StateDynamics: Six-Factor Forecasting Engine
Working Paper v0.1

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0. Quick Guide (Layman's Terms)

Think of a country as a **multi-stage engine**: it burns resources, tells stories, and needs elites to keep the gears running. When resource fuel or story oxygen runs low—or when elites decide the risk is too high—the engine stalls or mutates.

StateDynamics turns this narrative into six math switches. If any two switches flip to red, alarm goes off; if three flip, regime change or fragmentation becomes likely.

Symbols at a Glance

Letter	English	Intuition
ΔW	Wealth gap	Who grabbed the hammer?
ΔC	Cultural legitimacy gap	How much do people believe the official story?
ΔS	Security gap	Is survival becoming more threatened?
η_E	Elite concession factor	High = willing to reform, Low = clinging to privilege
$B(t)$	Narrative bandwidth	How wide and smooth is the information channel?
ρ_M	Capital velocity	How fast is money moving and investing?
μ_K	Jurisdiction friction	How hard is it to switch nations or legal systems?
$\mathcal{F}(t)$	Shock convolution	Accumulated impacts from wars, tech shocks, etc.

Reading order: Jump to §2 to see how we differ from Turchin & Goldstone ⇒ skim §3 equations (place-holders) ⇒ check §4 roadmap to see where you can contribute.

1. Introduction

Like South Korea and Taiwan, nations that take off under authoritarian rule and later land in democracy, the issue isn't that countries choose democratic landing or that a politician suddenly becomes enlightened. Rather, when a nation is dirt-poor, no one can

indulge in leisure, and even if they could, there's little to enjoy. So, authoritarian regimes aggressively develop the economy. But when economic growth reaches a certain level and a sizable middle class emerges, they start demanding democracy, influencing political changes. However, rapid development leaves hidden problems for the future (e.g., hyper-competitive education and work culture). Moreover, the previous generation's push for democracy can, to some extent, constrain national development. As a result, young people often lose opportunities for self-reliance, leading to further changes.

In reality, authoritarian regimes that aggressively develop the nation provide young people with more opportunities than democratic systems. To some extent, democracy is too "lazy," and young people become lazy too. They lose the striving spirit of their ancestors. Consequently, in terms of national development, they lag behind other countries—for example, Australia falls behind China in technology and infrastructure. But does this mean Australia offers more opportunities for its youth? Almost all of Australia's manufacturing relies on imports, heavily dependent on globalization. If the global supply chain falters (as it might now), the economy suffers greatly, and the two-party system is essentially powerless.

In countries like Australia or the U.S., bound together by ideology, if young people lose their drive and lack opportunities for self-reliance, what kind of farce will unfold? Will there be division, or something else? Politicians will merely exploit the psychology of the youth to manipulate elections again, whether through DEI or drugs. A nation's future belongs to its youth. If the youth lack vitality, what vitality can the nation have? The older generation's struggles mirror the state of the nation's youth, while today's young people reflect a nation entering middle age. Without fundamentally changing people's mindset and drive (I'm not here to debate the purpose of life—whether it's for enjoyment or national development; that's a logical fallacy and irrelevant to my point), the nation effectively enters a middle-aged state. What will the future look like? An elderly state?

If so, no matter which politician takes office—take the U.S., whether Biden or Trump—it's just a matter of tweaking the lifestyle of this "middle-aged" nation. Biden's policies might be gentler, Trump's more aggressive, like telling this middle-aged person to quit smoking and drinking while jacking up the price of cigarettes and alcohol by 200 percent. But no matter what, the next step—entering old age—is inevitable without a fighting spirit. What can politicians do? Rely on new narratives? What would those be, and for the masses, for individuals, where do the opportunities lie?

Traditional instability models use single-layer cycles or resource factors. **We propose** the first *six-factor* coupled framework:

- Multi-Layer Life-Cycle

- Tension Function W,C,S + Elite Payoff

- Narrative Bandwidth $B(t)$

- External Shock Convolution $\mathcal{F}(t)$

- Capital-Skill Velocity Gap

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- Cross-Jurisdiction Friction μ_k

This in-progress draft shows core equations and roadmap.

2. Comparison to Existing Models

Feature	Prior Art	This Work
Lifecycle	Single cycle (Turchin)	Multi-layer convolution
Tension	Wealth only	W+C+S, adj. by E
Narrative	Qualitative soft power	$S_{\text{eff}} = S_{local} + B(t)S_{import}$
Shocks	One-off dummy	$\sum A_k e^{-k(t-t_k)}$
Capital	Absent	$\dot{M} - \text{Skill}$
Friction	Qualitative risk	Explicit μ_k param.

3. Core Equations (Placeholders)

$$Life(t) = \sum_L w_L \, Stage_L(t - \tau_L)$$

$$T = \alpha \, \Delta W + \beta \, \Delta C + \gamma \, \Delta S, \quad T_{\text{adj}} = T \, (1 - \eta E)$$

$$S_{\text{eff}} = S_{\text{local}} + B(t) \, S_{\text{import}}$$

$$\mathcal{F}(t) = \sum_k A_k e^{-\lambda_k(t - t_k)}$$

$$\Pi_{\text{ind}} = \sigma \, \text{Skill} - \mu_k + \rho \dot{M} - \psi \, \text{Tax}$$

$$Collapse \, if \, R_{\text{eff}} < R_{\min} \ \lor \ S_{\text{eff}} < S_{\min}$$

4. Roadmap

1. **Toy Dataset**: US/FIN/ETH (2000–2020)

2. **Prototype Code**: core.py $\rightarrow$ risk_score()

3. **Demo Back-Test**: Jupyter plots

4. **arXiv v0.3**: Upload 4-page draft

5. **Expand Data**: add WB, Polity, Proxy–$B(t)$

6. **Publish & Present**: NetSci/SFI 2025 April 26th