

κ -Chain — A Brief for the Scholar

An interest-free ($\iota = 0$) pricing framework: the claim, the boundary, and the one open question

Shehzad Ahmed — Founder, Baraka Protocol & Arcus Quant Fund
with Dr. Rafiqul Bhuyan, Alabama A&M University

A research artifact. Not financial advice, not a solicitation, and not a fatwa.

The claim, in one paragraph

Modern finance prices everything on a charge for the passage of time — the interest rate r . That time-charge is *riba al-nasiah*. For fifty years the industry’s “Islamic” products have kept that rate underneath and wrapped it in permissible-looking legal form. We do something different: we remove the time-charge from the **pricing mathematics itself**. Building on a 2025 theorem in *Mathematical Finance* (Akerer, Hugonnier & Jermann), a perpetual contract has a unique, well-behaved price with the interest parameter set to zero ($\iota = 0$); the role r used to play is taken by κ , the measured rate of a **real event** — a default, a loss, a price converging — not the passing of time. A live market already prices this way (dYdX v4), and a chain that computes κ in consensus is running today.

Why κ is not interest relabeled

Three independent checks, any of which could have failed:

- **It fails the classical (El-Gamal) test for *riba*.** *Riba* is a charge that is *predetermined*, *independent of outcome*, and *levied for time*. κ is none of these: it is measured after the fact, it *is* the outcome, and it is charged for an event, not for time.
- **It is recovered from places that have no interest rate.** The same κ comes out of credit spreads, of the convergence of perpetual prices, and of **insurance loss records** — the frequency with which crop failures and claims actually occur. There is no bond market, and no interest rate, in a register of failed harvests.
- **It moves *against* the interest rate, not with it** (its loading on the risk-free rate is negative, -0.3 to -0.75).

The honest boundary — what we do and do not claim

We claim this addresses **riba**, and only *riba*, and only at the level of pricing. It does **not**, by itself, settle the other pillars — **gharar** (excessive uncertainty), **maysir** (gambling), or **qabd** (possession) — least of all for cash-settled synthetic contracts, which we treat as the hardest case, not the easiest. We have issued **no fatwa** and seek none.

The one open question — measured, not answered

When κ is separated into the part that is *realised loss* and the part that is a *priced risk premium*, the result varies sharply by domain: in **takaful** the premium share is small ($\sim 18\%$ — you pay for what

actually happens), while in **credit** it is the great majority (a charge for bearing a risk that almost never materialises; at least 45% for sovereigns, bounded). This locates a genuine *fiqh* question to the basis point but does not answer it:

Is a fully contingent, loss-bearing risk premium — stripped of every predetermined charge — *riba* in substance, or the permitted return under **al-ghunm bil-ghurm** (entitlement to gain tied to liability for loss)?

That judgment belongs to scholars, not to a formula.

What we ask

1. A judgment on the narrow question: does setting $\iota = 0$ remove *riba in substance*, and is κ genuinely a measure of real risk rather than interest under another name? **Yes, no, or yes-with-conditions.**
2. If you cannot conclude yet — what exactly you would need to see.
3. If you find it sound — a scoped review, beginning with the asset-backed instruments (a real, deliverable underlying), leaving the cash-settled case for last.

We do not ask for a stamp. We ask for scrutiny — especially the kind that tries to break the argument.

See for yourself

- The argument in plain language: **kappachain.site/letter**
- The running chain + interactive evidence: **kappachain.site**
- Reproduce every result (81 analyses, scripts + data): **github.com/shehzadahmed-xx/kappa-replication**
- The full corpus (17 papers, one volume): **kappachain.site/KAPPA__THE__BOOK.pdf**
- Contact: **shehzadahmed@arcusquantfund.com**