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When Crime Becomes a Livelihood: Social Normalisation, Organisational Capital, and Criminal Persistence - Theory and Evidence from Nigeria

Jamilu Said Babangida[1]

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Abstract

Why does organised criminal activity persist after the economic or enforcement conditions that initially generated it improve? This paper develops a dynamic political-economy model in which criminal participation changes two objects that standard occupational-choice models treat as fixed. Participation erodes the social cost of joining crime and accumulates organisational capital (e.g. recruitment networks, coercive capacity, financing relationships, territorial knowledge, and related infrastructure) that raises future criminal returns. Their interaction can generate multiple local equilibria, basin-dependent policy effects, and hysteresis. A temporary intervention can therefore have a durable effect by moving the state across a basin boundary, while restoring the original wage or enforcement environment may be insufficient after organisational capital has accumulated. With convex implementation costs, the least-cost transition allocates effort across legitimate opportunities, effective deterrence, and network disruption. I examine the model's empirical implications using an Armed Conflict Location and Event Data (ACLED) state-year panel for Nigeria. In 2019-2024, high-intensity states remain in the high kidnapping-rate tercile in 73.8% of year-to-year transitions. With state and year fixed effects, both the one-year lag of kidnapping intensity and a depreciating stock of deeper history are significant, whereas the 2018/19 state poverty headcount is only weakly related to recent cross-state intensity. For context using qualitative evidence, documentary and field materials additionally records reinvestment of kidnapping proceeds in weapons, market and logistical infrastructure used by bandit groups, and socialisation of younger cohorts into an environment in which banditry is treated as a business. This evidence is descriptive rather than causal, but together it supports a model of criminal persistence that extends beyond contemporaneous poverty alone.

[1] Griffith Business School, Griffith University, Brisbane, Australia. j.babangida@griffith.edu.au

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D74, K42, O17, O55, I32, H56

1. Introduction

Nigeria's insecurity economy provides a stark episode of a significant development puzzle. SBM Intelligence reported 7,825 people kidnapped between July 2025 and June 2026, 66 percent more than in the preceding year, with at least 1,142 people killed and confirmed ransom payments of approximately ₦7.78 billion (US$5.79 million) (SBM Intelligence, 2026). These figures point not only to the scale of the problem, but also to the persistence and apparent institutionalisation of kidnapping and banditry as organised economic activities, suggesting that they are not simply episodic responses to temporary economic hardship or weak enforcement, but increasingly persistent criminal markets. The central economic question is therefore not only why people enter criminal activity when legitimate opportunities are weak, but why criminal markets remain large, adaptive, and profitable after the conditions that initially encouraged entry have changed, and why temporary security surges or income programmes so often produce suppression rather than durable exit.

The standard economics-of-crime framework developed by Becker (1968) and Ehrlich (1973) offers a staring point: criminal participation rises when expected criminal returns increase, legitimate returns fall, or punishment becomes less likely or less costly. Yet a static opportunity-cost model has difficulty explaining two features that are central to mature criminal markets. First, the private return to crime can itself be shaped by past criminal activity. Social interactions, peer exposure, and accumulated criminal capital can transmit skills, information, contacts, and other productive resources that increase subsequent criminal opportunities and illegal earnings (Glaeser, Sacerdote, and Scheinkman, 1996; Bayer, Hjalmarsson, and Pozen, 2009; Loughran et al., 2013). A kidnapping network with informants, brokers, weapons suppliers, routes, recruiters, safe areas, and established ransom-negotiation practices can therefore generate higher returns than an otherwise identical individual acting alone. Second, the non-pecuniary cost of joining crime need not be fixed. Social norms against criminal behaviour are themselves shaped by social interaction, guilt, shame, community sanctions, and family disapproval can affect the effective cost of participation (Funk, 2005; Buonanno, Montolio, and Vanin, 2009).

This paper formalises these two mechanisms, depicted in Figure A1 in appendix. Social normalisation makes the non-pecuniary cost of criminal participation decline as the local participation rate, denoted θ, rises, consistent with evidence that social interactions shape the

strength of norms against crime and generate self-reinforcing criminal behaviour (Funk, 2005). Organisational capital, denoted K, accumulates through participation and raises future criminal returns, building on the idea that accumulated criminal experience and specialisation can generate higher illegal earning (Loughran et al., 2013). The two mechanisms reinforce one another. Entry weakens stigma and other social costs, thereby encouraging further entry. Consequently, participation also builds organisational capacity that raises the returns to subsequent criminal activity. This feedback can generate multiple equilibria: a low-crime stable equilibrium and a high-crime stable equilibrium, separated by an unstable threshold. In the dynamic model, accumulated organisational capital shifts the criminal best-response mapping upward, creating a region of path dependence in which the equilibrium selected today depends not only on current incentives but also on the history through which the locality arrived at its present state. This gives rise to hysteresis: even after the original shock weakens or is reversed, criminal activity may remain trapped in the high-crime equilibrium.

The paper's main theoretical contribution is to distinguish four features of persistent criminal markets. First, social normalisation can generate multiple equilibria and a threshold separating low- and high-crime basins of attraction. Second, a temporary intervention can produce a durable transition if it moves the economy across that basin boundary before withdrawal. Third, when criminal participation accumulates organisational capital, the conditions required to reverse a mature criminal market can be more demanding than those required to prevent its formation, generating hysteresis. Fourth, crossing the transition boundary at least cost is a policy-allocation problem across legitimate opportunities, effective deterrence, and network disruption, rather than a presumption that every instrument must be a strategic complement. Together, these results distinguish the emergence, persistence, and reversal of organised criminal activity and clarify when temporary interventions can generate lasting effects.

The framework connects four literature streams. The first is the economics of crime, beginning with Becker (1968) and Ehrlich (1973), in which individuals compare legitimate and illegal returns under enforcement risk. The second is the social-interactions literature. Sah (1991) shows how crime can exhibit endogenous social-osmosis dynamics as individuals form perceptions about the probability of punishment from information generated within the economy. Glaeser, Sacerdote, and Scheinkman (1996) show that social interactions can generate substantial cross-city variation in crime, while Glaeser, Sacerdote, and Scheinkman (2003) develop the

broader idea of a social multiplier, whereby social interactions can amplify aggregate responses relative to individual-level responses. Acemoglu and Jackson (2017) show how the interaction between laws and prevailing social norms can affect law-breaking and the effectiveness of enforcement. More broadly, the idea that behaviour can depend on social customs, conformity pressures, and socially defined identities has a long tradition in economics (Akerlof, 1980; Bernheim, 1994; Akerlof and Kranton, 2000). The mechanism developed here is narrower and distinct from these channels in the sense that the externality operates directly through the social cost of criminal participation, which falls as local participation becomes more common.

The third literature studies persistent armed and criminal organisations. Bandiera (2003) shows how the Sicilian mafia emerged as a provider of private protection in a setting where publicly provided security was scarce and banditry widespread. Acemoglu, Robinson, and Santos (2013) show how non-state armed actors can persist when their political influence weakens the incentives of elected governments to eliminate them. Recent computational work by van Elteren, Vasconcelos, and Lees (2024) demonstrates hysteresis in the formation and dissolution of criminal organisations. This paper embeds an organisational-capital stock inside an occupational-choice model, making the mechanism analytically transparent and linking organisational persistence to local labour-market incentives.

A related conflict literature emphasises that the viability of organised violence depends not only on grievances but also on economic opportunities, recruitment conditions, and state capacity (Collier and Hoeffler, 2004; Fearon and Laitin, 2003; Blattman and Miguel, 2010). Although kidnapping markets are not equivalent to civil war or insurgency, this literature motivates attention to the organisational conditions that allow coercive groups to form and persist.

The fourth literature is on poverty traps and path dependence. Self-reinforcing mechanisms can generate persistent states in which otherwise similar economies follow different trajectories depending on initial conditions and past shocks (Azariadis and Stachurski, 2005; Barrett and Carter, 2013). The connection is conceptual rather than literal: the state variable here is not household wealth or productive assets, but criminal participation together with accumulated organisational capacity. This study's contribution is not that poverty alone creates a trap, nor that social interactions alone can generate multiple equilibria. It is that social normalisation and an endogenous stock of criminal organisational capital jointly transform a temporary livelihood or

enforcement shock into persistent criminal-market maturity. Nigeria is used to motivate the mechanism rather than to claim that one reduced-form correlation identifies the theory.

The rest of the paper continues as follows: Section 2 presents the Nigerian setting, four stylised facts, and mechanism-focused institutional evidence. Section 3 develops the static participation model and multiple equilibria. Section 4 introduces organisational capital and derives threshold transition, least-cost intervention, and hysteresis. Section 5 uses ACLED event data to estimate persistence, transitions, and deeper history in Nigerian kidnapping intensity. Section 6 applies the model cautiously to criminal-market maturity and policy design. Section 7 discusses the broader implications of the theoretical and empirical results. Section 8 concludes, discusses limitations, and identifies directions for future research.

2. Nigeria's Criminal Economy: Stylised Facts and Institutional Evidence

2.1 Scale and stylised facts motivating the model

The scale of kidnapping is large under multiple measurement systems, although the systems should not be treated as interchangeable. SBM Intelligence recorded at least 4,722 abductees in 997 incidents between July 2024 and June 2025, with 762 deaths, approximately ₦48 billion demanded, and ₦2.57 billion in confirmed ransom payments. The Northwest accounted for 42.6 percent of recorded incidents and 62.2 percent of recorded victims, with Zamfara alone accounting for 1,203 victims (SBM Intelligence, 2025). In the following July 2025–June 2026 period, SBM reported 7,825 abductees and 1,142 deaths, with confirmed ransom payments rising to ₦7.78 billion (SBM Intelligence, 2026). These patterns are consistent with the paper's concept of a criminal market rather than isolated offending: repeated transactions, specialised roles, geographic concentration, and adaptation in response to enforcement and victim capacity to pay.

Nigeria's 2024 Crime Experience and Security Perception Survey generated a much larger household-survey estimate of approximately 2.24 million kidnapping incidents between May 2023 and April 2024 and approximately ₦2.23 trillion (US$1.4 billion) in ransom payments (National Bureau of Statistics, 2024). That estimate is survey-based and conceptually different from event-monitoring counts compiled from media and conflict-event sources. I therefore report it separately rather than treating it as an event count or combining it mechanically with the ACLED and SBM series. Disagreement across sources is a measurement issue, not a quantity to be averaged away.

The model is motivated by four descriptive regularities (stylised facts). We state them compactly so that the theoretical objects are tied to observable features of the Nigerian setting before the formal analysis. Some of the stylised facts, particularly 2 and 3 are estimated directly using the ACLED event data, while 4 draws on qualitative policy studies. It is noteworthy that none of these facts, individually or jointly, identifies multiple equilibria, social normalisation, or structural organisational capital. Their role is to discipline what the model must be capable of explaining. The stylised facts are as described as follows.

First, kidnapping operates as a repeated, monetised criminal market. The scale estimates reported above involve thousands of abductees, repeated ransom transactions, geographic concentration, and substantial confirmed payments across successive years. This is economically different from a sequence of isolated offences: repeated transactions create scope for specialisation, learning, reinvestment, and durable relationships among recruiters, armed actors, informants, intermediaries, transporters, and ransom negotiators.

Second, criminal-market intensity is geographically persistent. In the 2019–2024 ACLED state panel, adjacent-year rank correlations in kidnapping-event rates are high, and states in the high-intensity tercile remain there in 73.8% of observed year-to-year transitions; only 3.1% move directly from the high to the low tercile. Section 5 reports the full transition matrix and fixed-effects specifications. Persistent geography is consistent with slow-moving local state variables, although it does not by itself establish what those state variables are.

Third, deeper criminal history contains information beyond both the immediately preceding year and measured poverty. With state and year fixed effects, the one-year lag of the broad kidnapping-event rate is positively and statistically significantly associated with current intensity. When a depreciating stock of activity from two or more years earlier is added, both immediate history and the deeper-history stock remain positive and statistically significant. By contrast, the cross-state relationship between the 2018/19 monetary-poverty headcount and mean 2019–2024 kidnapping intensity is weak and statistically imprecise. This pattern motivates a model in which poverty affects entry but does not fully determine criminal-market persistence once endogenous capacity has accumulated.

Lastly, policies that restrict current criminal activity can generate temporary respite without obviously eliminating the underlying criminal infrastructure. Idris et al. (2024) study Zamfara's “market warfare” strategy, under which rural markets were closed partly to prevent bandit groups

from selling rustled cattle and obtaining provisions, arms, and ammunition. Their qualitative assessment reports temporary respite alongside substantial costs to poor households. Idris et al. (2025) further document the emergence of community “peace purchases” after failed government accords, with communities paying for security and livelihood access while remaining vulnerable to renewed coercion. These studies are not causal tests of Proposition 2, but they motivate the distinction between suppressing current flows and dismantling the stock of organisational capacity that supports them.

2.2 Institutional evidence on the model mechanisms

We use the quantitative evidence to establish persistence. However, the two central theoretical mechanisms, declining social cost and organisational capital are latent. We therefore use a deliberately small set of qualitative sources to show that the mechanisms have institutional counterparts in the Nigerian setting. The evidence is illustrative rather than representative and is mapped transparently to the model in Table 1.

BBC Africa Eye's 2022 documentary *The Bandit Warlords of Zamfara* followed bandit leaders and affected communities over more than two years. The documentary describes shrinking livelihood opportunities and a younger generation growing up amid sustained armed violence, while also portraying kidnapping and banditry as increasingly organised sources of income. Its summary is blunt: 'banditry has become a business' (BBC Africa Eye, 2022). This is not a direct estimate of social normalisation, i.e., $\sigma(\theta)$, nor evidence that communities approve of banditry. It is evidence that the social environment facing potential recruits can itself be shaped by previous violence, exposure to armed groups, and the normalisation of criminal earnings as an available livelihood. That institutional margin is what the reduced-form social-cost function is intended to capture.

The same documentary contains unusually direct evidence of criminal reinvestment. A man who said he participated in the 2021 Jangebe school abduction claimed that a ransom had been paid; when asked what the group did with the money, he replied, 'We bought more rifles' (BBC Africa Eye, 2022). The economically relevant observation is the perpetrator's own description of criminal revenue being reinvested in coercive capacity - precisely the type of accumulation represented by K.

Other qualitative studies point to a broader infrastructure around that reinvestment. The market-closure strategy examined by Idris et al. (2024) was explicitly designed to interrupt the commercial nodes through which armed groups dispose of rustled cattle and obtain provisions, weapons, and ammunition. Idris et al. (2025) document community-level "peace purchases" in which failed government agreements were followed by arrangements through which communities sought security and livelihood access from armed groups, while remaining vulnerable to renewed coercion. Together these accounts suggest that mature banditry relies on commercial access, bargaining relationships, weapons procurement, and territorial coercion rather than on the current labour supply of individual offenders alone. Those persistent capabilities are the institutional content of organisational capital in the model.

Ostensibly, the livelihood mechanism also operates on the victim side. In August 2026, the Associated Press reported the case of Abba Bukar, who said he was held for roughly four weeks after being abducted near a university in Borno State. His family reported paying about ₦2 million (approximately US$1,500) in ransom by selling a house and belongings, borrowing money, and remained in financial difficulty afterwards (Shibayan, 2026). A single account is not representative evidence. It nevertheless illustrates a mechanism important for development: ransom extraction can convert insecurity into household asset liquidation and debt, weakening future legitimate earning capacity as well as producing an immediate transfer to the criminal market.

Table 1. Qualitative evidence mapped to model mechanisms

Source	Observed institutional evidence	Model mechanism	Inference limit
BBC Africa Eye (2022)	Bandit leaders describe exclusion from formal opportunities; documentary describes younger cohorts growing up amid armed violence and kidnapping becoming a business.	Reservation wage and social normalisation $\sigma(\theta)$.	Does not measure community approval, stigma, or the functional form of $\sigma(\theta)$.
BBC Africa Eye (2022)	A Jangebe attack participant claims criminal proceeds were used to buy more rifles; the state government disputed that a ransom was paid.	Reinvestment into coercive organisational capital K.	Does not verify the disputed ransom amount or measure the stock of K.
Idris et al. (2024)	Market closures were designed to prevent bandits from selling rustled cattle and obtaining provisions, arms, and ammunition; the study reports temporary respite and welfare costs.	Commercial/logistical infrastructure; temporary suppression versus stock destruction.	Qualitative policy study; not a causal estimate of the threshold effect.
Idris et al. (2025)	Community peace purchases emerged after failed government accords and tied payments to security and livelihood access, while agreements remained vulnerable to violation.	Coercive bargaining capacity, territorial control, and persistent organisational relationships.	Does not establish that peace purchases caused subsequent violence.
Shibayan (2026), AP	A former captive reports that his family sold assets and borrowed to pay ransom and remained in financial difficulty afterwards.	Victim-side asset depletion and reduction in future legitimate earning capacity.	Single reported case; not representative of average welfare effects.

Notes: The table is a transparency device for mechanism interpretation. It does not convert qualitative evidence into structural estimates. The BBC documentary evidence is reported with the government denial of the alleged Jangebe ransom payment retained explicitly.

2.3 Structural heterogeneity and empirical interpretation

The economic environment also varies sharply across states. The World Bank's *Nigeria Poverty Assessment*, using the 2018/19 Nigeria Living Standards Survey, documents substantial differences in monetary poverty across states, while official National Population Commission projections provide state-level population denominators for 2016–2019 (World Bank, 2022; NBS, 2020). We merge these measures with the ACLED data to distinguish contemporaneous economic conditions from persistence in criminal-market intensity. The qualitative material above is used only to interpret mechanisms that the event panel cannot observe directly.

The central empirical implication is therefore not a simple claim that "poor places have more kidnapping." The model predicts state dependence, persistence beyond the immediately preceding period when organisational capacity depreciates slowly, and non-linear transitions across low- and high-intensity states. These patterns are examined below. Importantly, the empirical and qualitative exercises are deliberately model disciplining: neither is presented as causal identification of $\sigma(\theta)$, K, or the structural thresholds.

3. Static Model: Occupational Choice and Social Normalisation

3.1 Environment

Consider a locality populated by a unit mass of agents. Agent i chooses between legitimate activity and criminal activity. The legitimate return is w. The expected private return to criminal activity depends on organisational capital K and enforcement. Let $\pi(K)$ denote the gross criminal return, $p \in (0, 1)$ the probability of apprehension or effective interdiction, and $S>0$ the sanction if apprehended. To keep the aggregation transparent, agents are risk-neutral and criminal proceeds are assumed to be forfeited upon apprehension. The expected material advantage of crime before social and idiosyncratic costs is therefore expressed as:

$$r_C(K, p) = (1 - p)\pi(K) - pS \qquad (1)$$

Agent i has an idiosyncratic cost of criminal participation ω_i, distributed according to a continuously differentiable cumulative distribution F with density f. A larger ω_i means stronger attachment to legitimate work, greater moral aversion, weaker criminal connections, or a higher personal cost of violence.

The social cost of criminal participation depends on the share θ of the local population participating in crime:

$$\sigma(\theta) = \sigma_0(1 - \theta)^{\alpha}, \qquad \sigma_0 > 0,\ \alpha > 0 \qquad (2)$$

The function satisfies $\sigma(0) = \sigma_0$, $\sigma(1) = 0$ and $\sigma'(0) < 0$. It captures a reduced-form social-normalisation channel: as criminal participation becomes more common, family stigma, reputational loss, community sanction, or the psychological cost of norm violation may erode.

This is a social-interaction mechanism, not an assertion that all communities approve of crime at high θ.

Agent *i* chooses criminal activity when

$$(1 - p)\pi(K) - pS - w - \sigma(\theta) - \omega_i \geq 0 \quad (3)$$

Define the systematic net advantage of crime as

$$q(\theta, K) \equiv (1 - p)\pi(K) - pS - w - \sigma_0(1 - \theta)^{\alpha} (4)$$

Since agents choose crime when $\omega_i \leq q(\theta, K)$, aggregate participation is the best response

$$\Psi(\theta, K) \equiv F(q(\theta, K)), \qquad \theta = \Psi(\theta, K) \qquad (5)$$

3.2 Multiple equilibria

A criminal-market equilibrium is a fixed point θ*=Ψ(θ*,K). For fixed K, Ψ is increasing in θ because participation reduces the social cost of entry. Its slope is:

$$\Psi_\theta(\theta, K) = f(q(\theta, K)) \cdot \alpha\sigma_0(1 - \theta)^{\alpha - 1} > 0 \qquad (6)$$

The relevant mapping is therefore increasing, not non-monotone. With a sufficiently strong social interaction, however, it can be S-shaped and locally steeper than the 45-degree line. To give stability argument a formal basis, participation adjusts according to

$$\dot{\theta} = \lambda[\Psi(\theta, K) - \theta], \qquad \lambda > 0 \qquad (7)$$

An equilibrium is locally stable when $\Psi_\theta(\theta^*, K) < 1$ and unstable when $\Psi_\theta(\theta^*, K) > 1$

The model yields a sequence of results that characterise how social normalisation and organisational capital shape the emergence, persistence, and reversal of criminal activity. We begin with the equilibrium structure of criminal participation for a given stock of organisational capital, before turning to the dynamic interaction between participation and accumulated criminal capacity.

Proposition 1 (Multiple equilibria and local stability)**.** Suppose *F* has a continuous density and, for the relevant parameter region, the best-response mapping $\Psi(K)$is S-shaped, with $\Psi_\theta < 1$ near the low- and high-participation regions and $max_\theta \Psi_\theta > 1$ over an interior interval. Then, for

an open set of values of the material-return index $A(K)$, equation (5) has three fixed points: a low-crime equilibrium, θ_L^*; an intermediate threshold, $\hat{\theta}$; and a high-crime equilibrium, θ_H^*. Under the participation adjustment rule defined in equation (7), θ_L^* and θ_H^* are locally stable, while $\hat{\theta}$ is unstable. Initial participation below $\hat{\theta}$ converges toward the low-crime equilibrium and participation above $\hat{\theta}$ converges toward the high-crime equilibrium, holding K fixed, as shown in Figure 1.

The proposition does not claim that multiple equilibria exist for all parameter values. It identifies a region in which social normalisation makes local criminal participation sufficiently self-reinforcing to create two basins of attraction. Higher legitimate returns, w, or a higher probability of punishment, p, shift the criminal-participation mapping, Ψ, downward; higher criminal returns, $\pi(K)$, including those generated by greater organisational capital, K, shift it upward. Stronger baseline stigma, σ_0, changes both the level and curvature of the mapping.

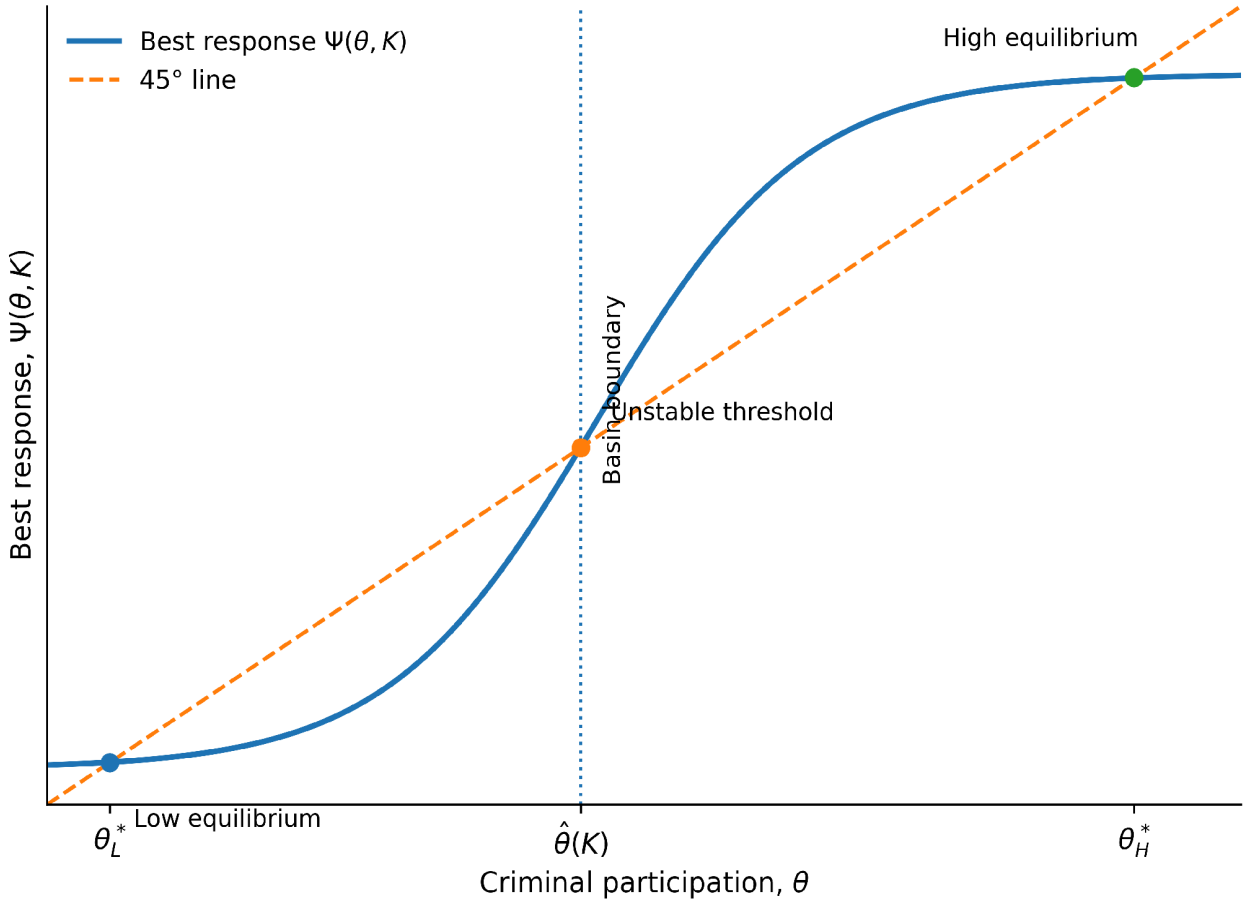


Figure 1. Social normalisation and multiple equilibria.

At a locally stable equilibrium, an increase in legitimate returns, w, reduces criminal participation, as does an increase in the probability of punishment, p, or the sanction, S. An increase in organisational capital, K, raises participation whenever $\pi'(K) > 0$. The effect of baseline stigma, σ_0, is strongest where a meaningful social sanction remains. These comparative statics reproduce the standard opportunity-cost logic locally. The new implication is that the same parameter change can have very different long-run effects depending on whether it is sufficiently large or sufficiently persistent to move the economy across the basin boundary.

4. Dynamic Organisational Capital, Policy Transitions, and Hysteresis

4.1 Organisational capital and threshold transitions

Criminal enterprises accumulate productive capabilities. In a kidnapping market, these can include information about targets, recruiters, weapons access, transport routes, territorial control, safe locations, ransom brokers, payment verification, and relationships that lower the cost of finding or coercing victims. Let Kdenote this stock and let gross criminal returns satisfy

$$\pi(K) = \pi_0 + \phi K, \phi > 0. \quad (8)$$

To ensure that organisational capital remains bounded, it follows a linear accumulation law:

$$\dot{K} = \gamma\theta - \delta K, \gamma > 0, \delta > 0. \quad (9)$$

Participation creates organisational learning and network capacity at rate γ; disruption, attrition, obsolescence, and fragmentation depreciate it at rate δ. For $\theta \in [0, 1]$, Kconverges toward a bounded interval, and conditional on a constant participation rate its steady state is $K^* = (\gamma/\delta)\theta$. The complete dynamic system is given by equations (7) and (9). The two feedbacks now operate at different speeds: social normalisation affects current participation directly, while organisational capital carries the history of past participation into future returns.

This dynamic structure allows us to characterise when a temporary intervention produces a durable transition rather than a temporary reduction in criminal activity.

Proposition 2 (Threshold transition)**.** Suppose the pre-policy system has low- and high-crime stable equilibria separated by $\hat{\theta}(K)$. Consider a temporary intervention that increases w, increases p, raises the effective social cost of joining crime, directly reduces θ, and/or reduces K. When the intervention is withdrawn at time T, the locality converges to the low-crime equilibrium if its state lies inside the low-crime basin in the one-dimensional fixed-K case, $\theta_T < \hat{\theta}(K_T)$. Figure A2 in the appendix illustrates this threshold-transition mechanism, showing how a temporary intervention can move participation across the basin boundary before policy support is withdrawn. If θ_T remains above the boundary, participation rebounds toward the high-crime equilibrium. A durable transition therefore does not require the high-crime equilibrium to be permanently eliminated; it requires the state to cross the relevant basin boundary before policy support is withdrawn.

This distinction changes the policy interpretation. A sufficiently strong but temporary intervention can be durable if it moves actual participation far enough and if accumulated K has not simultaneously kept the basin boundary out of reach. Conversely, an intervention can produce a significant short-run decline in incidents yet fail dynamically if it ends while the state remains inside the high-crime basin.

4.2 Least-cost policy mix

We represent enforcement, opportunity expansion and network disruption as alternative policy instruments within a common allocation problem. Let x_w, x_p, and x_K denote policy effort that respectively raises legitimate returns, increases effective deterrence, and reduces organisational capital. Let $\eta_w, \eta_p, \eta_K > 0$ denote the effectiveness of each of the instruments in reducing the material return index $A(K)$. Suppose a successful transition requires a total reduction D^*, and implementation costs $C_j(x_j)$ are increasing and strictly convex. The least-cost transition can be formulated as a standard constrained optimisation problem with convex implementation costs as follows:

$$min\ C_w(x_w) + C_p(x_p) + C_K(x_K)$$

subject to

$$\eta_w x_w + \eta_p x_p + \eta_K x_K \geq D^* \quad (10)$$

Proposition 3 (Least-cost policy mix)**.** If the optimum is interior and implementation costs are strictly convex, the least-cost transition equalises effectiveness-adjusted marginal costs:

$$\frac{C_w'(x_w)}{\eta_w} = \frac{C_p'(x_p)}{\eta_p} = \frac{C_K'(x_K)}{\eta_K}. \quad (11)$$

Hence, a cost-minimising transition generally uses more than one instrument whenever no single instrument has a uniformly lower effectiveness-adjusted marginal cost over the required range. Policy coordination follows from the transition constraint and convex implementation costs; it need not be imposed as primitive strategic complementarity.

The proposition also allows corner solutions. In a locality with very low K, relatively inexpensive improvements in $w$may dominate. In a mature criminal market, the marginal effectiveness of raising $w$alone may be low because Kkeeps $\pi(K)$high, making network disruption comparatively valuable. The model therefore supports maturity-contingent policy design without claiming that every locality requires the same three-part package. Figure 2 illustrates the corresponding transition frontier.

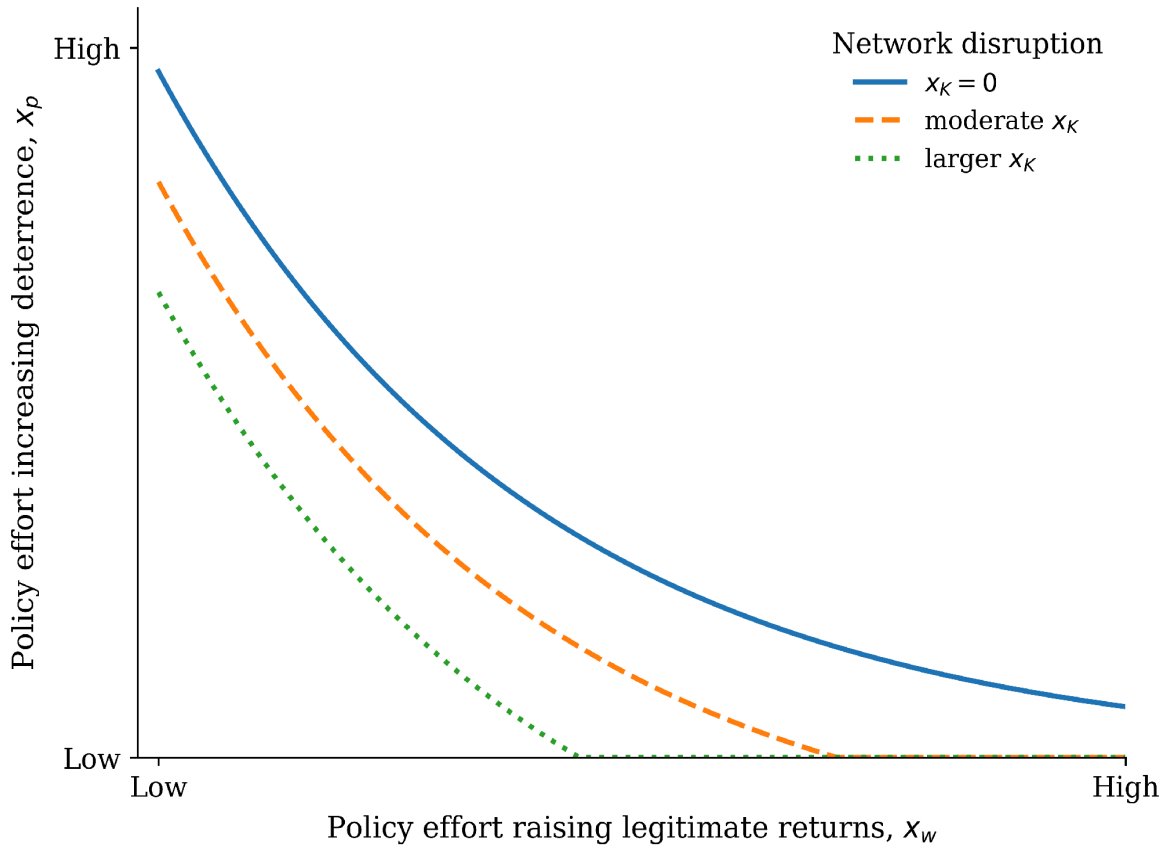


Figure 2. Least-cost transition frontier.

4.3 Hysteresis

Organisational capital makes the model genuinely path-dependent. Holding w and p fixed, higher K shifts Ψ upward. In parameter regions with saddle-node folds, there are two critical values, $K_{down} < K_{up}$. Starting on the low-crime branch, gradual accumulation of Kcan eventually eliminate the low-crime equilibrium at K_{up} and trigger a jump to the high-crime branch. After that jump, merely reversing $K$to a value just below $K_{up}$is insufficient. The high-crime equilibrium remains locally stable until Kfalls below the lower fold, K_{down}.

Proposition 4 (Organisational-capital hysteresis). Suppose there exist two-fold points satisfying $\Psi(K) = \theta$and $\Psi_\theta(K) = 1$, with $K_{down} < K_{up}$. A temporary adverse shock to $w$or p that raises θ can increase Kthrough equation (9). If the induced accumulation moves the system beyond the upper fold or into the high-crime basin, restoring w and p to their pre-shock values need not restore the low-crime equilibrium. Reversal requires a larger reduction in K or a stronger

offsetting change in w, p, or social costs than was needed to prevent the initial transition. The equilibrium is therefore history-dependent. Figure 3 illustrates the organisational-capital hysteresis The economy shifts to the high-crime equilibrium only once organisational capital rises above K_{up}, but returning to the low-crime equilibrium requires K to fall below the lower threshold, K_{down}. Consequently, the equilibrium associated with a given level of K depends on the economy's prior criminal-market trajectory.

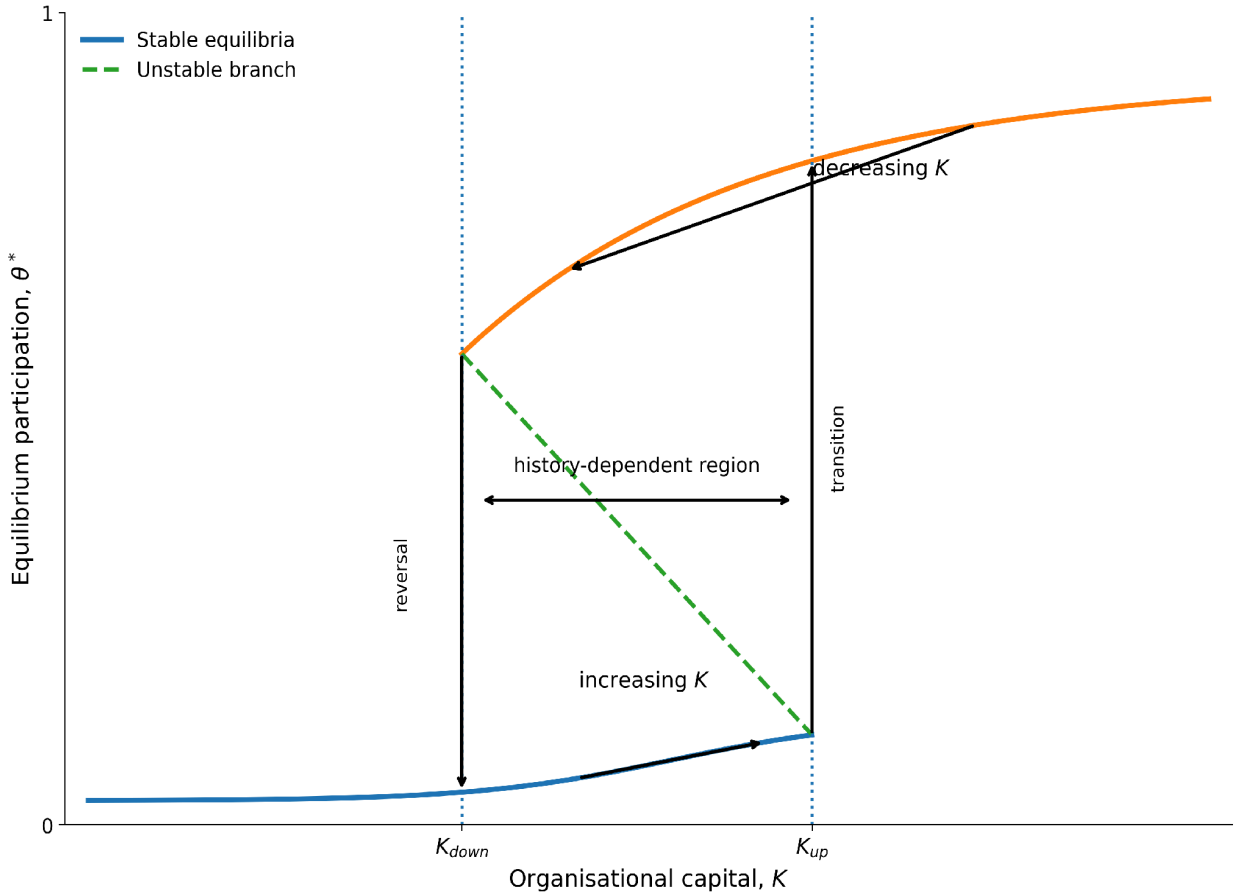


Figure 3. Organisational-capital hysteresis.

This is this paper's central persistence result. It distinguishes the conditions that generate criminal-market formation from those required for its dissolution. Because accumulated organisational capital can sustain the high-crime equilibrium after the conditions that triggered its emergence have been reversed, preventing a transition into persistent crime can be substantially less costly than reversing one after it has occurred, even when observed poverty ad enforcement conditions return to their initial levels.

5. Empirical Evidence from Nigeria

5.1 Data

The empirical analysis uses event-level data from the Armed Conflict Location and Event Data (ACLED). The full Nigeria coverage contains 44,771 events recorded between 1997 and 27 August 2025. Because coverage for 2025 is incomplete, all observations from 2025 are excluded and the analysis ends in 2024. The empirical sample is further restricted to the period 2010 ro 2024, yielding 37,728 events. Table A1 summarises the sample construction.

Kidnapping is measured in two ways. The conservative definition counts events for which ACLED's sub-event type is 'Abduction/forced disappearance.' This definition produces 3,092 events over the study period (2010-2024). The preferred broad definition adds Attack events whose narrative notes directly report a completed kidnapping, abduction, or hostage-taking while excluding attempted, foiled, or failed kidnapping descriptions. This adjustment follows the ACLED coding hierarchy: abductions involving serious injury or fatalities can be recorded as Attack rather than as the pure abduction sub-event type (ACLED, 2026). The broad definition yields 4,898 kidnapping-related events over the study period. The results below report both definitions.

The main unit of analysis is at state level. I construct a complete 37-unit panel and divide event counts by population. Official state population projections are available for 2016-2019; outside that period, I transparently backcast and extrapolate using each state's 2016-2019 compound annual growth rate. The main regression period is 2019-2024, yielding 222 state-year observations. Earlier ACLED observations are retained to construct history. State monetary-poverty headcounts are from the World Bank's 2018/19 NLSS-based poverty assessment. At a more granular level, ACLED reports 758 distinct local Government Areas (LGAs) combinations during 2010-2024, of which 589 experience at least one event under the broad kidnapping definition. Because consistent historical population estimates are not available at the LGA level over the full study period, the granular analysis uses event counts rather than per-capita rates.

5.2 Persistence and transition patterns

The first prediction is persistence. Rank correlations in state kidnapping-event rates are high across adjacent years in the recent period: Spearman correlations are 0.866 for 2019-2020, 0.638

for 2020-2021, 0.762 for 2021-2022, 0.817 for 2022-2023, and 0.822 for 2023-2024. Figure 4 shows the national event series under the broad and conservative definitions.

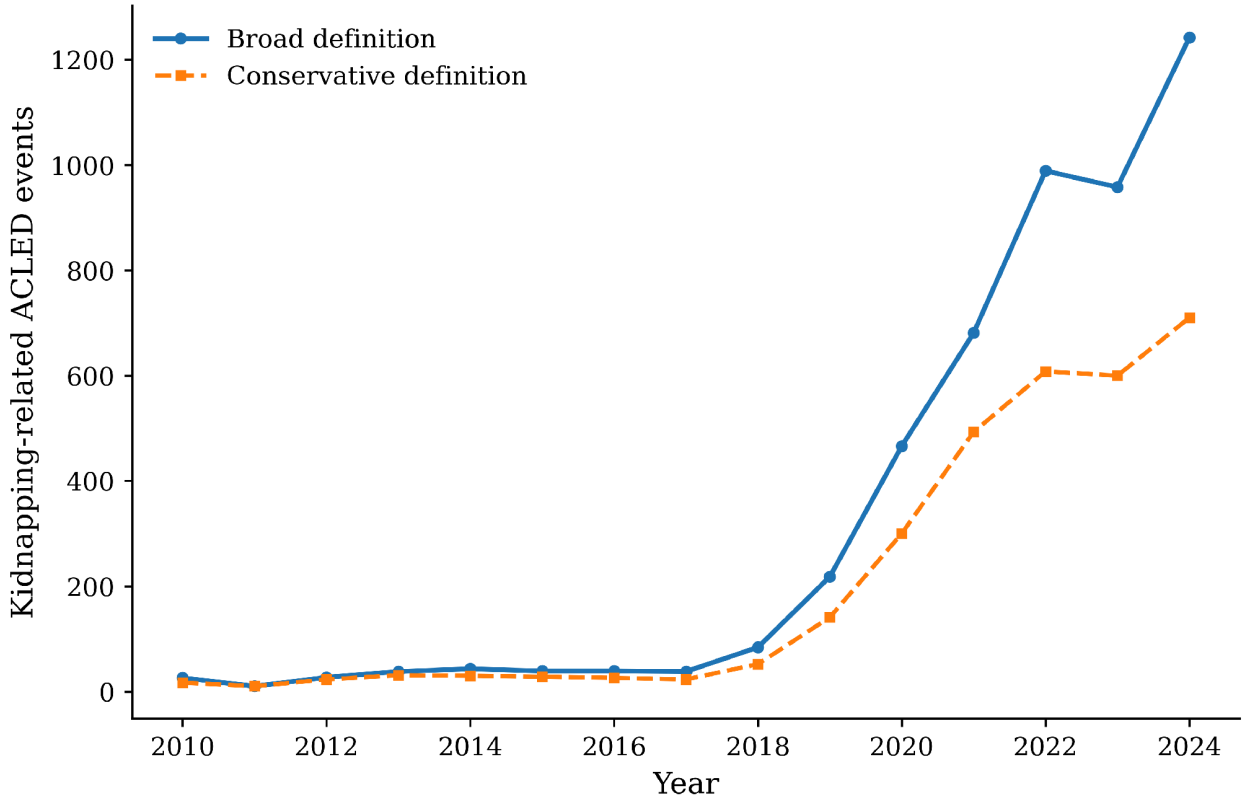


Figure 4. ACLED-recorded kidnapping-related events in Nigeria, 2010–2024.

Source: ACLED Data.

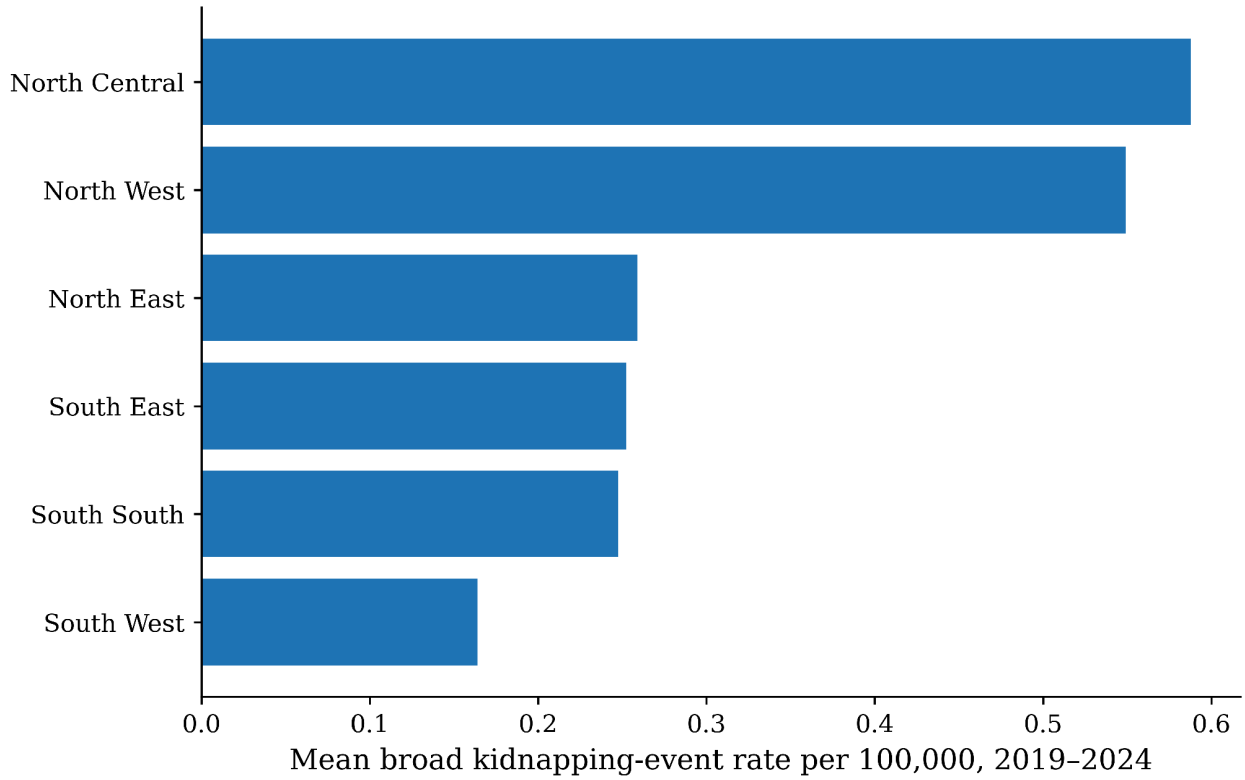


Figure 5. Mean broad kidnapping-event rates by geopolitical zone, 2019–2024.

The persistence is also visible non-parametrically. I classify states into within-year terciles of the broad kidnapping-event rate. Among states in the high-intensity tercile in year t-1, 73.8% remain in the high tercile in year t, whereas only 3.1% move directly from high to low. Low-intensity states remain low in 68.3% of transitions. Table 2 report the full transition matrix. These patterns do not establish multiple equilibria, but they are consistent with substantial state dependence and relatively rare direct transitions between the tails of the distribution.

Table 2. State kidnapping-rate tercile transitions, 2019-2024

Previous year tercile	Current: Low	Current: Middle	Current: High
Low	68.3	25.0	6.7
Middle	28.3	50.0	21.7
High	3.1	23.1	73.8

Notes: Entries are row percentages. Terciles are defined within each year using the broad kidnapping-event rate per 100,000. The table uses transitions from 2019→2020 through 2023→2024.

5.3 Immediate and deeper history

To separate the immediate persistence from the influence of more distant history, let y_{it} denote the broad kidnapping-event rate per 100,000 in state i and year t and define a depreciating history stock that excludes the immediately preceding year:

$$H_{it} = y_{i,t-2} + 0.8y_{i,t-3} + 0.8^2 y_{i,t-4} + \ldots \quad (12)$$

The estimating equation is

$$y_{it} = \alpha_i + \tau_t + \rho y_{i,t-1} + \kappa H_{it} + \varepsilon_{it} \quad (13)$$

where α_i are state fixed effects and τ_t are year fixed effects. Standard errors are clustered at the state level. The history stock H_{it} is not interpreted as a direct measure of the structural organisational-capital stock K. Rather, it is a reduced-form measure of whether activity from earlier years contains predictive information beyond the immediately preceding year.

The estimates indicate that kidnapping intensity is highly persistent. Table 3 reports the estimates for immediate and deeper historical persistence in kidnapping intensity. When only one-year lag is included, the coefficient of 0.640 imply substantial persistence after controlling for state and ear fixed effects. Once the deeper history stock, H_{it}, is introduced, the coefficient on the one-year lag falls to 0.320, while the deeper history measure enters positively and significantly with a coefficient of 0.351. Thus, part of what initially appears as short-run persistence reflects the influence of more distant history. The same pattern emerges under the conservative ACLED definition, where the coefficients on the immediate lag and deeper history stock are 0.257 and 0.261 respectively. Figure 6 presents standardised coefficients, highlighting that information from more distant history contributes materially to explaining current kidnapping intensity.

Table 3. Persistence and deeper history in state kidnapping intensity, 2019-2024

	(1) Broad rate	(2) Broad rate	(3) Conservative rate	(4) Log broad rate
Lagged outcome	0.640***	0.320**	0.257**	0.280**
	(0.169)	(0.141)	(0.112)	(0.124)
Deeper-history stock	—	0.351***	0.262***	0.225***
		(0.086)	(0.076)	(0.055)
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	222	222	222	222
State clusters	37	37	37	37
R-squared	0.783	0.822	0.767	0.827

Notes: OLS estimates. Standard errors clustered by state are in parentheses. The deeper-history stock excludes t−1 and equals the event-rate history from t−2 and earlier with annual depreciation factor 0.8. Column (3) uses only ACLED Abduction/forced disappearance events. Column (4) uses ln(1 + broad event rate) and an analogously constructed log-history stock. These coefficients describe persistence and are not interpreted as causal dynamic-panel parameters. *** p<0.01, ** p<0.05, * p<0.10.

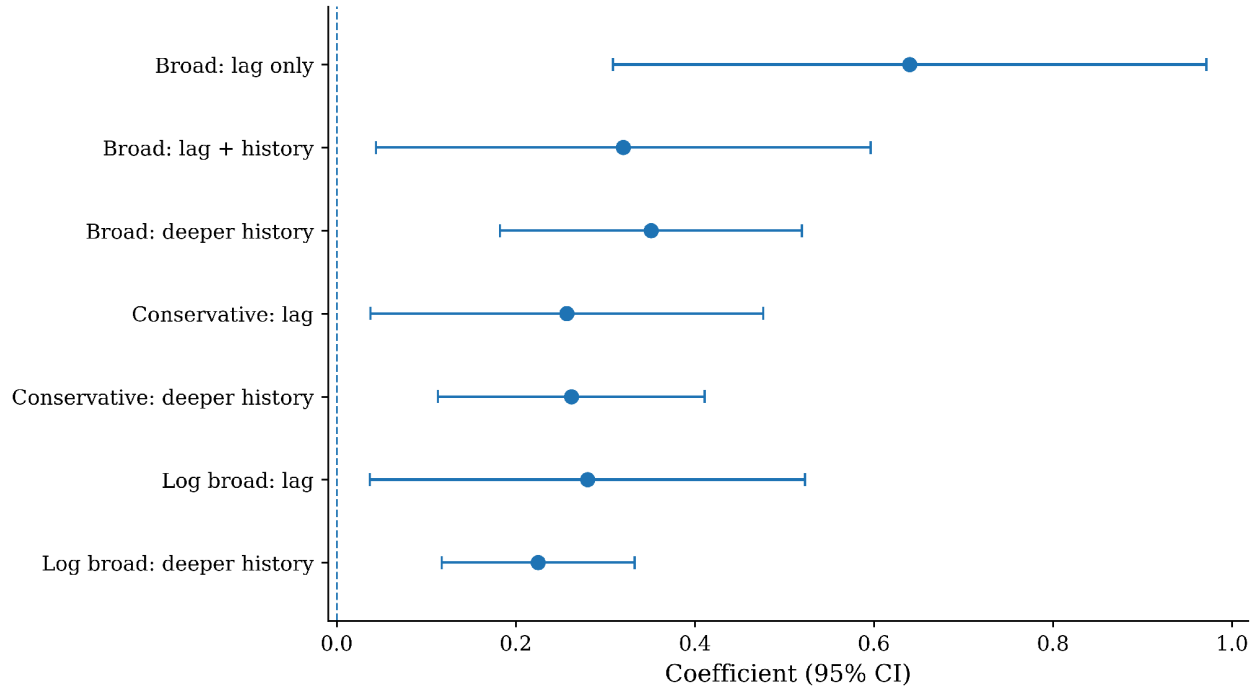


Figure 6. Immediate and deeper criminal-market history.

The deeper-history result is robust to alternative depreciation assumptions (see Table A2 in appendix). Reconstructing the history stock with annual weights of 0.6, 0.7, and 0.9, rather than the baseline 0.8, leaves the substantive result unchanged: the coefficient on deeper history

remains positive and statistically significant in every specification, while the one-year lag also remains positive and significant. The persistence result is therefore not driven by the depreciation value used to construct the baseline history stock.

This is the empirical result most closely aligned with the study's path-dependence mechanism. Current intensity is associated not only with activity in the immediately preceding year; a slowly depreciating summary of earlier activity also retains predictive power. This result is nevertheless descriptive. Persistent institutions, reporting patterns, geography, conflict history, or omitted differences in state capacity could generate a similar reduced-form pattern. The estimates are therefore interpreted as evidence that the dynamic mechanism is empirically plausible, rather than as structural estimates of the effect of organisational capital on criminal returns, the rate at which criminal participation builds organisational capital, or the rate at which organisational capital depreciates over time.

5.4 Current poverty versus criminal-market history

The state poverty data provide a useful contrast. Across the 36 states/FCT units with a 2018/19 monetary-poverty estimate, the Pearson correlation between the poverty headcount and the mean broad kidnapping-event rate in 2019-2024 is 0.233 (p=0.171); the Spearman correlation is 0.124 (p=0.471). In a linear-probability model for membership in the high kidnapping-rate tercile, prior-year high-tercile status raises the probability of remaining high by about 0.596 (s.e. 0.095), whereas the poverty headcount coefficient is 0.0011 (0.0012) and statistically imprecise. Table 4 reports the regression; Figure 7 shows the cross-state association.

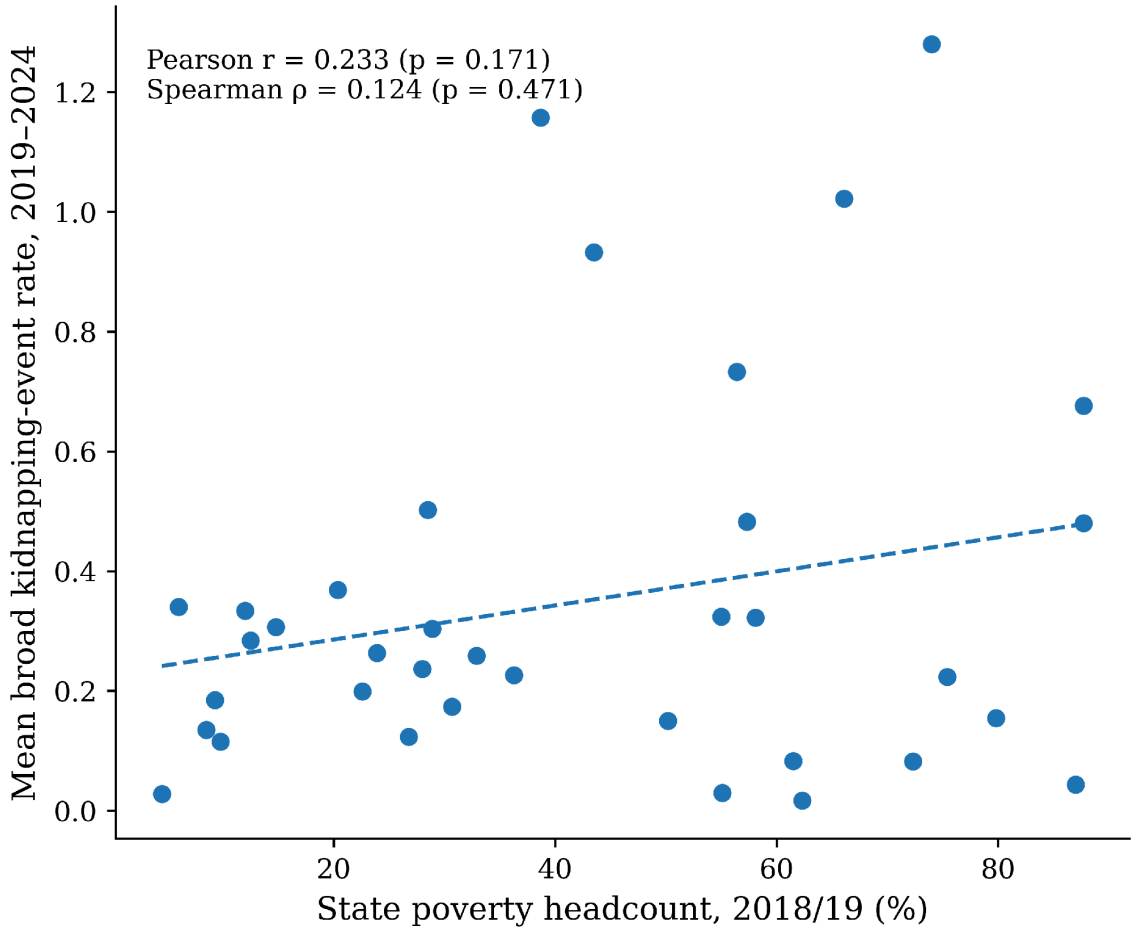


Figure 7. State poverty and recent kidnapping intensity.

Table 4. High-intensity state dependence conditional on measured poverty

Variable	Coefficient
Prior-year high-tercile status	0.596***
	(0.095)
State poverty headcount, 2018/19	0.0011
	(0.0012)
Year fixed effects	Yes
Observations	180
State/FCT clusters	36
R-squared	0.368

Notes: Linear-probability model for membership in the within-year high tercile of the broad kidnapping-event rate, 2020-2024. Borno is omitted because a comparable 2018/19 monetary-poverty headcount is unavailable. Standard errors are clustered by state and reported in parenthesis. The cross-state Pearson correlation between the poverty headcount and mean 2019-2024 kidnapping rate is 0.233 (p=0.171); the Spearman correlation is 0.124 (p=0.471). *** p<0.01, ** p<0.05, * p<0.10

The result shows a weak cross-sectional relationship. This finding should not be interpreted as evidence that poverty is irrelevant to criminal recruitment or criminal participation. The poverty measure is observed only once, using the 2018/19 cross-section, and therefore cannot identify the effect of changes in legitimate economic opportunities or income shocks over time. Nor does the cross-sectional comparison capture within-state deterioration in labour-market conditions, household vulnerability, or other local shocks that may affect recruitment incentives. The narrower empirical point is that contemporaneous differences in poverty across states do not, by themselves, account for the pronounced persistence in kidnapping intensity documented in the event data. Recent kidnapping activity remains strongly related to subsequent intensity even after accounting for state-level poverty differences. This persistence is consistent with the possibility that criminal activity is sustained not only by current economic deprivation but also by accumulated organisational capacity, networks, information, weapons access, territorial control, and other forms of criminal capital that persist beyond the conditions that initially encouraged entry. This is the empirical pattern that the organisational-capital mechanism is intended to rationalise.

The persistence result is also examined at the finer LGA level. Table 5 reports the estimates for the LGAs panel level over 2019-2024. Within LGAs, log kidnapping-event intensity remains positively associated with its one-year lag. By contrast, an indicator for whether any kidnapping event occurs is negatively associated with its lag. Taken together, these estimates suggest that persistence is more evident in the intensity of criminal activity than in its exact local incidence: kidnapping events may shift across neighbouring LGAs even while the broader state-level criminal market remains persistent. Such geographic churn is consistent with displacement across local administrative boundaries and with the interpretation of organisational capital, K, as a market or network-level stock whose relevant geographic reach may extend beyond an individual LGA.

Table 5. LGA-level persistence robustness, 2019-2024

	(1) ln (1 + broad events)	(2) Any broad event
Lagged outcome	0.088***	−0.099***
	(0.028)	(0.019)
LGAs fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	4,548	4,548
LGAs clusters	758	758
R-squared	0.570	0.434

Notes: OLS/linear-probability fixed-effects specifications with standard errors clustered by LGAs. Positive intensity persistence combined with negative persistence in the binary event indicator is consistent with within-state geographic churn/displacement. *** p<0.01, ** p<0.05, * p<0.10.

6. Application to Nigeria and Policy Design

The model suggests classifying policy environments along two conceptually distinct dimensions: the current incentive environment and the maturity of criminal organisation. The empirical results caution against inferring organisational maturity from poverty alone. A more plausible indication of maturity is persistent event intensity, recurrent participation, established coercive and logistical infrastructure, and the re-emergence of activity after temporary suppression. Figure A4 in the appendix maps these two dimensions into a simple policy space. It distinguishes settings in which policy primarily seeks to prevent criminal-market formation from those in which accumulated organisational capital makes durable reversal the central objective. Table 6 summarises the corresponding model-based policy typology.

Table 6. Model-based policy typology

Criminal-market stage	Model signature	Primary policy objective	Illustrative Nigerian interpretation
Low maturity / prevention	Low K; θ below basin boundary	Keep legitimate returns and deterrence sufficient to prevent threshold crossing	Lower-incidence localities; classification should be data-based.
Transitional	Rising θ and K; near boundary	Act early; combine the least-cost instruments capable of moving the state into the low-crime basin	Parts of North-Central may fit this pattern; this is an application hypothesis rather than an estimated classification.
Entrenched	High θ; persistent K; recurrent activity	Reduce K while creating feasible exit paths; maintain support until the state crosses the relevant basin boundary	The Northwest is the leading motivating case given the concentration and persistence of kidnapping activity.
Post-demobilisation / residual network	Participation falls but K remains	Prevent network reconstitution; target residual infrastructure alongside reintegration	The Niger Delta is an illustrative historical comparison, not part of the ACLED kidnapping classification exercise.

Notes: The typology maps model states to policy objectives. K is latent and is not equated mechanically with current event counts or poverty

The hysteresis result creates a prevention premium. A locality below the formation threshold can often be stabilised by modest changes in legitimate opportunities or enforcement. Once a criminal organisation has accumulated recruitment networks, territorial knowledge, weapons access, and ransom infrastructure, reversing the same initial poverty or enforcement shock may be insufficient. Evidence from northwest Nigeria shows that temporary peace arrangements and amnesty initiatives have often failed to produce durable reductions in banditry, with armed groups retaining the capacity to resume coercion after agreements break down (Idris et al., 2025; Onyia et al., 2025).

A higher p lowers the expected material returns to crime. The non-linearity concerns duration and state dependence: enforcement can suppress incidents during deployment yet fail to generate a durable transition if participation and K remain above the post-withdrawal basin boundary. This distinction is consistent with evidence from Zamfara, where market closures designed to restrict bandits' commercial access produced temporary respite but did not generate a durable resolution of armed banditry (Idris et al., 2024). There is evidence that improving legitimate economic opportunities can shift labour away from illicit activity. For instance, Blattman and Annan (2016) shows that agricultural training combined with capital inputs increased farm employment and reduced time allocated to illicit activities in Liberia. This evidence supports the

legitimate-opportunity margin of the model, although it does not establish that such interventions alone dismantle accumulated criminal organisation.

Reintegration raises the return to legitimate activity for participants who leave criminal groups. In the model, however, a payment or employment programme that changes legitimate returns (w) without affecting organisational capital (K) can leave the criminal production technology largely intact. This concern has an empirical counterpart in Nigeria. Evidence from the Niger Delta indicates that reintegration programmes can leave important organisational and political structures surrounding former armed groups intact, while evidence from northwest Nigeria shows that poorly implemented amnesty arrangements have not eliminated persistent bandit attacks (Ebiede, 2024; Onyia et al., 2025). These experiences do not constitute a direct test of the model, but they illustrate why interventions directed at individual incentives may have limited effects when organisational structures supporting violence remain in place.

Network disruption is therefore conceptually distinct from punishment. It can include restricting access to arms, markets, safe areas, financing, ransom intermediaries, and recruitment infrastructure. The Zamfara market-closure strategy provides a concrete example of an intervention aimed at disrupting such supporting networks, including bandits' access to markets for selling rustled cattle and acquiring provisions, arms, and ammunition (Idris et al., 2024).

7. Discussion

The central implication of the analysis is that persistent criminal activity need not reflect persistent deterioration in the economic conditions that initially encouraged entry. Related studies shows that endogenous social interactions can generate persistent differences in crime even when underlying economic fundamentals are similar (Sah, 1991; Glaeser, Sacerdote, and Scheinkman, 1996). In the present model, a temporary decline in legitimate opportunities or weakening of deterrence can increase criminal participation, but participation itself subsequently changes the environment in which future choices are made. As criminal activity becomes more prevalent, its social cost falls, while accumulated organisational capital raises the returns to continued participation. Crime can therefore persist even after the original shock has dissipated. This distinguishes persistence generated by state dependence from persistence generated simply by chronically low legitimate returns or weak enforcement.

The Nigerian evidence is consistent with this distinction. Kidnapping intensity exhibits substantial persistence across states, and this relationship extends beyond the immediately preceding year. Once a depreciating measure of deeper criminal history is included, it retains predictive power alongside the one-year lag. By contrast, cross-state differences in measured poverty have relatively little power to account for the observed persistence. These patterns do not identify organisational capital or social normalisation, but they narrow the set of interpretations consistent with the data. In particular, they suggest that current criminal-market intensity contains information about future activity that is not readily reduced to contemporaneous differences in economic deprivation.

The more granular or finer geography evidence confirms our findings. Persistence is clearer in the intensity of kidnapping within LGAs than in the recurrence of an event in exactly the same LGA. Criminal activity can therefore exhibit local geographic churn while remaining persistent at a broader market level. This distinction matters for how organisational capital is understood. Recruitment relationships, weapons access, information networks, ransom intermediaries, transport routes, and coercive capacity need not coincide with administrative boundaries. A criminal market may consequently remain organisationally persistent even as particular incidents shift across nearby locations. The relevant economic state variable is therefore better conceived as accumulated market or network capacity than as a fixed stock attached mechanically to a particular locality. This interpretation is consistent with evidence that criminal experience and specialisation can generate returns in illegal labour markets, suggesting that capabilities accumulated through criminal participation can have economic value beyond the individual offence itself (Loughran et al., 2013).

The qualitative evidence provides institutional content for this interpretation. Accounts of kidnapping and banditry in northwest Nigeria describe criminal proceeds being reinvested in weapons, commercial channels connecting armed groups to supplies and markets, bargaining relationships between armed groups and communities, and repeated attempts to suppress or accommodate criminal activity. Evidence from Zamfara state similarly documents commercial and coercive infrastructure surrounding armed groups. For instance, market restrictions were designed to interrupt bandits' access to markets, provisions, arms, and ammunition, while subsequent community-level peace arrangements remained vulnerable to renewed coercion (Idris et al., 2024, 2025). These observations do not establish the structural parameters of the model.

They do, however, illustrate why the history of criminal activity may affect the productivity and viability of subsequent criminal participation. The organisational-capital mechanism formalises this possibility by allowing past participation to alter future criminal returns rather than treating each period's occupational choice as independent of previous criminal-market development.

This perspective also changes the interpretation of policy effectiveness. A reduction in violence during an intervention is not necessarily evidence of a durable transition. If enforcement, income support, or another intervention temporarily lowers participation without moving the economy into the low-crime basin, criminal activity can recover after the intervention is withdrawn. The distinction has an institutional counterpart in Zamfara, where market restrictions intended to disrupt armed banditry generated temporary respite but did not produce a durable resolution of the underlying criminal activity (Idris et al., 2024). Conversely, an intervention need not permanently eliminate the high-crime equilibrium to have lasting effects: it can succeed by moving participation and organisational capacity sufficiently far across the basin boundary that subsequent dynamics reinforce rather than reverse the decline. The relevant policy question is therefore not only whether an intervention reduces crime while it is in place, but whether it changes the conditions from which the criminal market evolves after the intervention ends.

This distinction helps explain why apparently similar interventions may produce different outcomes across locations or periods. Where criminal organisation remains immature, improvements in legitimate opportunities or deterrence may prevent the emergence of a self-sustaining criminal market. Where organisational capital is already substantial, the same intervention may have weaker long-run effects because accumulated capacity continues to support criminal returns. The least-cost policy mix should consequently depend on criminal-market maturity. Opportunity expansion, deterrence, and network disruption are not mechanically complementary in every setting; their appropriate combination depends on their effectiveness-adjusted marginal costs and on how far the locality must move to cross the relevant transition boundary.

The hysteresis mechanism helps to sharpen this argument. The conditions required to prevent criminal-market formation need not be the same as those required to reverse it. Once participation has generated organisational capacity and the economy has moved onto the high-crime branch, simply restoring legitimate opportunities or enforcement to their pre-shock levels may not restore the previous equilibrium. Organisational capital may have to be reduced

further before reversal occurs. Related computational work similarly demonstrates that criminal organisations can exhibit hysteresis, with different conditions governing their formation and dissolution (van Elteren, Vasconcelos, and Lees, 2024). In our model, this asymmetry creates a prevention premium: policies that prevent temporary economic or security shocks from generating persistent criminal organisation can be substantially less costly than policies required to dismantle that organisation after it has matured.

The social-normalisation channel adds a related but distinct source of persistence. As criminal participation becomes more prevalent, potential entrants may face a different social environment from that faced by earlier entrants. This mechanism relates to a broader literature showing that individual criminal behaviour can respond to endogenous social interactions (Sah, 1991; Glaeser, Sacerdote, and Scheinkman, 1996) and that social norms can interact with legal rules and enforcement in shaping compliance and law-breaking (Acemoglu and Jackson, 2017). The implication here is not that communities necessarily approve of criminal activity as participation rises. Rather, repeated exposure to criminal participation can alter the social cost attached to entry, reinforcing the material incentives generated by accumulated organisational capital.

The argument extends beyond kidnapping in Nigeria. The relevant boundary is not a particular offence category but a form of criminal production in which participation generates capabilities that survive individual transactions. Extortion, protection markets, illicit mining, piracy, armed-group taxation, and other organised illicit activities can potentially exhibit similar dynamics when repeated participation creates networks, information, coercive capacity, specialised skills, or territorial control. The framework is less applicable to isolated interpersonal offences for which current participation contributes little to the productivity of future criminal activity. The broader distinction is therefore between crime as a sequence of individual choices and crime as an accumulating economic organisation.

8. Conclusion

This paper develops a dynamic framework for understanding how crime can evolve from a response to adverse economic conditions into a persistent livelihood system. The central mechanism is that criminal participation changes the environment facing future potential entrants. As participation expands, the social cost of joining crime can decline, while repeated criminal activity accumulates organisational capital that raises future criminal returns. These

feedbacks generate multiple equilibria, basin dependence, and hysteresis. This means a temporary shock can move a locality into a high-crime state that persists even after the conditions that initiated the transition have disappeared.

Evidence from Nigeria is consistent with the persistence mechanism motivating the model. Kidnapping intensity is strongly persistent across states, and deeper criminal history retains predictive power even after accounting for activity in the immediately preceding year. By contrast, a single cross-section of state poverty does not account for this persistence. At the LGA level, persistence is more apparent in the intensity of kidnapping than in the recurrence of events in exactly the same location, suggesting that criminal activity can shift geographically while broader market or network capacity persists. The qualitative evidence complements these patterns by documenting institutional features—including reinvestment of criminal proceeds, weapons access, commercial networks, coercive infrastructure, and repeated relationships between armed groups and communities—that provide plausible real-world counterparts to the organisational-capital mechanism. These findings do not identify organisational capital or social normalisation structurally, but they establish a set of empirical and institutional patterns that a theory of persistent criminal markets should be able to rationalise.

The framework has an important implication for policy: prevention, suppression, and reversal are distinct objectives. An intervention can substantially reduce observed crime while it is in place yet fail to produce a durable transition if participation and organisational capital remain within the high-crime basin. Conversely, a temporary intervention can have persistent effects if it moves the locality across the relevant basin boundary before withdrawal. The least-cost response therefore depends on both the current incentive environment and the maturity of criminal organisation. Where organisational capital is limited, improving legitimate opportunities or deterrence may be sufficient; where criminal markets have matured, disrupting the networks and productive capacity embodied in the organisational capital may also be necessary. Because the threshold for entering a persistent high-crime state can differ from the threshold required to leave it, prevention can be substantially less costly than reversal.

Several limitations qualify these conclusions. The functional forms governing social normalisation and organisational returns are deliberately parsimonious, so the quantitative location of the implied thresholds is functional-form dependent. Organisational capital is latent, and the deeper-history and recurrence measures used in the empirical analysis may also capture

persistent differences in state capacity, geography, conflict history, displacement, or reporting. The empirical estimates are therefore model-disciplining rather than causal or structural, and the qualitative evidence provides institutional counterparts to otherwise unobserved mechanisms rather than identifying social cost of criminal participation or the stock of organisational capital. A stronger empirical test of hysteresis would require plausibly exogenous temporary shocks and sufficient post-shock observation to distinguish genuine state dependence from persistent observed and unobserved local characteristics. Finally, the framework is most applicable to forms of organised crime in which participation generates productive or coercive capacity that survives individual criminal transactions; it is not intended as a general model of all criminal behaviour.

These limitations point to an interesting direction for future research. One priority is to distinguish local state dependence from diffusion through criminal networks by linking event-level actor and location data to subsequent criminal entry and persistence. A second is to exploit plausibly exogenous economic shocks, such as rainfall variation, to examine whether temporary declines in legitimate opportunities generate criminal activity that persists after the initial shock has passed. Finally, household- and community-level data could be used to measure exposure to criminal networks, perceived enforcement, and social attitudes toward participation, and to assess how persistent criminal markets affect labour allocation, enterprise activity, migration, assets, and investment. Together, these extensions would move the analysis from documenting persistence toward identifying the mechanisms that sustain it and the conditions under which it can be reversed.

The broader contribution of this paper is to shift attention from why individuals enter crime today to how today's criminal participation changes the economic environment in which tomorrow's participation decisions are made. When criminal activity builds networks, productive capacity, and its own conditions for reproduction, restoring the economic environment that existed before crime expanded may no longer be sufficient to restore the previous equilibrium. Understanding when temporary shocks generate these persistent criminal institutions, how organisational and social mechanisms sustain them, and what is required to reverse them is therefore central both to the economics of crime and to the design of development and security policies intended to prevent temporary failures from becoming persistent criminal economies.

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Supplementary Material

Appendix A. Figures

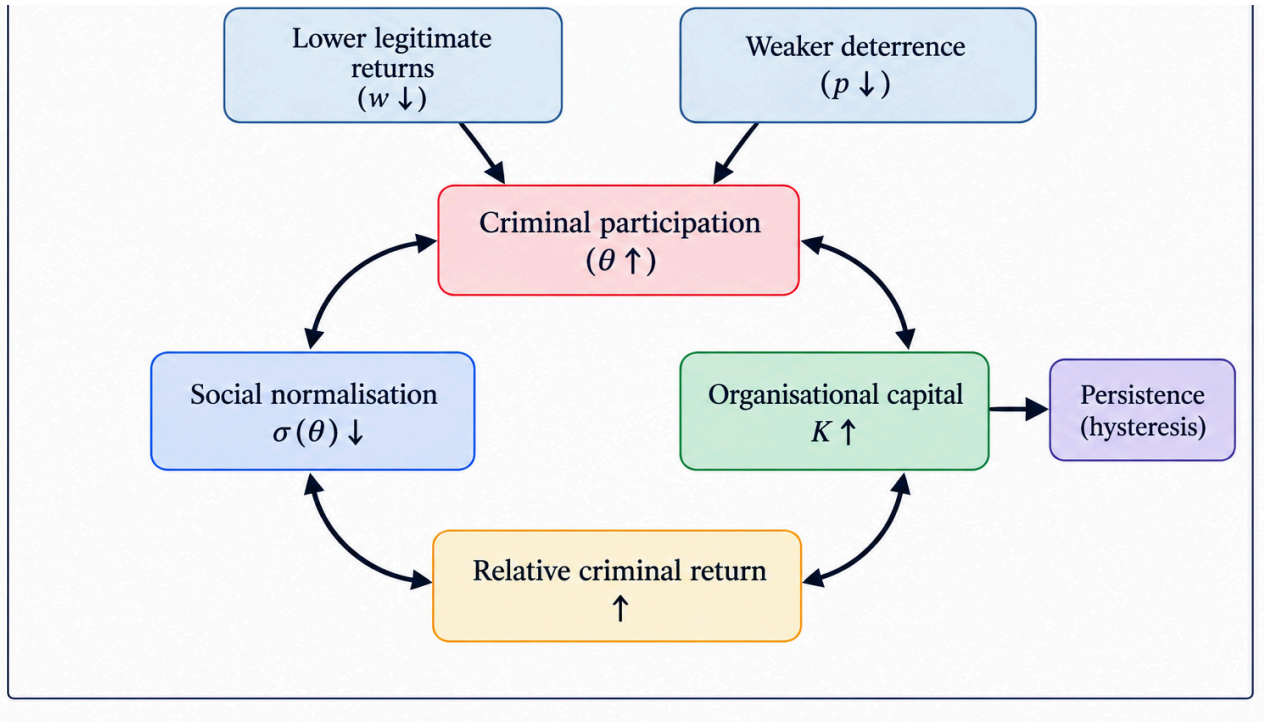


Figure A1. Feedback mechanisms of crime.

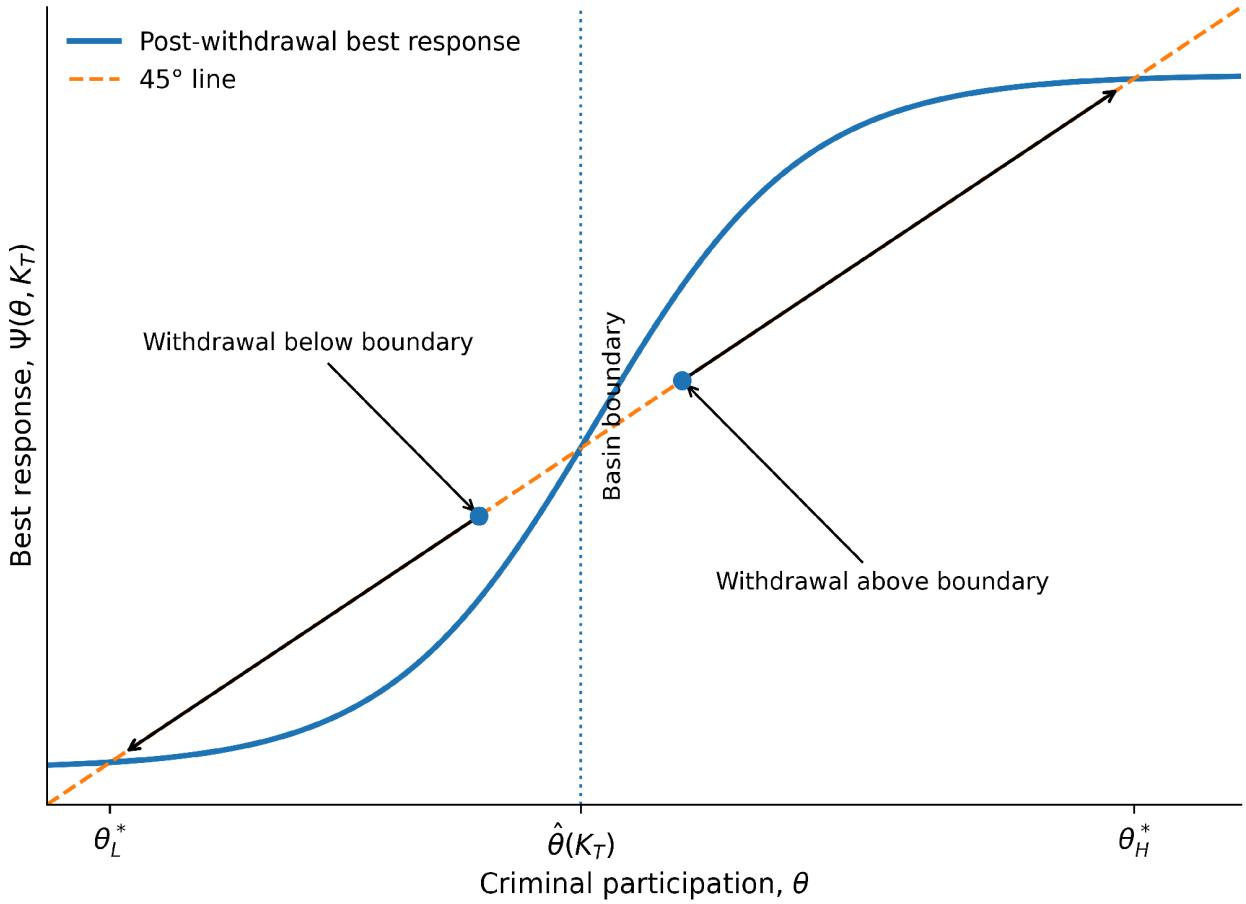


Figure A2. Temporary intervention and the basin boundary.

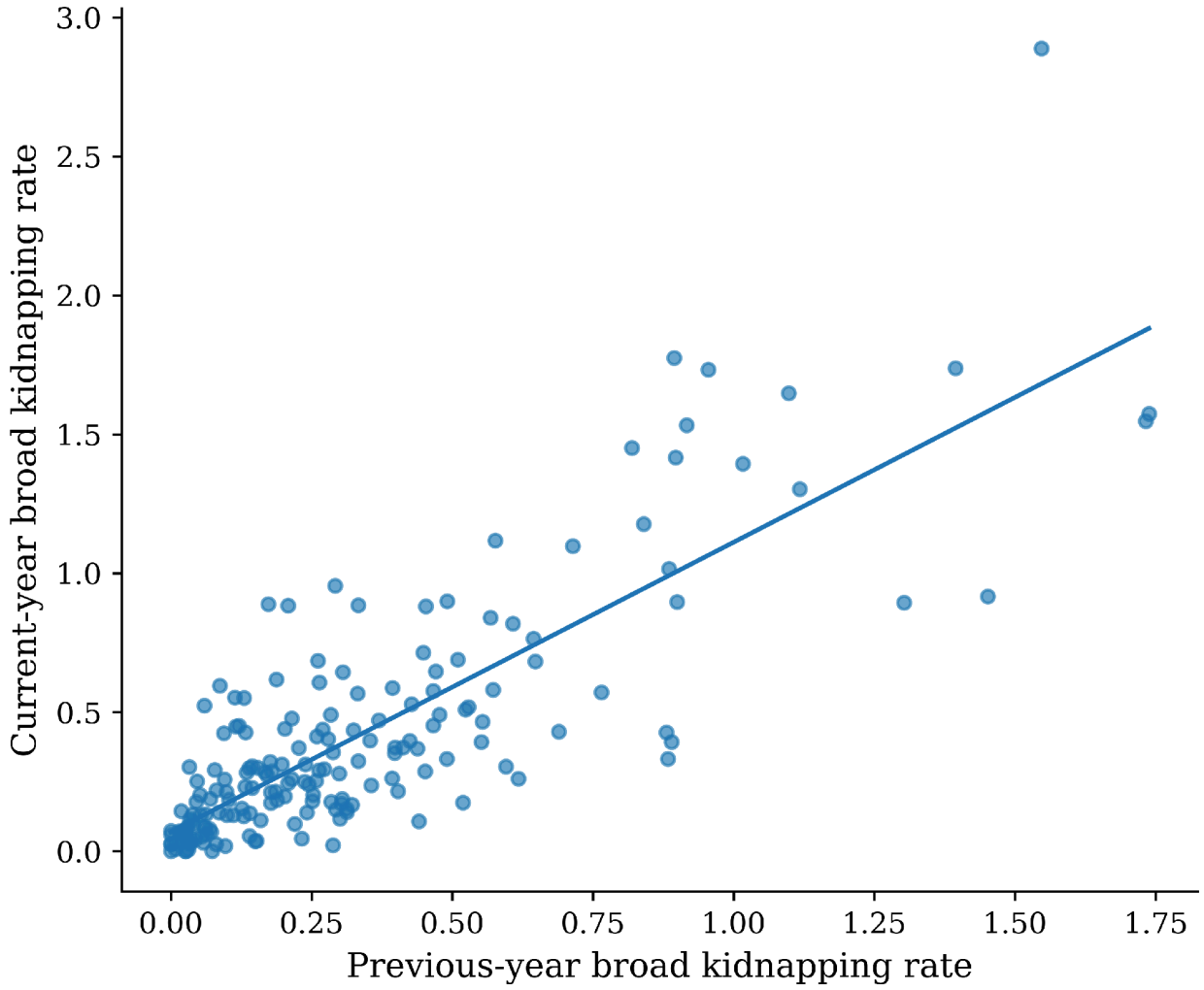


Figure A3. State-level persistence in broad kidnapping-event rates.

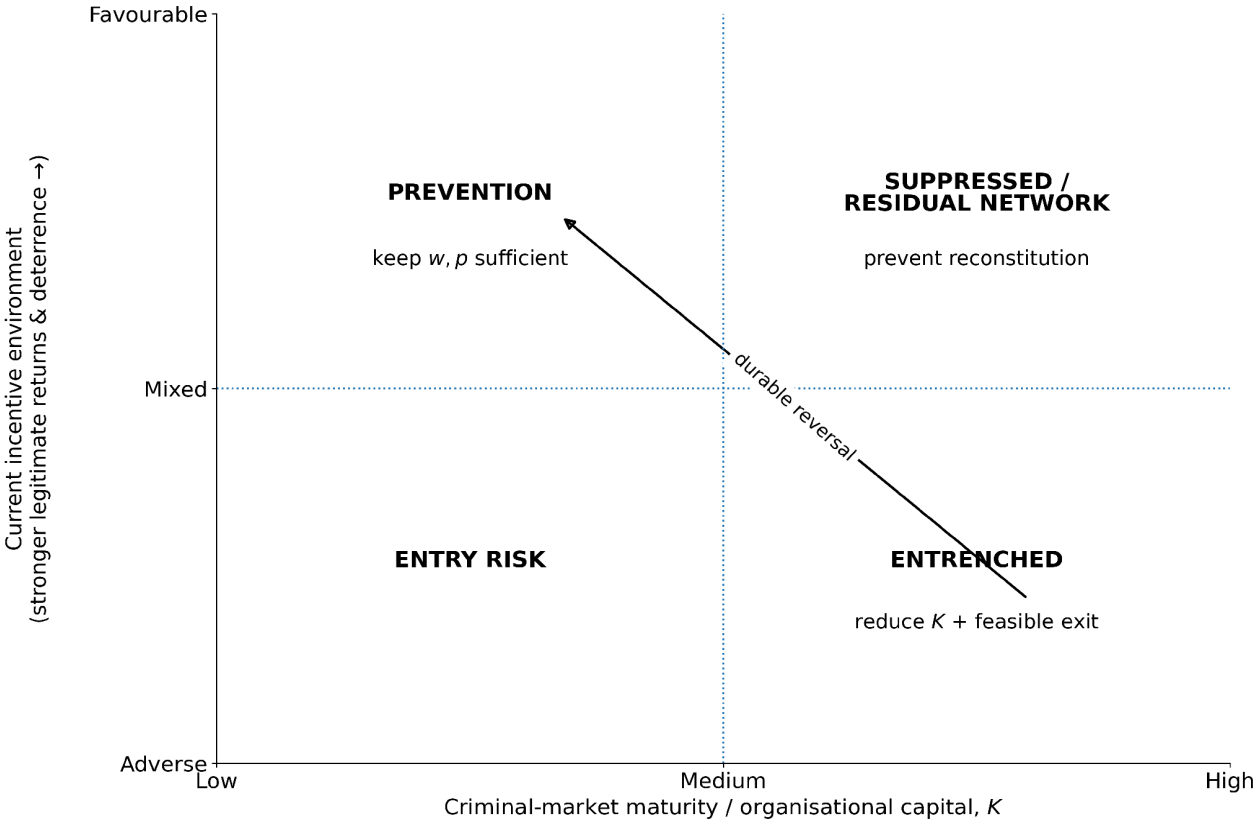


Figure A4. Prevention versus reversal in policy space.

Appendix B. Derivations

B.1 Proposition 1

Under the assumptions of Proposition 1, $\Psi(K)$is S-shaped over the relevant parameter region, with slope below one in the low- and high-participation regions and above one over an interior interval. Define

$$H(\theta) \equiv \Psi(K) - \theta.$$

Fixed points satisfy $H(\theta) = 0$. Since

$$H'(\theta) = \Psi_{\theta}(K) - 1,$$

$H(\theta)$has negative slope in the low- and high-participation regions and positive slope over an interior region. For an open set of values of the material-return index $A(K)$, vertical shifts in the

best-response mapping therefore generate three crossings of $H(\theta) = 0$: a low-crime fixed point θ_L^*, an intermediate fixed point $\hat{\theta}$, and a high-crime fixed point θ_H^*.

Linearising equation (7) around a fixed point θ^* gives

$$\frac{d(\theta-\theta^*)}{dt} \approx \lambda\left[\Psi_\theta(K) - 1\right](\theta - \theta^*).$$

Hence,

$$\Psi_\theta(K) < 1$$

implies local stability, whereas

$$\Psi_\theta(K) > 1$$

implies instability. In the three-fixed-point region, this yields the low-stable, middle-unstable, high-stable ordering stated in Proposition 1.

B.2 Proposition 2

For fixed Kafter policy withdrawal, equation (7) is a one-dimensional autonomous system. In the three-equilibrium region, the unstable fixed point $\hat{\theta}$separates the basins of attraction of $\theta_L^*$and θ_H^*. If

$$\theta_T < \hat{\theta},$$

then the sign of $\Psi(K) - \theta$over the relevant interval directs participation toward θ_L^*. If

$$\theta_T > \hat{\theta},$$

the corresponding dynamics direct participation toward θ_H^*. A temporary intervention can therefore have a persistent effect without permanently changing the set of equilibria, provided that it moves the state across the basin boundary before withdrawal.

When Kalso evolves according to equation (9), the basin boundary becomes a curve in (K)space rather than a single threshold in θ. The same logic applies: a durable transition requires the intervention to move the state into the basin of attraction of the low-crime equilibrium before policy support is withdrawn.

B.3 Proposition 3

Form the Lagrangian

$$L = \sum_j C_j(x_j) + \mu\left[D^* - \sum_j \eta_j x_j\right], \ \mu \geq 0.$$

At an interior optimum, the transition constraint binds and the first-order conditions are

$$C_j'(x_j) = \mu\eta_j$$

for each active instrument j. Hence,

$$\frac{C_j'(x_j)}{\eta_j} = \mu,$$

so effectiveness-adjusted marginal costs are equalised across all active instruments. Strict convexity of the cost functions implies a unique allocation for a given active set.

Corner solutions arise when, for an inactive instrument j,

$$\frac{C_j'(0)}{\eta_j} \geq \mu,$$

so introducing that instrument would not lower the cost of satisfying the transition constraint. Policy coordination therefore follows from the common transition requirement and convex implementation costs; it does not require technological complementarity among the instruments.

B.4 Proposition 4 and fold conditions

Treat K as a slowly moving state and define

$$H(K) \equiv \Psi(K) - \theta.$$

A saddle-node fold satisfies

$$H(K) = 0 \ and \ H_\theta(K) = 0,$$

or equivalently,

$$\Psi(K) = \theta, \ \Psi_\theta(K) = 1.$$

Suppose two such folds exist, with

$$K_{down} < K_{up}.$$

For values of Kbetween these thresholds, low- and high-crime stable branches coexist, separated by an unstable branch. Starting on the low-crime branch, an increase in K eventually reaches K_{up} , at which point the low-crime branch disappears and the economy transitions to the high-crime branch. After this transition, reducing K below K_{up} is not sufficient to restore the low-crime equilibrium. Reversal occurs only once K falls below K_{down}.

Equation (9) provides the endogenous mechanism through which a temporary increase in criminal participation can raise organisational capital and move the economy across these thresholds. The difference

$$K_{up} - K_{down}$$

therefore provides a natural graphical measure of the width of the hysteresis region in the bifurcation diagram.

B.5 Deeper-history proxy

For each state i, the deeper-history stock is defined as

$$H_{it} = \sum_{s=2}^{\infty} 0.8^{s-2} y_{i,t-s},$$

and is operationalised using all available annual observations from 2010 onward. The measure deliberately excludes $y_{i,t-1}$, allowing the regression to distinguish immediate persistence from the influence of more distant criminal history. The depreciation factor of 0.8 gives progressively less weight to earlier observations. Importantly, H_{it} is a reduced-form proxy for persistence in past criminal activity; it is not a direct measure of the theoretical stock of organisational capital.

Appendix C. Tables

Table A1. Data construction and analysis sample

Item	Value	Notes
Nigeria events in authenticated ACLED export	44,771	1997-27 Aug 2025; 2025 is a partial year.
Nigeria events retained for history construction	37,728	2010-2024, all ACLED event types.
Broad direct-kidnapping events	4,898	Preferred definition; see Section 5.1 and Appendix B.2.
Conservative abduction events	3,092	ACLED sub-event type: Abduction/forced disappearance only.
States	37	Complete state/FCT panel.
State-year observations, 2010-2024	555	37 × 15 years.
Main regression observations	222	37 × 6 years, 2019-2024.
Local Government Areas (LGAs) observed	758	Balanced robustness panel built from units appearing in ACLED.
LGAs with ≥1 broad kidnapping event	589	2010-2024.

Notes: The broad definition adds direct completed-kidnapping Attack narratives to ACLED's abduction code because the ACLED hierarchy can classify abductions with serious injury/fatalities as Attack. Population rates use official 2016-2019 projections and transparent state-specific extrapolations outside that window.

Table A2. Robustness: Persistence and deeper history in state kidnapping intensity, 2019-2024

History weight	Lagged outcome	Deeper history	p: history	R^2	N
0.6	0.311** (0.132)	0.425*** (0.099)	<0.001	0.824	222
0.7	0.313** (0.136)	0.389*** (0.092)	<0.001	0.823	222
0.8 baseline	0.320** (0.141)	0.351*** (0.086)	<0.001	0.822	222
0.9	0.335** (0.147)	0.309*** (0.079)	<0.001	0.820	222

Notes: OLS with state and year fixed effects. Standard errors clustered by state in parentheses. ** p<0.05; *** p<0.01.