamalluk; original full resolutions to collate.]

S82. International Islamic Fiqh Academy, Resolution 238 (9/24), Hedging Transactions in Islamic Financial Institutions, 20 November 2019, https://iifa-aifi.org/en/33165.html [Reaffirms hedging constraints and options restriction; conditions for particular alternative hedges.]

S83. Office of Ali al-Sistani, Islamic Laws, Cases When a Person Can Annul a Transaction, ruling 2134, https://www.sistani.org/english/book/48/2343/ [Enumerates khiyar powers in sales; does not independently authorize exchange-traded puts.]

S84. International Islamic Fiqh Academy, Resolutions 40–41 (2/5 and 3/5), Keeping a Promise and Murabaha to the Purchase Orderer, 15 December 1988, https://iifa-aifi.org/en/32332.html [Possession and risk of loss before delivery; defect remedies; conditions on advance promises.]

S85. International Islamic Fiqh Academy, Resolution 51 (2/6), Installment Sales, 20 March 1990, https://iifa-aifi.org/en/33292.html [Permits a fixed higher deferred price; prohibits separately stated interest and late-payment uplift; security details.]

S86. Ṣaḥīḥ Muslim 2934b, chapter on the Dajjāl, https://sunnah.com/muslim:2934b [Appearance of rivers, water and fire; metaphorical institutional application is an authorial analogy.]

S87. Qurʾān 63:1–4, https://quran.com/63/1-4 [Description of hypocritical profession and conduct; supplies no procedure to infer a particular person’s hidden belief.]

S88. Qurʾān 4:142, https://quran.com/4/142 [Performative piety and insincerity as a religious warning; institutional analogy remains proposed.]

S89. Ṣaḥīḥ al-Bukhārī 33, “The signs of a hypocrite,” https://sunnah.com/bukhari:33 [Lying, breached promise and betrayed trust; does not license judicial diagnosis of inward faith.]

S90. Qurʾān 2:188, https://quran.com/2/188 [Prohibition on wrongful property appropriation and using authorities for unjust enrichment.]

S91. Qurʾān 83:1–3, https://quran.com/83/1-3 [Condemnation of short measure; extension to protocol-reserve disclosure is contemporary analogy.]

S92. Qurʾān 3:67, https://quran.com/3/67 [Abraham described as ḥanīf; neither a constitutional source for a network state nor a direct definition of its institutions.]

S93. Qurʾān 16:120, https://quran.com/16/120 [Abraham characterized as an ummah, devoted to Allah; the political application is original.]

S94. Qurʾān 4:58, https://quran.com/4/58 [Return trusts and adjudicate with justice; institutional governance implication is proposed.]

S95. Qurʾān 42:38, https://quran.com/42/38 [Mutual consultation; no particular election or federation design directly specified.]

S96. Qurʾān 5:8, https://quran.com/5/8 [Justice required even toward those against whom one bears hostility.]

S97. Qurʾān 2:256, https://quran.com/2/256 [No compulsion in religion; legal and historical application has interpretive literature.]

S98. Qurʾān 4:135, https://quran.com/4/135 [Justice and true testimony even against oneself and kin.]

S99. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, October 2008, https://bitcoin.org/bitcoin.pdf [Peer-to-peer payment design and security assumptions; makes no moral or public-law claims.]

S100. National Institute of Standards and Technology, AI Risk Management Framework AI 100-1, 26 January 2023, https://www.nist.gov/publications/artificial-intelligence-risk-management-framework-ai-rmf-10 [Voluntary risk governance framework, not a certification of the proposed decentralized AI institutions.]

S101. NIST, Artificial Intelligence Risk Management Framework: Generative AI Profile AI 600-1, 26 July 2024, https://www.nist.gov/publications/artificial-intelligence-risk-management-framework-generative-artificial-intelligence [Generative AI risks and controls; separate from religious premises and legal authority.]

S102. Ṣaḥīḥ Muslim 2937a, narration of al-Nawwās ibn Samʿān, https://sunnah.com/muslim:2937a [Dajjāl and descent of ʿĪsā within extended report; esoteric institutional application remains authorial.]

S103. Fischer Black and Myron Scholes, The Pricing of Options and Corporate Liabilities, JPE 81 (1973), pp. 637–654, https://doi.org/10.1086/260062 [Primary research article; assumptions of frictionless replication are model-specific.]

S104. Robert C. Merton, Theory of Rational Option Pricing, Bell Journal of Economics 4 (1973), 141–183, https://ideas.repec.org/a/rje/bellje/v4y1973ispringp141-183.html [Primary research article; no classification of Islamic finance.]

S105. Harrison and Pliska, Martingales and Stochastic Integrals in the Theory of Continuous Trading, SPA 11 (1981), 215–260, https://doi.org/10.1016/0304-4149(81)90026-0 [Primary mathematical finance research article.]

S106. Harrison and Pliska, A Stochastic Calculus Model of Continuous Trading: Complete Markets, SPA 15 (1983), 313–316, https://ideas.repec.org/a/eee/spapps/v15y1983i3p313-316.html [Primary mathematical finance research article; conditional on model hypotheses.]

S107. CFTC, Economic Purpose of Futures Markets and How They Work, https://www.cftc.gov/LearnAndProtect/AdvisoriesAndArticles/economicpurpose.html [Primary regulator education, no Islamic-law ruling.]

S108. CME Group, Glossary, https://www.cmegroup.com/education/glossary [Primary exchange definitions, not a guarantee of venue solvency.]

S109. Vladimir Piterbarg, Funding Beyond Discounting: Collateral Agreements and Derivatives Pricing, Risk (2010), https://www.risk.net/derivatives/1589992/funding-beyond-discounting-collateral-agreements-and-derivatives-pricing [Author article abstract and lead; no unconditional universal formula inferred.]

S110. Donald MacKenzie, An Engine, Not a Camera, MIT Press (2006), https://doi.org/10.7551/mitpress/9780262134606.001.0001 [Publisher-confirmed scholarly book; feedback equation is original toy model.]

S111. Neubert, Rams and Gruhn, Cryptocurrency Perpetual Futures and Swaps: A Systematic Literature Review, posted 24 April 2026, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=6639558 [Recent SSRN research review; not protocol certification or primary trading data.]

S112. Breeden and Litzenberger, Prices of State-Contingent Claims Implicit in Option Prices, Journal of Business 51 (1978), 621–651, https://doi.org/10.1086/296025 [Primary peer-reviewed article.]

S113. IIFA, Resolution 224 (8/23), Hedging in Financial Transactions, 2018, https://iifa-aifi.org/en/33127.html [Direct institutional ruling, rejects certain derivative rights and most conventional future forms.]

S114. McLeay, Radia, Thomas, Money Creation in the Modern Economy, Bank of England Quarterly Bulletin 54(1), March 2014, https://www.bankofengland.co.uk/quarterly-bulletin/2014/q1/money-creation-in-the-modern-economy [Primary central bank research; paper does not address fiqh.]

S115. Hiraki and Rhouzlane, How to Operationalize an Exchange Rate Peg, IMF How-to Note 2026/006, 28 Aug 2026, https://www.imf.org/en/publications/imf-how-to-notes/issues/2026/08/27/how-to-operationalize-an-exchange-rate-peg-578088 [Primary IMF operational note; applicability depends on exchange arrangement.]

S116. IMF, Review of Institutional View on Liberalization and Management of Capital Flows, Policy Paper 2022/008, https://www.imf.org/en/publications/policy-papers/issues/2022/03/29/review-of-the-institutional-view-on-the-liberalization-and-management-of-capital-flows-515883 [Institutional policy document; qualified country-specific recommendations.]

S117. IMF, Design Principles for FX Mismatch Capital Flow Measures, Policy Paper 2022/011, https://www.imf.org/en/publications/policy-papers/issues/2022/03/29/review-of-the-institutional-view-on-the-liberalization-and-management-of-capital-flows-515898 [Primary policy background; not categorical endorsement of controls.]

S118. BIS, Annual Economic Report 2026, https://www.bis.org/publ/arpdf/ar2026e.pdf [Bank of International Settlements macro-financial study.]

S119. BIS, Anchoring Trust in Money: Innovation Beyond Stablecoins, 2026, https://www.bis.org/publications/iii-anchoring-trust-money-innovation-beyond-stablecoins [Official institutional research, not fiqh.]

S120. Financial Stability Board, High-level Recommendations for Global Stablecoin Arrangements, 2023, https://www.fsb.org/2023/07/high-level-recommendations-for-the-regulation-supervision-and-oversight-of-global-stablecoin-arrangements-final-report/ [International standard-setting recommendations.]

S121. Basel Committee, Cryptoasset Exposures SCO60, in force 2026-01-01, https://www.bis.org/committees/bcbs/basel-framework/standard/sco/60/inforce/2026-01-01/published/2024-11-27 [Banking regulation standard, not a general legal theory.]

S122. International Islamic Fiqh Academy, Resolution No. 21 (9/3), Paper Currency and Its Legal Status, 16 October 1986, https://iifa-aifi.org/en/1679.html [Attested institutional fiqh ruling.]

S123. International Islamic Fiqh Academy, Resolution No. 42 (4/5), Changing Value of Currency, 1988, https://iifa-aifi.org/en/32336.html; Resolution No. 115 (9/12), Inflation and Changing Value, 2000, https://iifa-aifi.org/en/33460.html [Attested institutional fiqh rulings; scope limited to specified debts.]

S124. International Islamic Fiqh Academy, Resolution No. 231 (2/24), Inflation and Changing Value of Currency, 2019, https://iifa-aifi.org/en/33149.html [Attested institutional ruling on extraordinary inflation conditions.]

S125. Qurʾān 9:60, designated zakāt categories; https://quran.com/9/60 [Primary text]

S126. Qurʾān 2:280, debtor hardship; https://quran.com/2/280 [Primary text]

S127. Qurʾān 4:58, restitution of trusts; https://quran.com/4/58 [Primary text]

S128. AAOIFI Shariah Standard 35, Zakah; https://aaoifi.com/shariah-standards-3/?lang=en [Institutional standard; application requires collation]

S129. IIFA Resolution 28 (3/4), 1988, zakāt on company shares; https://iifa-aifi.org/en/33247.html [Attested institutional ruling]

S130. ICRC, Handbook on Data Protection in Humanitarian Action (2024); https://www.icrc.org/en/data-protection-humanitarian-action-handbook [Humanitarian data governance guidance]

S131. IIFA Resolution 15 (3/3), 1986, investment of zakāt subject to restrictions; https://iifa-aifi.org/en/32251.html [Attested institutional ruling]

S132. Ṣaḥīḥ al-Bukhārī 2737, transmitted Khaybar waqf report; https://sunnah.com/bukhari:2737 [Classical transmission; not a modern protocol authorization]

S133. IIFA Resolution 140 (6/15), 2004, waqf investment and cash waqf; https://iifa-aifi.org/en/2157.html [Attested institutional ruling]

S134. AAOIFI Shariah Standard 33, Waqf, published standards index; https://aaoifi.com/shariah-standards-3/?lang=en [Institutional standard; later revisions should be checked]

S135. IIFA Resolution 9 (9/2), 1985, cooperative insurance; https://iifa-aifi.org/en/32229.html [Attested institutional ruling]

S136. IIFA Resolution 187 (2/20), 2012, cooperative insurance criteria; https://iifa-aifi.org/en/33031.html [Attested institutional ruling; some topics deferred for detailed standards]

S137. Islamic Relief Worldwide, zakāt distribution policy; https://islamic-relief.org/zakat-policy/ [Contemporary institutional practice; school-specific interpretation]

S138. Qurʾān 4:58, fiduciary office; https://quran.com/4/58 [Primary text]

S139. Qurʾān 4:135, justice against self-interest; https://quran.com/4/135 [Primary text]

S140. Qurʾān 42:38, mutual consultation; https://quran.com/42/38 [Primary text]

S141. Qurʾān 2:256, compulsion and religion; https://quran.com/2/256 [Primary text]

S142. UN CEB, Principles for Ethical Use of AI in UN System, endorsed 2022; https://unsceb.org/products/principles-ethical-use-artificial-intelligence-united-nations-system/ [Contemporary governance comparison]

S143. patrickdugan/TradeLayer-Rust, main README, checked 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/README.md [Repository primary design source; prototype and scope change by commit]

S144. patrickdugan/TradeLayer-Rust, docs/CLEARING_MATH.md, reviewed 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/CLEARING_MATH.md [Repository design and synthetic test report; not live economic settlement]

S145. patrickdugan/TradeLayer-Rust, docs/STAGE25F_SYNTHETIC_PARTIAL_CLOSEOUT.md, reviewed 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/STAGE25F_SYNTHETIC_PARTIAL_CLOSEOUT.md [Repository audit describing unverified experiments and pinned JavaScript provenance]

S146. patrickdugan/TradeLayer-Rust, docs/INSURANCE_LEDGER_V2.md, reviewed 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/INSURANCE_LEDGER_V2.md [Repository design and explicit limits; not live funded guarantee]

S147. patrickdugan/TradeLayer-Rust, docs/SETTLEMENT_AUTHORIZATION.md, reviewed 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/SETTLEMENT_AUTHORIZATION.md [Repository security design; not a claim of production proof verification]

S148. Bitcoin Developer Reference, Transactions, https://developer.bitcoin.org/reference/transactions.html [Primary technical documentation; law and deployed DLC behavior require separate review]

S149. International Islamic Fiqh Academy, Resolution 70 (1/8), Exemption and its Ruling, 27 June 1993; https://iifa-aifi.org/en/32460.html [Verified named primary institutional ruling; no authorization for the proposed school] S150. International Islamic Fiqh Academy, Resolution 153 (2/17), Ifta: Requirements and Ethics, 28 June 2006; https://iifa-aifi.org/en/32922.html [Verified named primary institutional ruling] S151. Abu Hamid al-Ghazali, al-Mustasfa, text witness and discussion of partial ijtihad; https://www.ghazali.org/books/mustasfa/mustasfa4.pdf [Digitized Arabic witness identified; printed passage and limitations not critically collated] S152. Ali al-Sistani, Islamic Laws, Following a Jurist (Taqlid), Ruling 6; https://www.sistani.org/english/book/48/2117/ [Verified named contemporary Jafari primary rule] S153. International Islamic Fiqh Academy, Resolution 63 (1/7), Financial Markets, 14 May 1992; https://iifa-aifi.org/en/1845.html [Verified named primary ruling, scope-specific] S154. Securities Commission Malaysia, Resolutions of Shariah Advisory Council, 2nd ed., printed p.60, IISG decision 26 July 1995; https://www.sc.com.my/api/documentms/download.ashx?id=511180c4-b0f1-49e3-9f92-46efe55457bc [Verified publisher PDF and page screenshot; narrow institutional ruling] S155. Securities Commission Malaysia, Resolutions of Shariah Advisory Council, 2nd ed., printed pp.75-79, SAC decision 26 November 1997; https://www.sc.com.my/api/documentms/download.ashx?id=511180c4-b0f1-49e3-9f92-46efe55457bc [Verified publisher PDF and page screenshot; specific market only] S156. International Islamic Fiqh Academy, Resolution 224 (8/23), Hedging in Financial Transactions, 2018; https://iifa-aifi.org/en/33127.html [Verified primary institution; express market-option and most futures opposition] S157. International Islamic Fiqh Academy, Resolution 72 (3/8), Bay Urbun, 27 June 1993; https://iifa-aifi.org/en/32466.html [Verified primary

institution; excludes salam/sarf settings] S158. International Islamic Fiqh Academy, Resolution 238 (9/24), Hedging Transactions in Islamic Financial Institutions, 2019; https://iifa-aifi.org/en/33165.html [Verified primary institution; website dating details need Arabic reconciliation] S159. International Islamic Fiqh Academy, Resolution 102 (5/11), Currency Trading, 19 Nov 1998; https://iifa-aifi.org/en/32566.html [Verified primary institution; scope of sarf needs explicit contract classification]

S160. Ducat Protocol, published website, read 25 October 2026; https://www.ducatprotocol.com/ [Vendor disclosure, mutable marketing source; contract version unverified] S161. Ducat Protocol, Trust Assumptions: Liquidations, read 25 October 2026; https://docs.ducatprotocol.com/trust-assumptions/liquidations [Protocol author documentation, not on-chain script proof] S162. Ducat Protocol, Liquidations: Basic Mechanics, read 25 October 2026; https://docs.ducatprotocol.com/liquidations/basic-mechanics [Protocol author documentation, version-dependent] S163. Ducat Protocol, Governance, read 25 October 2026; https://docs.ducatprotocol.com/governance/governance [Governance defaults, subject to changes by vote] S164. DUCAT-UNIT/ducat-snap, FAQ.md, inspected 25 October 2026; https://github.com/DUCAT-UNIT/ducat-snap/blob/main/FAQ.md [Public implementation documentation; partial component only] S165. patrickdugan/TradeLayer-Rust, docs/CLEARING_MATH.md, inspected 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/CLEARING_MATH.md [Repository research design, may evolve by commit] S166. patrickdugan/TradeLayer-Rust, docs/SETTLEMENT_AUTHORIZATION.md, inspected 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/SETTLEMENT_AUTHORIZATION.md [Repository authorization boundary; no deployed verifier] S167. patrickdugan/TradeLayer-Rust, docs/INSURANCE_LEDGER_V2.md, inspected 25 October 2026; https://github.com/patrickdugan/TradeLayer-Rust/blob/main/docs/INSURANCE_LEDGER_V2.md [Repository research design; insurance payout not certified]

S168. Harris Irfan, Heaven’s Bankers: Inside the Hidden World of Islamic Finance, Abrams/Overlook (2015); https://www.abramsbooks.com/product/heavens-bankers_9781468311839/ [Published book and publisher description; arguments interpreted in context]

S169. Harris Irfan, interview, “Harris Irfan on Islamic Finance,” Foreign Affairs, 12 June 2015; https://www.foreignaffairs.com/articles/2015-06-12/harris-irfan-islamic-finance [Author interview; views attributed to the speaker]

S170. Satyajit Das, Traders, Guns & Money (2006), FT Business Book longlist/review; https://ig.ft.com/sites/business-book-award/books/2006/longlist/traders-guns-and-money-by-satyajit-das/ [Published book; accessible FT review and synopsis]

S171. Satyajit Das, Extreme Money: The Masters of the Universe and the Cult of Risk (2011/2012), Wiley; https://onlinelibrary.wiley.com/doi/book/10.1002/9781119199212 [Publisher book record and synopsis]

S172. Coinfessions, anonymous submissions, https://coinfessions.com/ and https://x.com/coinfessions [Unverified user submissions; neither representative nor evidence against named persons]

S173. CoinMarketCap Academy, “Evil, Awful and Downright Weird: The Worst Coinfessions Shared on Twitter,” accessed 25 October 2026; https://coinmarketcap.com/academy/article/evil-awful-and-downright-weird:-the-worst-coinfessions-shared-on-twitter [Secondary reproduction of unverified anonymous self-reports]

S174. U.S. Department of Justice, “Samuel Bankman-Fried Sentenced to 25 Years,” 28 March 2024; https://www.justice.gov/usao-sdny/pr/samuel-bankman-fried-sentenced-25-years-prison [Government statement of court outcome; specific defendant and adjudicated conduct]

S175. Author’s professional chronology and project records (2015–2026), unpublished; reviewed for this editorial edition [First-person recollection and private records; publication review and independent corroboration desirable]

S176. Coinfessions: Where Crypto Twitter Bears Its Soul, Crypto Briefing, 3 September 2022; https://cryptobriefing.com/coinfessions-where-crypto-twitter-bears-its-soul/ [Journalistic context, not authentication of individual submissions]

S177. Mohammad Hashim Kamali, Islamic Commercial Law: An Analysis of Futures and Options, Islamic Texts Society (2001 paperback), https://its.org.uk/catalogue/islamic-commercial-law-paperback/ [B: Publisher book description, not full-text inspection]

S178. Mohammad Hashim Kamali, Prospects for an Islamic Derivatives Market in Malaysia, Thunderbird International Business Review 41(4–5) (1999), pp. 523–540, https://doi.org/10.1002/tie.4270410413 [B: Published article abstract; commodity futures and agricultural hedging]

S179. Mohammad Hashim Kamali, Commodity Futures: An Islamic Legal Analysis, Thunderbird International Business Review 49(3) (2007), pp. 309–339, https://doi.org/10.1002/tie.20146 [B: Published article abstract; five objections and legal tests]

S180. Mohammad Hashim Kamali, Islamic Commercial Law: An Analysis of Futures, American Journal of Islam and Society 13(2) (1996), pp. 197–212, https://doi.org/10.35632/ajis.v13i2.2330 [B: Published introductory text on agricultural futures and ijtihad]

S181. Matt Levine, The Synthetic Lender of Last Resort, Bloomberg Money Stuff, 27 March 2025, https://www.bloomberg.com/opinion/newsletters/2025-03-27/the-synthetic-lender-of-last-resort [B: Published commentary on Treasury basis trade and synthetic leverage]

S182. Satyajit Das, Financial Crisis oral-history interview, FRONTLINE/PBS, interview conducted 15 February 2012, https://www.pbs.org/wgbh/pages/frontline/oral-history/financial-crisis/satyajit-das/ [B: First-person interview discussing hybrid capital and trading incentives]

S183. Fatih Han, “Al-Qāḍī ʿAbd al-Jabbār (d. 415/1025) on the Impossibility of Seeing God,” in Islamic Sensory History (Brill, 2024), DOI 10.1163/9789004515932_029; https://brill.com/display/book/9789004515932/BP000038.pdf [Specialist secondary; text extraction examined; page-image request failed; consult print/critical edition: Historical five principles and the Mānkdīm taʿlīq/commentary-attribution distinction]

S184. Daniel Gimaret, “Abu’l-Ḥosayn Baṣrī,” Encyclopaedia Iranica, updated 23 May 2018; https://www.iranicaonline.org/articles/abul-hosayn-mohammad-b/ [Scholarly encyclopedia; reliable overview; passages of Arabic al-Muʿtamad not collated: Al-Muʿtamad and relations between Muʿtazilī theology and Ḥanafī law]

S185. International Islamic Fiqh Academy, Resolution 70 (1/8), “Exemption and its Ruling,” 27 June 1993; https://iifa-aifi.org/en/32460.html [Direct institutional ruling in published English translation; separate from new-school authorization: Scope and restrictions on qualified selection of juristic exemptions and prohibited talfīq]

S186. Devin J. Stewart, “Ejāza,” Encyclopaedia Iranica 8.3 (1998), updated 2013; https://www.iranicaonline.org/articles/ejaza/ [Scholarly encyclopedia; al-dirāyah certificate in book is explicitly modern proposal: Historically attested transmission, memorization, and teaching/iftāʾ ijāzāt]

S187. International Islamic Fiqh Academy, Resolution 153 (2/17), “Iftā: Requirements and Ethics,” 28 June 2006; https://iifa-aifi.org/en/32922.html [Direct institutional ruling in published English translation: Qualifications, technical expert consultation and collective fatwa]

S188. Office of Sayyid ʿAlī al-Sīstānī, Islamic Laws, Rulings 1–6, “Following a Jurist (Taqlīd)”; https://www.sistani.org/english/book/48/2117/ [Direct contemporary primary school-specific text; rule not

adopted as universal standard: A competing Twelver rule for juristic authority; reason in beliefs and reliance for law]

S189. Al-Ghazālī, al-Mustaṣfā, reported argument for partial/domain-specific ijtihād, cited in academic thesis at https://etheses.whiterose.ac.uk/id/eprint/415/1/uk_bl_ethos_365452.pdf, p.202 footnote 10 [Secondary quotation only; original Arabic edition and contextual limits require collation: Potential classical precedent for competence limited to particular legal questions]

S190. Qurʾān 4:58, 4:135, 17:36, 5:8, 4:29, 5:1 and 16:43; verse locators e.g. https://quran.com/4/58 and https://quran.com/17/36 [Scripture; precise implications are interpretive proposals: Foundational texts about entrusted rights, fairness and speech from knowledge]

S191. Neal Robinson, "Ashʿariyya and Muʿtazila," Routledge Encyclopedia of Philosophy (1998); https://www.rep.routledge.com/articles/thematic/ash-ariyya-and-mu-tazila/v-1/sections/the-five-principles ; Murtadha Mutahhari, "Muʿtazilah," Al-Islam.org; https://al-islam.org/al-tawhid/vol3-no2/introduction-ilm-al-kalam-murtadha-mutahhari/mutazilah [Secondary descriptions; modern authorial departures labeled explicitly: Historical doctrines on divine promise/threat and intermediate position]

Appendix B. School comparison and source disputes

Three comparisons must remain unsettled unless the required sources are found. First, early Kufan *muzāraʿah* needs an edition-controlled comparison of Abū Ḥanīfa, Abū Yūsuf, and al-Shaybānī; a secondary summary cannot carry a claim about a precise rationale by itself. Second, the 1995 Malaysian decision approves an issuer-style call warrant on a compliant share, while the 1992 Academy text rejects a described category of market options. They are contrary positions about the saleability of certain option rights, but their subjects are not literally identical. Third, historical Ismāʿīlī and Ibāḍī sources need direct passage collation before attributed rule synthesis.

The narrowest shared observations already attested are that sale law recognizes ownership rights, conditional decisions exist in several traditions, and a prohibition may attach to a class of stand-alone paid rights. The new madhhab chooses a rule for funded rights whose performance is independently enforceable, and openly places that choice in contention with restrictive traditions. That makes it a *new* school-level argument and a legitimate target for refutation.

Appendix C. Ducat numeric test vectors

Scenario	BTC spot	Debt	Put strike	Call strike	Collar gross value	Ratio versus debt
Adverse drawdown	$40,000	$50,000	$70,000	$166,000	$70,000	140%
Lower boundary	$70,000	$50,000	$70,000	$166,000	$70,000	140%
Initial valuation	$100,000	$50,000	$70,000	$166,000	$100,000	200%
Upper boundary	$166,000	$50,000	$70,000	$166,000	$166,000	332%
High market	$200,000	$50,000	$70,000	$166,000	$166,000	332%

These are terminal *illustrations* with no fees, no funding basis, no put default and no early-liquidation path. They show exactly why a contract-level hedge settlement is needed: a numerical floor at maturity cannot preserve custody if a separate liquidation path fires earlier.

Appendix D. Research and falsification agenda

Next: audit Ducat liquidation code, prove creditor priority, test hostile oracles, collate madhhab sources, and solicit legal dissent.

Appendix E. Edition 0.16 editorial and verification boundaries

The earlier working manuscript used 21 numbered chapters plus 8A, 8B, 20A and 20B. This edition maps their content into 27 proposed final chapters and retains the material extracted from the former short chapters as identified subparts. Chapters on consensus, modal obligations, commutativity, synthetic dollars, TradeLayer, DLCs and the rentier economy are newly written and require independent legal and technical review.

The TradeLayer engineering passages cite design files retrieved from its accessible repository on 25 October 2026. Those files identify offline research states and unverified settlement paths. Nothing in this edition constitutes approval of its deployment or financial security. Citations to IIFA and school rulings identify institutional legal positions, including disagreement with this book's proposals.

The accompanying legacy Lean modules have not been compiled in this edition. Numeric demonstrations remain conditional on their model assumptions. No original historical consensus, universal permissibility of financial derivatives, or deployed Bitcoin-collateral safety is asserted by the formal work in the absence of evidence.

Appendix F. A working glossary

ʿ**Ilmī uṣūl:** The proposed discipline in which a legal argument includes sources, formalized contract effects, authority rules, logical consequences, and falsifiers.

Ijāzah: A scoped authorization whose historical and proposed types must be distinguished.

Ijāzat al-dirāyah: This book's newly proposed competency examination category, not an attested medieval title.

Ijāzat al-iftāʾ: A limited permission to issue institutional legal opinions within stated competence and authority.

Mutaqlid fī al-uṣūl: The book's proposed jurist who adopts and reconciles source principles under an expressly declared theory of authority; the term is a new technical proposal.

Takhayyur: Selection of an established legal position under applicable conditions.

Tarjīḥ: Reasoned preference among legal opinions based on accepted criteria of evidence and authority.

Talfīq: Combining rules associated with different juristic traditions; its acceptability and limits depend upon the governing method.

Ijmāʿ: Juristic consensus, whose epistemic status and membership criteria differ among uṣūl traditions.

Qiyās: Juristic analogy through an accepted operative legal cause (ʿ*illah*), subject to school-specific conditions.

Istiḥsān: Preference for a stronger or exceptional legal reason in traditions that authorize that method.

Ḥukm: A legal classification or ruling; the formal models here encode only stipulated portions of its jurisprudential content.

Māl: Legally recognized property or wealth; economic market value alone may be insufficient under a particular school.

Thaman and ṣarf: Monetary consideration and exchange of monetary commodities, potentially attracting currency-exchange restrictions.

Qabd and qabd ḥukmī: Actual and constructive possession, assessed through enforceable power to dispose of property.

Qard: A loan involving a repayment obligation, whose stipulated lender benefits require independent ribā analysis.

Rahn: A pledge or collateral right; enforcement and the owner's remainder are distinct questions.

Ribā: The class of prohibited increases or exchange conditions addressed by scriptural texts and juristic extension.

Gharar: Legally relevant uncertainty in a transaction, with scope and degree requiring sourced analysis.

Maysir: Gambling or wagering, whose classification requires a legal argument about the transaction concerned.

Khiyār and ʿurbūn: Recognized contractual choice rights and down-payment arrangements, with school-specific details.

Salam and istiṣnāʿ: Contract forms for specified future delivery and manufacture under their relevant legal conditions.

Murābaḥah: Disclosed cost-plus sale, requiring attention to title and asset risk as well as the payment schedule.

Zakāt and waqf: Obligatory transfer to defined recipient classes, and property devoted to a specified enduring purpose.

UTXO: A Bitcoin transaction output that remains unspent; spending authority and lawful title are separately analyzed.

DLC: Discreet log contract, a contingent settlement arrangement using prearranged Bitcoin transactions and oracle-linked conditions.

Hedge ratio: Short or offsetting exposure divided by underlying exposure, separate from leverage on posted margin.

Basis risk: A mismatch between a hedged exposure and the instrument intended to offset it.

Mark price: A reference price used for valuation, funding or liquidation under declared engine rules.

Liquidation and ADL: Forced position closeout and auto-deleveraging, both of which depend on executable rights and funded resources.

Proof-carrying fatwa: A legal decision dossier with explicit normative premises and machine-checkable conditional consequences, subject to source and implementation review.

Appendix G. Source-critical findings and contested fatwa bridges (Edition 0.13)

This appendix distinguishes a verified contemporary institutional ruling from our use of it in a new legal argument. It records the precise gap between the source and the proposed *mutaqlid* construction. The expanded machine-readable audit accompanies the manuscript.

Source	Verified proposition	Limitation for this book
IIFA 70 (1/8), 1993	Recognized concessions may be selected under strict conditions; prohibited talfīq composites are identified	No direct license for a new authority formed by mixing schools [S149]
IIFA 153 (2/17), 2006	Mufti needs legal competence and correct knowledge of the case, including expert consultation	Protocol expertise is insufficient to establish mufti status [S150]
Al-Ghazālī, *al-Mustaṣfā*	Argument supporting ijtihād in a particular domain by a sufficiently qualified scholar	Edition collation and full limits remain open [S151]
Sīstānī, *Islamic Laws* Ruling 6	A follower adheres to the most learned jurist's fatwa, with specified exception on obligatory precaution	Does not endorse the proposed free cross-school authority [S152]
IIFA 63 (1/7), 1992	Market options examined by the Academy are rejected as lacking a compensable subject under its legal classification	The holding addresses those contracts, rather than all possible contingent rights [S153]
Malaysia IISG, 26 July 1995	Call warrants on compliant shares accepted as saleable financial rights subject to Islamic conditions	Different underlying, issuer and execution from a BTC put [S154]
Malaysia SAC, 26 November 1997	Specified crude palm oil futures permitted after contract-focused examination	Distinct from perpetual crypto swaps [S155]
IIFA 224 (8/23), 2018	Wealth-preserving hedging valued; the contract method must itself be compliant	Express restrictions on abstract rights and common derivative forms remain [S156]
IIFA 72 (3/8), 1993	Earnest money sale permitted under stated conditions	Requires genuine sale and defined deposit treatment [S157]
IIFA 238 (9/24), 2019	Lists particular lawful hedging mechanisms and rejects defined deferred FX forms	Does not announce approval of standalone puts or perpetuals [S158]
IIFA 102 (5/11), 1998	Prohibits deferred currency exchange under the Academy's *ṣarf* rules	A synthetic-dollar design must distinguish its legal object [S159]

The exact disagreement. The proposed school gives a funded contingent right the possibility of being a saleable financial asset. The Academy's institutional line rejects the described market options as independently compensated abstract rights. The Malaysian decisions supply examples of particular permissible rights and contracts. An original legal ruling may adopt the wider view after defending the reasons and testing the implementation. It should be published under that school's responsibility.

Source versus proof. A proof of the invariant Payout(w) <= FundedReserve(w) for every modeled state w shows that a specified model's promise is backed in every modeled state. The premise that this independently compensable exercise right counts as lawful *māl* requires jurisprudential argument. Whether a real protocol satisfies the formal invariant requires authenticated transaction and state evidence. Each conclusion carries the boundary of the discipline that produced it.

Final publication gate. The historical school-wide authority matrix, full Arabic text collation, kernel compilation and live protocol audit remain open. Proposed new-school rulings are marked as such throughout this edition.

Appendix H. Edition 0.14 formal and implementation evidence map

The following documents represent related but distinct claims. Mutaqlid/TraceEquivalence14.lean tests state-indexed payment and selected property-right projections. Mutaqlid/CreditWaterfall14.lean models a hypothetical BTC loan under published example ratio thresholds, a separate liquidation-authorization predicate, and a borrower-remainder accounting proposal. Mutaqlid/Clearing14.lean models preflight funding, preservation of bilateral escrow totals, and economic-authentication conditions. None contains a deployment connection or a certificate from a historical jurist.

Theorem-level gate. The theorem prover must compile every imported module under the pinned Lean 4 toolchain. A completed theorem is conditional on the definitions and premises supplied. Independent Python cases are finite countermodels and arithmetic regression tests. A static search showing no sorry is useful only as a preliminary check; it cannot replace a Lean kernel compilation.

Source-level gate. A juristic rule must have an identifiable author, version, quoted text, language, method of legal interpretation, and scope. The selected authority must accept the rule or the new school must declare the bridge as original. The IIFA's rejection of compensated abstract option rights in Resolutions 224 and 238 remains a substantive adverse source, even if a funding model can be shown mathematically safe [S156, S158].

Protocol-level gate. A Ducat case requires pinned script leaves, authorized guardian and oracle evidence, fee transaction records, liquidation threshold and incentive configuration, sale or replacement transaction, and the final BTC/UNIT distribution [S160–S164]. A TradeLayer case requires source-chain inclusion, identities, exact contract and price evidence, funding accounts, rounded position PnL, settlement authority, insurer priority and replay exclusion [S165–S167]. An audit of an interface or arithmetic helper covers only that component.

Institutional gate. Adjudication must establish whose asset is being transferred, which claims are superior, whether the customer consented to the relevant enforcement paths and whether the proposed legal theory gives an enforceable remedy for a wrongly executed transfer. Formal state-machine equality does not authenticate that legal rule.

The research package contains a machine-readable evidence register, standalone model tests, three Lean modules, and a source-collation list. All remain versioned research artifacts pending outside review.

Appendix I. Source discipline for industry testimony and author recollections

This edition uses three evidentiary categories. First, books and published interviews by Harris Irfan and Satyajit Das are attributed arguments about finance and the institutions that sell its products. Neither writer supplies a classical juristic authority for the proposed mutaqlid rules. Their value is an adversarial account of incentives, product engineering and the capacity of financial professionals to profit from legal complexity [S168–S171].

Second, Coinfessions provides anonymous self-reports. The selections are neither verified confessions in a legal sense nor a random sample. A claim that a charity misused money must remain an anonymous, unverified allegation; it cannot establish a historical charge against an identifiable person. The submissions can generate questions for a contract audit concerning title, withdrawal, disclosure and restitution [S172, S173, S176]. The FTX court record illustrates independently established misconduct and should be cited separately [S174].

Third, career notes refer to the author's participation in OmniLayer treasury operations (2015–2017), Input Trading's Bitcoin-denominated strategies (2021–2022), and the TradeLayer protocol project (from 2017), together with the author's reported difficulty finding a small Bitcoin-native hedge counterparty during 2026. These are consciously brief recollections. The timing, numerical claims and interpretations should receive author review before public release [S175]. No trading-desk dialogue or private personal allegation has been invented for this edition.

Fiqh remains the judge. Technical resemblance, success in trading, failure of a company or an anonymous confession cannot independently establish a ḥukm. A proposed fatwa requires evidence about the subject of the transaction, authoritative legal reasons within its declared uṣūl, and an inspectable connection from those premises to the judgment. The book's existing limitations on Lean kernel compilation, deployed protocol verification and classical Arabic collation continue to apply.

Appendix J. Commentary sources and the limits of the futures analogy

This edition draws four different kinds of testimony into the doctrinal analysis. Mohammad Hashim Kamali contributes recognized contemporary scholarship within Islamic legal studies. His 1996 article, 1999 discussion of Malaysian commodity futures, 2001 book, and 2007 article address the possible legal standing of futures and options. The accessible publisher and journal materials support a careful claim about commodity hedging, agricultural price risk and serious attention to the standard prohibitory objections [S177–S180]. They provide no general fatwa authorizing every cryptocurrency perpetual, leverage arrangement, or uncollateralized cash-settled option. Full printed-edition collation remains outstanding.

Matt Levine provides an external analyst's account of financial packaging and synthetic leverage. His Treasury basis-trade essay discusses how institutions obtain essentially financed bond exposure through futures subject to different mandate rules. It is evidence about modern market structure and a useful illustration of economic equivalence; he is not represented as a jurist or as endorsing the new-school fatwa [S181].

Satyajit Das's documented experience with capital instruments and his published criticism of the derivatives industry help explain the gap between a legal classification and the risk distributed by an engineered instrument. His work enters the book as adversarial financial evidence, preserving the independently verified legal rulings [S170–S171, S182].

The authorial episodes refer to OmniLayer treasury operations from 2015–17, Bitcoin basis/arbitrage trading at Input Trading during 2021–22, the exit from FTX exposure without reported credit losses, TradeLayer protocol development since 2017, and the reported search for a $5,000 Bitcoin-native hedge. These examples are bounded first-person claims requiring author approval for publication. No private conversation, realized trading result, guaranteed return, or person's wrongdoing has been invented [S175].

The standard of legal proof remains unchanged: a published rule with defined scope, a proven or stipulated fact about the transaction, a valid inference within the declared uṣūl, and a named agent responsible for the rights transferred. These editorial interventions aim to expose an assumption to inspection. They carry no independent juristic authority. The source-critical, Lean kernel, and deployed-contract verification tasks remain open.