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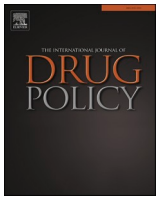

Governance and trade: Mafias' multifunctional violence in Italian drug markets

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ABSTRACT

Systemic violence is a structural feature of drug economies and a key spillover of prohibitionist drug policies. Despite its centrality, the concept is often applied in ways that obscure its distinct purposes, market levels, and organizational contexts. To address this gap, the study examines violence at the intersection of mafia activity and drug markets, focusing on its distribution across market levels (retail, national wholesale, transnational), organizational functions (governance and trade), and rivalry configurations (inter-, intra-, and extra-clan). It draws on a press-based dataset of mafia-related homicides in Italy (2014–2024) to code and analyze these dynamics. Results show that more than half of all mafia homicides are drug-related, mainly tied to governance activities and concentrated at the retail level of the market. This pattern marks a qualitative shift in mafia violence: increasingly selective, embedded in market dynamics, confined to criminal circuits. Statistical analyses reveal significant associations between activity type, market level, and rivalry configuration, indicating that coercion concentrates where regulatory control and market participation intersect. This pattern underscores the multifunctional nature of Italian mafias, which govern markets from within while actively engaging in trade. By grounding this overlap empirically, the study advances theoretical debates on organized crime's role in shaping illicit economies. It also offers a replicable framework for analyzing drug-related violence in the absence of official statistics.

Introduction

Violence embedded in the routine functioning of illicit markets—what Goldstein (1985); 1992 termed systemic violence—is a defining feature of many drug economies and a key spillover of prohibitionist policies (MacCoun & Reuter, 2001; Reuter, 2009; Reuter & Kleiman, 1986). Yet, despite its centrality in scholarly and policy debates, the concept is often applied in ways that blur distinct mechanisms and contexts (Liem & Moeller, 2025). To advance cumulative knowledge, focusing on mafia groups, we empirically investigate systemic violence along three axes: where in the drug supply chain violence emerges (retail, national wholesale, transnational), what organizational functions it serves (governing markets versus performing trade), between whom it concentrates (within clans, between clans). This triple focus allows us to disentangle how, and at which levels, lethal coercion is produced in concrete settings.

Systemic violence in illicit markets refers to a continuum of coercive practices—ranging from threats and non-lethal assaults to kidnappings, property damage, and murders—through which market actors enforce agreements, discipline participants, deter defection, and assert authority under conditions of illegality (Goldstein, 1985, 1992; Reuter, 2009). In this study, we focus on lethal violence and take homicide as our unit of analysis. Lethal violence is not simply "more violence"; it is a distinct instrument with different costs and payoffs. Non-lethal coercion can discipline while limiting visibility and enforcement risk, and it may therefore be preferred when compliance can be restored without permanently removing an actor. Killings tend to be reserved for higher-stakes conditions in which credible deterrence requires an irreversible sanction, the organization seeks to eliminate a rival, defector, informant, or uncontrollable subordinate rather than correct behavior, retaliation is needed to maintain reputation and prevent challenges, or organizational coordination fails and conflicts escalate into feuds. Conversely, because homicide attracts attention and can disrupt business, it is often avoided when stable cooperation and reputation-based exchange can substitute for force.

The choice of focusing on homicides is primarily methodological and

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inferential. Compared to non-lethal forms of coercion, homicides are more consistently detected and publicly documented, making them the most reliably observable manifestation of extra-legal enforcement when relying on open sources. Homicide is less subject to underreporting and definitional ambiguity than assaults or intimidation and therefore provides a comparatively robust proxy for violence trends and correlates (Aziani, 2020; Eisner, 2014; Nivette, 2011). At the same time, focusing on homicides implies that our findings capture the extreme end of mafia coercion—the situations in which conflict, discipline, or retaliation escalates beyond non-lethal control. We therefore interpret observed patterns not as the full distribution of coercion used in mafia drug markets, but as the subset of episodes in which the governance–trade interplay becomes visible through its most consequential and least deniable outcome. We distinguish violence used to govern markets—policing territory, disciplining participants, fixing prices, or excluding rivals—from violence used to perform the trade—securing shipments, enforcing specific payments, or managing transactional risks. This differentiation sharpens long-standing debates on whether mafias are primarily regulators or entrepreneurs (Kleemans, 2007; L. Paoli, 2020; Varese, 2010). It also allows one to investigate the rivalry configurations in which violence occurs—within clans (intra-group discipline and succession struggles), between clans (turf and market contests), or against external actors (encroachers and free-riders) (Catino, 2019; Chinnici & Santino, 1989). Through this lens, we link the micro-mechanisms of coercion to the broader question of how organized crime combines regulatory authority with commercial participation.

Empirically, progress has been constrained by data that rarely identify the market level, organizational role, or relational context of violent events (de Bont et al., 2018; Rabolini et al., 2024). Official statistics seldom classify homicides by drug-market involvement or by governance versus trade functions, and legal categories typically do not require such distinctions to be recorded systematically. We address this gap by drawing on a comprehensive press-based dataset of mafia-related homicides in Italy from 2014 to 2024. Systematic open-source collection from national and local outlets enables us to capture otherwise overlooked dimensions of drug-related violence and to code events consistently across time and space. In doing so, we illustrate an approach which can be adopted to improve international comparability of drug-violence data, offering a replicable strategy for jurisdictions where official sources do not differentiate types of criminal market violence.

Beyond mapping drug-related killings, the article speaks to the multifunctionality of mafia-type organizations. We argue that production, trade, and governance are not discrete, mutually exclusive roles but interwoven dimensions of organized crime. Recognizing this overlap clarifies how violence by mafia groups operates simultaneously as market enforcement and regulatory authority. By situating lethal events at the intersection of market level, organizational function, and rivalry configuration, the study links classic theoretical distinctions to observed patterns on the ground and provides an empirical basis for comparative research on criminal governance in drug markets.

Background

Debates on organized crime have long turned on a familiar dichotomy: whether to define it by who commits it or by what is done. Early actor-based approaches, centered on stable criminal groups and hierarchies, soon showed their limits, feeding stereotypes and what Albanese (1996) called the “ethnicity trap” of labelling whole communities as criminal. The corrective came with the shift to activities—from Smith’s (1975) and Block’s (1980/1983) view of organized crime as the supply of illicit goods and services to Reuter’s (1983) analysis of illegal markets. This focus on activities replaced static notions of ethnicity or organization with economic and relational processes, but it also raised new questions about how to classify and connect different criminal functions within and across markets.

Over time, this activity-based approach evolved and diversified. Block’s (1980/1983) distinction between enterprise and power syndicates first acknowledged that organized crime could involve both market-oriented exchange and coercive control. Gambetta (1993) expanded this insight by conceptualizing the Sicilian Mafia as a private supplier of protection, making regulation and violence themselves a form of enterprise. Later, Kleemans (2007) distinguished between transit crime and racketeering, and Varese (2010) between organized crime—aiming to regulate and control the production and distribution of goods and services illegally—and mafias, which control the supply of protection. The most recent contributions propose tripartitions: Von Lampe (2016) distinguishes between market-based, predatory, and governance crimes, while Varese and colleagues differentiate production, trade, and governance as the main modalities of organized crime (Breuer & Varese, 2023; Campana et al., 2025; Campana & Varese, 2018).

While these classifications offer clear analytical categories, they rest on a problematic assumption of exclusivity. The tripartition between production, trade, and governance is often treated as alternative rather than cumulative, implying that criminal groups specialize in one dominant activity. This logic extends to organizational structure, assuming that form follows function and that distinct activities correspond to distinct organizational types. Although activities can influence structure (Morselli et al., 2007), research shows that among mafias, multiple layers of activity frequently coexist within broader structural orders (Calderoni, 2012; Manzi, 2025). Recent models largely associate mafias with governance—conceiving them as providers of protection and regulation over legal and illegal markets (Breuer & Varese, 2023; Campana et al., 2025; Campana & Varese, 2018). Paoli (2002, 2014, L. 2020) explicitly challenged this assumption, describing mafias as *multifunctional organizations* that pursue economic, political, and social objectives simultaneously.

Among the various activities linked to organized crime, drug markets hold a central position. They are among the most profitable illegal economies and generate complex value chains connecting production, trafficking, and retail distribution. Empirical research shows that organized crime groups and mafias, though not the only actors involved, play key roles within these markets (Paoli, 2002; Reuter, 1983). While often associated with governance, mafias also engage directly in trading and, at times, production—either autonomously or through alliances and subcontracting with other criminal groups (Baradel & Breuer, 2024; Calderoni, 2012; Calderoni et al., 2016; Tenti & Morselli, 2014). These overlapping roles show how the same organization can act simultaneously as market participant and regulator, blurring the boundaries between entrepreneurial and governance functions.

Within both organized crime and the functioning of many drug markets, violence has a core position. In classical accounts of the mafias, violence and the reputation for violence constitute their defining resources: Gambetta (1993) described the Sicilian Mafia as a private supplier of protection whose credibility depends on its capacity to use force effectively and selectively. Violence is not an aberration but a regulatory mechanism—a way to enforce agreements, maintain discipline, and project authority in the absence of legal enforcement (Beatrice, 2017; Catino, 2019; Paoli, 2003). Yet mafia violence also performs symbolic and cultural functions: it communicates power, reaffirms hierarchy, and expresses adherence to internal codes of honor and reputation (Massari & Martone, 2018; Paoli, 2003; Santino, 1989). Catino (2014, 2019, 2020) further argues that patterns of mafia violence vary with organizational structure: mafias with *higher-level coordinating bodies*, such as Cosa Nostra and the ’Ndrangheta, tend to contain internal conflicts and channel coercion toward external targets, whereas decentralized systems like the Camorra, lacking such mechanisms, display more frequent internal homicides. Although his framework concerns mafia violence in general rather than drug markets specifically, it underscores how organizational coordination shapes both the use and visibility of lethal force—a factor central to understanding

contemporary criminal economies.

Although drug markets are often peaceable, systemic violence—aggressive interactions embedded in the business practices of distribution and trafficking—can erupt under certain conditions (Aziani, 2020; Goldstein, 1985; Jacques & Wright, 2008; Liem & Moeller, 2025; Reuter, 1983, 2009). Such violence encompasses disputes over territory, assaults and homicides within dealing hierarchies to enforce internal codes, the elimination of informers, and punishment for counterfeit sales or unpaid debts (Goldstein, 1985, 1992). This systemic violence parallels the coercive governance of organized crime, rooted in the foundational constraint that illicit markets operate without the civil protections of the state and courts (Jacques & Wright, 2008; Reuter, 2009). These dynamics mirror the coercive governance of organized crime, grounded in the absence of legal protections within illicit markets (Aziani, 2020; Jacques & Wright, 2008; Reuter, 2009). This violence is regulatory, functioning to enforce internal normative codes, deter defection, and discipline subordinates (Goldstein, 1985; Reuter, 2009). Managers, fearing subordinates who might inform, may use violence as a prophylactic tool to reduce this risk. Furthermore, violence serves a symbolic role, such as gaining respect and deterring future attacks by applying the "code of the streets" where the shedding of blood repays the debts (Goldstein, 1985; Moeller & Sandberg, 2019). In this sense, the violence of drug markets and that of mafias reflect a shared logic of extra-legal governance, sustaining order and defining authority within criminal economies.

Against this background, our analysis examines how these theoretical distinctions manifest in contemporary mafia violence. Despite extensive theorization on the activities of organized crime and the role of violence, empirical research has rarely examined how different forms of violence correspond to the functions of organized crime in practice. Most studies focus either on the economic dimension of illicit markets or on the governance and regulatory roles of mafias, but seldom on how these overlap. As a result, the relationship between *trading* and *governing* remains largely inferred rather than observed, and the extent to which violence serves market enforcement, internal regulation, or both is still unclear. Systematic and comparable data on these dynamics are scarce, particularly in advanced economies where overt mafia violence has declined but persists in more selective and strategic forms.

By classifying each homicide according to its link to drug markets, the type of activity involved, the market level where it occurred, its internal or external nature, and the roles and criminal records of victims and offenders, the study explores how patterns of violence reveal the interplay between trading and governing functions within organized crime. In doing so, the analysis connects long-standing conceptual debates on production, trade, and governance with empirical evidence on the concrete use of lethal violence in drug markets. The resulting framework not only advances understanding of how mafias operate across overlapping economic and regulatory spheres, but also offers a replicable basis for studying drug-related violence and organized crime in other contexts.

Data and methods

Data sources

Newspapers have long offered accessible and detailed insights into mafia violence in Italy. Since the 1980s, studies on homicides in Palermo and Calabria have analyzed local press to trace patterns and trends in violence (Chinnici & Santino, 1989; Tucci, 1983). This reliance on journalistic sources remains central in recent scholarship, informing research on electoral coercion (Daniele & Dipoppa, 2017), Camorra shootings (Gatta, 2018), homicide clearance (Aziani & Persurich, 2023), and the territorial expansion of mafia groups (Dipoppa, 2025). Our study builds on this tradition, using online news as the primary data source.

The dataset used in this study is constructed through harvesting of open-access news reports and press releases on suspected mafia-related homicides occurred in Italy between 2014 and 2024. Online press material is gathered from major national and local outlets through two complementary strategies: searches on a large aggregator (i.e., Google News) and queries run on *MOSAIC*, a bespoke crawler indexing >1500 Italian newspapers and magazines. This dual collection strategy ensures comprehensive coverage across national and local news, capturing both widely publicized murders and those confined to local outlets.

To guide the search process, we used a list of Italian keywords designed to capture all variants of heterogeneous journalistic descriptions of suspected mafia-related killings. The query set combined (i) homicide terms (e.g., *omicidio, omicidi, assassinio, assassini*), (ii) explicit mafia markers (e.g., *mafia, mafioso/mafiosa, mafiosi/mafiose*), and (iii) event- and modality-specific expressions used in reporting mafia violence (e.g., *agguato* for ambushes; *faida* for feud-related violence; *lupara bianca* for enforced, mafia-style disappearances). In addition, we included combinations referencing specific organizations such as the Camorra, Cosa Nostra, and 'Ndrangheta. Search strings were implemented both as single terms and as multi-term combinations (e.g., *omicidio* + *mafia* + *agguato; faida* + *omicidio*; or *Camorra* + *omicidio*). Overlapping and redundant expressions were deliberately employed to maximize recall and avoid omissions due to variation in journalistic language.

Each homicide was included in the dataset when news coverage indicated a direct or indirect link to mafia dynamics. Direct connections were established when victims, alleged perpetrators, or both were identified by investigators, prosecutors, or journalists as members, affiliates, or associates of recognized mafia organizations. Episodes clearly outside these logics were excluded. Attribution to mafia activity typically relied on recurring indicators: the use of mafia-typical methods (e.g., commando-style ambushes), evidence of ongoing feuds or territorial disputes, ties between victims or suspects and known clans, statements from *pentiti* (collaborating witnesses), and the interpretive frames provided in judicial proceedings and official police reports (Aziani, 2022).

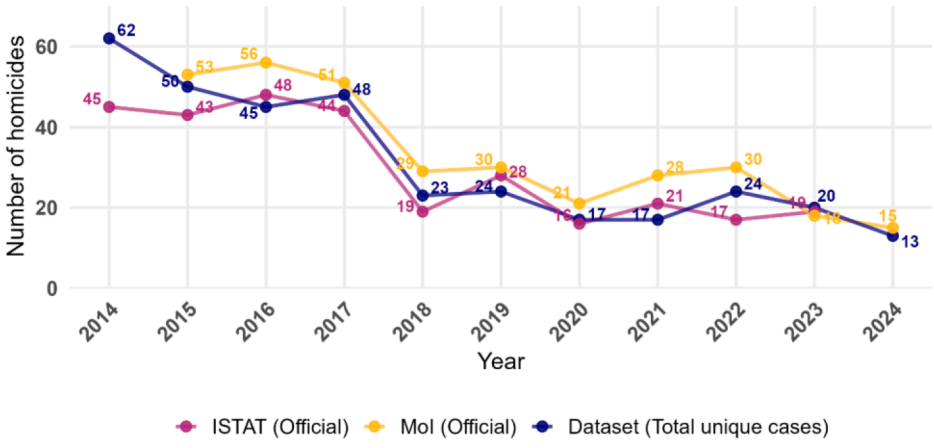
Yearly counts of mafia-related homicides reported by Italian police to the judiciary—made publicly available by the Italian National Institute of Statistics (ISTAT)—are used as a benchmark to evaluate the completeness of our data collection. Whenever ISTAT recorded higher tallies in a province than those identified in our press-based census, we conduct additional targeted searches in local outlets to reconcile discrepancies, or documented instances where divergences could plausibly reflect subsequent reclassifications by judicial authorities.

We identified a total of 343 mafia related homicides committed between 2014 and 2024. We validated our enumeration of mafia homicides against official statistics with satisfactory results (Fig. 1). The number of homicides identified in our dataset closely mirrors official statistics, with total annual counts close to the range of official figures reported by ISTAT's (2025) website and the Ministry of the Interior (MoI) (Servizio Analisi Criminale, 2025). Nonetheless, as also evident from the differences between ISTAT and MoI figures themselves, a degree of uncertainty and interpretive discretion is inherent in the classification and recording of mafia homicides.

Variable coding and analysis

Our dataset is organized around homicide events. Each case corresponds to a lethal episode that occurred in Italy from January 1, 2014, to December 31, 2024, and is credibly linked to mafia dynamics. For each episode, we collect information on the victim(s), the offender(s) (when available), and the circumstances of the event. Then, most of the analysis is conducted at the victim level: each victim within an event is treated as a distinct observational unit.

Rather than attributing each killing to a single cause, we examine motives and circumstances to capture the often-overlapping drivers of mafia homicides. Multiple factors frequently operate simultaneously: a single homicide may arise from both economic disputes (e.g., debts,



Comparison between the news-derived dataset totals (unique cases per year) and official mafia homicide counts reported by ISTAT and the Ministry of the Interior (MoI). Sums plotted: ISTAT (available years) = 300; MoI (available years) = 331; Dataset, Total unique cases (2014-2024) = 343. Official mafia-homicide counts — ISTAT: 2014: 45; 2015: 43; 2016: 48; 2017: 44; 2018: 19; 2019: 28; 2020: 16; 2021: 21; 2022: 17; 2023: 19; 2024: NA | Ministry of the Interior: 2014: NA; 2015: 53; 2016: 56; 2017: 51; 2018: 29; 2019: 30; 2020: 21; 2021: 28; 2022: 30; 2023: 18; 2024: 15.

Fig. 1. Trends in mafia-related homicides: comparison with official statistics (2014–2024).

drug trade) and internal governance dynamics such as disciplining affiliates or enforcing rules (Aziani, 2022; Catino, 2019; Chinnici & Santino, 1989; Paoli, 2003). By coding several motives concurrently, this approach reflects the multifaceted logic of mafia violence, where business, governance, and cultural dimensions intertwine.

Classification followed a multi-step procedure designed to balance systematic coding with the inherent ambiguity of media-based sources. Initial case reconstruction and coding were conducted manually using a standardized codebook and a fixed set of sources per case. These classifications were then supported by large language models (LLMs) to identify inconsistencies, omissions, or alternative interpretations across the full corpus of available news material. Cases where LLM-assisted coding diverged from the initial human classification were subjected to targeted manual review and adjustment. While the process was standardized in terms of decision rules and variables, the number of sources consulted and the intensity of manual verification varied across cases, reflecting differences in information availability and investigative clarity.

As a first step, we classified all homicides into multiple, non-exclusive circumstance categories. (1) *Drug-related* cases involved killings directly connected to drug markets where drugs played a key role. (2) *Other illicit markets* included homicides linked to illegal commodities or services beyond drugs (e.g., firearms, counterfeit goods, untaxed cigarettes, illegal waste, gambling). (3) *Non-drug governance* referred to violence enforcing a mafia group's authority over communities, territories, or markets outside the drug trade—such as punishing unpaid "street taxes" for protection, issuing territorial warnings, or enforcing internal rulings in disputes. By construction, this category was applied only when no market-based motive was identified (i.e., it was mutually exclusive with drug-related and other illicit-market classifications). (4) *Personal/interpersonal* covered killings arising from private relationships or everyday conflicts (jealousy, domestic or romantic disputes, insults, or fights) unrelated to organizational aims or illicit trade. (5) *Political* included attacks on public officials (politicians, judges, prosecutors, police, or civil servants) intended to intimidate, influence, or punish institutions. (6) *Predatory/robbery* comprised homicides committed for material gain (robberies, thefts, or assaults to obtain money, goods, or weapons). (7) *Collateral/bystander* involved unintended victims—mistaken identities, passersby, or individuals caught in crossfire. Finally, a residual category gathered unclear cases or those driven by other motives that are not included in any of the other categories.

As a second step, we next coded homicides for *clan rivalry*, distinguishing *intra-clan* violence—internal struggles, leadership disputes, or disciplinary actions—from *inter-clan* conflicts tied to territorial competition or market disputes (Catino, 2019; Chinnici & Santino, 1989; Santoro, 2022). These two modalities correspond to the internal violence analyzed by Chinnici and Santino (1989). Accordingly, we classified as *external* homicides involving non-mafia actors or undetermined ties. We also classified victim–offender status (mafia members, non-members with or without mafia ties, unknown) to capture how violence functions as both internal regulation and external domination governance (Chinnici & Santino, 1989; Gambetta, 1993; Paoli, 2003). Finally, the criminal record variable measured victims' and offenders' embeddedness in criminal networks, linking individual trajectories to broader market governance dynamics (Aziani 2022).

To assess the reliability of the classification process, we conducted an independent audit on a random subsample of cases. A second researcher re-coded 20 % of the homicides ($n = 68$) using the same codebook and decision rules, independently of the original coding. Inter-coder agreement was high across the core analytical dimensions used in the present study. Percent agreement was 98.5 % for market level and 94.1 % for both activity type and rivalry type. Agreement was similarly high for victim–offender attributes, ranging from 94.1 % to 98.5 %, with slightly lower accordance for offender status (94.1 %) than victim status (95.6 %), and strong agreement for criminal-record indicators (victims 98.5 %, offenders 95.6 %). At the case level, agreement was 97.1 % for drug involvement and 94.1 % for rivalry type. Reliability for circumstance and motive classifications was assessed at the tag level using audit-based false negative and false positive rates. Discrepancies were concentrated in categories that require greater inference from incomplete reporting: for example, non-drug governance was missed in 3 of 15 audited true-positive instances (false negative rate = 20.0 %), whereas drug involvement showed near-ceiling accuracy (false negative rate = 1/37 = 2.7 %; false positive rate = 1/29 = 3.4 %). Importantly, disagreements primarily involved the marginal addition or removal of secondary tags rather than revisions to the primary circumstance classification or market role attributed to the homicide. Overall, the pattern of disagreement reflects expected interpretative variability when coding complex events from open sources, rather than systematic bias or instability in the coding scheme. Discrepancies were resolved through adjudication and consensus review, and the resulting audit patterns were used to inform the sensitivity analysis of classification uncertainty.

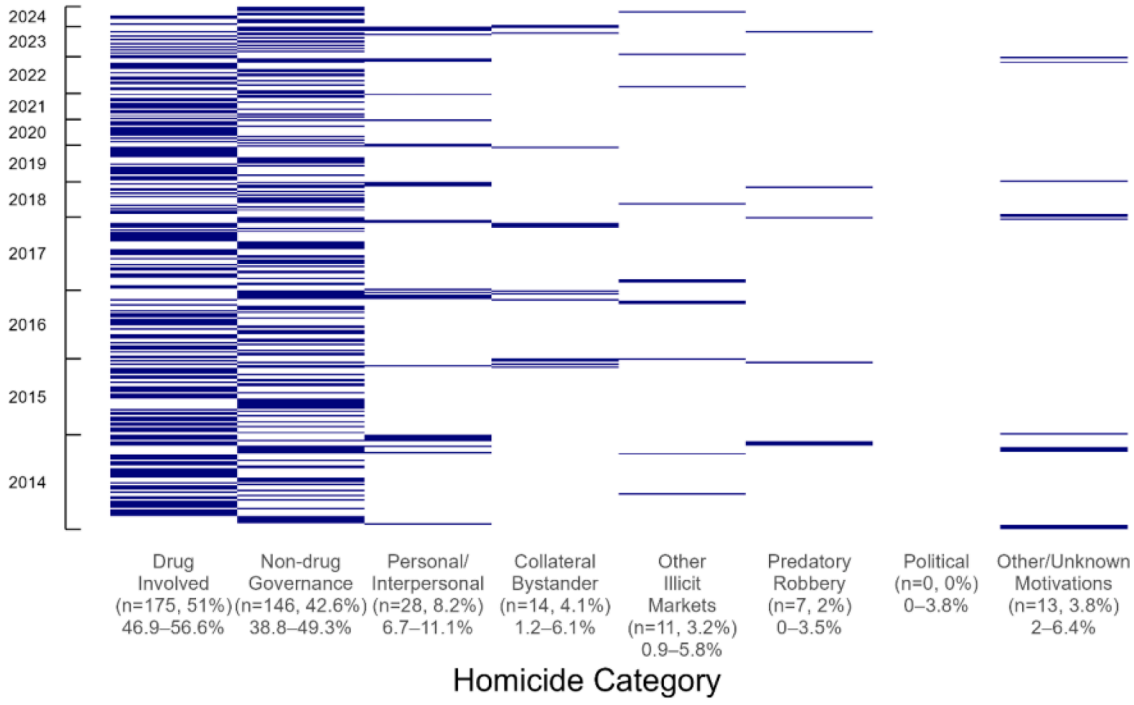
As a third step, we focused on the 175 drug-related homicides to disentangle the association between the market levels of the drug economy and the types of mafia activities. We employed a tagging approach that allowed each homicide to be assigned multiple,

overlapping modalities, capturing the complexity of violent dynamics across scales. First, we classified each homicide by *market level: transnational* (cross-border drug or money flows), *national wholesale* (bulk distribution within Italy), and *retail* (street-level dealing or direct supply to users); cases with insufficient evidence were coded as *unknown*. This variable situates lethal violence within the structure of the illicit market. While Goldstein's (1985; 1992) tripartite framework has long informed research on drug violence, it was developed for urban US contexts and overlooks conflicts along international trafficking routes. More recent studies—particularly on the cocaine trade—highlight these routes as key arenas where competition over logistical hubs such as ports and transport corridors fuels deadly disputes (Liem & Moeller, 2025).

Second, to examine how mafias operate within drug markets, we distinguished two mafia activities—*controlling* and *performing the trade*—reflecting the governance–trading framework introduced earlier. Violence was coded as *controlling* when it enforced authority over supply, distribution, or sales (e.g., expelling rivals, fixing prices, punishing informers, policing territory), consistent with the governance function of organized crime (Campana & Varese, 2018). *Performing the trade* captured violence along the transactional chain—production, transport, payment, or sale—driven by profit rather than regulation, in line with trading functions (Breuer & Varese, 2023; Campana & Varese, 2018). Because regulation and participation often intersect, some incidents combined both dimensions. Overall, 24 homicides (14 %) involved overlapping tags, more often across activities (15) than markets (9).

The analysis aims to map the distribution of drug-related mafia violence across its trading and governing functions, identifying whether specific forms of violence are more likely to occur in particular market segments or rivalry contexts. We first assess pairwise associations between categorical variables through Pearson's χ^2 tests, complemented by Fisher's exact tests when small expected frequencies make the χ^2 approximation unreliable (Cochran, 1954). These non-parametric tests serve as diagnostic tools to determine whether the observed distributions of violence deviate from randomness (Agresti & Kateri, 2011).

To evaluate joint associations across the three main dimensions—activity type, market level, and rivalry type—we apply a series of hierarchical log-linear models (Christensen, 1997; Haberman, 1978). The baseline model assumes independence among the three variables, the second model includes all pairwise interactions, and the saturated model adds a three-way interaction term. Likelihood-ratio (G^2) tests between nested models identify whether higher-order dependencies significantly improve model fit, distinguishing simple pairwise relationships from genuine three-way interactions. To aid interpretation, we report Cramér's V coefficients as standardized effect sizes and inspect standardized residuals to pinpoint which cell combinations drive the strongest associations. For the log-linear models, we restricted the analytic sample to cases with non-missing and non-'unknown' classifications on activity type, market level, and rivalry type; complementary analyses treat 'unknown' as a substantive category and assess robustness to its exclusion.



Note: Columns represent homicide categories, treated as tags; labels report observed counts and percentages together with Monte Carlo 95% prevalence intervals. Rows correspond to unique cases (by victim), grouped by year and ordered within year by the number of distinct motives; multiple categories may apply to the same case. Totals in figure (unique cases n=343): Drug Involved = 175; Non-drug Governance = 146; Personal/ Interpersonal = 28; Collateral Bystander = 14; Other Illicit Markets = 11; Predatory Robbery = 7; Political = 0; Other/Unknown Motivations = 13. Uncertainty is quantified via Monte Carlo propagation of coding error based on a manually audited subsample. For each category, misclassification is applied in the direction indicated by the audit: observed presences are removed with probability P(true=0 | observed=1), and observed absences are added with probability P(true=1 | observed=0). Error probabilities are drawn from Jeffreys-prior Beta distributions. Perturbation is applied only to non-gold (non-investigated) cases.

Category definitions: Drug Involved = drug trafficking; Non-drug Governance = enforcement or governance of authority beyond drug markets; Personal/ Interpersonal = disputes or quarrels unrelated to organized criminal activity; Other Illicit Markets = illegal markets other than drug trafficking; Collateral Bystander = bystanders or mistaken targets; Predatory Robbery = robberies or contract killings motivated by material gain; Political = coercion or violence directed at institutions, officials, or police; Other/Unknown Motivations = explicitly coded as other/unknown.

Fig. 2. Classification of mafia-related homicides (n = 343) in Italy 2014–2024 by circumstances.

We incorporated classification uncertainty into the empirical analyses. Building on the results of the reclassification audit, we implemented a Monte Carlo–based sensitivity procedure designed to propagate plausible misclassification into the contingency tables used for the χ^2 tests and hierarchical log-linear models. Specifically, the audited subsample was used both to identify conservative bounds for misclassification in each analytical dimension (activity type, market level, and rivalry) and to define a gold-standard set of observations that was held fixed (i.e., not perturbed) in the simulations. Higher uncertainty was assigned to inferential or boundary categories, and near-zero uncertainty to core classifications such as drug involvement. We then repeatedly generated alternative, "plausible" datasets by probabilistically reallocating non-audited cases across categories according to these error bounds, treating the observed classifications as noisy realizations of latent categories. Misclassification was structured (i.e., not uniform random): reassignment probabilities were informed by observed disagreement patterns from the audit (i.e., a confusion-matrix logic) and allowed to vary across analytical dimensions. For each of the 1000 Monte Carlo replications, we reconstructed the corresponding contingency tables and re-estimated all test statistics and model comparisons. Substantive conclusions are therefore based not on a single realization of the data, but on the stability of associations across simulations, allowing us to assess whether observed relationships persist under realistic levels of coding uncertainty inherent in media-based classification.

Results

The distribution of mafia-related homicides between 2014 and 2024 reveals that drug trafficking and non-drug related governance activities were the predominant contexts, while other motives were comparatively rare (Fig. 2). More than half of the homicides were connected to drug trafficking, followed by non-drug governance activities, which were relevant for >40 % of the cases. Other categories are less frequent, and notably no homicide had a clear political or institutional nature. Most of the total 343 homicides were associated with one category, while 43 cases were classified into two or more categories at the same time.

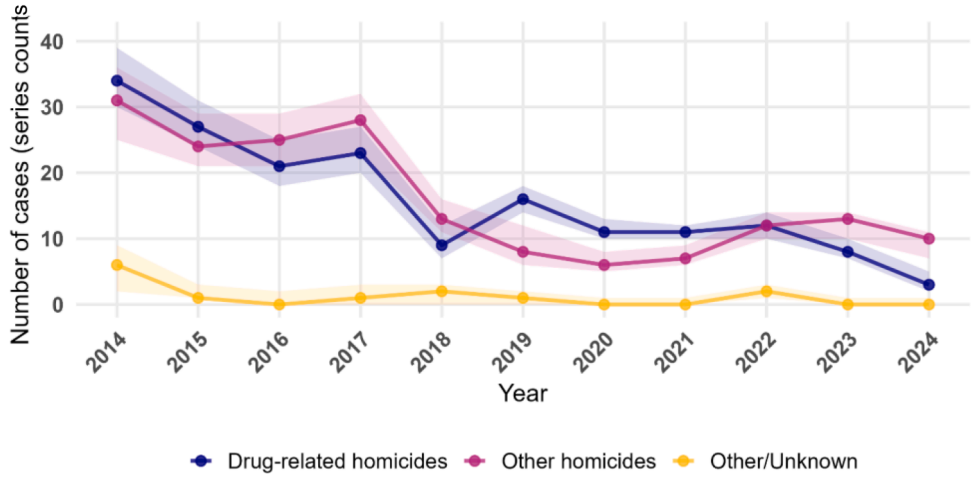
Given the central role of drug trafficking in mafia-related violence, we focus on the 175 drug-related homicides. Between 2014 and 2024, after peaking in 2014 (34 cases), drug-related homicides remained high through 2017 (21–27 cases per year), then dropped in 2018 (9) and stayed at lower levels thereafter, with a temporary rise in 2019 (16) and a further decline by 2024 (3) (Fig. 3). Non-drug-related homicides followed a similar pattern: high and stable through 2017 (24–31 cases), a sharp decrease in 2018–2021 (6–13), and a modest rebound in 2022–2024 (10–13). Overall, both series converge after 2018, indicating a broad contraction of lethal mafia violence over the decade. From a geographical perspective, drug-related mafia homicides concentrate in Southern Italy, with particularly high counts in Campania (102 cases) and Apulia (50), followed by Calabria (10) and Sicily (6). Together, these four regions account for >96 % of the 175 drug-related killings over the period examined. By contrast, the Center and North register only a residual share of such cases, with only Lazio (3) registering more than a single case.

We examined the interactions among activity, market level, and rivalry type in the 175 drug-related mafia homicides (Fig. 4). Among the 133 cases with complete information, at the market level, retail-related violence accounted for four fifths of all cases (80 %), typically reflecting territorial and regulatory conflicts within local distribution systems. Wholesale-level violence (26 %) was comparatively less frequent and primarily involved disputes over shipments, debts, or control of domestic supply networks. Transnational-level cases (7 %) were rare and generally related to high-tier trafficking disputes, such as retaliation for lost shipments or breaches in import arrangements.

Violence was predominantly associated with governance functions rather than trade activities and concentrated at the retail level of the market. Most cases (95 %) involved controlling the trade, while about one in five (18 %) were linked to performing it.

Regarding rivalry dynamics, inter-clan conflicts were the most frequent (63 %), followed by intra-clan (29 %) and external rivalries (21 %). Inter-clan violence often reflected competition over retail territories, whereas intra-clan cases were mainly disciplinary or retaliatory, reinforcing internal order and compliance. External rivalries, though less common, involved clashes with independent or non-mafia actors encroaching on clan territories.

Pairwise χ^2 tests identified significant associations between activity and market level ($\chi^2(2) = 8.62$, $p = .013$, $V = 0.21$) and between activity and rivalry type ($\chi^2(2) = 19.00$, $p < .001$, $V = 0.34$), but not between market level and rivalry type ($\chi^2(4) = 4.96$, $p = .292$, $V = 0.06$). Standardized residuals show that the activity–market association was driven by the overrepresentation of "control the trade" at the retail level (+2.92) and the underrepresentation of "perform the trade" (–2.92), with the reverse pattern at the national wholesale level (control: –2.32;



Series are tag-based counts and may overlap (a case can contribute to multiple series). Drug-related = Drug Involved tag. Other homicides = any non-drug main motive tag (governance, other illicit markets, interpersonal, robbery, collateral, political). Other/Unknown = explicit Other/Unknown tag (not a residual complement). Shaded bands show Monte Carlo 95% intervals from audited misclassification rates. Totals in dataset (2014–2024): Drug-related homicides = 175; Other homicides = 177; Other/Unknown = 13; Dataset total (unique cases) = 343.

Fig. 3. Annual trends in mafia-related homicides: drug-related versus other categories (2014–2024, $n = 343$).

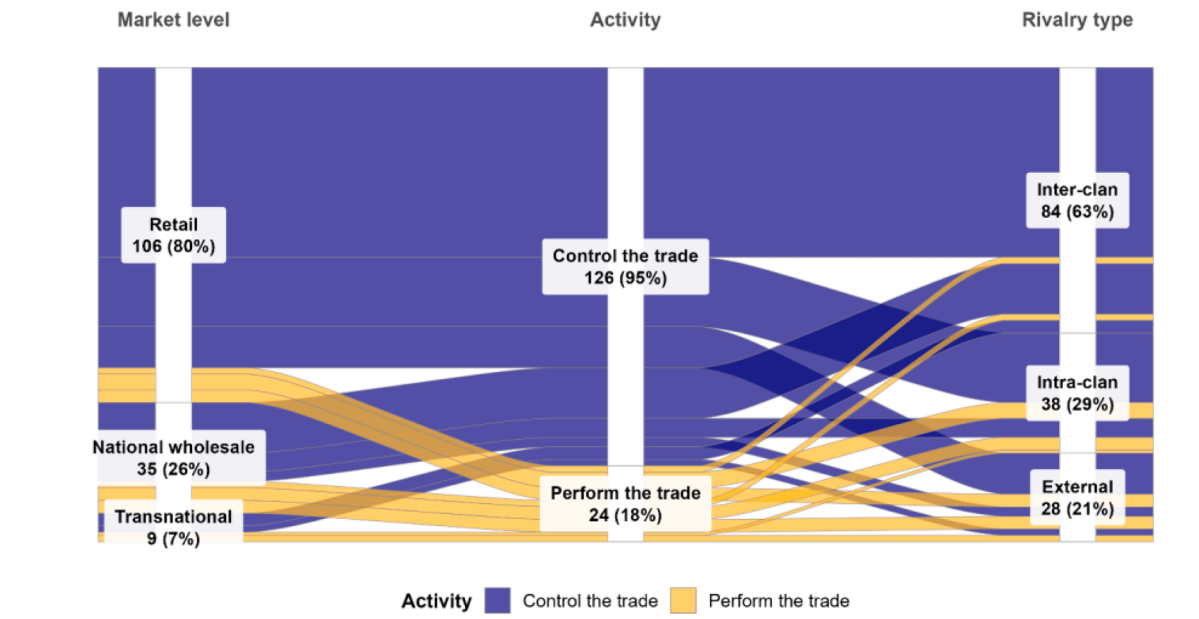


Fig. 4. Drug-related mafia homicides by activity and market level (n = 150).

perform: +2.32). For activity–rivalry, "control the trade" was over-represented in inter-clan cases (+4.24) and underrepresented in intra-clan (–2.01) and external (–3.16) violence, while "perform the trade" showed the opposite pattern (inter: –4.24; intra: +2.01; external: +3.16). Hierarchical log-linear analyses confirmed that two-way interactions among the three dimensions were jointly significant ($\Delta G^2(8) = 30.32$, $p < .001$), whereas the three-way interaction was not ($\Delta G^2(4) = 2.64$, $p = .620$), indicating that pairwise associations adequately capture the structure of drug-related mafia homicides.

Monte Carlo sensitivity analyses incorporating audit-informed

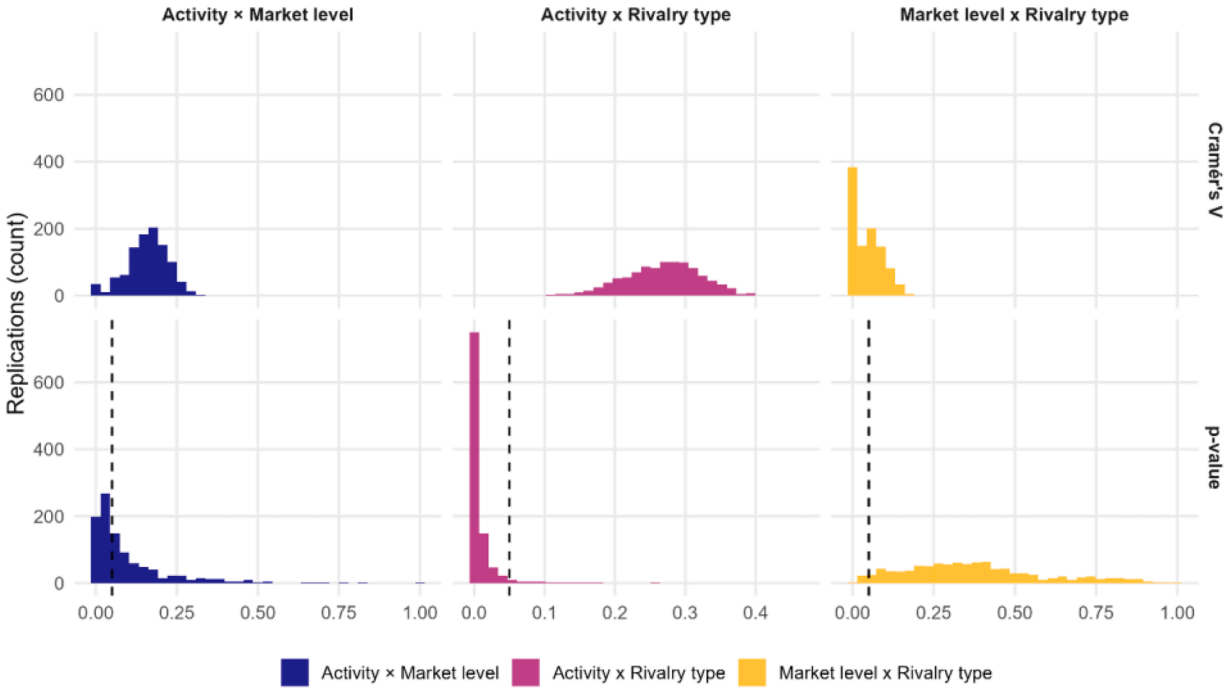


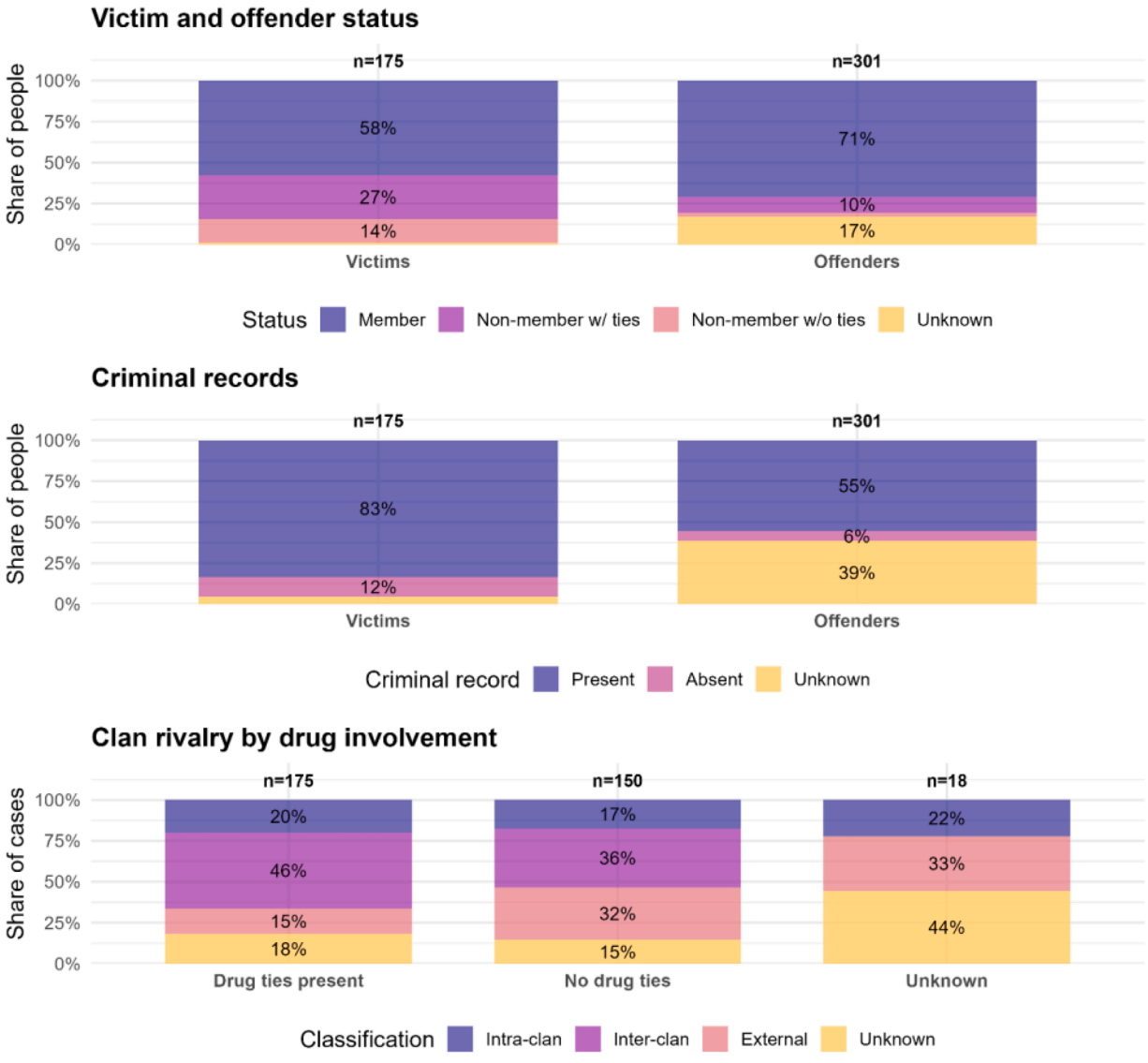
Fig. 5. Monte Carlo sensitivity of pairwise associations under audit-informed misclassification.

misclassification indicate that robustness differs across associations: the activity–rivalry relationship remains highly stable ($p < .05$ in 97 % of replications; median Cramér's $V = 0.27$), whereas evidence for the activity–market association is moderate (51 % significant; median $V = 0.16$) and the market level–rivalry association remains rarely significant (3 % significant; median $V = 0.04$). Hierarchical log-linear comparisons are also stable: adding all two-way interactions improves fit in most replications (significant in 91 %), while the three-way interaction is rarely supported (significant in <1 %), consistent with baseline results that higher-order dependence is not required to characterize the structure (Fig. 5).

Lethal violence by mafia members is predominantly oriented toward other mafia members (58 %) and non-members with external mafia ties (27 % of victims) (Fig. 6, first panel). Victims who are not connected to mafias are residual, representing only about 14 % of the total; violence from or to non-mafia drug trafficking organizations is marginal. This pattern is statistically robust: the overall goodness-of-fit test for victim status distribution is highly significant ($\chi^2(3) = 123.0$, $p < .001$), rejecting any notion of a uniform or random distribution.

Consistently, both victims and offenders are overwhelmingly "active" criminals with established criminal careers: 83 % of victims and 55 % of offenders had prior criminal records, which is 90 % if we consider solely known offenders. These differences between victims and offenders who have or who have not criminal records are also highly significant.

The rivalry results show that lethal violence is overwhelmingly an intra-mafia phenomenon and that its composition shifts meaningfully with drug involvement. Pooled across drug-related and non-drug-related homicides, rivalry types are far from uniform ($\chi^2(3) = 40.1$, $p < .001$), indicating that intra- and inter-clan killings dominate over external conflicts. When we collapse categories, the internal vs external split is even more clearly unbalanced overall ($\chi^2(2) = 97.9$, $p < .001$), underscoring that most victims/offenders face opponents from within the mafia sphere. Crucially, the mix of rivalry types depends on drug ties: the distribution of rivalry across drug groups is not homogeneous ($\chi^2(6) = 28.1$, $p < .001$), and this remains significant with Fisher's exact test (p



Figures refer to individuals involved in mafia-related homicides. 'Status' indicates whether a person was a mafia member, a non-member with external mafia ties, a non-member without ties, or his/her relation to mafias was Unknown (treated as a substantive category). 'Criminal records' indicate whether victims or offenders had prior records (present, absent, unknown). 'Clan rivalry': Intra-clan = victim and offender from the same clan; Inter-clan = different clans; External = at least one party outside the mafia. Intra+Inter represent internal mafia dynamics. Totals above each bar show the number of unique victims and offenders included.

Fig. 6. Status and criminal records of homicide victims and offenders. Clan rivalry by drug involvement.

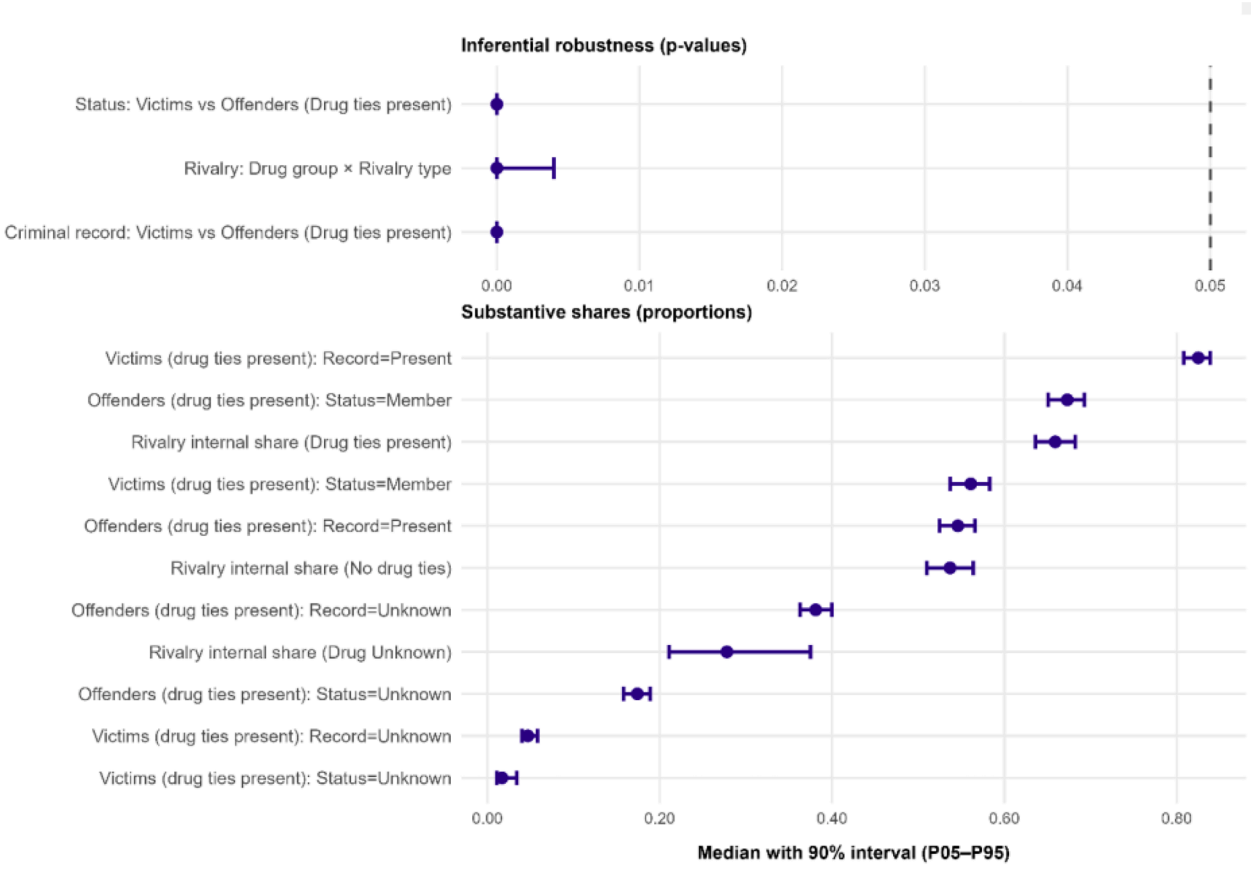
< .001), confirming that drug-related cases are comparatively more contained within mafia-to-mafia dynamics while non-drug cases carry a relatively greater share of external confrontations. Note that small expected counts in some cells can make the chi-square approximation conservative; the Fisher results, however, corroborate the same conclusion.

The main conclusions of the Monte Carlo analysis are conservative with respect to plausible misclassification: the status, criminal-record, and rivalry tests remain significant in 100 % of replications, with effect sizes remaining in the same range (median Cramér's $V \approx 0.339$ for status; ≈ 0.363 for criminal records; ≈ 0.163 for rivalry). In addition, the internal-rivalry share remains higher in drug-related than in non-drug cases across replications (median 65.9 % vs 53.7 %) (Fig. 7).

Discussion and conclusion

This study examined mafia-related homicides in Italy between 2014 and 2024 to explore how lethal violence reflects the interaction between drug markets, organizational activities, and clan rivalries. Systemic violence and drug-related killings constitute a key component of mafia homicides, though their numbers have declined over time. Violence is mainly linked to governing rather than performing the trade and is concentrated at the retail level of the drug market. Rivalry patterns show that inter-clan conflicts are the most frequent, followed by intra-clan disciplinary violence and, less often, external disputes. Statistical analyses confirm significant pairwise associations between activity type and both market level and rivalry configuration, showing that violence aimed at controlling the trade occurs mostly at the retail level and predominantly occurs in inter-clan confrontations, while violence linked to performing the trade is more often tied to intra- or extra-clan disputes. Moreover, homicides involving drug ties are more often associated with offenders and victims who have criminal records or are members of, or maintain ties to, mafia groups, suggesting that status and market involvement jointly shape exposure to lethal violence. Overall, these findings indicate that contemporary mafia violence remains deeply embedded in the functioning of illicit drug markets, where coercion operates simultaneously as a tool of market regulation and organizational control, sustaining authority and order under conditions of illegality. In this respect, mafia violence and systemic violence have strong overlaps.

The findings point to both continuity and transformation in mafia violence. Overall, mafia-related homicides have steadily declined, extending a downward trend that began in the early 1990s. Yet this reduction reflects more than a numerical contraction—it marks a



Monte Carlo sensitivity summary (median + uncertainty band). Each dot is the median estimate across B = 1000 Monte Carlo replications; each horizontal bar is the 90% Monte Carlo uncertainty interval (P05–P95).
Inferential robustness (top panel). Values are p-values from the corresponding hypothesis tests. The dashed line indicates the conventional threshold α = 0.05. If most of the interval lies to the left of α, the result is robustly significant under plausible misclassification; if the interval crosses or lies to the right of α, conclusions are sensitive to coding noise.
Substantive shares (bottom panel). Values are proportions (0–1 scale) summarizing key descriptive quantities (e.g., victim/offender status shares, criminal record shares, and internal rivalry shares). Intervals quantify how much these descriptive estimates would vary under misclassification.
Across replications, only non-audited rows are perturbed; audited cases remain fixed. Misclassification is implemented via role-specific confusion templates and smoothing (λ = 0.5).

Fig. 7. Monte Carlo sensitivity analysis: robustness of key associations under misclassification.

qualitative shift in the nature and targets of violence. Political killings, which once characterized the open confrontations of the 1970s to early 1990s, have virtually disappeared, indicating that contemporary mafias no longer rely on overt intimidation of public officials or civil society (Beatrice, 2017). Violence against political or institutional targets is highly visible and tends to trigger aggressive law-enforcement, judicial, and public reactions, substantially increasing the costs of such actions for criminal organizations (Alesina et al., 2019; M. Catino, 2020). As a result, overt lethal intimidation of political actors may become counterproductive once channels of political influence are stabilized through collusive or exchange-based arrangements (Barnes, 2017). Consistent with this interpretation, violence has become increasingly confined to criminal circuits, reflecting internal regulation and market disputes. Drug-related killings, which were marginal in earlier studies (Beatrice, 2017; Chinnici, 1989, 2003; Martini, 2011; Santino, 1989; Tucci, 1983), now represent the majority of mafia homicides, while non-drug governance violence—still accounting for about one-third-of case-s—demonstrates the persistence of mafia activities in the extortion and territorial control. The relative prominence of drug-related homicides is particularly notable given the overall decline in mafia killings, suggesting a process of specialization and rationalization of coercion: violence is now more selective, economically functional, and strategically deployed to regulate illegal markets and preserve profitable positions.

The patterns emerging from drug-related homicides confirm that violence remains a key mechanism through which mafias manage the intersection between trading and governing functions. Most killings relate to governance activities—asserting control, enforcing discipline, and protecting local dealing areas—yet a substantial share also involves the direct performance of trade. This distribution nuances and challenges the analytical separation between production, trade, and governance proposed by recent models of organized crime (Breuer & Varese, 2023; Campana et al., 2025; Campana & Varese, 2018; Varese, 2010), showing that in Italian drug markets, governance is rarely exercised as an external service over others' transactions but rather as internal regulation of the mafias' own market operations. Those who claim to "govern" retail drug markets are not merely controllers but often active participants in distribution and street-level sales. A telling case is the killing of a man in his twenties in July 2018 along the provincial road between Ugento and Melissano in the province of Lecce, where investigators and courts found established that the homicide was aimed at consolidating a faction's authority over the local drug piazza (Corriere Salentino, 2020; Sky TG24, 2018). The episode stemmed from an internal struggle between rival factions of the same criminal group, revealing how territorial governance and market control overlap. Two men were later convicted of aggravated voluntary homicide, and eight others were arrested for criminal association aimed at drug trafficking (Tadicini, 2021). In this sense, governance and trade are not distinct or mutually exclusive domains but interdependent modalities of action, with coercion and authority securing the conditions for market participation. These findings support Paoli's (2002, 2014, L. 2020) depiction of mafias as multifunctional organizations pursuing regulatory and entrepreneurial aims simultaneously and empirically ground this multifunctionality in the operation of violence.

Systemic violence in drug markets thus appears not only as a tool of control but also as an organizational resource that enables mafias to combine economic participation with rule enforcement. In line with Goldstein's (1985; 1992) notion of systemic violence, coercion functions as both enforcement and communication—ensuring compliance while affirming power and territorial legitimacy within criminal economies. This communicative dimension of violence is evident, for instance, in a 2015 killing in Boscoreale, Campania. On the afternoon of 7 February, at around 17:45, two assailants approached and shot a 21-year-old in a public housing complex long known as one of the main cocaine and cannabis retail hubs in the area (Positanonews, 2015). Investigators initially linked the murder to drug market dynamics and a likely vendetta. Subsequent testimony from a pentito revealed that the victim had previously participated in a failed ambush against a member of a rival group, provoking retaliation (Polizia di Stato, 2015; Russo, 2015). The killing was thus both punitive, aimed at eliminating a rival, and strategic, reaffirming control over the selling point during a violent feud between rival factions. By striking in the heart of the retail area in broad daylight, a place where residents immediately poured into the street after hearing the shots, the perpetrators delivered a visible and symbolic message to other market actors regarding who controlled the drug dealing area.

The concentration of homicides at the retail level and their predominantly internal nature point to the lower tiers of the drug market as the main arena of mafia violence. These findings echo results of both classical and recent studies conducted in consumer countries in the Global North, which likewise show that drug-market violence tends to be concentrated at the retail level and is driven by systemic conflicts (Johnson et al., 2005; MacCoun & Reuter, 2001; Magnusson & Gerell, 2026; Reuter, 2009). However, the absence of denominator data—such as the number of actors or transactions at each level—leaves two possible interpretations. One is that violence appears more frequent simply because retail transactions are more numerous and unstable. The other, which we find more plausible, is that violence is genuinely rarer at higher market levels. Consistent with previous research, wholesale and transnational exchanges rely on smaller, more stable networks where trust, reputation, and long-term cooperation substitute for coercion (Desroches, 2007; Dorn et al., 2005; Pearson & Hobbs, 2001; Reuter & Haaga, 1989). In these contexts, violence is selective and instrumental—used occasionally between competitors but largely avoided with partners and clients because it disrupts supply chains and attracts enforcement attention. The predominance of retail-level homicides thus reflects not only the density of interactions at the bottom of the market but also the organizational rationality of higher-level actors, for whom overt violence is widely regarded as "bad for business" (Pearson & Hobbs, 2001, p. 42).

Regional variations further highlight how organizational structure shapes violence. Most lethal manifestations of systemic violence occurred in Campania, where the Camorra's decentralized and factional structure predominates, while Sicily and Calabria—strongholds of Cosa Nostra and the 'Ndrangheta—recorded very few. This pattern echoes Catino's (2014, 2019, 2020) argument that mafias with higher-level coordinating bodies can contain internal conflicts, whereas organizations lacking them, like much of the Camorra, experience more frequent killings. Our findings partly support this view: the absence of coordination appears to foster violent regulation even within economic domains such as drug markets. Yet the form of violence has changed. Unlike the political and institutional killings of earlier decades, recent homicides are confined to criminal circuits, suggesting that internal governance now restrains escalation beyond the market sphere. At the same time, the persistence and selectivity of drug-related violence indicate that coercion continues to serve a functional role within illicit economies, linking market regulation to organizational control.

In sum, the analysis reveals that in mafia-controlled drug markets, the absence or weakness of higher-level coordinating bodies does not produce disorder but channels coercion into a structured instrument of governance within illicit economies. Rather than separating regulation from participation, mafias integrate violence into their economic operations: coercion enforces compliance, protects revenue flows, and reaffirms authority inside the market. This pattern situates Italian mafias within wider dynamics observed in comparative research on criminal governance, where violence serves to sustain order and regulate exchange under illegality (Goldstein, 1985; Snyder & Durán-Martínez, 2009). By grounding these mechanisms empirically, our findings refine theories of organized crime that conceptualize mafias as multifunctional organizations combining entrepreneurial and regulatory aims (Paoli, 2002, 2004, 2020) and demonstrate that in practice, coercion constitutes the connective tissue between market participation and

organizational control.

Methodologically, the study demonstrates the potential of systematic, media-based monitoring for examining the organization of violence in low-homicide contexts, such as drug markets in most societies. When triangulated with official data, this approach enables the reconstruction of rare events over time and the identification of links between motives, market levels, and relational configurations. The coding framework developed here provides a replicable model for comparative research, allowing the systematic study of how organized crime adapts its coercive and regulatory strategies as drug markets evolve. This method contributes to bridging theoretical distinctions with empirical evidence, providing empirical leverage to examine how different market and organizational configurations shape the use of lethal violence.

Several limitations must nonetheless be acknowledged. Reliance on press sources, while systematic, inevitably entails some interpretive uncertainty when information on motives or affiliations is incomplete. However, the comparison with official judicial statistics suggests that press coverage provides comprehensive and consistent documentation of mafia-related homicides in Italy, ensuring reliable enumeration even in a low-homicide context. The analysis focuses exclusively on mafia-related homicides, capturing only the most visible and extreme expressions of coercion. It excludes non-lethal violence and intimidation, as well as forms of drug-related violence fully unrelated to mafias. This means that the patterns we document should be read as the correlates of escalation—that is, the circumstances under which governance and trading frictions culminate in irreversible sanctions—rather than as a comprehensive account of everyday enforcement. The balance between "governing" and "performing" activities, and the distribution across rivalry types, may look different if we could systematically observe intimidation, assaults, or kidnappings, which can regulate behavior while keeping a lower profile. Our conclusions therefore pertain to the segment of coercion that is most consequential, most visible, and least substitutable through informal dispute resolution. The absence of denominator data—such as the total number of transactions or participants—further limits inferences about the relative incidence of violence across market levels. In addition, the study concentrates on the instrumental and functional dimensions of lethal violence, without systematically addressing its cultural and symbolic meanings. Future work will extend this line of inquiry to explore how violence also serves expressive purposes—communicating power, reaffirming hierarchy, and reinforcing organizational identity—alongside its economic and regulatory functions. Longitudinal and cross-national analyses, complemented by network-based approaches, will further clarify whether the trade–governance interplay and selective use of coercion identified here extend to other organized crime systems.

Overall, the findings suggest that contemporary mafia violence unfolds within the functioning of illegal drug markets, where coercion sustains authority and regulates exchange under conditions of illegality. The decline of political and externally oriented killings, together with the predominance of drug-related and internally directed homicides, signals not the disappearance of violence but its transformation into a selective and economically functional instrument. Violence remains central to the mafias' capacity to organize, discipline, and maintain control within illicit markets. While this study focused on its functional logic, future extensions will address the expressive and cultural dimensions of mafia violence, offering a fuller understanding of how power and meaning are reproduced through the strategic use of force.

Declaration of generative AI and AI-Assisted technologies in the manuscript preparation process

During the preparation of this work the authors used ChatGPT-5 to assist with the language refinement of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article. ChatGPT-5 was also used to support the consistency-checking stage of case classification by flagging potential omissions, inconsistencies, or alternative interpretations in the news corpus, as described in the Data and Methods section; all final coding decisions and revisions remained under full author control.

CRediT authorship contribution statement

Alberto Aziani: Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Francesco Calderoni:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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