

# SBCM Note #7: The Theory of Entropic Elasticity (v2.1)

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## — The Law of Potential Capacity, Plasticity Lag, and the Mechanism of Wealth Ejection —

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**Target:** Theoretical foundation for the failure of "Fiscal Injection" policies and refutation of "Pump Priming" theory.

## 1. Introduction: The "Bucket" Fallacy

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Traditional Keynesian economics assumes that pouring budget ( $I_{budget}$ ) into a region directly translates into economic growth ( $\Delta GDP$ ). This implies that a region is an "infinite container" (Plastic Body) capable of holding any amount of capital.

However, **SBCM Field Theory** posits that every physical system (region/block) behaves as an **Elastic Body** with a finite "**Potential Entropic Capacity** ( $C_{pot}$ )".

This note proves that when external injection exceeds this capacity, the system generates a "**Restoring Force**" that actively ejects the excess wealth to the exterior.

## 2. Core Hypothesis: Entropic Elasticity

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### 2.1 Potential Capacity ( $C_{pot}$ )

Every Standard Block ( $B_{std}$ ) has a natural limit to the complexity and wealth it can maintain. We define this capacity based on structural connectivity.

$$C_{pot} = \alpha \cdot P_{density} \cdot M_{mesh}$$

- $C_{pot}$ : Potential Capacity [J/m<sup>3</sup>] (The natural volume of entropy).
- $P_{density}$ : Population Density (Basic interaction potential).
- $M_{mesh}$ : **Mesh Connectivity Coefficient**.
  - Defined by the **Local Multiplier (LM3)** or **Intra-regional Input-Output Linkage**. A higher  $M_{mesh}$  indicates a complex internal network capable of trapping entropy.

### 2.2 The Elasticity Equation (Hooke's Law of Economics)

When a government forces budget ( $S_{in}$ ) into a block that exceeds its capacity ( $S_{current} > C_{pot}$ ), a counter-force is generated to restore equilibrium.

$$\mathbf{F}_{eject} = -k(S_{current} - C_{pot})$$

- **$k$ : Institutional Rigidity Constant.**
  - Represents the lack of liquidity or bureaucratic friction. A higher  $k$  means the system rejects excess capital more violently (e.g., immediate subcontracting to Tokyo due to lack of local vendors).
- **Result:** The excess wealth flows instantly to the path of least resistance (Tokyo/General Contractors), where  $C_{pot}$  is huge.
- **Re-definition:** The "Straw Effect" is not suction from the center, but **ejection from the periphery**.

### 3. Addressing Counterarguments (The Dynamics of Failure)

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Critics may argue that massive investment causes "**Plastic Deformation**" (permanent expansion of capacity), known as the "Pump Priming" effect. We refute this using **Time Constant Analysis**.

#### 3.1 The Time Constant Mismatch ( $\tau_{money} \ll \tau_{structure}$ )

Plastic deformation (growth of local capacity) requires time for human learning and supply chain formation.

Let  $\tau_{structure}$  be the time constant for capacity growth, and  $\tau_{money}$  be the speed of budget injection.

- **Physical Reality:** Money moves at digital speeds ( $\tau_{money} \approx 0$ ). Structural change moves at biological/social speeds ( $\tau_{structure} \approx \text{Years}$ ).

$$\frac{dS_{in}}{dt} \gg \frac{dC_{pot}}{dt} \implies \text{Elastic Rebound}$$

##### Theorem:

Because the injection speed overwhelmingly exceeds the adaptation speed, the system behaves as a rigid elastic body, ejecting the energy before plastic deformation can occur. "Shock therapy" investment physically cannot be absorbed; it merely passes through or dissipates as heat (inflation).

#### 3.2 The Phase Transition Fallacy

Critics argue that sufficient investment triggers a "Phase Transition" (Agglomeration).

However, phase transition requires density to reach a **Critical Point** ( $D_{critical}$ ).

$$D_{current} = \int (S_{in} - \text{Leakage}) dt$$

Under the current centralized system, the Leakage Rate ( $\lambda$ ) is near 1.0 (Note #4).

Therefore, no matter how much is injected,  $D_{current}$  never reaches  $D_{critical}$ . The water leaks out before it can boil.

## 4. Engineering Solution: G-Cart as a "Flow Regulator"

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To convert "Elastic Rejection" into "Plastic Growth," we must control the flow rate using **Impedance Matching**.

### 4.1 The Impedance Matching Principle

The budget injection rate ( $I(t)$ ) must be throttled to match the local growth rate ( $g_{local}$ ).

$$I(t) \leq \frac{dC_{pot}}{dt}$$

- **G-Cart's Role:**

Instead of a "Tsunami" (Massive Public Works), G-Cart enforces "**Drip Irrigation**" (Micro-transactions).

By keeping the pressure below the ejection threshold, wealth is allowed to permeate the mesh and permanently expand the container ( $C_{pot}$ ) via gradual plastic deformation.

## 5. Conclusion

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The failure of regional economics is not a lack of money, but a **violation of elasticity limits.**

Matter and Society both reject "Force." They only accept "Flow" that matches their capacity.

We must redesign the "Vessel" before filling it.

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## References

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1. **Koyama, H. (2025).** *SBCM Field Theory: The General Equations of Regional Flux.* Zenodo.
2. **Koyama, H. (2026).** *SBCM Note #6: The Thermodynamic Limit of AI-Driven Growth.* Zenodo.
3. **Hooke, R. (1678).** *De Potentia Restitutiva.*