EPINOVA–2026–PB–39

Policy Brief

Flow Persistence Under Blockade:

Systemic Friction and the Emergence of a Porous Maritime Regime

Author: Shaoyuan Wu

Affiliation: Global AI Governance and Policy Research Center, EPINOVA LLC

Date: April 22, 2026

Series Information:
This policy brief is part of the EPINOVA Policy Brief Series on Strategic Competition, AI-Enabled Warfare, and Information Conflict.

Recommended Citation:
Wu, Shaoyuan (2026), Flow Persistence Under Blockade: Systemic Friction and the Emergence of a Porous Maritime Regime, Policy Brief No. EPINOVA–2026–PB–39, Global AI Governance and Policy Research Center, EPINOVA LLC, https://doi.org/10.5281/zenodo.19692504.

GLOBAL AI GOVERNANCE
RESEARCH CENTER

EPINOVA

Key Judgments

- The persistence of maritime flows under blockade conditions does not indicate policy failure; it reflects system adaptation under constraint.
- The blockade operates through systemic friction, reshaping routing, timing, and cost structures rather than eliminating throughput.
- Bypass events are expected under probabilistic enforcement and represent leakage within a porous system, not operational breakdown.
- The emerging regime is best understood as a porous blockade, characterized by flow persistence, volatility, and rising coordination costs.
- Strategic impact derives from cost imposition and behavioral change, rather than binary interdiction outcomes.
- Escalation risk is driven by threshold transition, as cumulative pressure pushes the system toward instability.

Executive Summary

Recent reporting indicates that, following the initiation of the U.S. maritime blockade at 10:00 ET on April 13, 2026, at least 34 Iranian-linked oil tankers have bypassed enforcement measures.

At first glance, continued maritime flows appear to contradict the stated objective of the blockade. However, a system-level assessment suggests a different conclusion.

The blockade has not eliminated flows. It has restructured them, introducing friction, volatility, and uncertainty into an otherwise continuous logistics system. The result is the emergence of a porous blockade regime, in which throughput persists while efficiency, predictability, and coordination are degraded.

This pattern reflects a broader shift in coercive strategy. Rather than relying on denial, contemporary conflict increasingly operates through cost imposition, where strategic effect derives from making activity more difficult, risky, and expensive to sustain over time.

Policy Brief

Why This Matters

Maritime flow stability may mask underlying system stress, leading to systematic misinterpretation of blockade effectiveness. Assessing coercive measures therefore requires moving beyond volume-based indicators toward system-level metrics, including volatility, coordination efficiency, and overall system health.

Porous enforcement regimes can generate sustained pressure without immediate disruption, but they increase sensitivity to threshold-crossing shocks. Misreading flow persistence as policy failure risks premature adjustment or escalation miscalculation, particularly as cumulative pressure approaches system tolerance limits. This increases the likelihood that policy decisions are made on misleading indicators of stability.

1. Policy Initiation and Temporal Structure

The U.S. blockade was initiated at 10:00 ET on April 13, 2026, marking a shift from localized maritime disruption to system-wide exclusion targeting vessels entering or departing Iranian waters.

The immediate effect was not a collapse in maritime flows. Instead, system response unfolded over a 24–72 hours adjustment window. As shown in **Figure 1**, flows initially persisted despite rising constraints, reflecting adaptive behavior rather than immediate disruption.

During this period, three dynamics emerged: shipping behavior adjusted to enforcement risk, routing patterns diversified, and operational tempo became increasingly irregular.

This lagged response is consistent with complex system dynamics, in which structural constraints delay observable degradation while underlying systemic friction accumulates.

2. Empirical Observation: Flow Persistence Under Constraint

Available vessel-tracking data indicate that blockade effects manifest as rising systemic friction rather than immediate flow collapse. As shown in **Figure 1**, system response is characterized by persistence under constraint followed by nonlinear degradation. Three patterns emerge.

2.1 Total Vessel Presence Remains Stable

The number of vessels operating within the Persian Gulf system does not decline significantly after blockade initiation and, in some intervals, increases. This reflects the structural inelasticity of energy logistics, where demand constraints limit rapid flow reduction.

2.2 Departure Patterns Exhibit High Volatility

Departures fluctuate sharply, with drops followed by surge waves. This pattern indicates rhythmic disruption rather than volumetric decline, as vessels delay movement under enforcement risk and subsequently exploit perceived operational windows.

2.3 System Health Index (SHI) Compresses Without Collapse

SHI metrics show temporary degradation followed by partial recovery, indicating elevated coordination friction and reduced throughput efficiency, while overall system functionality is maintained under stress.

3. Interpreting “Bypass” Events: Leakage, Not Failure

Taken together, these dimensions interact to produce differentiated recovery trajectories across actors, rather than a uniform pattern of post-conflict stabilization.

2.4 Conceptual Model: Recovery Index (RI)

The reported bypass of at least 34 tankers should not be interpreted as blockade failure. Instead, it reflects the structural properties of a selectively permeable enforcement system.

As shown in **Figure 1**, flows persist under constraint, indicating that enforcement increases systemic friction rather than eliminating movement.

Bypass events therefore represent expected leakage under probabilistic enforcement, reflecting adaptive responses by market actors to shifting risk conditions. They signal system adjustment, not breakdown.

Blockade effectiveness does not depend on full interdiction. Strategic impact is achieved when enforcement reshapes system behavior, such as altering routing, timing, and cost structures, even as flows continue.

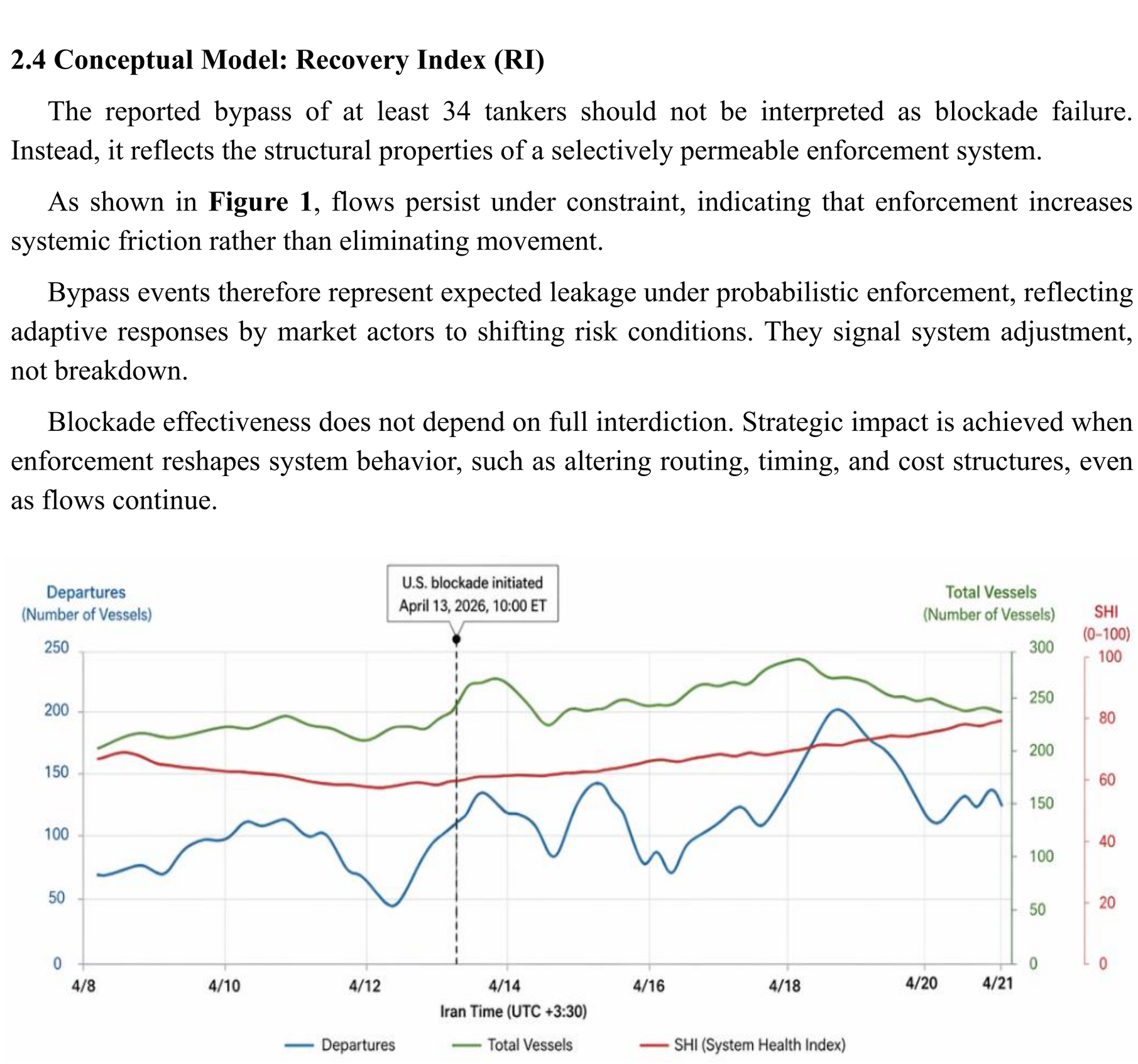

Figure 1. Flow Persistence vs. Systemic Friction Under Blockade Conditions

Resources: AIS vessel tracking data; Strait of Hormuz throughput estimates; shipping risk and insurance indicators; open-source reporting.

Note: Flow persistence reflects continued movement under constraint, while systemic friction captures cumulative disruption (routing, delay, cost). The relationship is threshold-driven and nonlinear.

4. The Emergence of a Porous Blockade Regime

The observed dynamics are best conceptualized as a porous blockade—a coercive regime in which flows are not eliminated, but restructured through selective permeability, elevated risk, and increased systemic friction.

> **Conceptual Definition: Porous Blockade**
>
> A porous blockade is a coercive regime in which flows persist under constraint, enforcement operates through selective permeability, and strategic effect derives from systemic friction rather than flow denial.

This regime represents a structural shift in maritime coercion, in which control is exercised through modulation of system behavior rather than direct interdiction. Rather than suppressing throughput, enforcement reshapes how flows operate—altering routing decisions, temporal patterns, and coordination structures.

Five characteristics define this regime: persistent flows under constraint, adaptive routing and timing, disruption of operational rhythms, rising cost burdens, and declining system predictability.

Taken together, these dynamics indicate a transition from interdiction to system modulation, in which strategic effects are generated through friction accumulation rather than flow termination.

5. Strategic Logic: From Denial to Cost Imposition

The blockade reflects a broader shift in coercive strategy, from flow denial to cost imposition. Rather than eliminating maritime movement, the emerging model operates by distorting flows, increasing systemic friction, and generating cumulative pressure over time.

Table 1. Transition in Coercive Logic

Dimension	Traditional Model	Emerging Model
Objective	Flow denial	Flow distortion
Mechanism	Physical interdiction	Systemic friction
Temporal logic	Immediate impact	Cumulative pressure
Evaluation	Binary success/failure	Gradual degradation

Note: Conceptual comparison of coercive strategies derived from system-level analysis of maritime behavior under blockade conditions.

Under this framework, strategic success is not defined by stopping ships, but by increasing the marginal cost of operation, reducing system efficiency, and forcing adaptive but suboptimal behavior.

These effects emerge through friction accumulation rather than immediate disruption, aligning with cost-imposition dynamics observed across the conflict.

6. System-Level Interpretation: High-Pressure Equilibrium

The Persian Gulf maritime system is best characterized as operating under a High-Pressure Systemic Equilibrium (HPSE). HPSE, as developed in prior analysis, describes a condition in which systems remain operational under sustained pressure while exhibiting declining resilience and increasing sensitivity to disruption.

In this state, flows continue as systemic pressure accumulates, with the system approaching, but not crossing, collapse thresholds. Persistence under constraint coexists with rising friction, producing stability without equilibrium in the conventional sense.

This condition is inherently unstable. It can persist over time but becomes increasingly sensitive to marginal shocks. Three triggers are particularly consequential: further tightening of enforcement, repricing or withdrawal of insurance coverage, and physical disruption of critical nodes.

Taken together, HPSE describes a system that remains functional but progressively less resilient, with escalation risk driven by threshold proximity rather than immediate breakdown.

7. Implications for Policy and Analysis

- Flow metrics alone are insufficient. Stable vessel counts may mask underlying systemic friction. Analysis should incorporate volatility indicators, coordination efficiency, and system health metrics.
- Blockade effectiveness is structural, not absolute. Effectiveness should be assessed in terms of behavioral change, cost redistribution, and friction generation, rather than binary interdiction rates.
- Escalation risk lies in threshold transition. The primary risk is not immediate disruption, but the shift from strained equilibrium to systemic instability as cumulative pressure approaches system tolerance.

8. Limitations

This analysis is subject to several limitations.

First, vessel-tracking data are incomplete and may not capture all movements, particularly under conditions of signal suppression or reporting delays.

Second, the assessment relies on observable flow and system indicators, which reflect system behavior but do not directly measure enforcement intensity or decision processes.

Third, the analysis focuses on short-term system dynamics and may not capture longer-term structural adjustments in logistics networks or energy markets.

Finally, findings are derived from open-source data and should be interpreted as indicative rather than definitive measures of blockade effectiveness.

Policy Brief

Conclusion

The persistence of maritime flows following the April 13 blockade does not indicate policy failure. Instead, it reflects the operation of a porous blockade regime, in which strategic effect is generated through the gradual transformation of system dynamics rather than immediate disruption.

The blockade is not stopping ships. It is changing the system in which ships operate.