Trust Equilibrium Framework – Formal, Conditional Model

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1. Status of This Document

This document is a formal framework describing a conditional model of trust, value, and continuity. It is not a novel, philosophical treatise, or prescription for governance. All conclusions are conditional on stated assumptions.

2. Purpose

- Define a rigorous language for trust as a system variable.
- Describe how trust quantities are recorded, transformed, and exhausted.
- Explain decision rules under uncertainty without normative justification.
- Allow testing, refutation, or repurposing of the model.

3. Scope and Non-Scope

3.1 In Scope

- Trust as a retrospective, ledger-based quantity.
- Residual effects (EV) external to the ledger, observable only through variance and tail behaviour.
- System-level aggregation of outcomes.
- Decision thresholds under uncertainty.
- Failure and collapse modes arising from mismeasurement.

3.2 Out of Scope

- Moral or ethical justification.
- Psychological completeness.
- Optimality or efficiency claims.
- Policy recommendations.
- Empirical calibration to real societies.

4. Core Definitions

4.1 Trust

Verified contribution under uncertainty, recorded retrospectively. Trust cannot be created prospectively or assumed.

4.2 EV (Expected Variance)

Residual, unobserved effects influencing variance and tail behaviour; not directly measurable.

4.3 Ledger

A state-recording structure maintaining time-indexed trust balances across scopes.

4.4 Status

A dimensionless weighting parameter derived from historical trust balance, conveying no moral or social meaning.

4.5 Observation

System capacity to measure outcomes; costly and withdrawable when marginal value declines.

5. Assumptions

- Agents act under incomplete information.
- Trust is finite and exhaustible.
- Emotional and moral factors affect outcomes but are unobservable.
- Measurement alters behaviour.
- Systems prioritise continuity over local optimality.

6. State Variables and Formal Interpretation

System behaviour may be interpreted as compatible with a generalised linear structure, where trust and status act as predictors through a non-linear link. EV dominates residual variance and tail behaviour. No empirical calibration or predictive claim is made.

7. Transformation Rules

7.1 Accumulation

Trust increases only after verified contribution.

7.2 Decay

Trust decays over time absent renewal.

7.3 Transfer

Trust is non-fungible but may aggregate at collective levels.

7.4 Loss

Severe breach results in irreversible trust loss.

7.5 Irreversibility of Actions

Actions differ in their cost and feasibility of reversal.
Actions with higher irreversibility require higher trust thresholds and narrower decision authority.

7.6 Failure Handling

Failures reduce trust within the affected domain. Trust reduction is proportional to severity and irreversibility of the action. Failures do not propagate globally unless systemic. Recovery requires re-earning trust through subsequent verified actions.

8. Decision Rules

- Intervention when variance exceeds tolerance.
- Suspension of observation upon stability.
- Emergency protocols when tail risk dominates mean outcomes.

9. Hypotheses and Tests

Example null hypotheses include:

- H0: Trust accumulation does not affect system stability.
- H0: Increased observation reduces variance.

10. Failure Modes

- False Stability: Apparent equilibrium masking EV accumulation.
- Over-Trust: Excess reliance on historical credibility.
- Measurement Blindness: Ignoring unobservable costs.
- Silent Collapse: Gradual erosion without trigger events.

11. Misuse and Adversarial Application

The framework may be misused to justify exclusion, rationalise coercion, or mask responsibility. Such misuse is unavoidable and does not invalidate the framework.

12. Limitations

- EV cannot be fully captured.
- Human meaning is not reducible to ledgers.
- Long-horizon outcomes remain uncertain.

13. Status of the Framework

This document defines a specific formalisation of trust under uncertainty.

The framework is formal, conditional, and assumption-bound. All results follow only within the scope of its stated definitions and rules.

The framework does not claim optimality, completeness, or exclusivity. Other formalisations are possible and may coexist.

This version (v0.2) is released as a frozen public record. Any future formalisations or revisions, if released, will be published as separate versions.