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The Geography of Lethal Violence Escalation: Cross-National Differences in Recorded Homicide and Serious Assault across Structural Contexts

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ABSTRACT

Why do countries with recorded serious interpersonal violence display markedly different shares of lethal outcomes? This study introduces the Lethal Escalation Index (LEI), calculated as intentional homicide divided by the sum of intentional homicide and police-recorded serious assault. LEI is an ecological measure of the lethal composition of recorded violence, not the probability that an individual assault becomes homicide. UNODC counts for 2016-2018 were linked to civilian firearm estimates, alcohol consumption, current health expenditure per capita, and government effectiveness. The complete-case sample comprises 88 countries. Fractional logistic regression with heteroskedasticity-robust standard errors assesses the associations, supplemented by temporal-coverage sensitivity tests. Recorded LEI ranges from 0.19% to 86.44%, with a median of 9.27%. Government effectiveness is associated with a substantially lower lethal share in the fully adjusted model; firearm prevalence, alcohol volume, and health expenditure are not independently distinguishable from zero. Health expenditure is negative before government effectiveness enters, but their strong correlation prevents clean separation. The findings support treating homicide as an outcome of lethalization while demonstrating that administrative visibility remains inseparable from cross-national comparisons of serious violence.

INTRODUCTION

Cross-national homicide research usually asks why some societies produce more killings than others. This combines the production of violent encounters with the conditions under which violence ends in death. Homicide may be high because violence is common, violent events are unusually lethal, or both. Comparable volumes of serious violence can therefore coexist with different fatal shares. Treating homicide as self-contained obscures mechanisms involving weapons, post-injury survival, institutional response, and official data production.

The lethality perspective has a clear intellectual lineage but a limited cross-national application. Harris et al. (2002) described homicide partly as a medically contingent outcome of criminal assault, while Berg (2019) separated the prevalence of disputes from the proportion ending in death. Serious violence, firearm victimization, and homicide do not necessarily follow identical trajectories (Lauritsen & Lentz, 2019). Research comparing fatal and nonfatal shootings also identifies differences in event characteristics and social correlates (Hipple & Magee, 2017; Gill et al., 2026). Yet the principal cross-national explanandum remains the homicide rate, even though national trajectories are heterogeneous and structural predictors are context dependent (Nivette, 2011; Tuttle et al., 2018). Recent work has accordingly argued that lethal violence warrants a distinct criminological field rather than remaining dispersed across legally defined categories (Kadir, 2026d). What remains underdeveloped is a comparative measure that places fatal violence inside the larger recorded field of serious interpersonal violence.

This article addresses that gap through the Lethal Escalation Index (LEI), calculated from UNODC counts of intentional homicide and serious assault. Homicide rates express killings relative to population; LEI expresses homicide as a proportion of recorded serious violence. The distinction changes the theoretical object. A factor can increase homicide by producing more violent encounters without altering their fatal share. Another can increase the lethality of encounters while leaving their frequency relatively stable. LEI therefore shifts the explanandum from how much violence occurs to how lethal its recorded composition is. Comparative work on low- and high-homicide settings likewise suggests that lethal inequality reflects uneven protection and conflict regulation, not violence frequency alone (Kadir, 2026b). The term *lethal escalation* is used at the population level. No incident identifier connects the homicide numerator to antecedent assaults in the denominator, so the index is an ecological compositional proxy rather than an individual-level transition probability.

Figure 1 locates this proxy within a macro-level architecture. Weapon characteristics may influence injury severity, emergency care may alter survival, and administrative systems may determine whether nonfatal violence enters official records. These mechanisms shape the observed division between serious assault and homicide, although their event sequence is unmeasured. This is *lethality conditionality*: the fatal share depends on the ecology of injury production, survival, and institutional visibility.

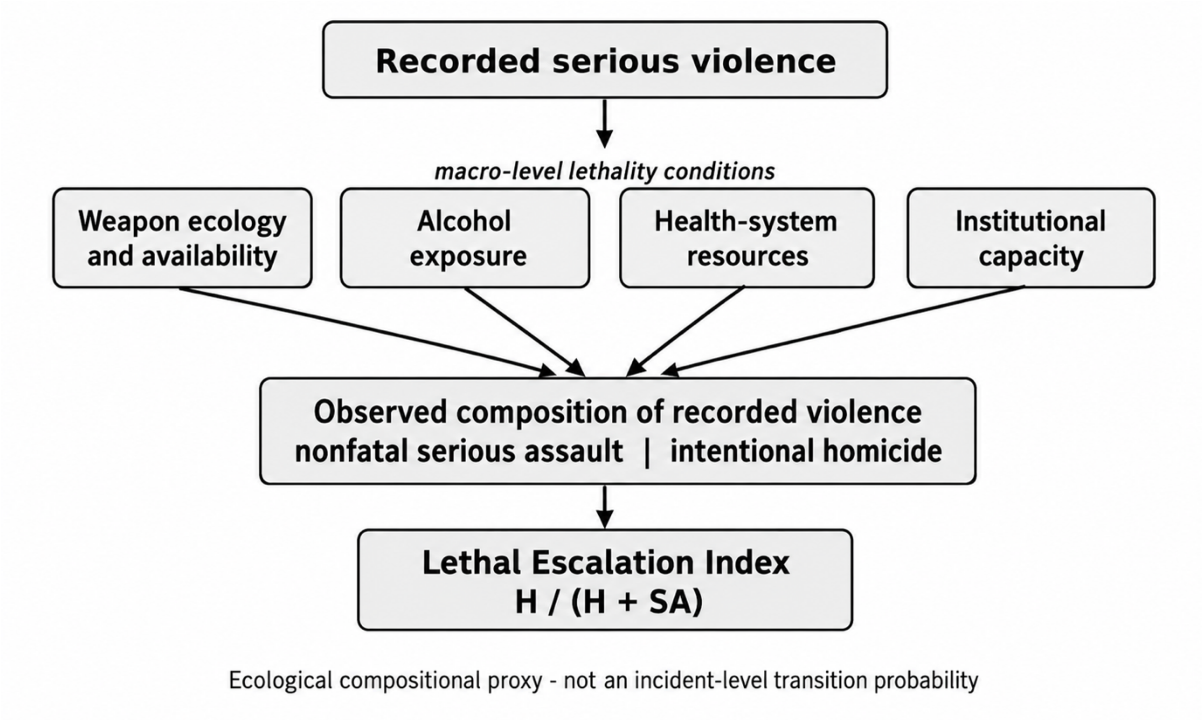

Figure 1. Conceptual Architecture of the Lethal Escalation Index

Weapon instrumentality provides the most direct escalation mechanism. Firearms generally increase the lethality of violent situations, although selection into weapon use complicates causal inference (Braga et al., 2021). Higher caliber predicts death within gun assaults (Braga & Cook, 2018), hospital fatality and treatment costs differ by assault mechanism (Barry et al., 2022), and fatal and nonfatal firearm injuries can move along different epidemiological trajectories (Kaufman et al., 2021). Stable firearm-assault lethality during one US period nevertheless indicates that weapon effects remain conditional on event composition and treatment environments (Cook et al., 2017). At the national level, civilian firearms per 100 persons is an imperfect translation of this mechanism. It measures a stock rather than firearm presence in violent incidents and says little about illicit circulation, carrying, caliber, or offender access. The limitation matters because non-firearm homicide retains a substantial and regionally differentiated role outside gun-dominant settings (Kadir, 2026a). Cross-national associations between gun ownership, regulation, and homicide justify its inclusion (Hurka & Knill, 2020; Rutar, 2025), but a null LEI association would not invalidate firearm instrumentality. It could instead expose the distance between national stock estimates and event-level deployment.

Alcohol operates less directly. Aggregate consumption has been associated with homicide across demographic and political settings (Weiss et al., 2018), including national and Latin American longitudinal analyses (Hockin et al., 2018; Escaño & Pridemore, 2024). Stronger alcohol-policy environments are associated with lower alcohol-attributable homicide internationally (Trangenstein et al., 2021). LEI, however, concerns fatal composition rather than violence frequency. Annual liters per adult do not capture event intoxication, so the measure is an exposure-context proxy rather than evidence of alcohol involvement.

Post-injury survival also separates serious violence from homicide. Death depends on injury severity, treatment delay, transport, and trauma capacity. Medical development may partly explain the historical decline in assault lethality (Harris et al., 2002). Subnational studies connect emergency-care access, road connectivity, and trauma-center distance to violent mortality (Crandall et al., 2013; Poole et al., 2018; Summers & Rogers, 2020; Hanink et al., 2023; Park et al., 2025). Because comparable international measures of ambulance time and trauma coverage are unavailable, health expenditure per capita serves as a distal proxy. A negative LEI association is plausible (Linde, 2018), but expenditure cannot show whether resources reach violently injured patients.

Institutional capacity is important but empirically ambiguous. Effective institutions can reduce death through conflict control, emergency coordination, and service delivery; legitimate governance is associated with lower homicide (Nivette & Eisner, 2013; Cao & Zhang, 2017). This role has been framed as a homicide-prevention architecture operating before adjudication through lethal-means restriction, victim protection, and coordinated intervention (Kadir, 2026e). Yet capacity can also increase nonfatal-assault recording. When homicide is more visible than serious assault, better coverage enlarges the denominator and lowers LEI without changing survival. Distrust suppresses reporting (Gingerich & Oliveros, 2018), police data contain measurement error (Pina-Sánchez et al., 2023), and homicide portals require scrutiny of definitions and imputation (Kanis et al., 2017; Eisner & Fearon, 2021). Government effectiveness may therefore express prevention, denominator visibility, or both.

Against this framework, the analysis asks how widely the lethal share of recorded serious violence varies across countries and how firearm availability, alcohol consumption, health-system resources, and government effectiveness are associated with that share. The design is anchored on 2017 firearm estimates and pools matched 2016–2018 outcomes to reduce annual volatility. Fractional logistic regression accommodates the bounded index. The contribution is deliberately diagnostic: it establishes lethal composition as a comparative object while keeping its claims commensurate with ecological and administratively produced data.

RESEARCH METHODS

The study uses a cross-sectional ecological country-period design. Homicide and serious-assault data came from July 2026 UNODC Data Portal downloads (UNODC, 2026a, 2026b). Intentional homicide follows ICCS 0101: unlawful death inflicted with intent to cause death or serious injury. Serious assault follows ICCS 020111: intentional or reckless application of serious physical force resulting in serious bodily injury. The broadly available series provide homicide victim counts and serious-assault offense counts.

The outcome window is 2016–2018. Within countries, counts were summed only across years containing both measures; inclusion required at least two matches. Eighty-one of 98 valid outcome cases contained all three years. Covariate linkage and complete-case analysis produced 88 countries: 35 European, 32 American, 13 Asian, six African, and two Oceanian. The sample is not globally representative or regionally balanced.

For country *i*, the Lethal Escalation Index is:

$$\mathbf{LEI_i = H_i / (H_i + SA_i),}$$

Where *H* is the sum of recorded intentional homicides and *SA* the sum of recorded serious assaults in matched 2016–2018 years. LEI ranges from zero to one and is multiplied by 100 for descriptive presentation. The label “escalation” refers to the relative lethal share at country level. Because no common incident identifier connects the two UNODC series, LEI is not a case-fatality rate and does not show that assaults in the denominator progressed into homicides in the numerator.

Firearm availability is the Small Arms Survey estimate of civilian firearms per 100 persons in 2017 (Small Arms Survey, 2018); its survey, expert, and analogous-country methods entail variable precision. Alcohol exposure is liters of pure alcohol per capita among persons aged 15 years or older, nearest 2017 (World Bank, 2026a). Health capacity is current health expenditure per capita, also nearest 2017 and log transformed (World Bank, 2026b). Institutional capacity is the 2017 WGI Government Effectiveness estimate, a perception-based composite rather than an agency diagnostic (World Bank, 2025).

Table 1. Measurement and Data Architecture

Construct	Operational measure	Source / period	Interpretive boundary
Lethal share	H / (H + SA); percentage	UNODC, matched 2016-2018	Recorded country composition; not an incident probability
Intentional homicide (H)	Victim counts; ICCS 0101	UNODC, 2016-2018	Visible fatal outcome; sensitive to revisions and coverage
Serious assault (SA)	Offense counts; ICCS 020111	UNODC, 2016-2018	Sensitive to reporting, recording stage, and counting practice
Firearm availability	Civilian firearms per 100 persons	Small Arms Survey, 2017	National stock proxy; not weapon use in violent events
Alcohol exposure	Liters of pure alcohol per capita, age 15+	World Bank WDI, nearest 2017	Volume proxy; not acute intoxication
Health-system resources	Current health expenditure per capita; log transformed	World Bank WDI, nearest 2017	Resource proxy; not trauma access or response time
Institutional capacity	Government Effectiveness estimate	World Bank WGI, 2017	Composite measure that may reflect recording capacity

Note. H = intentional homicide; SA = serious assault; ICCS = International Classification of Crime for Statistical Purposes; WDI = World Development Indicators; WGI = Worldwide Governance Indicators.

Fractional logistic regression models the conditional mean of LEI on its [0,1] support. Bernoulli quasi-likelihood with a logit link applies to nonbinary fractions and avoids out-of-range predictions (Papke & Wooldridge, 2008). Because the conditional mean may be misspecified, robust inference and sensitivity tests remain necessary (Ramalho et al., 2011).

Predictors were standardized after log transforming health expenditure; HC3 standard errors were used. Model 1 includes firearms and alcohol, Model 2 adds health expenditure, Model 3 instead adds government effectiveness, and Model 4 includes all predictors. Separate intermediate models are important because health expenditure and government effectiveness correlate at $r = .872$. Their full-model variance-inflation factors are 5.00 and 4.21, making unique coefficients imprecise.

Sensitivity models restrict the sample to 74 countries with all three matched years or calculate 2017-only LEI for 89 cases. Exploratory regional fixed effects are weakly identified by only six African and two Oceanian cases. No causal claim is made; reverse ordering, omitted variables, measurement error, and endogenous assault visibility remain plausible.

RESULTS AND DISCUSSION

Distribution of the Lethal Share

Mean LEI is 17.60% and the median 9.27%, indicating right skew; values span 0.19% to 86.44% (Table 2). The median country has 9.95 civilian firearms per 100 persons, alcohol consumption of 7.83 liters per adult, and health expenditure of US$635.63 per capita. Government effectiveness ranges from −1.25 to 2.22.

Table 2. Descriptive Statistics for the Complete-Case Sample

Variable	N	Mean	SD	Median	Minimum	Maximum
LEI (%)	88	17.60	19.60	9.27	0.19	86.44
Civilian firearms per 100	88	13.75	15.46	9.95	0.20	120.50
Alcohol (liters, age 15+)	88	7.40	3.51	7.83	0.10	16.92
Health expenditure per capita (US$)	88	1,677.81	2,195.81	635.63	31.44	9,822.61
Government effectiveness	88	0.44	0.85	0.27	-1.25	2.22

Note. Health expenditure is displayed in its original metric; its natural logarithm is used in regression. LEI is multiplied by 100 for presentation.

Figure 2 ranks the lethal share of *recorded* serious violence, not intrinsic national lethality. Upper-end cases combine large homicide numerators with small assault denominators. LEI reaches 86.44% in the Philippines, 83.87% in Venezuela, and 68.98% in Honduras; it is 0.19% in New Zealand, 0.27% in France, and 0.30% in Australia. Table 3 supplies constituent counts. The contrast is real within these data but too large to treat as biological case fatality alone; definitions and recording likely contribute.

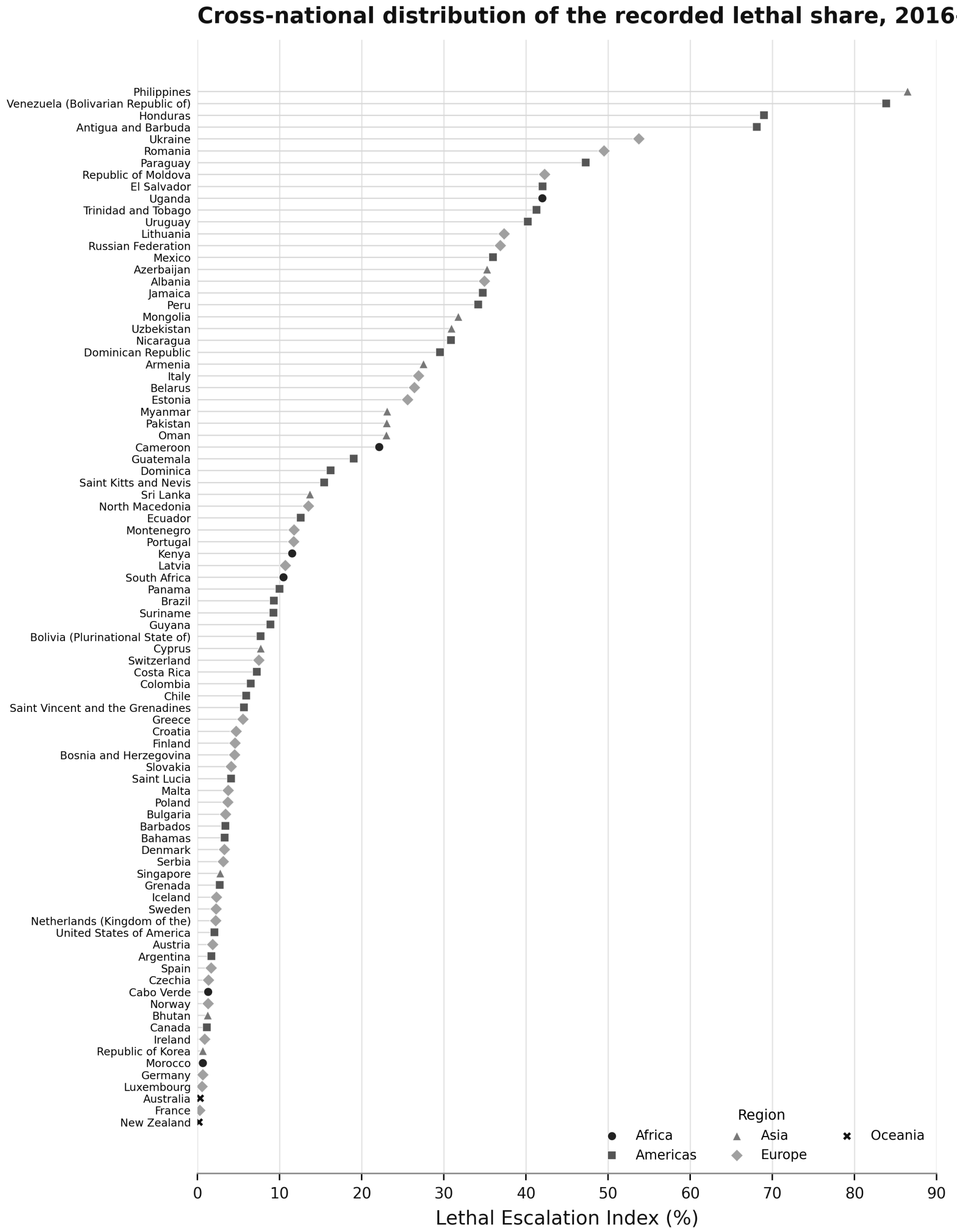

Figure 2. Ranked Lethal Escalation Index across 88 Countries

Table 3. Countries at the Lower and Upper Ends of the Recorded LEI Distribution

Position	Country	Homicides	Serious assaults	LEI (%)	Matched years
Lowest 1	New Zealand	140	73,654	0.19	3
Lowest 2	France	2,185	806,099	0.27	3
Lowest 3	Australia	656	216,584	0.30	3
Lowest 4	Luxembourg	10	1,765	0.56	3
Lowest 5	Germany	2,564	413,818	0.62	3
Lowest 6	Morocco	1,865	293,868	0.63	3
Highest 6	Romania	811	828	49.48	3
Highest 5	Ukraine	4,753	4,093	53.73	2
Highest 4	Antigua and Barbuda	32	15	68.09	2
Highest 3	Honduras	12,723	5,721	68.98	3
Highest 2	Venezuela (Bolivarian Republic of)	32,072	6,167	83.87	2
Highest 1	Philippines	25,074	3,933	86.44	3

Note. Counts are summed only over matched 2016-2018 observations. Positions describe recorded composition and must not be interpreted as a ranking of true physiological case fatality.

Fractional-Response Sstimates

Table 4 reports log-odds coefficients with robust standard errors. In Model 1, firearms are negatively associated with LEI at $p = .051$ and alcohol is uncertain. The firearm direction reverses once resource or institutional covariates enter, precluding a substantive interpretation.

Health expenditure is negative in Model 2 ($b = -0.781$, $p < .001$). Replacing it with government effectiveness produces another negative estimate ($b = -1.047$, $p < .001$). With both in Model 4, government effectiveness remains negative ($b = -0.981$, $p = .007$) and health contracts toward zero. This does not make medical resources irrelevant; the two characteristics share too much variance for reliable separation.

Table 4. Fractional Logistic Regression Estimates for the Lethal Escalation Index

Predictor / fit	M1	M2	M3	M4	S1	S2
Intercept	-1.599*** (0.146)	-1.703*** (0.136)	-1.834*** (0.144)	-1.833*** (0.147)	-2.028*** (0.158)	-1.848*** (0.145)
Firearms	-0.390 (0.200)	0.015 (0.170)	-0.050 (0.188)	-0.029 (0.176)	0.054 (0.183)	-0.078 (0.181)
Alcohol	-0.177 (0.160)	0.123 (0.149)	0.150 (0.121)	0.159 (0.118)	0.207 (0.183)	0.134 (0.117)
Log health expenditure	—	-0.781*** (0.172)	—	-0.086 (0.324)	-0.443 (0.476)	-0.076 (0.319)
Government effectiveness	—	—	-1.047*** (0.188)	-0.981** (0.366)	-0.718 (0.418)	-0.994** (0.350)
N	88	88	88	88	74	89
AIC	86.27	83.89	81.38	83.36	66.87	84.18

Predictor / fit	M1	M2	M3	M4	S1	S2
McFadden R^2	.020	.073	.104	.104	.102	.104

Note. Entries are coefficients with HC3 robust standard errors in parentheses. Predictors are standardized; health expenditure is log transformed. M1 includes firearms and alcohol; M2 adds health; M3 adds government effectiveness; M4 includes all predictors. S1 requires three matched years; S2 uses 2017 only. ***p* < .01.** **p* < .001.

Firearm prevalence and alcohol consumption remain statistically uncertain in Model 4. Holding the other predictors at their means, moving government effectiveness from its first to third quartile corresponds to an adjusted LEI difference of −17.68 percentage points (95% CI: −30.40, −4.96). The analogous contrasts are −0.33 points for firearms (95% CI: −4.34, 3.68), 2.72 for alcohol (95% CI: −1.24, 6.69), and −1.38 for health expenditure (95% CI: −11.65, 8.89). Figure 3 shows these conditional predictions and their uncertainty.

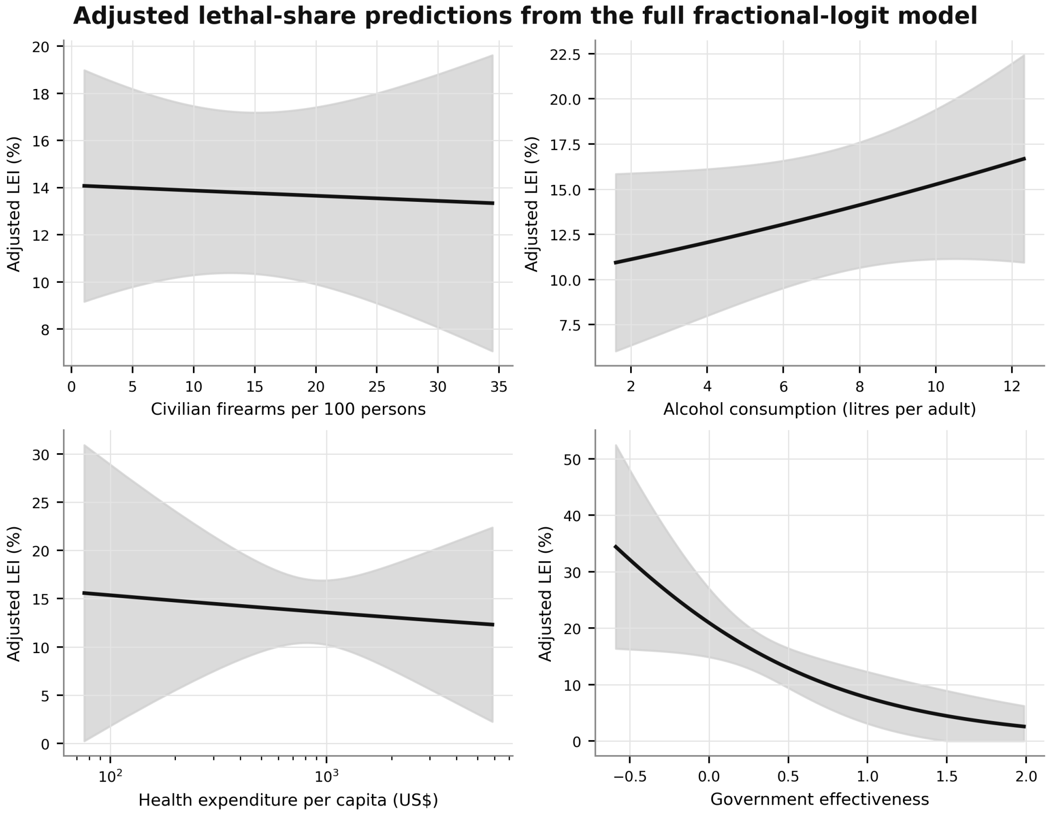

Figure 3. Adjusted LEI Predictions from the Full Fractional-Logit Model

The exact-three-year sensitivity model preserves the signs of the full specification but widens uncertainty; government effectiveness is negative at p = .086. The 2017-only model closely reproduces the primary estimate for government effectiveness (b = −0.994, p = .005). Adding regional fixed effects reduces its precision (p = .091) and yields a positive alcohol coefficient, but the region groups are too imbalanced for this exploratory result to carry much weight. Across specifications, the most defensible pattern is not a precisely isolated institutional effect. It is a shared institutional-resource gradient that the available macro indicators cannot fully decompose.

Interpreting the Cross-National Lethal Share

The first research question receives a clear descriptive answer: countries differ dramatically in the lethal share of recorded serious violence. LEI reveals variation hidden by homicide rates alone and aligns with research separating dispute frequency from lethal resolution (Berg, 2019) and distinguishing fatal from nonfatal firearm events (Hipple & Magee, 2017; Gill et al., 2026). Lethality conditionality is therefore a comparative object in its own right.

The second question yields a more qualified answer. Government effectiveness has the most stable negative association, but its substantive content is not singular. Effective institutions may interrupt conflicts, coordinate emergency services, or improve the chances that an injured victim survives. They may also record serious assault more comprehensively. Because LEI places serious assault in the denominator, institutional visibility lowers the index even if the underlying risk of death is unchanged. The coefficient may therefore combine lethal prevention with administrative penetration. Cross-national governance research often interprets institutional measures as social-control capacity (Cao & Zhang, 2017; Nivette & Eisner, 2013); a compositional outcome reveals that measurement capacity can be part of the same association.

Health expenditure is negative until government effectiveness enters. This supports but cannot verify the medical-lethality thesis because national spending is remote from trauma treatment. Discovery, dispatch, transport, triage, surgery, and blood supply are better captured by spatial or clinical measures (Crandall et al., 2013; Summers & Rogers, 2020; Hanink et al., 2023). Heavy spending need not ensure rapid trauma access, while capable administration may make expenditure more effective. The health–governance correlation is therefore substantive: survival infrastructure is institutionally organized.

The firearm null does not contradict evidence that guns make attacks more lethal (Braga et al., 2021). Civilian firearms per 100 persons measures a stock, whereas instrumentality operates through weapons used in violent events. High-stock societies may have little criminal firearm use; low-estimate societies may contain concentrated illicit access. Caliber and wound characteristics further shape survival (Braga & Cook, 2018). Cross-national firearm research identifies associations with homicide or policy (Hurka & Knill, 2020; Rutar, 2025), but LEI conditions on recorded serious assault. Better tests require comparable weapon data for fatal and nonfatal incidents.

Annual alcohol volume is too coarse to capture acute intoxication. Consumption may predict violent encounters without determining their fatality, so the uncertain coefficient does not rebut wider homicide evidence (Weiss et al., 2018; Hockin et al., 2018; Escaño & Pridemore, 2024). Future analysis should measure episodic drinking and alcohol involvement at the event.

The broader methodological implication is that LEI occupies two empirical domains. It is an *outcome ecology* because weapon severity and post-injury care shape survival. It is also a *recording ecology* because administrative systems decide which nonfatal events enter the denominator. These domains are not separable with the present data. That limitation does not make the index meaningless; it changes the claims that can be made. A high LEI identifies a country-period where recorded serious violence is unusually concentrated in homicide. It does not establish that a randomly selected serious assault has the reported probability of becoming fatal.

Limitations and Future Research

The primary limitation is denominator comparability. UNODC harmonizes concepts through the ICCS, but national legal definitions, counting units, reporting propensities, police coverage, and recording stages still differ. Serious assault is especially sensitive to victim reporting and institutional processing. Homicide data are comparatively robust but not immune to missingness or model-based estimation, and data portals can conceal revisions that matter for reproducibility (Kanis et al., 2017; Eisner & Fearon, 2021). Ecological mapping of recorded homicide in Indonesia similarly demonstrates that official counts index territorial visibility and administrative capture as well as underlying burden (Kadir, 2026c). The wide LEI range should therefore be understood as a diagnostic signal that includes data-system variation.

Second, the numerator and denominator are aggregate categories, not linked events. The construction cannot observe assault severity among survivors, attempted homicide, delayed deaths, multiple victims, or whether national systems count victims and offenses consistently. Relational analysis of Indonesian homicide also shows that aggregate legal counts suppress distinctions in victim–offender relationships, immediate situations, and final legal classification (Kadir, 2026f). Population pooling over 2016–2018 reduces annual noise but does not solve classification heterogeneity. The ratio is also affected mechanically when the assault denominator is unusually small.

Third, the covariates are proxies with unequal precision. Small Arms Survey estimates use different estimation methods across countries. Alcohol volume does not measure event intoxication. Current health expenditure is not emergency medical performance. Government effectiveness is a broad perception-based composite and may absorb development, state capacity, and data quality. The complete-case sample underrepresents Africa and Oceania, precluding confident global generalization. Cross-sectional estimation cannot establish temporal ordering and remains vulnerable to omitted inequality, organized violence, urban structure, weapon-use patterns, and conflict exposure.

The next empirical step should prioritize measurement depth over additional macro predictors. A credible extension would assemble fatal and nonfatal assault by weapon, use victim-based counts, document the recording stage, and link emergency transport and trauma-capacity indicators. Countries with stable definitions could then be followed longitudinally. Multilevel analysis would become appropriate only when comparable country-year variation and sufficient within-country observations exist. For the present data, a single fractional-response framework keeps the estimator proportionate to the claims.

CONCLUSION

Homicide is not only a frequency of violent death; at the aggregate level, it is also the lethal component of a wider serious-violence configuration. The Lethal Escalation Index makes that configuration visible. Across 88 countries, the lethal share of recorded serious violence varies sharply, and its strongest adjusted correlate is a national institutional-resource gradient. The result remains substantively ambiguous because capable institutions can both reduce death and increase the visibility of nonfatal assault.

The contribution is therefore conceptual and diagnostic rather than causal. LEI redirects attention from violence prevalence to violence lethality while enforcing a distinction between event-level survival and country-level recorded composition. Used with that restraint, it can guide more exacting research on weapon deployment, emergency care, and administrative visibility. Used as a literal probability or a ranking of “true” national lethality, it would exceed what the data can support.

REFERENCES

Barry, L. E., Crealey, G. E., Nguyen, N. T. Q., Weiser, T. G., Spitzer, S. A., & O’Neill, C. (2022). Hospital costs and fatality rates of traumatic assaults by mechanism in the US, 2016–2018. *JAMA Network Open, 5*(6), e2218496. https://doi.org/10.1001/jamanetworkopen.2022.18496

Berg, M. T. (2019). Trends in the lethality of American violence. *Homicide Studies, 23*(3), 262–284. https://doi.org/10.1177/1088767919849643

Braga, A. A., & Cook, P. J. (2018). The association of firearm caliber with likelihood of death from gunshot injury in criminal assaults. *JAMA Network Open, 1*(3), e180833. https://doi.org/10.1001/jamanetworkopen.2018.0833

Braga, A. A., Griffiths, E., Sheppard, K., & Douglas, S. (2021). Firearm instrumentality: Do guns make violent situations more lethal? *Annual Review of Criminology, 4*(1), 147–164. https://doi.org/10.1146/annurev-criminol-061020-021528

Cao, L., & Zhang, Y. (2017). Governance and regional variation of homicide rates. *International Journal of Offender Therapy and Comparative Criminology, 61*(1), 25–45. https://doi.org/10.1177/0306624X15587278

Cook, P. J., Rivera-Aguirre, A. E., Cerdá, M., & Wintemute, G. (2017). Constant lethality of gunshot injuries from firearm assault: United States, 2003–2012. *American Journal of Public Health, 107*(8), 1324–1328. https://doi.org/10.2105/AJPH.2017.303837

Crandall, M., Sharp, D., Unger, E., Straus, D., Brasel, K., Hsia, R., & Esposito, T. (2013). Trauma deserts: Distance from a trauma center, transport times, and mortality from gunshot wounds in Chicago. *American Journal of Public Health, 103*(6), 1103–1109. https://doi.org/10.2105/AJPH.2013.301223

Eisner, M., & Fearon, P. (2021). Pitfalls of using data portals as sources for psychological research: The example of cross-national homicide data. *Psychological Science, 32*(6), 863–865. https://doi.org/10.1177/0956797621989967

Escaño, G. J., & Pridemore, W. A. (2024). Population-level alcohol consumption and homicide rates in Latin America: A fixed effects panel analysis, 1961–2019. *The British Journal of Criminology, 64*(3), 656–674. https://doi.org/10.1093/bjc/azad056

Gill, L., Novak, K. J., & Patterson, S. (2026). Social vulnerability and firearm violence: An examination of the correlates of fatal and nonfatal shootings. *Homicide Studies, 30*(3), 237–260. https://doi.org/10.1177/10887679241252438

Gingerich, D. W., & Oliveros, V. (2018). Police violence and the underreporting of crime. *Economics & Politics, 30*(1), 78–105. https://doi.org/10.1111/ecpo.12102

Hanink, P. A., Renner, M., & Bates, C. J. (2023). Lethality of police shootings and proximity to trauma centers. *Homicide Studies, 27*(1), 120–141. https://doi.org/10.1177/10887679221116546

Harris, A. R., Thomas, S. H., Fisher, G. A., & Hirsch, D. J. (2002). Murder and medicine: The lethality of criminal assault, 1960–1999. *Homicide Studies, 6*(2), 128–166. https://doi.org/10.1177/108876790200600203

Hipple, N. K., & Magee, L. A. (2017). The difference between living and dying: Victim characteristics and motive among nonfatal shootings and gun homicides. *Violence and Victims, 32*(6), 977–997. https://doi.org/10.1891/0886-6708.VV-D-16-00150

Hockin, S., Rogers, M. L., & Pridemore, W. A. (2018). Population-level alcohol consumption and national homicide rates. *European Journal of Criminology, 15*(2), 235–252. https://doi.org/10.1177/1477370817731042

Hurka, S., & Knill, C. (2020). Does regulation matter? A cross-national analysis of the impact of gun policies on homicide and suicide rates. *Regulation & Governance, 14*(4), 787–803. https://doi.org/10.1111/rego.12235

Kadir, Z. K. (2026a). Beyond firearms: Mapping Global Patterns of Non-Firearm Homicide in Comparative Criminological Perspective. *Punggawa Global Research: Jurnal Multidisiplin, 1*(2), 1–10.

Kadir, Z. K. (2026b). Ketimpangan Risiko Pembunuhan di Berbagai Kawasan Dunia: Pola dan Karakteristik pada Masyarakat dengan Pembunuhan Rendah dan Tinggi. *Majelis: Jurnal Hukum Indonesia, 3*(2), 224–239. https://doi.org/10.62383/majelis.v3i2.1724

Kadir, Z. K. (2026c). Mapping Recorded Homicide in Indonesia: An Ecological Criminological Analysis Using BPS Data. *Punggawa Law Review, 1*(2), 9–18.

Kadir, Z. K. (2026d). Melampaui Kajian Pembunuhan: Urgensi Kekerasan Mematikan (Lethal Violence) sebagai Bidang Analisis Kriminologis Tersendiri. *Jurnal Pendidikan Sosial dan Humaniora, 5*(3), 3992–4008.

Kadir, Z. K. (2026e). Preventing Murder without Expanding Punishment: Rethinking Homicide Policy Beyond Deterrence. *Punggawa Law Review, 1*(3), 49–58. https://doi.org/10.67707/plr.v1i3.40

Kadir, Z. K. (2026f). The Social Anatomy of Homicide: Relationships, Situations, and Legal Categories in Indonesia. *SOCILEXIA: Journal of Social Sciences and Legal Studies, 1*(1).

Kanis, S., Messner, S. F., Eisner, M. P., & Heitmeyer, W. (2017). A cautionary note about the use of estimated homicide data for cross-national research. *Homicide Studies, 21*(4), 312–324. https://doi.org/10.1177/1088767917715670

Kaufman, E. J., Wiebe, D. J., Xiong, R. A., Morrison, C. N., Seamon, M. J., & Delgado, M. K. (2021). Epidemiologic trends in fatal and nonfatal firearm injuries in the US, 2009–2017. *JAMA Internal Medicine, 181*(2), 237–244. https://doi.org/10.1001/jamainternmed.2020.6696

Lauritsen, J. L., & Lentz, T. S. (2019). National and local trends in serious violence, firearm victimization, and homicide. *Homicide Studies, 23*(3), 243–261. https://doi.org/10.1177/1088767919848665

Linde, A. (2018). The impact of improvements in medical care resources on homicide trends: The case of Germany (1977–2011). *European Journal on Criminal Policy and Research, 24*(1), 99–119. https://doi.org/10.1007/s10610-017-9340-7

Nivette, A. E. (2011). Cross-national predictors of crime: A meta-analysis. *Homicide Studies, 15*(2), 103–131. https://doi.org/10.1177/1088767911406397

Nivette, A. E., & Eisner, M. (2013). Do legitimate polities have fewer homicides? A cross-national analysis. *Homicide Studies, 17*(1), 3–26. https://doi.org/10.1177/1088767912452131

Papke, L. E., & Wooldridge, J. M. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics, 145*(1–2), 121–133. https://doi.org/10.1016/j.jeconom.2008.05.009

Park, M., Park, S., Lee, Y., & Lee, J. (2025). Exploring the association between emergency hospital services and homicide incidents in Pennsylvania. *SSM—Population Health, 29*, 101744. https://doi.org/10.1016/j.ssmph.2024.101744

Pina-Sánchez, J., Brunton-Smith, I., Buil-Gil, D., & Cernat, A. (2023). Exploring the impact of measurement error in police recorded crime rates through sensitivity analysis. *Crime Science, 12*(1), 14. https://doi.org/10.1186/s40163-023-00192-5

Poole, A. C., McCutcheon, J. C., Toohy, K., & Burraston, B. (2018). Testing the impact of road network connectivity on criminal lethality. *Homicide Studies, 22*(3), 277–295. https://doi.org/10.1177/1088767918754307

Ramalho, E. A., Ramalho, J. J. S., & Murteira, J. M. R. (2011). Alternative estimating and testing empirical strategies for fractional regression models. *Journal of Economic Surveys, 25*(1), 19–68. https://doi.org/10.1111/j.1467-6419.2009.00602.x

Rutar, T. (2025). Guns do kill people: Novel global evidence on the cross-national relationship between gun ownership and (gun) homicide. *Journal of Criminal Justice, 101*, 102512. https://doi.org/10.1016/j.jcrimjus.2025.102512

Small Arms Survey. (2018). *Civilian firearms holdings, 2017: Annexe to Estimating global civilian-held firearms numbers*. Geneva: Small Arms Survey.

Summers, L., & Rogers, T. G. (2020). Too far for comfort? Situational access to emergency medical care and violent assault lethality. *Crime Science, 9*(1), 16. https://doi.org/10.1186/s40163-020-00124-7

Trangenstein, P. J., Peddireddy, S. R., Cook, W. K., Rossheim, M. E., Monteiro, M. G., & Jernigan, D. H. (2021). Alcohol policy scores and alcohol-attributable homicide rates in 150 countries. *American Journal of Preventive Medicine, 61*(3), 311–319. https://doi.org/10.1016/j.amepre.2021.03.020

Tuttle, J., McCall, P. L., & Land, K. C. (2018). Latent trajectories of cross-national homicide trends: Structural characteristics of underlying groups. *Homicide Studies, 22*(4), 343–369. https://doi.org/10.1177/1088767918774083

United Nations Office on Drugs and Crime. (2026a). *Intentional homicide: Data and metadata*. UNODC Data Portal. Data downloaded July 2026.

United Nations Office on Drugs and Crime. (2026b). *Violent and sexual crime: Data and metadata*. UNODC Data Portal. Data downloaded July 2026.

Weiss, D. B., Testa, A., & Rennó Santos, M. (2018). Hazardous alcohol drinking and cross-national homicide rates: The role of demographic, political, and cultural context. *Journal of Drug Issues, 48*(2), 246–268. https://doi.org/10.1177/0022042617750579

World Bank. (2025). *Worldwide Governance Indicators: Government effectiveness*. Washington, DC: World Bank.

World Bank. (2026a). *World Development Indicators: Total alcohol consumption per capita (liters of pure alcohol, projected estimates, 15+ years of age)*. Washington, DC: World Bank.

World Bank. (2026b). *World Development Indicators: Current health expenditure per capita (current US$)*. Washington, DC: World Bank.