

Eight Independent Formal Frameworks — One Structural Conclusion

The Formal Case for Correcting Money's Misrepresentation

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FILP Standard: Every claim traces to an independently observable phenomenon or a valid logical derivation from such a phenomenon or an axiom whose denial leads to contradiction.

Chapter 1: Does Money Exist? The Requirement for Independent Existence

A valid concept requires either independent physical existence or a valid intensional definition.

- "Medium of exchange, store of value, unit of account" — these are use-descriptions, not definitions. They presuppose money's existence; they cannot establish it.
- The metre: distance light travels in $1/299,792,458$ s — independently anchored. The kilogram: defined via Planck's constant. Both are FILP-valid.
- Money's circular chain: money $\rightarrow$ medium of exchange $\rightarrow$ exchange requires value $\rightarrow$ value requires a standard $\rightarrow$ the standard is money. No external anchor exists.
- Result: the monetary unit symbol has no valid intensional definition and no decidable truth conditions.

$B = 0$ Proof (additive identity): Let $A \geq 0$ be value transacted, $B \geq 0$ independent value of the unit.

$A = A + B$ iff $B = 0$.

For any $B > 0$, the unit ceases to measure A . It is not a defective measure — it is not a measure at all.

Chapter 1a: The Measurability of Relative Value — The Effort-Induced Measure

Standard economic theory: relative utility is ordinal, not cardinal. This chapter proves that position is incorrect.

- Let Ω be the space of outcomes. Ω carries no natural background measure prior to observation.
- Define effort function $e: \Omega \rightarrow \mathbb{R}_{\geq 0}$ assigning to each outcome ω the total effort voluntarily directed at it.
- Pushforward measure $\mu_e(A) = \text{total effort directed at outcomes in } A$. This satisfies Lebesgue conditions by the physical nature of effort: non-negativity, null empty set, countable additivity.
- The Radon-Nikodym derivative $d\mu_{e_1}/d\mu_{e_2}$ gives the marginal effort ratio — a cardinal, independently observable measure of relative value.
- Objection (interpersonal comparison): μ_e measures physical allocation of effort, not internal states. Commensurability of effort-hours follows from commensurability of physical durations, not subjective utility.
- Consequence: a valid monetary recording instrument must satisfy $B = 0$ — it must not insert its own cost into the effort-outcome ratio.

Chapter 2: $M \cap C = \emptyset$ — The Category Error

M: Valid Measure

Independence:	defined externally, no circular reference
Passivity:	output $\leq$ input at every transaction
Decidability:	necessary & sufficient conditions for identity
Countable additivity:	parts sum to whole

C: Commodity

Market value $B > 0$:	tradable, commands a price
Scarcity:	can be withheld, hoarded
Speculation:	price varies independently
Commodity role:	bought, sold, lent

$M \cap C = \emptyset$ by logical necessity. Any object assigned properties from both sets simultaneously satisfies a contradiction. The conventional monetary unit assigns both. This is the root misrepresentation.

Chapter 8: Theorem 1 — Formal Proof of Structural Instability

Statement

Let $W > 0$ be constant real value, $r > 0$ a fixed percentage fee, $n \geq 1$ sequential transaction links. Then $C_n = W(1+r)^n$ and $F_n/C_n \rightarrow 1$ as $n \rightarrow \infty$, independently of all real economic variables.

Proof by Mathematical Induction

- Base ($n=1$): Fee = rW , so $C_1 = W + rW = W(1+r)^1$ ✓
- Hypothesis: Assume $C_k = W(1+r)^k$
- Step: $C_{k+1} = C_k(1+r) = W(1+r)^k(1+r) = W(1+r)^{k+1}$ ✓
- By induction, $C_n = W(1+r)^n$ for all $n \geq 1$. Since $(1+r)^n \rightarrow \infty$ for any $r > 0$, bounded input W produces unbounded output: BIBO unstable.

Z-transform: pole at $z=(1+r)$ lies outside the unit circle for any $r>0$ — discrete-time BIBO instability criterion.

Theorem 1 — Four Corollaries

C1: Systemic Independence

Divergence $(1+r)^n$ depends solely on r and n — independent of W , productivity, demand, or goods transacted.

C2: Rate Insensitivity

For any $r > 0$, however small, $\lim(1+r)^n = \infty$. Only $r = 0$ produces BIBO stability.

C3: Feedback Amplification

In multi-cycle economies, effective compounding factor = $(1+r)^{(n \cdot m)}$ over m cycles — super-exponential.

C4: Distributive Instability

Producer shares $W/C_n = 1/(1+r)^n \rightarrow 0$. Real producer compensation erodes to zero regardless of nominal price adjustments.

Chapter 7: Radon–Nikodym Failure — Measure-Theoretic Breakdown

- The Radon-Nikodym theorem requires absolute continuity: wherever the real measure μ assigns zero, the nominal measure ν must also assign zero.
- Under the percentage fee, extraction $F_n = W[(1+r)^n - 1] \rightarrow \infty$ is assigned to the empty activity set — no additional real goods or services are produced.
- Therefore the nominal measure grows where the real measure is zero. The Radon-Nikodym derivative $d\nu/d\mu$ does not exist.
- This is stronger than Theorem 1: the unit is structurally invalid as a measure prior to any dynamics.
- With Chapter 1a: the current monetary unit fails the conditions of the only formally valid, physically grounded measure of relative value (μ_e). It introduces a compounding cost that has no representation in any effort-outcome relationship.
- This is not a failure of calibration. It is a failure of kind.

The Convergence of Eight Independent Disciplines

Formal Logic

No valid intensional definition — viciously circular, indeterminate

Decidability

$V=PQ/M$ is formally indeterminate — same value, four radically different realities

BIBO Stability

Pole at $z=(1+r)>1$ — outside unit circle for any $r>0$

Functional Analysis

Percentage fee is a formal parasite on the Lebesgue integral — no corresponding $u(x)$

Measure Theory

Radon-Nikodym derivative $dv/d\mu$ does not exist — absolute continuity violated

Metrology (SI)

No external anchor; not a measurement unit in any SI sense

Ontology

$MnC=\emptyset$ violated; percentage fee charges range not domain

B=0 Synthesis

$B=0$ is necessary and sufficient; $B>0$ is sufficient alone to condemn any system

Chapter 11–12: Contagion and Stein's Conservation Principle

Contagion causal chain (Theorem 1 → real economy):

- $r > 0 \rightarrow F_n/C_n \rightarrow 1 \rightarrow$ Producer shares erode (Corollary 4)
- Producers must increase transaction volume: economy of scale imperative
- Essentials (low-margin, slow-turnover) structurally disadvantaged
- Military production (state-guaranteed, demand-inelastic) structurally optimal
- Same mechanism selects weapons manufacturers over housing builders

Stein's Principle (2003):

Sensitivity improvements in one frequency band are paid for by deteriorations elsewhere. The conserved residue — dirt — cannot be destroyed, only moved. QE → sovereign debt → inflation. Austerity → household income. Capital requirements → shadow banking. Total dirt conserved. Only correcting the unit at source eliminates it.

Effective rate: $(r + r_{\text{attenuation}}) / \bar{\tau}$ — attenuation itself compounds.

Chapter 13a: $V = PQ/M$ — A Formally Indeterminate Policy Instrument

The Maria proof: $M = €40$, $PQ = €40$, $V = 1.0$ in all four cases:

Circulation Pattern	Policy Signal
€1 × 40 participants	Broad, healthy
€2 × 20, €20 idle	50% idle — reads healthy
€4 × 10, €30 idle	75% idle — reads healthy
€10 × 4, €36 idle	90% idle — reads healthy

- $V = PQ/M$ is the same value for four radically different economic realities. No policy response is valid for all four simultaneously.
- PQ is contaminated by phantom wealth: $C_n = W(1+r)^n$ visible in global balance sheets. Financial claims exceed real assets 3–10× (Bain 2012; BIS 2024).
- Transaction velocity $\bar{v}$ (Chapter 14) is categorically different from V — a structural property of real productive organisation, no monetary content.

Chapter 18: The Passive Unit — Thirteen Conditions

All thirteen must hold simultaneously. $B > 0$ alone is sufficient to condemn any system regardless of all others.

Formal measurement conditions:

- Independence — defined without circular reference
- Passivity — output $\leq$ input; fees grounded in measured service cost
- Decidability — identity conditions formally specified
- Countable additivity — parts sum to whole
- Non-negativity — $\mu(A) \geq 0$
- Unconstrained supply — restricting supply imports implicit per-unit cost (deflation pathway)

Operational conditions:

- No function on balances other than + and – (no interest, no demurrage)
- Inertness — currency has no effect on wealth creation
- No coercion by monopoly of units
- Price determined by parties only
- Units not object of unit transactions (no lending money for money)
- Donation permitted — flat fixed-amount transfer, stable
- Public balances, private transactions

Stable Currency Unit Theorem & The Switch Analogy

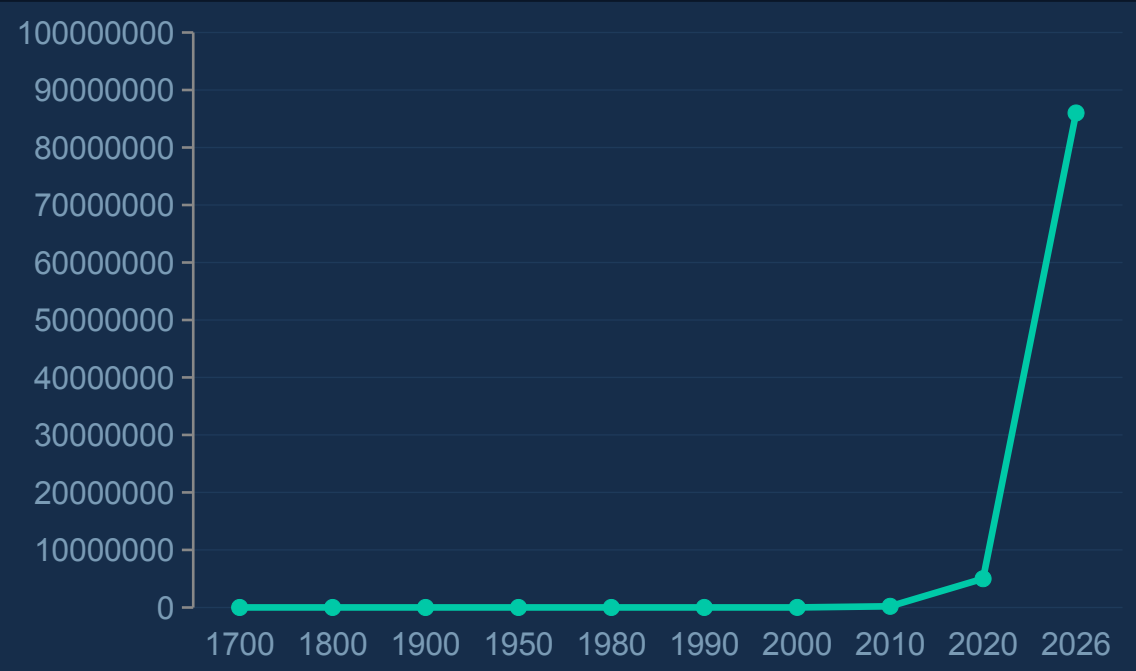
Stable Currency Unit Theorem (Gauvin & Domínguez, 2011):

If every transaction is Passive BIBO stable and all units created are necessarily products of such stable transactions, then all such units will necessarily maintain a bounded ratio with all system inputs — the units will be stable by definition.

- Stability is the default state of any monetary recording system. $B > 0$ is the sole introduced departure from that default.
- $B > 0$ is sufficient alone to destroy validity. $B = 0$ is necessary but not sufficient — all 13 conditions must hold.
- The correction has the character of a switch, not a dial. No halfway position between a valid and invalid definition.
- The moment the definition changes, the percentage fee loses its rational basis within it (Chapter 3 entailment). No new phantom obligations are created from that moment forward.
- Prior accumulated obligations require legal treatment (Chapter 20) and transitional management (Chapter 23) — but their source is switched off.

Chapter 14: Transaction Velocity — Technology Accelerates the Instability

With $n = T/\bar{\tau}$ (mean transaction time $\bar{\tau}$), effective instability rate: $i_{\text{eff}} = r / \bar{\tau}$



- 1970: $\bar{\tau} \approx 3 \text{ days} = 259,200 \text{ s}$
- 2026: $\bar{\tau} \approx 3 \text{ ms} = 0.003 \text{ s}$
- Same $r = 5\% \rightarrow i_{\text{eff}}$ increased $\sim 86,000,000\times$
- As $\bar{\tau} \rightarrow 0$, $i_{\text{eff}} \rightarrow \infty$ for any $r > 0$
- CBDCs without $B=0$: reduce $\bar{\tau}$ further, accelerating instability

Chapter 24: The Four Thresholds — None Crossed Yet

T1 Domain Exhaustion

W falls below minimum required to service $C_n = W(1+r)^n$

T2 Natural Capital Irreversibility

Ecological tipping points permanently reduce $V_{\max}$

T3 Institutional Capture

Corrective authorities become structurally dependent on extraction

T4 Cognitive Lock-in

Population capable of recognising the FILP argument falls below critical mass

T4 is the sine qua non: crossing it forecloses the remedy for all others simultaneously. It requires only understanding and transmission —

V16: What Is New — The Positive Result

Prior versions proved what is wrong and why. V16 adds what must be — in an irrefutable objective sense.

- Chapter 1a: Relative value IS cardinally measurable — through the effort-induced pushforward measure μ_e on the outcome space Ω . This satisfies Lebesgue conditions by the physical nature of the phenomenon, not by modelling convention.
- Voluntary human effort directed at outcomes already is a valid Lebesgue measure of value — by its own physical nature. We do not build boats for wages; we build them to sail the sea.
- The current monetary unit fails the conditions of the only formally valid, physically grounded measure of relative value available from independently observable phenomena.
- The $B=0$ specification is not merely a formal requirement — it is the correct expression of an instrument adequate to μ_e .
- The interpersonal comparison objection is refuted: μ_e measures physical allocation of effort, not internal subjective states. Commensurability is physical, not normative.

Summary: The Convergence Is Not Rhetorical

*A result that can be attacked in one framework survives in the other seven.
A result that fails in all eight simultaneously is not a matter of interpretation.
It is a matter of logical necessity.*

- The proof is complete and publicly available since 2009 (bibocurrency.com)
- It has not been refuted in any forum in which it has been encountered
- The remedy satisfies all eight frameworks simultaneously
- Implementation costs nothing and penalises no agent
- The window identified in Chapter 25 is open — and narrowing

The Simplicity of the Remedy

Record the value of goods and services by their own value (domain) — not as a proportion of the value of what is being recorded. Never assign the value of one's service on the basis of the value of the goods and services of others.

The formal specification is complete.
The period of plausible ignorance is over.
The remedy costs nothing to implement.
There is no valid rational basis for delay.