Monetary Half-Life: Value Creation Through Transactional Contraction

Abstract

Modern economic systems are built on a single, largely unexamined assumption: that value must be created through continuous expansion of production, population, leverage, or throughput. While this assumption held under conditions of abundant resources and demographic growth, it becomes unstable in mature, saturated, or finite systems.
This paper introduces **Monetary Half-Life**, a monetary mechanism that creates value not through expansion, but through **controlled, rule-based contraction triggered by economic activity itself**. By embedding predictable decay at the moment of transaction—rather than through inflation or hoarding penalties—Monetary Half-Life replaces growth dependence with a time- and activity-based scarcity engine suitable for long-horizon, post-growth economies.

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1. The Hidden Assumption in Growth Economics

Contemporary monetary systems implicitly assume:

Value must increase through expansion.

Expansion appears as:

- larger markets
- increased production
- population growth
- leverage and forward-priced expectations

This assumption is not ideological—it is **arithmetical**. When expansion slows or stops, the system destabilizes. Monetary Half-Life begins by removing this assumption rather than moralizing against it.

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2. Core Thesis (Canonical Form)

If growth creates value by expansion,
Monetary Half-Life creates value by controlled contraction at the moment of exchange.

Value is reframed as a **denominator problem**, not a race to increase the numerator.

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3. What Monetary Half-Life Is — and Is Not

What it is

- A **transaction-costed scarcity engine**
- A rule-based reduction of active supply triggered by exchange
- A system where **commerce itself creates scarcity**
- A mechanism that prices time and movement, not ownership

What it is not

- Not inflation (no dilution of all units)
- Not demurrage (no penalty for holding)
- Not confiscation or discretionary taxation
- Not deflationary collapse

Monetary Half-Life does not punish saving.
It does not force velocity.
It prices **use**, not possession.

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4. The Corrected Mechanism (Critical Clarification)

Capital does **not** decay by being held.
Capital decays **only when it is transacted**.

Every transaction:

- completes an exchange of value
- removes a small, predefined fraction of capital from circulation
- permanently reduces total active supply

Capital held in wallets:

- does not decay
- is insulated from dilution
- benefits indirectly from increasing scarcity

Saving preserves value.
Commerce funds scarcity.

This distinction separates Monetary Half-Life from all prior decay-based monetary models.

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5. Decay vs. Inflation (Precise Distinction)

Inflation	Monetary Half-Life
Dilutes all holders	Affects only transactions
Penalizes saving	Protects saving
Increases unit count	Decreases unit count
Politically discretionary	Rule-based and mechanical
Erodes trust	Can strengthen trust

Inflation is loss without structure.
Half-life is loss **with purpose and consent**.

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6. Why This Is Not Deflationary Collapse

Classic deflation suppresses demand by rewarding delay and increasing real debt burdens.
Monetary Half-Life avoids this because:

- decay is predictable and bounded
- the cost is priced into transactions
- value loss is fractional, not compounding debt
- utility still outweighs decay cost

People transact because the transaction is worth it—not because money forces them to.

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7. Structural Insight (The Contribution)

Traditional systems assume:

Trade increases supply; value must come from growth.

Monetary Half-Life asserts:

Trade reduces supply; value emerges from scarcity created by use.

Scarcity becomes **endogenous to commerce**, not imposed by external limits or authorities.
This aligns monetary behavior with:

- finite systems
- mature economies
- low-growth or post-growth conditions

Growth becomes optional, not mandatory.

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8. Conceptual Formal Framing

Let:

- S_0 = total supply
- τ = transaction value
- δ = decay fraction per transaction

Then each transaction reduces supply by $\delta \cdot \tau$.
Wallet-held capital remains unchanged.
Aggregate scarcity increases as a function of economic activity.

Scarcity is no longer external.
It is produced by use.

Conclusion

Monetary Half-Life does not reject markets, value, or capitalism.
It rejects one assumption: that value must be generated through infinite expansion.

By embedding **transactional contraction** into capital itself, Monetary Half-Life introduces a new class of monetary behavior—one suited to finite systems, long horizons, and mature economies.

It is not a revolution.
It is a correction.

SH Rushton