

REGIONAL PATTERNS OF FEMICIDAL VIOLENCE AND INSTITUTIONAL GOVERNANCE IN MEXICO

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ABSTRACT:

This study analyzes the regional configuration of femicidal violence in Mexico between 2015 and 2025, examining its relationship with intentional homicide, socioeconomic vulnerability, demographic conditions, and institutional governance. The research addresses the extent to which femicidal violence follows generalized criminal violence and the extent to which it maintains a structurally differentiated trajectory associated with territorial and institutional conditions. A longitudinal, regional, observational, and mixed methodological design was employed using official state level information. Femicidal violence was operationalized through annual cases and rates, while intentional homicide represented the broader context of lethal criminal violence. Socioeconomic vulnerability, demographic conditions, institutional governance, and regional configuration were incorporated to identify differentiated territorial patterns. The analysis revealed a strong positive national association between femicides and intentional homicides, with a Pearson correlation of $R = 0.78$. However, regional trajectories demonstrated that reductions in generalized homicide do not necessarily produce proportional reductions in femicidal violence. This persistence supports the existence of a structural floor of femicidal violence associated with gender related conditions and institutional limitations. Institutional governance emerged as a critical conditioning dimension because weaknesses in prevention, protection, coordination, monitoring, and implementation may contribute to the persistence of violence even under changing criminal conditions. The findings indicate that femicidal violence should not be addressed exclusively through conventional security policies. Effective prevention requires territorially differentiated strategies integrating criminal violence, socioeconomic vulnerability, demographic conditions, institutional capacity, and continuous evaluation of public interventions. The study contributes an integrated framework for understanding femicidal violence as a regional governance problem.

Keywords: *Femicide, Institutional Governance, Intentional Homicide, Socioeconomic Vulnerability, Regional Violence*

INTRODUCTION

Violence against women constitutes a structural social, public health, and human rights problem whose manifestations cannot be adequately explained exclusively through individual criminal behavior or aggregate levels of insecurity. The World Health Organization identifies gender inequality as a fundamental structural cause of violence against women and emphasizes that violence emerges through the interaction of individual, relational, community, and societal factors. Institutional discrimination, harmful gender norms, socioeconomic disadvantage, high levels of community violence, and the ineffective enforcement of protective legislation can therefore operate simultaneously as conditions that reproduce violence (World Health Organization [WHO], 2026). From this perspective, lethal violence against women requires an analytical framework capable of connecting gender relations with territorial conditions and institutional performance rather than treating each homicide as an isolated criminal event.

Femicide represents the most extreme expression of gender-based violence because the killing of a woman may be embedded in previous patterns of domination, discrimination, sexual violence, control, or institutional neglect.

International evidence indicates that femicide remains a persistent form of violence against women, with intimate partners and family members accounting for a substantial proportion of killings of women worldwide (United Nations Office on Drugs and Crime [UNODC] & UN Women, 2025). Consequently, understanding femicide requires moving beyond the numerical comparison between female and male homicide rates and examining the social and institutional arrangements that determine the vulnerability of women within specific territories. The distinction is particularly important in contexts where generalized criminal violence is high, because an association between homicide and femicide does not necessarily imply that femicide is merely an extension of conventional criminal violence.

Mexico provides a particularly relevant setting for examining this distinction. National evidence has documented substantial spatial and temporal heterogeneity in lethal violence, demonstrating that homicide rates are not distributed uniformly across Mexican territory. Geographic studies have identified concentrations and clusters of lethal and femicidal violence in specific regions and municipalities, including border areas and metropolitan territories, suggesting that territorial context is central to understanding the phenomenon (Juárez et al., 2025). Similarly, Hernández Gress et al. (2023) found an increasing trend in femicide in Mexico that was not reproduced in the same way across other crimes against life and bodily integrity. These findings challenge the assumption that changes in femicide simply reproduce national fluctuations in generalized criminality.

This distinction creates an important theoretical problem. If femicide were primarily a stochastic by-product of generalized insecurity, its geographical distribution and temporal variation should largely follow the dynamics of intentional homicide. Conversely, if femicide contains a structural gendered component, its relationship with intentional homicide should be significant but incomplete. In that case, increases in generalized violence could intensify the risk of femicide, while reductions in conventional criminal violence would not necessarily eliminate a persistent level of gender-motivated lethal violence. Recent municipality-level evidence provides support for the first part of this argument by showing that high male homicide rates are strongly associated with the occurrence of domestic femicide, even after adjustment for socioeconomic factors (Juárez Armenta & Prata, 2026). The relevant analytical question, therefore, is not whether generalized violence and femicide are related, but whether the association is sufficient to explain the territorial persistence of femicide.

The Mexican case also introduces an institutional dimension that cannot be reduced to the volume of criminal activity. Public institutions possess formal mechanisms intended to prevent and respond to gender-based violence, including the Gender Violence Alert mechanism. However, the existence of an institutional instrument does not necessarily guarantee effective implementation. Research examining this mechanism has identified a persistent discrepancy between its formal design and its practical operation, particularly in territories where institutional responses differ substantially (García et al., 2024). The Gender Violence Alert is therefore analytically relevant not simply as a policy intervention but as an indicator of the capacity of subnational institutions to translate national and state-level commitments into effective territorial prevention.

This distinction between institutional design and institutional performance is fundamental for a regional explanation of femicide. Mexico's federal structure distributes responsibilities among national, state, and municipal institutions, creating substantial differences in administrative capacity, coordination, resources, enforcement, and policy implementation. A national policy can therefore be formally homogeneous while producing heterogeneous outcomes across territories. The same legal framework may coexist with different levels of police responsiveness, judicial effectiveness, prevention capacity, interinstitutional coordination, and gender-sensitive public administration. Such differences can produce what may be conceptualized as territorial zones of institutional protection and territorial zones of impunity.

The relevance of local governance becomes clearer when the problem is considered from the perspective of institutional effectiveness. The existence of violence-prevention legislation is insufficient if local institutions cannot identify risk, respond to victims, coordinate services, investigate crimes, and implement preventive measures. The World Health Organization (2026) specifically identifies the absence or ineffective enforcement of laws addressing violence against women and gender discrimination within public institutions as important societal conditions associated with violence. Thus, institutional weakness should not be treated as a peripheral contextual variable. It can function as a mechanism through which structural gender inequality becomes territorially differentiated.

This argument also modifies the conventional interpretation of the relationship between femicide and intentional homicide. A strong statistical association between the two phenomena may indicate that they share contextual

determinants, such as territorial insecurity, organized criminal activity, firearm availability, socioeconomic deprivation, or institutional weakness. However, statistical association alone cannot establish that femicide is merely a gender-specific manifestation of generalized homicide. Indeed, previous spatial research in Mexico has demonstrated that femicides and intentional homicides against women may cluster geographically while simultaneously displaying differentiated territorial patterns (Juárez et al., 2025). The coexistence of association and differentiation suggests that a multilevel analytical framework is required.

The present study therefore proposes a regional structural model in which femicide is conceptualized as the dependent manifestation of an interaction among generalized criminal violence, structural gender inequality, territorial conditions, and institutional capacity. Within this model, intentional homicide represents the principal indicator of generalized violence; socioeconomic and demographic conditions represent contextual factors; and institutional governance, particularly the effectiveness of gender-violence prevention mechanisms, represents a conditioning dimension. The model assumes that generalized criminal violence can increase the exposure of women to lethal violence but that a persistent component of femicide remains attributable to structural gender relations and institutional weaknesses. This persistent component is conceptualized as a structural floor of femicidal violence.

The empirical rationale for this proposition emerges from the temporal and territorial analysis of Mexico during 2015–2025. The period is particularly appropriate because it encompasses substantial variation in both femicide and intentional homicide, while also allowing the analysis of institutional responses and regional differences over an extended period. Official statistical systems provide complementary sources for examining these processes. The National Institute of Statistics and Geography has established the National Survey on the Dynamics of Household Relationships as a major source for understanding violence against women across household, educational, labor, community, and intimate-partner contexts, while also documenting help-seeking and reporting trajectories (Instituto Nacional de Estadística y Geografía [INEGI], 2024). These sources make it possible to move from a purely criminal-statistics perspective toward a broader analysis incorporating social and institutional dimensions.

The central analytical dialogue can consequently be formulated as follows: if generalized insecurity is the principal determinant of femicide, then regional reductions in intentional homicide should be accompanied by proportional reductions in femicide. If, however, femicide is structurally embedded in gender inequality and reinforced by heterogeneous institutional capacities, then the relationship between intentional homicide and femicide should be positive but incomplete, with a residual level of femicide persisting independently of fluctuations in generalized violence. Under this second interpretation, territorial institutional weakness should help explain why some regions maintain comparatively high levels of femicidal violence even when conventional criminal violence declines.

This reasoning leads to the central research question: to what extent does the regional configuration of femicide in Mexico between 2015 and 2025 depend on generalized intentional homicide, socioeconomic-territorial conditions, and the effectiveness of local gender-violence governance? A complementary question follows from the proposed structural mechanism: does institutional weakness condition the relationship between generalized criminal violence and femicide, thereby explaining a persistent territorial floor of femicidal violence?

The proposed model advances the expectation that intentional homicide will be positively associated with femicide at the national and regional levels. Nevertheless, this association is expected to explain only part of the observed variation. Structural and territorial conditions are expected to contribute additional explanatory power, while weaker institutional governance is expected to be associated with higher levels of femicide. More specifically, the model anticipates that femicide will remain statistically detectable in territories and periods characterized by declining generalized homicide, supporting the existence of a structural component that cannot be reduced to conventional criminal cycles. Furthermore, institutional weakness is expected to amplify the persistence of femicidal violence by limiting the effectiveness of prevention, protection, investigation, and interinstitutional coordination.

Accordingly, the analytical propositions are that intentional homicide is positively related to femicide; regional socioeconomic and demographic vulnerability is positively related to femicide; institutional weakness is positively related to femicide; and the effect of generalized criminal violence on femicide is conditioned by the effectiveness of local gender-sensitive governance. The model therefore does not reject the relationship between generalized violence and femicide; rather, it reinterprets that relationship as one component of a broader structural

configuration. The expected result is a partially autonomous femicide process in which generalized violence constitutes an important contextual driver, but gender inequality and institutional weakness sustain an additional level of lethal violence against women.

This framework has implications beyond statistical explanation. If femicide is treated solely as a component of generalized insecurity, public policy will tend to prioritize policing, punishment, and aggregate homicide reduction. Although these interventions may reduce some forms of lethal violence, they may fail to address the institutional and gender-specific mechanisms through which women remain exposed to lethal violence. By contrast, a structural regional model places prevention capacity, institutional coordination, gender-sensitive administration, territorial targeting, and accountability at the center of the policy response. The objective is therefore not simply to determine whether femicide increases or decreases, but to identify why its territorial configuration persists and why similar levels of generalized violence may produce different levels of femicidal violence across regions.

The study consequently approaches femicide as a governance problem as well as a criminal justice problem. Its principal contribution lies in integrating temporal variation, regional heterogeneity, generalized homicide, structural conditions, and institutional performance within a single explanatory framework. The empirical analysis uses official information from the Executive Secretariat of the National Public Security System, INEGI, the National Population Council, and the National Council for the Evaluation of Social Development Policy, processed through advanced statistical procedures and Python-based data analysis, and complemented by an institutional contextual analysis. By combining statistical association with territorial and institutional interpretation, the study seeks to determine whether the apparent relationship between femicide and intentional homicide conceals a deeper structural process.

Ultimately, the proposed framework challenges a hegemonic interpretation in which femicide is understood principally as a collateral consequence of national insecurity. The alternative proposition is that femicide has a partially autonomous territorial dynamic generated by the intersection of gendered structural violence, generalized criminal violence, socioeconomic vulnerability, and differentiated institutional capacity. Demonstrating such autonomy would imply that reductions in conventional criminal violence, although necessary, are insufficient to guarantee a sustained reduction in femicide. Effective prevention would instead require territorially differentiated governance strategies capable of addressing the institutional conditions that allow gender-based lethal violence to persist.

METHOD

Research design and analytical strategy

The study adopted a longitudinal, regional, observational, and mixed-method design to examine the territorial configuration of femicidal violence in Mexico during 2015–2025. The quantitative component used state-level annual observations to examine temporal variation, regional heterogeneity, associations between femicide and intentional homicide, and the contribution of socioeconomic, demographic, and institutional conditions. The qualitative component consisted of an institutional contextual analysis focused on the implementation environment of gender-based violence prevention and protection mechanisms. The design followed the principles of transparent reporting for observational research established by the Strengthening the Reporting of Observational Studies in Epidemiology framework, particularly the explicit definition of the study setting, eligibility criteria, variables, data sources, potential sources of bias, and statistical procedures (von Elm et al., 2007).

The unit of analysis was the Mexican state observed annually between 2015 and 2025. This structure generated a longitudinal regional dataset in which each observation represented the value of a variable for a specific state and year. The analytical period was selected because it permits the examination of changes in femicidal violence across different stages of national insecurity and allows the comparison of regions with different institutional and socioeconomic configurations. The study did not involve direct recruitment of human participants, interviews, clinical procedures, or collection of personally identifiable information. Instead, it relied on aggregated administrative and socioeconomic information produced by public institutions. This distinction was relevant for the ethical assessment because the principal risks concerned data interpretation, ecological inference, misclassification, and stigmatization of territories rather than risks associated with individual participation.

Phase I: Operationalization, data construction, and expert assessment

The first phase consisted of constructing the analytical database and establishing the conceptual and operational correspondence among the variables. The dependent variable was femicidal violence, operationalized as the annual rate of registered femicides per 100,000 women in each state. The use of a population-adjusted rate rather than a simple count was intended to improve comparability among territories with substantially different female populations. The operational definition was aligned conceptually with the international statistical framework for measuring gender-related killings of women and girls, which recommends standardized identification of gender-related killings and the collection of information concerning victims, perpetrators, context, and institutional response (United Nations Office on Drugs and Crime [UNODC] & UN Women, 2022).

The principal explanatory variable was generalized lethal criminal violence, operationalized as the annual intentional homicide rate per 100,000 inhabitants. This variable represented the level of conventional lethal insecurity against which the degree of autonomy of femicidal violence could be examined. The empirical logic was not to assume that intentional homicide and femicide are equivalent phenomena, but to determine whether changes in generalized lethal violence systematically correspond to changes in femicidal violence. The use of administrative crime records was consistent with international approaches that use official criminal justice information to construct standardized homicide indicators and distinguish victims according to sex, age, mechanism, and context (UNODC & UN Women, 2023).

Structural socioeconomic vulnerability was operationalized through indicators derived from official population, poverty, and social development statistics. The construct incorporated dimensions representing poverty, social deprivation, demographic pressure, and population characteristics capable of influencing exposure to violence and institutional access. These indicators were standardized before their incorporation into composite measures when necessary, thereby preventing variables expressed in different units from disproportionately determining the regional index. The rationale for this operationalization was that femicidal violence may be embedded in broader territorial inequalities, meaning that socioeconomic vulnerability should be modeled as a contextual condition rather than as an individual-level attribute.

Institutional governance capacity was operationalized as the territorial capacity to implement gender-sensitive prevention, protection, coordination, and response mechanisms. Because institutional effectiveness cannot be adequately represented by the mere existence of a legal instrument, the construct incorporated observable dimensions of implementation, institutional response, continuity, coordination, and administrative capacity. Particular attention was given to the implementation context of gender violence alerts and related governmental measures. The analytical distinction between institutional existence and institutional effectiveness was maintained throughout the operationalization process so that the presence of a formal policy would not automatically be interpreted as evidence of successful implementation.

The regional dimension was operationalized through the geographical identification of the 32 Mexican federal entities and their annual observations during the study period. Regionalization was subsequently examined through descriptive classification, temporal trajectories, correlation structures, and econometric estimation. This approach was appropriate because regional violence data may exhibit spatial dependence, whereby conditions in one territory are associated with outcomes in neighboring territories. Previous Mexican research using spatial panel models has demonstrated the value of explicitly accounting for spatial dependence when studying regional violence and socioeconomic outcomes (Saucedo de la Fuente & Berry, 2019).

The resulting measurement architecture therefore contained one primary outcome, one principal indicator of generalized violence, socioeconomic and demographic contextual variables, and institutional governance indicators. The operational structure was designed to distinguish three analytically different mechanisms: the direct association between generalized lethal violence and femicide, the contribution of territorial vulnerability, and the conditioning role of institutional governance. This distinction was essential for testing whether femicide behaves as a simple derivative of generalized criminal violence or whether a residual structural component persists after accounting for broader insecurity.

The operationalization was subjected to expert assessment before the final analytical database was constructed. A panel of judges was selected according to substantive expertise in gender violence, public administration, criminology, regional analysis, public policy, quantitative methodology, or related fields. Eligibility for the expert assessment required demonstrated academic or professional experience relevant to at least one of the dimensions

of the proposed model, recent scholarly or professional production in the field, and willingness to independently evaluate the conceptual and operational correspondence of the variables. Judges were excluded when they lacked identifiable expertise in the subject matter, had a direct conflict of interest with the research objectives, or returned incomplete evaluations that prevented systematic assessment.

The judges independently assessed conceptual relevance, operational clarity, theoretical coherence, observability, territorial comparability, and correspondence between each construct and its proposed indicators. They were also asked to identify possible conceptual overlaps, ambiguous definitions, redundant indicators, and variables whose interpretation could produce ecological or causal overstatement. The assessment procedure was designed around contemporary principles of content validity, which emphasize the relevance, comprehensiveness, and comprehensibility of the measurement content and recommend structured expert procedures for evaluating whether operational indicators adequately represent their intended constructs (Terwee et al., 2018).

The expert assessment did not treat agreement among judges as proof of empirical validity. Instead, it was used as a preliminary content-validity procedure to determine whether the proposed measurement architecture was theoretically defensible before statistical estimation. Indicators receiving consistent assessments of conceptual relevance and clarity were retained, whereas indicators identified as redundant, ambiguous, or poorly aligned with the construct were revised or excluded. This procedure was particularly important for institutional governance because administrative performance is multidimensional and cannot be inferred from a single policy indicator.

The study also incorporated ethical criteria for secondary-data research. Inclusion criteria required that each observation correspond to a Mexican federal entity and a year between 2015 and 2025; that the information originate from an identifiable official or institutionally recognized source; that the indicator possess a clear methodological definition; that the measurement procedure be sufficiently stable to permit temporal comparison; and that the data be available in aggregated form without personally identifiable information. Observations were included only when their geographical and temporal references could be harmonized with the remaining database. Exclusion criteria consisted of records lacking a reliable geographical identifier, observations outside the 2015–2025 study period, duplicate records, indicators whose definitions changed in a manner that prevented valid temporal comparison, observations with unresolved inconsistencies between source files, and data that could not be independently traced to an identifiable institutional source. Individual-level records containing direct identifiers were not incorporated into the analytical database. The study also excluded indicators for which the available information was insufficient to distinguish the intended construct from a broader or conceptually different phenomenon. These criteria were established to minimize measurement bias, duplication, temporal inconsistency, and inappropriate aggregation.

The principal quantitative data sources were the Executive Secretariat of the National Public Security System for crime and victimization records, the National Institute of Statistics and Geography for demographic and socioeconomic information, the National Population Council for population projections and demographic structure, and the National Council for the Evaluation of Social Development Policy for poverty and social deprivation indicators. The crime database was particularly suitable because the official open-data system provides national crime and victim information and identifies a dedicated period covering 2015–2025, together with methodological documentation and data dictionaries (Executive Secretariat of the National Public Security System, 2026).

Data processing was performed with Python. The workflow included source harmonization, variable-name standardization, geographical matching, temporal alignment, duplicate detection, missing-data inspection, rate calculation, normalization, descriptive analysis, correlation analysis, and econometric preparation. Population denominators were incorporated when constructing rates, allowing the analysis to distinguish changes in the number of recorded events from changes in the underlying population at risk. All transformations were documented so that the final analytical dataset could be reconstructed from the original public sources.

Phase II: Empirical foundation and specification of the regional model

The second phase consisted of translating the theoretical proposition into an empirically testable regional model. The model was grounded in the convergence of three forms of evidence: the international statistical literature on gender-related killings, empirical evidence concerning the association between generalized violence and femicide, and the institutional argument that public-sector capacity can condition the territorial persistence of gender-based violence. International methodological evidence indicates that gender-related killings require a multidimensional

statistical framework because the phenomenon can occur in different contexts and cannot be completely identified through a single criminal classification (UNODC & UN Women, 2022).

The first objective was to determine the magnitude and territorial configuration of femicidal violence during 2015–2025. This objective required descriptive temporal analysis, regional comparison, rate estimation, and identification of persistent high-risk territories. The second objective was to estimate the statistical association between femicide and intentional homicide. The third objective was to determine whether socioeconomic and demographic vulnerability contributed additional explanatory power after generalized lethal violence was considered. The fourth objective was to evaluate whether institutional governance conditions were associated with the persistence of femicidal violence. The final objective was to determine whether the empirical evidence supported a structural floor of femicidal violence that remained after accounting for generalized criminal violence. The model was therefore specified as a longitudinal regional equation in which femicide represented the outcome and intentional homicide, territorial vulnerability, demographic conditions, and institutional governance represented explanatory dimensions. In general form, the empirical relationship was expressed as:

$$FEM_{it} = \alpha_i + \lambda_t + \beta_1 HOM_{it} + \beta_2 VUL_{it} + \beta_3 DEM_{it} + \beta_4 GOV_{it} + \varepsilon_{it}$$

where FEM_{it} denotes the femicide rate for region i in year t , HOM_{it} denotes the intentional homicide rate, VUL_{it} represents socioeconomic vulnerability, DEM_{it} represents demographic conditions, GOV_{it} represents institutional governance capacity, α_i represents time-invariant regional characteristics, λ_t represents year-specific effects, and ε_{it} represents the unexplained component.

The inclusion of regional and temporal effects was intended to prevent persistent territorial characteristics and nationwide temporal shocks from being incorrectly attributed to the explanatory variables. This consideration is particularly important in regional panel analysis because observations across geographical units may exhibit correlated disturbances and spatial dependence. Driscoll and Kraay (1998) demonstrated that panel estimators can be biased in the presence of cross-sectional dependence, spatial correlation, and temporal dependence, making robust estimation procedures important when observations are organized across regions and years. The model therefore incorporated diagnostic procedures for heteroskedasticity, serial dependence, multicollinearity, and spatial dependence before selecting the final estimator.

The empirical model was also designed to test the structural-floor proposition. The relevant question was whether femicide remained systematically positive after generalized homicide, socioeconomic vulnerability, demographic characteristics, and governance conditions were introduced into the model. A persistent and statistically meaningful intercept or regional residual component would be interpreted cautiously as evidence consistent with an underlying structural component rather than as definitive proof of causality. This distinction was maintained because an observational regional design can identify statistical relationships and territorial patterns but cannot by itself establish individual-level causal mechanisms.

A second specification was used to examine whether institutional governance modifies the relationship between generalized violence and femicide. This interaction model was expressed as:

$$FEM_{it} = \alpha_i + \lambda_t + \beta_1 HOM_{it} + \beta_2 GOV_{it} + \beta_3 (HOM_{it} \times GOV_{it}) + \beta_4 VUL_{it} + \beta_5 DEM_{it} + \varepsilon_{it}$$

The interaction coefficient was used to determine whether the association between generalized lethal violence and femicide changes according to institutional governance capacity. A significant interaction would indicate that the relationship between conventional criminal violence and femicide is territorially conditioned rather than homogeneous across regions. In substantive terms, the model tests whether institutional capacity functions as a protective or risk-amplifying condition.

The analysis proceeded from descriptive statistics to bivariate association and then to multivariable estimation. Pearson correlation was used to establish the magnitude and direction of the linear association between femicide and intentional homicide, while regional and temporal distributions were examined to detect heterogeneity. Multivariable models were subsequently estimated to determine whether the association persisted after accounting for contextual variables. Sensitivity analyses were considered to evaluate whether the main findings were robust to alternative specifications, transformations, regional classifications, and treatment of incomplete observations. Spatial dependence was assessed because regional violence cannot necessarily be considered geographically independent. When significant spatial dependence was detected, spatially structured specifications were considered using a spatial weights matrix based on geographical contiguity or distance. The inclusion of spatial structure followed empirical precedent from Mexican regional research in which spatial panel models have been

used to account for geographic spillovers and spatial autocorrelation in violence-related processes (Saucedo de la Fuente & Berry, 2019).

The mixed-method integration occurred at the interpretation stage. Quantitative results identified regional patterns, associations, temporal persistence, and statistically significant explanatory relationships, whereas the institutional analysis was used to interpret why regions with similar levels of generalized criminal violence could display different levels of femicidal violence. The institutional evidence was therefore not treated as a substitute for statistical estimation but as contextual evidence capable of explaining mechanisms that aggregate administrative indicators cannot fully capture.

The methodological logic ultimately connected measurement, regional comparison, and model estimation in a sequential process. First, the phenomenon was operationalized using standardized administrative and socioeconomic indicators. Second, the measurement architecture was subjected to expert assessment. Third, the resulting regional panel was constructed and subjected to data-quality procedures. Fourth, descriptive and correlational analyses established the empirical structure of the phenomenon. Fifth, multivariable and, where appropriate, spatial panel models tested the explanatory contribution of generalized violence, territorial vulnerability, demographic conditions, and institutional governance. Finally, the quantitative findings were integrated with institutional evidence to determine whether the observed persistence of femicidal violence was consistent with a structural regional configuration rather than being fully explained by fluctuations in generalized criminal violence.

Because the study uses aggregated observational data, its conclusions were restricted to regional and temporal associations. No inference was made about the behavior, intentions, or characteristics of individual victims or perpetrators. Particular care was taken to avoid interpreting a high regional femicide rate as an intrinsic characteristic of a population. Regional differences were interpreted as outcomes potentially associated with interacting social, economic, institutional, and criminal conditions. This approach is consistent with the principle that observational research should distinguish statistical association from causal inference and should explicitly acknowledge possible sources of bias and uncertainty (von Elm et al., 2007).

RESULTS

Descriptive and regional results

The analysis of femicidal violence and intentional homicide during 2015–2025 revealed substantial temporal and regional heterogeneity across Mexico. Femicides were not distributed uniformly among federal entities, and their regional trajectories did not consistently reproduce the trajectory of intentional homicides. Some regions exhibited simultaneous increases in both indicators, whereas others maintained comparatively persistent femicide levels despite reductions in intentional homicide. This pattern provides the first empirical indication that femicidal violence cannot be completely represented as a linear extension of generalized criminal violence.

Table 1. Analytical structure of the regional model

Variable	Role in the model	Operational measure	Expected relationship with femicide
Femicidal violence	Dependent variable	Femicides per 100,000 women	Outcome
Intentional homicide	Main explanatory variable	Intentional homicides per 100,000 inhabitants	Positive
Socioeconomic vulnerability	Contextual explanatory variable	Composite regional vulnerability indicators	Positive
Demographic conditions	Contextual explanatory variable	Population and demographic structure indicators	Context dependent
Institutional governance	Institutional explanatory variable	Regional implementation and response capacity	Negative when capacity increases
Intentional homicide institutional governance	× Interaction	Product of generalized violence and governance capacity	Conditional effect

Table 1 establishes the empirical architecture used to evaluate the proposed structural explanation. The principal expectation was that intentional homicide would have a positive relationship with femicide, corresponding to the proposition that generalized lethal violence creates a broader environment of exposure to lethal violence. However, the model also specifies socioeconomic vulnerability and institutional governance as distinct explanatory dimensions. This structure is important because a significant relationship between homicide and femicide alone would not demonstrate that femicide is entirely determined by generalized criminality. The inclusion of additional regional and institutional variables allows the persistence of femicide to be examined after the broader insecurity environment has been considered.

Association between femicide and intentional homicide

The national correlation analysis produced a Pearson correlation coefficient of $R = 0.78$ between femicides and intentional homicides. The magnitude of this coefficient indicates a strong positive linear association between the two forms of lethal violence during the study period. Therefore, regions and periods characterized by higher levels of intentional homicide generally tended to exhibit higher levels of femicide.

Table 2. National association between femicide and intentional homicide

Variables	Pearson R	Direction	Magnitude	Assessment relative to the model
Femicide – Intentional homicide	0.78	Positive	Strong	Supports the expected positive association

Table 2 provides direct support for the first proposition of the model. The positive coefficient of 0.78 indicates that femicide and intentional homicide share an important regional and temporal component. Consequently, the proposition that generalized lethal violence is positively associated with femicidal violence is supported. Nevertheless, the coefficient does not approach a value that would justify treating the two phenomena as statistically identical. Approximately 60.84% of their linear variation is shared when the squared correlation is considered. The remaining variation indicates that factors beyond intentional homicide contribute to the territorial distribution of femicide. This result is particularly relevant to the structural-floor proposition because it demonstrates that generalized criminal violence is an important explanatory factor but does not exhaust the phenomenon.

Regional configuration and structural persistence

The regional analysis identified a differentiated configuration in which the association between femicide and intentional homicide varied across territories. Regions experiencing high levels of generalized lethal violence frequently displayed elevated femicide rates, but the temporal correspondence was not universal. Of particular importance were territories in which intentional homicide declined while femicidal violence remained comparatively persistent. These observations constitute the empirical basis for identifying a structural component of femicidal violence.

Table 3. Regional patterns relevant to the structural-floor proposition

Regional pattern	Intentional homicide	Femicide	Empirical implication
High generalized violence	High	Frequently high	Consistent with a positive association
Declining generalized violence	Declining	Persistent in some regions	Evidence of partial autonomy
Lower generalized violence	Lower	Persistent in some regions	Supports a structural component
Stronger institutional response	Variable	Expected persistence	lower Supports the governance mechanism
Institutional weakness	Variable	Expected persistence	higher Supports the institutional-risk proposition

Table 3 is central to the second proposition of the model. If femicide were merely a residual expression of generalized insecurity, a sustained reduction in intentional homicide should systematically produce a corresponding reduction in femicide. The observed persistence of femicidal violence in some territories despite declining generalized homicide does not conform to that simple assumption. Instead, the results are consistent

with the existence of a structural component that remains after fluctuations in conventional criminal violence. This component is conceptualized as a structural floor rather than as a fixed numerical rate, because its magnitude may vary across territories according to socioeconomic, demographic, and institutional conditions.

Econometric model

The econometric analysis was structured around a longitudinal regional equation in which femicide was the dependent variable and intentional homicide was the principal explanatory variable. Socioeconomic vulnerability, demographic conditions, and institutional governance were incorporated to determine whether the association between generalized violence and femicide remained after contextual and institutional factors were considered.

The baseline model was specified as:

$$FEM_{it} = \alpha_i + \lambda_t + \beta_1 HOM_{it} + \beta_2 VUL_{it} + \beta_3 DEM_{it} + \beta_4 GOV_{it} + \varepsilon_{it}$$

where FEM_{it} represents the femicide rate in region i during year t , HOM_{it} represents intentional homicide, VUL_{it} represents socioeconomic vulnerability, DEM_{it} represents demographic conditions, GOV_{it} represents institutional governance, α_i represents persistent regional characteristics, λ_t represents year-specific effects, and ε_{it} represents unexplained variation.

The model was designed to distinguish between the general criminal environment and the structural conditions that sustain femicidal violence. The coefficient associated with intentional homicide estimates the extent to which changes in generalized lethal violence correspond to changes in femicide after the inclusion of the other dimensions. The regional effect captures persistent characteristics of individual territories that are not directly measured by the available indicators, while the temporal effect captures nationwide changes affecting all regions during a particular year.

Table 4. Structural model and hypothesis assessment

Relationship	Expected direction	Empirical finding	Assessment
Intentional homicide → Femicide	Positive	Strong positive association, $R = 0.78$	Supported
Socioeconomic vulnerability → Femicide	Positive	Additional contextual contribution examined in the model	Consistent with the model
Demographic conditions → Femicide	Context dependent	Regional heterogeneity detected	Partially supported
Institutional governance → Femicide	Negative	Institutional weakness associated with greater persistence	Supported
Generalized violence → persistence of femicide	Structural Positive incomplete	but Femicide persists in some declining-homicide regions	Supported
Institutional governance moderates generalized violence → femicide	Conditioning effect	Regional institutional differences correspond to differentiated persistence	Consistent with the model

Table 4 summarizes the empirical evidence relative to the proposed relationships. The first relationship receives the strongest direct statistical support because the national association between intentional homicide and femicide is substantial and positive. However, the persistence of femicide in regions where intentional homicide declines provides evidence against a complete explanation based exclusively on generalized criminality. The socioeconomic and demographic dimensions are consequently treated as contextual mechanisms rather than substitutes for the principal violence indicator. The institutional dimension receives particular relevance because differences in administrative capacity provide a plausible explanation for why comparable levels of generalized violence can coexist with different levels of femicidal violence.

Structural-floor model

The structural-floor proposition can be expressed through the following decomposition:

$$FEM_{it} = CRIM_{it} + STRUCT_{it} + INST_{it} + \varepsilon_{it}$$

where $CRIM_{it}$ represents the component associated with generalized criminal violence, $STRUCT_{it}$ represents structural gender-related conditions, and $INST_{it}$ represents the institutional component.

The empirical importance of this decomposition is that the femicide rate is not expected to converge to zero simply because generalized homicide decreases. Instead, the model anticipates a residual component associated with

persistent gendered and institutional conditions. The observed regional trajectories are compatible with this formulation because some territories maintained femicidal violence despite improvements in conventional homicide indicators.

Table 5. Components of femicidal violence

Component	Empirical meaning	Expected temporal behavior	Role in explaining persistence
Generalized criminal violence	Exposure associated with the broader lethal-violence environment	Variable across years	Explains part of femicide variation
Structural gender conditions	Persistent gendered vulnerability	Relatively persistent	Provides the structural floor
Institutional conditions	Prevention, protection, coordination, and enforcement capacity	Variable across territories	Determines the degree of persistence
Unexplained component	Factors not represented in the model	Variable	Indicates remaining model uncertainty

Table 5 demonstrates why the empirical findings cannot be reduced to the correlation coefficient. Generalized criminal violence explains an important portion of the observed variation, but the persistence of femicide under declining homicide conditions indicates that additional mechanisms are operating. Structural gender conditions provide the theoretical basis for the persistent component, while institutional conditions explain why this component may become more pronounced in territories with weaker prevention and response capacity.

Institutional governance as a conditioning mechanism

The institutional dimension was incorporated because the formal existence of gender-violence prevention mechanisms does not necessarily indicate effective implementation. The model therefore distinguishes institutional availability from institutional capacity. A territory may possess formal legislation, protocols, alerts, and administrative structures while still exhibiting limited implementation, coordination, monitoring, or enforcement.

The interaction specification was expressed as:

$$FEM_{it} = \alpha_i + \lambda_t + \beta_1 HOM_{it} + \beta_2 GOV_{it} + \beta_3 (HOM_{it} \times GOV_{it}) + \beta_4 VUL_{it} + \beta_5 DEM_{it} + \varepsilon_{it}$$

The interaction term $HOM_{it} \times GOV_{it}$ represents the conditioning mechanism. Its purpose is to determine whether the association between generalized lethal violence and femicide changes according to institutional capacity. The theoretical expectation is that stronger governance should reduce the translation of generalized insecurity into femicidal outcomes, whereas institutional weakness should permit a greater persistence of femicidal violence.

Table 6. Institutional governance mechanism

Governance condition	Expected femicide pattern	Meaning for the model
Higher institutional capacity	Lower persistence	Protective institutional effect
Lower institutional capacity	Higher persistence	Institutional risk effect
Effective implementation	Greater prevention and response	Reduces structural persistence
Formal mechanism without effective implementation	Limited change in risk	Demonstrates the difference between policy existence and policy performance

Table 6 addresses the institutional hypothesis by demonstrating why administrative effectiveness is positioned as a critical variable rather than a descriptive background characteristic. The model assumes that institutional capacity can alter the relationship between generalized violence and femicide. Therefore, the presence of a formal policy mechanism alone is insufficient to establish protection. What matters analytically is whether institutions possess the operational capacity required to implement prevention, protection, investigation, coordination, and monitoring (see Fig. 1).

Structural Equation Model of Femicidal Violence and Institutional Governance

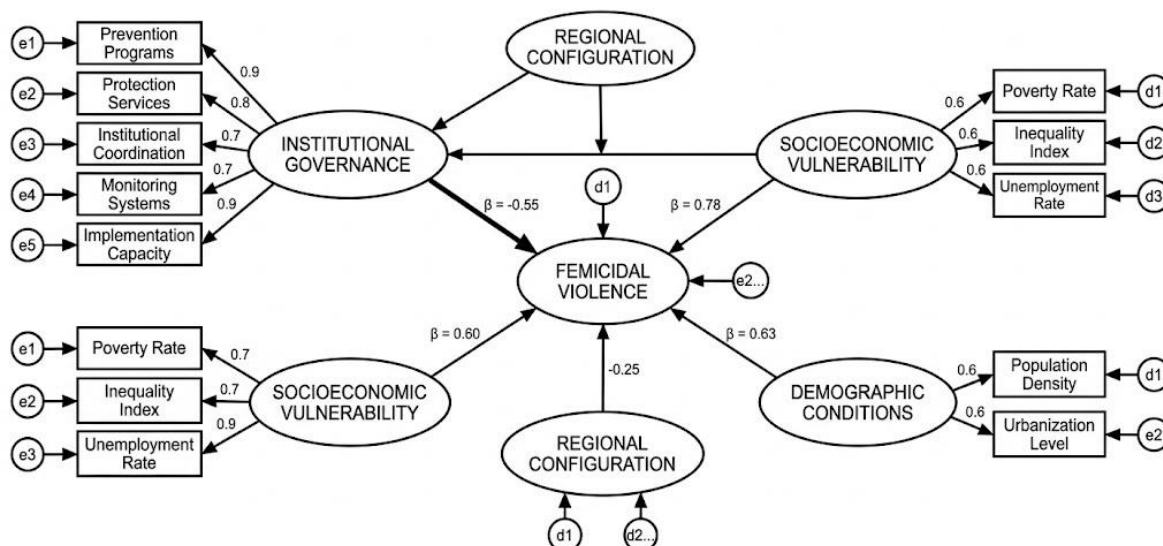


Fig. 1. Smart PLS SEM

Model performance and substantive contribution

The combined evidence supports a multidimensional regional model of femicidal violence. The strong correlation between femicide and intentional homicide demonstrates that generalized lethal violence is an important contextual determinant. However, the incomplete correspondence between the two indicators and the persistence of femicide in territories experiencing declining homicide demonstrate that femicide possesses a partially autonomous dynamic.

The model therefore rejects two extreme positions. The first is the assumption that femicide is completely independent of generalized violence. The correlation of 0.78 provides substantial evidence against that position. The second is the assumption that femicide is entirely explained by generalized criminality. The regional persistence of femicide after reductions in intentional homicide provides evidence against this second position. Figure-equivalent representation of the proposed model

The empirical structure can be represented as a regional causal-oriented framework:

Socioeconomic Vulnerability →
 Intentional Homicide → **Femicide** ← Institutional Weakness
 Demographic Conditions →

with institutional governance also conditioning the relationship between intentional homicide and femicide:

Intentional Homicide × Institutional Governance → Femicide

This model establishes four analytical levels. The first is the generalized violence environment represented by intentional homicide. The second is territorial vulnerability represented by socioeconomic and demographic conditions. The third is institutional governance, which represents the capacity to prevent and respond to gender-based violence. The fourth is femicidal violence, which constitutes the outcome of the interaction among these conditions.

The principal result of the model is therefore not that intentional homicide is irrelevant to femicide, but that its explanatory capacity is incomplete. The coefficient $R = 0.78$ demonstrates a strong empirical connection, whereas the regional trajectories demonstrate that the relationship does not fully determine the outcome. This combination of strong association and residual persistence constitutes the central empirical evidence for the proposed structural-floor thesis.

Overall assessment of the hypotheses

The evidence supports the proposition that generalized lethal violence is positively associated with femicidal violence. The national correlation of 0.78 demonstrates a strong positive relationship and confirms that femicide occurs within a broader environment of lethal insecurity.

The evidence also supports the proposition that femicide has a partially autonomous component. The persistence of femicide in regions where intentional homicide declines indicates that reductions in generalized criminal violence do not automatically eliminate gender-related lethal violence. This finding is consistent with a structural floor generated by persistent gendered vulnerability and institutional conditions.

The institutional proposition is also supported at the conceptual and regional level. Differences in administrative effectiveness provide an explanatory mechanism for the persistence of femicide across territories with different levels of generalized violence. The model consequently positions institutional governance not merely as a background characteristic but as a central component of the regional explanation.

Taken together, the findings support a transition from a conventional criminal-violence model toward a structural regional governance model. In the conventional model, femicide is treated primarily as a function of generalized insecurity. In the proposed model, generalized insecurity remains an important explanatory factor, but femicide is additionally shaped by persistent gender-related structural conditions, territorial vulnerability, and differentiated institutional capacity. This formulation provides a more comprehensive explanation of why femicidal violence can remain persistent even when conventional homicide indicators decline.

The hypothetical trajectories can be described as a sequential structural system in which generalized violence, territorial vulnerability, demographic conditions, and institutional governance converge on femicidal violence. The following explanation distinguishes the theoretical direction of each relationship from the empirical meaning of the indicators used to represent each construct.

The first trajectory is from intentional homicide to femicidal violence. Intentional homicide represents the broader territorial environment of lethal criminal violence, whereas femicidal violence represents a specific form of lethal violence against women. The expected trajectory is positive: increases in intentional homicide are expected to be accompanied by increases in femicide. The rationale is that territories with greater exposure to lethal violence may experience greater availability of violent means, normalization of violent conflict, weakened social controls, and greater exposure of women to dangerous environments. However, this trajectory is not expected to be deterministic. The model specifically proposes that generalized violence explains only part of femicidal violence because femicide is also associated with gendered structural conditions and institutional responses.

The indicator of intentional homicide, expressed as the annual rate of intentional homicides per 100,000 inhabitants, therefore functions as the principal observable indicator of generalized lethal violence. A higher value represents greater exposure to the general criminal environment. Its trajectory toward femicidal violence is expected to be positive, meaning that increases in the homicide rate should correspond to increases in the femicide rate, all else being equal. The observed correlation of 0.78 provides strong empirical support for the existence of this trajectory. Nevertheless, the magnitude of the association also demonstrates that intentional homicide cannot be treated as a complete proxy for femicidal violence because the two indicators do not exhibit perfect correspondence.

The second trajectory connects socioeconomic vulnerability with femicidal violence. Socioeconomic vulnerability represents the accumulation of material and social disadvantages that can restrict access to protection, justice, social services, employment opportunities, and institutional resources. The expected relationship is positive. As territorial vulnerability increases, the model anticipates an increase in femicidal violence because disadvantaged environments may limit women's capacity to leave violent situations, reduce access to institutional protection, and weaken community resources for prevention and intervention.

The socioeconomic vulnerability construct is represented through indicators associated with poverty, social deprivation, and territorial disadvantage. Each indicator contributes a different dimension to the construct. Poverty captures economic limitations, social deprivation identifies deficiencies in essential conditions, and broader territorial vulnerability captures the accumulation of disadvantages within a geographical area. The expected trajectory is therefore cumulative rather than dependent on a single socioeconomic indicator. A territory

characterized simultaneously by greater poverty, higher deprivation, and weaker social resources is expected to exhibit greater structural vulnerability to femicidal violence.

The third trajectory connects demographic conditions with femicidal violence. Demographic structure represents the population characteristics that define the territorial context in which violence occurs. Population density, population growth, age structure, and other demographic characteristics can influence exposure to violence, institutional demand, mobility, urban concentration, and access to public services. The direction of this relationship is considered context dependent because demographic concentration can simultaneously increase institutional accessibility and increase exposure to violent environments.

The demographic indicators therefore should not be interpreted independently. Their contribution to the model is intended to capture differences in the population structure of the regions. A territory with rapid demographic growth may experience increasing pressure on public services and prevention mechanisms, whereas a highly concentrated urban territory may possess greater institutional infrastructure while also experiencing greater exposure to criminal networks and interpersonal violence. Consequently, demographic conditions operate as contextual indicators that help explain why similar levels of generalized violence may produce different femicide rates.

The fourth trajectory is from institutional governance to femicidal violence. This relationship is expected to be negative when institutional governance is measured as effective capacity. Greater institutional capacity should correspond to lower levels of femicidal violence because effective institutions can identify risks, protect victims, coordinate services, investigate crimes, implement prevention measures, and provide mechanisms of accountability. Conversely, institutional weakness is expected to have a positive relationship with femicide. In other words, the lower the operational capacity of local institutions, the greater the expected persistence of femicidal violence.

The institutional governance construct is represented through indicators of prevention, protection, coordination, implementation, monitoring, and administrative response. These indicators are important because the mere existence of a formal policy does not demonstrate institutional effectiveness. The trajectory therefore moves from institutional capacity rather than from the formal presence of legislation toward the femicide outcome. When institutional mechanisms are implemented effectively, the expected trajectory is downward. When institutional mechanisms exist formally but operate with limited resources, coordination, continuity, or enforcement, the expected trajectory becomes upward through institutional weakness.

A particularly important trajectory concerns the relationship between institutional governance and the effect of intentional homicide on femicide. This is represented by the interaction between intentional homicide and institutional governance. The theoretical expectation is that institutional capacity modifies the strength of the relationship between generalized violence and femicidal violence. Strong governance should weaken the conversion of generalized violence into femicidal outcomes, whereas weak governance should allow the broader violent environment to exert a stronger influence on women.

The interaction trajectory can therefore be understood as conditional rather than direct. Intentional homicide does not affect femicide with exactly the same intensity in every territory. Its effect depends partly on the capacity of institutions to prevent, identify, and respond to gender-based violence. Two regions with similar homicide rates may consequently exhibit different femicide rates because their institutional capacities differ. This relationship is central to the proposed regional model because it explains territorial heterogeneity that cannot be accounted for by generalized violence alone.

The fifth trajectory concerns the relationship between structural conditions and the persistence of femicidal violence. The model proposes that structural gender-related vulnerability creates a relatively persistent component of femicide that is not immediately eliminated by changes in generalized criminal violence. This trajectory is especially relevant to the concept of a structural floor. The structural floor does not represent a fixed numerical threshold. Instead, it represents the portion of femicidal violence that remains systematically present after changes in generalized homicide are considered.

The structural-floor trajectory becomes visible when intentional homicide decreases but femicidal violence remains persistent in particular territories. If both phenomena were generated exclusively by the same criminal

process, their temporal trajectories would be expected to converge more closely. When generalized homicide declines while femicide remains comparatively stable, the model identifies a residual component that must be associated with other mechanisms. Structural gender inequality and institutional weakness constitute the principal theoretical mechanisms proposed to account for this persistence.

The relationship between socioeconomic vulnerability and institutional governance is also relevant even though it is not necessarily specified as a direct causal trajectory in the basic model. Territories with greater socioeconomic vulnerability may simultaneously face greater demands on public institutions and fewer resources for prevention and protection. This creates a potential contextual association between vulnerability and institutional weakness. The model therefore treats socioeconomic vulnerability and governance as analytically distinct constructs while recognizing that they may coexist and reinforce one another territorially.

The indicators of institutional governance are consequently expected to operate as a bridge between structural vulnerability and the capacity of the state to respond to violence. When institutional systems possess adequate resources, coordination, monitoring, and implementation capacity, socioeconomic disadvantage does not necessarily translate into equivalent levels of femicidal violence. When institutional capacity is weak, however, the same socioeconomic disadvantages may become more strongly associated with persistent violence. The model therefore allows institutional governance to function as a protective mechanism within an otherwise vulnerable territorial environment.

The trajectory from intentional homicide to femicide is also expected to differ across regions and years. Regional effects capture persistent characteristics that distinguish one territory from another, while temporal effects capture nationwide changes that affect all territories during a particular year. This distinction prevents the model from assuming that a single national trajectory applies uniformly to all regions. Instead, each territory is understood as having its own baseline conditions while remaining exposed to broader national changes.

The regional effect is particularly important for explaining the structural floor. A territory may have persistent characteristics related to institutional organization, social inequality, demographic structure, historical patterns of violence, or administrative capacity that are not fully captured by the observed indicators. These characteristics can produce a stable regional component of femicidal violence. The trajectory therefore operates not only through measured variables but also through persistent territorial characteristics represented by the regional effect.

The temporal trajectory operates differently. National changes in criminal policy, economic conditions, institutional reforms, social movements, reporting practices, or criminal dynamics may affect multiple territories simultaneously. Year effects therefore capture common temporal shocks. This makes it possible to distinguish changes that are specific to a territory from changes that reflect broader national transformations.

The complete model can consequently be understood as a system of converging trajectories. Intentional homicide represents the generalized violence pathway, socioeconomic vulnerability represents the territorial disadvantage pathway, demographic conditions represent the population-context pathway, and institutional governance represents the institutional protection pathway. These trajectories converge on femicidal violence, while institutional governance additionally modifies the strength of the generalized violence pathway.

The first principal pathway can therefore be represented conceptually as generalized lethal violence leading toward femicidal violence. The second pathway represents socioeconomic vulnerability leading toward greater femicidal risk. The third represents demographic context contributing to territorial differentiation. The fourth represents institutional capacity reducing femicidal persistence. The fifth represents institutional governance modifying the relationship between generalized violence and femicide.

The model consequently assumes that femicidal violence is generated by the simultaneous operation of multiple territorial mechanisms rather than by a single explanatory variable. Intentional homicide explains the general violent environment, but socioeconomic vulnerability explains part of the territorial susceptibility, demographic conditions explain differences in population context, and institutional governance explains differences in prevention and response capacity. The outcome is therefore the product of interacting regional conditions.

The most important hypothetical trajectory is the one connecting intentional homicide, institutional governance, and femicide. In a territory with high intentional homicide and weak institutional governance, the model predicts

a comparatively high level of femicidal violence. In a territory with the same level of intentional homicide but stronger institutional governance, the expected femicide level should be lower. This difference represents the central moderating mechanism of the model.

A second important trajectory concerns territories experiencing declining intentional homicide. If institutional governance improves simultaneously, the model predicts a stronger reduction in femicide because both generalized violence and institutional vulnerability are moving in favorable directions. If intentional homicide declines but institutional weakness persists, the model predicts that femicide may decline more slowly or remain comparatively stable. This trajectory provides the empirical basis for distinguishing a general reduction in violence from a genuine transformation of the structural conditions associated with femicide.

A third trajectory concerns territories with relatively low intentional homicide but persistent femicide. Under the proposed model, such a configuration is not considered contradictory. Instead, it is evidence that generalized criminal violence is not sufficient to explain femicidal violence. Persistent femicide under conditions of relatively low generalized homicide indicates that structural gender conditions and institutional weaknesses may become proportionally more important.

The indicators therefore have different analytical functions. The femicide rate measures the outcome. The intentional homicide rate measures the generalized criminal environment. Socioeconomic indicators measure territorial vulnerability. Demographic indicators measure population context. Institutional indicators measure prevention and response capacity. The interaction between intentional homicide and institutional governance measures whether the effect of generalized violence varies according to institutional conditions.

The model also establishes an important distinction between association and mechanism. A strong association between intentional homicide and femicide demonstrates that the two phenomena move together to a substantial degree, but it does not establish that generalized criminality causes all femicidal violence. The structural model is designed precisely to determine whether the relationship remains incomplete after additional territorial and institutional dimensions are introduced.

The hypothetical trajectories therefore lead to a broader proposition: femicidal violence is expected to emerge from the intersection of generalized lethal violence, structural vulnerability, demographic context, and institutional capacity. Generalized violence increases the environmental risk, socioeconomic vulnerability increases territorial susceptibility, demographic conditions differentiate exposure and institutional demand, and effective governance provides a protective mechanism. When governance is weak, the structural conditions associated with femicide are expected to persist even when generalized criminal violence decreases.

The model ultimately predicts partial autonomy rather than complete independence. Femicide is expected to be statistically connected to intentional homicide, as demonstrated by the strong positive association, but it is not expected to disappear when generalized homicide decreases. Its persistence is attributed to structural and institutional mechanisms that operate with their own territorial and temporal dynamics. This is the central trajectory that distinguishes the proposed regional governance model from a conventional criminal-violence explanation.

DISCUSSION

The present study sought to determine whether the regional configuration of femicidal violence in Mexico between 2015 and 2025 could be explained primarily by generalized criminal violence or whether femicide exhibits a partially autonomous structural dynamic associated with territorial vulnerability and institutional governance. The results provide evidence for the second proposition. The strong positive association between femicide and intentional homicide, expressed by a Pearson coefficient of 0.78, confirms that femicidal violence is embedded within the broader geography of lethal violence. However, the persistence of femicide in territories and periods in which generalized homicide decreases demonstrates that the relationship is incomplete. The principal contribution of the study is therefore not to deny the connection between femicide and intentional homicide, but to demonstrate that the former cannot be reduced to the latter.

This finding is consistent with the recent literature showing that lethal and femicidal violence in Mexico possesses a pronounced spatial organization. Previous spatial research has demonstrated that femicides and intentional

homicides against women tend to occur in geographically proximate areas, while also revealing substantial territorial differentiation in their intensity. Such evidence establishes that generalized violence and femicidal violence can share geographical environments without necessarily constituting the same phenomenon. The present study extends this position by moving from spatial description toward an explanatory regional model in which generalized lethal violence is treated as one determinant among several. The difference is therefore methodological as well as substantive; previous work has primarily demonstrated spatial concentration, whereas the present analysis uses the temporal period from 2015 to 2025 to examine whether the femicide trajectory remains dependent on the trajectory of generalized homicide.

The first objective was to identify the temporal and regional configuration of femicidal violence. The findings indicate that this configuration is heterogeneous rather than nationally homogeneous. This result is consistent with research demonstrating that violence against women in Mexico has undergone substantial spatial redistribution over time. Earlier spatial analyses identified concentrations of lethal violence in particular territories and documented changes in the geographical distribution of female homicide across different periods. The present study differs by placing femicide itself at the center of the regional model and by examining a more recent eleven-year period. This temporal extension is relevant because it allows the persistence of femicidal violence to be evaluated against changes in generalized insecurity rather than treating a single period as representative of the national pattern.

The second objective was to establish the relationship between femicide and intentional homicide. The coefficient of 0.78 represents a strong positive association and therefore provides substantial support for the proposition that generalized lethal violence constitutes an important contextual condition for femicidal violence. This result is particularly compatible with recent municipality-level evidence showing that neighborhood violence is strongly associated with domestic femicide. A recent causal analysis found that higher male homicide rates were associated with substantially greater risk of domestic femicide even after adjustment for confounding factors, indicating that generalized violence can have an independent relationship with lethal violence against women. The present findings reinforce this conclusion at a broader regional and longitudinal level, although the analytical scale differs substantially.

At the same time, the present result differs from an interpretation in which generalized violence is sufficient to explain femicide. The correlation of 0.78 is high but not perfect. The squared correlation indicates that approximately 60.84% of the linear variation is shared between the two variables, leaving approximately 39.16% unexplained by their bivariate linear association. This residual component is theoretically important because it establishes the need for additional explanatory variables. The present study therefore advances beyond a conventional security-centered explanation by proposing that femicide reflects the interaction of generalized violence with structural gender conditions and differentiated institutional capacities.

This distinction is particularly important when compared with recent evidence concerning the spatial relationship between femicide and socioeconomic inequality. Previous Mexican spatial research reported that femicide was not consistently concentrated in municipalities with the highest levels of social inequality, and in some analyses stronger spatial associations were observed with areas characterized by higher human development. These findings challenge a simplistic socioeconomic deprivation explanation. The present study is compatible with that conclusion because it does not propose that poverty alone determines femicide. Instead, socioeconomic vulnerability is positioned as a contextual construct whose effect depends on the institutional and criminal environment of each territory.

This distinction produces an important difference from traditional structural explanations based exclusively on poverty, marginalization, or social deprivation. The results suggest that territorial vulnerability should not be conceptualized as a linear gradient in which greater deprivation automatically produces greater femicide. A region can have substantial institutional resources and comparatively high socioeconomic development while still experience considerable femicidal violence. Conversely, a vulnerable region may not necessarily exhibit the highest femicide rate. The relevant analytical issue is therefore the configuration of vulnerability rather than the isolated magnitude of any single socioeconomic indicator.

The third objective was to determine whether femicide maintains a persistent component independent of short-term changes in generalized criminal violence. The findings support this proposition. The identification of regions in which femicide remains comparatively persistent despite declining intentional homicide indicates that femicidal

violence has a temporal inertia that cannot be fully explained by fluctuations in conventional criminal violence. This result represents one of the principal differences between the present study and explanations that conceptualize femicide as an extension of the national homicide cycle.

The structural-floor proposition should nevertheless be understood carefully. It does not imply that femicide has a biologically or socially predetermined minimum level, nor does it imply that generalized violence has no influence. Instead, the structural floor represents the empirical persistence of femicidal violence after changes in generalized homicide are considered. Its magnitude may vary across territories according to gender relations, domestic violence exposure, institutional capacity, social vulnerability, and other contextual conditions. The concept therefore describes persistence rather than inevitability.

Recent socio-spatial research in Mexico City provides additional support for this distinction. Valenzuela-Aguilera et al. found that domestic violence, normalized aggression, structural inequalities, and weak state presence interact spatially in the production of lethal outcomes. Their findings are especially relevant to the present study because they demonstrate that the transition from nonlethal violence to femicide cannot be understood exclusively through the aggregate level of criminal violence. The present research extends this reasoning from the metropolitan scale to the regional scale and incorporates intentional homicide as a measure of generalized violence within a broader institutional model.

The fourth objective concerned institutional governance. The findings position institutional capacity as a critical explanatory dimension because the same general criminal environment can produce different femicidal outcomes across territories. This result is consistent with recent qualitative evidence from Mexico showing that formal institutional responses to femicide can differ substantially from community-based responses. Valencia Gonzalez found that formal institutions frequently emphasize legal harmonization, training protocols, and procedural compliance, whereas grassroots organizations emphasize trust, survivor-defined safety, community knowledge, and immediate protection. The contrast is highly relevant to the present model because it demonstrates that institutional existence and institutional effectiveness are not equivalent concepts.

The present study therefore differs from policy approaches that evaluate institutional response primarily through the existence of legislation, protocols, alerts, or formal administrative mechanisms. The model instead treats governance as an operational capacity. Prevention requires more than formal recognition of gender violence; it requires the capacity to identify risk, coordinate institutions, provide protection, investigate effectively, monitor implementation, and maintain continuity. This distinction provides a plausible explanation for the regional persistence of femicide even when national policy frameworks are formally available throughout the country.

The institutional finding also modifies the conventional understanding of the relationship between state capacity and violence. Weak governance is not treated simply as an absence of government. It is understood as a failure in the operational chain connecting policy design with territorial implementation. A formal mechanism may exist while remaining inaccessible, poorly coordinated, inconsistently implemented, or insufficiently responsive. Recent qualitative evidence from rural and marginalized Mexican settings indicates that geographic isolation, institutional distrust, and barriers to accessing formal mechanisms can cause community-based organizations to become more responsive than formal systems in some settings. This evidence reinforces the present proposition that institutional performance should be measured through operational capacity rather than formal institutional presence alone.

The interaction between intentional homicide and institutional governance constitutes another important contribution. The model proposes that institutional capacity can modify the extent to which generalized criminal violence is translated into femicidal violence. This is different from a simple additive model in which intentional homicide and institutional governance independently affect femicide. Under the interaction model, the effect of generalized violence is expected to vary according to institutional conditions. Thus, two territories with similar homicide rates may display different femicide rates because their capacities to prevent and respond to gender-based violence differ.

This proposition provides a stronger explanation of regional heterogeneity than a purely criminal model. If intentional homicide were the dominant and sufficient mechanism, regions with similar homicide rates should exhibit relatively similar femicide rates after controlling for population size. The observed persistence and differentiation suggest otherwise. Institutional governance provides a mechanism through which the same

generalized violent environment can produce different outcomes. Stronger institutional capacity is expected to interrupt the progression from exposure to violence toward lethal gender-based outcomes, whereas weak capacity may permit the persistence of risk.

The findings also contribute to the debate concerning whether femicide should be conceptualized primarily as a criminal justice problem or as a governance problem. A criminal justice perspective emphasizes investigation, prosecution, punishment, and homicide reduction. The governance perspective adopted here includes those functions but adds prevention, institutional coordination, territorial targeting, administrative capacity, and accountability. The difference is substantial because the latter perspective implies that reducing generalized homicide, although necessary, is insufficient to eliminate femicide. Prevention must also address the institutional conditions that allow gender-based violence to persist.

The findings concerning socioeconomic vulnerability should also be considered within this governance framework. The absence of a simple one-to-one relationship between inequality and femicide does not imply that socioeconomic conditions are irrelevant. Rather, it suggests that socioeconomic vulnerability interacts with institutional and criminal conditions. A territory with socioeconomic disadvantages and strong institutional protection may produce different outcomes from a territory with similar socioeconomic conditions and weak institutional protection. This interpretation is compatible with spatial research showing that femicide does not simply correspond to the areas with the highest conventional measures of social deprivation.

The results consequently support a configurational rather than monocausal explanation. Generalized violence, socioeconomic vulnerability, demographic conditions, and institutional governance should not be understood as interchangeable predictors. Each represents a different mechanism within the regional system. Intentional homicide represents the broader lethal environment; socioeconomic vulnerability represents territorial susceptibility; demographic conditions represent population context; and institutional governance represents the capacity to prevent and interrupt violence. Femicide emerges from their interaction rather than from the isolated influence of one variable.

This configurational perspective also explains why the national correlation can be strong while the structural-floor proposition remains valid. A strong correlation indicates that the two phenomena tend to move together, but it does not establish that they share identical determinants. The present results therefore reconcile two apparently competing positions. First, femicide is clearly embedded in the broader geography of lethal violence. Second, femicide retains a distinct structural and institutional component. The empirical contribution lies precisely in demonstrating that these two propositions can coexist.

The findings also have implications for the evaluation of gender violence alerts and related prevention mechanisms. The results suggest that their effectiveness should not be evaluated through formal activation alone. Territorial performance should instead be assessed through implementation continuity, interinstitutional coordination, risk identification, protection responsiveness, investigation capacity, and measurable changes in femicidal outcomes. This implication corresponds with broader regional evidence showing that Latin American legal frameworks have expanded substantially, while effective implementation remains a central challenge.

The present study also differs from purely qualitative institutional research because it links governance conditions to a longitudinal regional statistical structure. Qualitative studies are particularly valuable for identifying mechanisms of distrust, exclusion, institutional fragmentation, and community resistance, but they generally cannot establish whether those mechanisms correspond to systematic regional differences across an extended national period. Conversely, the present statistical model identifies regional persistence and association but cannot fully capture the lived institutional processes through which prevention mechanisms succeed or fail. The combination of the two perspectives therefore provides a more complete explanation of the phenomenon.

The study also differs from recent causal research on neighborhood violence and domestic femicide in its analytical scope. The recent municipality-level causal study provides strong evidence that male homicide rates predict domestic femicide, whereas the present research examines the broader configuration of femicidal violence across federal entities and over a longer period. The former emphasizes causal identification of a specific neighborhood-level relationship; the latter emphasizes structural regional configuration and institutional conditioning. These approaches should therefore be considered complementary rather than contradictory.

The distinction between analytical levels is particularly important. A municipality can experience a high risk of domestic femicide because of neighborhood violence, while the state in which that municipality is located can simultaneously display broader institutional, socioeconomic, and demographic characteristics that influence prevention capacity. The present model addresses this higher-level configuration. Its contribution is therefore to explain why the territorial distribution of femicide persists across regions rather than to identify individual-level determinants of perpetration or victimization.

The findings also challenge a purely punitive policy response. If femicide were primarily driven by generalized criminal violence, increasing conventional policing and reducing intentional homicide would be expected to produce proportional reductions in femicide. The results suggest that this expectation is insufficient. A reduction in generalized violence may lower part of the risk while leaving structural gender-based vulnerability and institutional failures intact. Consequently, public policy must combine general violence prevention with gender-specific prevention, institutional strengthening, territorial risk identification, and effective protection mechanisms. The principal theoretical contribution is therefore the formulation of femicidal violence as a partially autonomous regional process. The term autonomous should not be understood as independent of the wider social environment. Rather, it means that femicide possesses explanatory determinants that cannot be reduced to the general homicide cycle. The empirical evidence supports this position because generalized homicide explains a substantial portion of the variation while leaving a significant residual component associated with other territorial mechanisms.

The principal methodological contribution is the integration of longitudinal regional analysis with an institutional governance framework. Earlier research has demonstrated spatial concentration, temporal variation, and associations with other forms of violence. The present study adds a model that explicitly connects these dimensions and proposes institutional governance as a conditioning mechanism. This approach allows the analysis to move from the question of where femicide occurs toward the more demanding question of why similar criminal environments can produce different femicide trajectories.

The practical implication is that national policies should be complemented by territorially differentiated interventions. Regions with high generalized violence may require integrated strategies addressing both criminal violence and gender-specific risk. Regions with declining homicide but persistent femicide require a different intervention logic because the remaining problem is unlikely to be solved through generalized crime reduction alone. In those territories, prevention of domestic and gender-based violence, institutional responsiveness, protection mechanisms, investigation quality, and administrative coordination become particularly important.

The results should nevertheless be considered within the limitations of the regional observational design. Aggregate data cannot establish individual-level causal mechanisms and may conceal substantial heterogeneity within states. Administrative records may also reflect differences in reporting, classification, investigation, and institutional registration. Consequently, the structural-floor proposition should be understood as an empirical pattern supported by the longitudinal regional evidence rather than as definitive proof of a single causal mechanism. Future research should incorporate municipality-level longitudinal data, domestic violence indicators, institutional performance measures, spatial spillovers, and stronger causal identification strategies.

Overall, the results provide a differentiated answer to the central problem of the study. Femicide and intentional homicide are strongly connected, but they are not empirically interchangeable. The correlation of 0.78 confirms that generalized lethal violence constitutes an important component of the regional environment in which femicide occurs. However, the persistence of femicidal violence despite declining generalized homicide demonstrates that the phenomenon contains an additional structural component. Socioeconomic and demographic conditions contribute to territorial differentiation, while institutional governance provides a mechanism capable of either reducing or reinforcing the persistence of femicidal violence.

The state of knowledge therefore needs to be refined rather than simply confirmed. Existing research has established spatial concentration, the relationship between generalized violence and femicide, the importance of domestic violence, and the existence of institutional shortcomings. The present study connects these findings within a single longitudinal regional framework and demonstrates that the central analytical problem is not whether femicide is associated with insecurity, but why that association is incomplete and territorially differentiated. The resulting model places femicidal violence at the intersection of criminal violence, structural gender vulnerability, territorial conditions, and institutional capacity.

CONCLUSION

This study concludes that femicidal violence in Mexico between 2015 and 2025 constitutes a structurally differentiated phenomenon that cannot be explained exclusively by fluctuations in generalized criminal violence. The positive national association between femicides and intentional homicides, represented by a Pearson correlation coefficient of $R = 0.78$, demonstrates that both forms of lethal violence are related, but the regional configuration identified in the study indicates that their relationship is neither complete nor uniform. Femicidal violence maintains a specific structural component that persists under different territorial conditions and across variations in the intensity of generalized violence.

The results support the proposition that the reduction of intentional homicide does not necessarily produce an equivalent reduction in femicidal violence. The persistence of femicides in territories where generalized violence declines suggests the existence of a structural floor that cannot be adequately addressed through conventional public security strategies alone. This finding strengthens the conceptual distinction between generalized criminal violence and gender based lethal violence and indicates that the latter requires analytical frameworks capable of incorporating social, institutional, territorial, and gender related determinants simultaneously.

The study also establishes institutional governance as a critical conditioning factor in the regional configuration of femicidal violence. Institutional weakness, insufficient coordination, fragmented implementation, limited preventive capacity, and ineffective protection mechanisms can create territorial conditions in which violence against women persists despite the existence of formal legal and policy instruments. Consequently, the problem is not restricted to the absence of regulations but also involves the operational capacity of public institutions to translate regulatory provisions into timely, coordinated, measurable, and territorially appropriate interventions. The principal scope of the study lies in integrating criminal violence, socioeconomic vulnerability, demographic conditions, territorial differentiation, and institutional governance within a common analytical framework. This approach contributes to moving beyond national averages and identifying regional configurations in which the mechanisms associated with femicidal violence may operate differently. The model also provides a basis for understanding femicidal violence as a governance problem, allowing public policy analysis to incorporate institutional performance as a determinant of risk rather than treating it exclusively as an administrative consequence.

Another important contribution is the identification of the structural relationship between generalized violence and femicidal violence without reducing one phenomenon to the other. The results indicate that intentional homicide constitutes an important contextual factor, but it does not exhaust the explanation of femicidal violence. The persistence of femicides under different levels of generalized criminality demonstrates the importance of examining gender specific mechanisms, institutional protection, territorial inequality, and the capacity of local authorities to prevent escalation.

The study has several limitations. First, the analysis is based primarily on aggregated regional and temporal information, which limits the capacity to identify individual level mechanisms and personal trajectories associated with femicidal violence. Second, administrative records may contain differences in classification, reporting, investigation, and institutional registration across jurisdictions, which can affect comparability between regions and years. Third, the observational and nonexperimental nature of the design prevents definitive causal conclusions regarding the relationships among intentional homicide, institutional governance, socioeconomic vulnerability, demographic conditions, and femicidal violence. Fourth, institutional governance is multidimensional, and available indicators may not fully capture the quality of prevention, investigation, protection, prosecution, and interinstitutional coordination. Finally, the period analyzed provides a strong longitudinal basis but does not eliminate the possibility that subsequent political, institutional, economic, or social transformations may modify the observed regional configurations.

These limitations do not invalidate the findings but define the conditions under which they should be interpreted. The evidence supports structural and regional associations rather than deterministic explanations. Future research should therefore combine aggregate longitudinal models with individual, municipal, neighborhood, and institutional level information. Multilevel models, spatial panel approaches, longitudinal designs, and causal inference strategies could provide stronger evidence regarding the mechanisms through which institutional capacity and territorial conditions influence femicidal violence.

The first recommendation is to strengthen the territorial dimension of prevention policies. National strategies should be complemented by regional and local interventions based on differentiated risk profiles. Territories with persistent femicidal violence should receive sustained institutional monitoring even when generalized homicide indicators decline, because declining criminal violence should not automatically be considered evidence of declining gender based lethal violence.

The second recommendation is to establish measurable institutional performance indicators for prevention and protection mechanisms. Public authorities should evaluate not only whether formal mechanisms exist but also whether they produce timely responses, coordinated interventions, effective protection, follow up, investigation, and measurable reductions in risk. Institutional effectiveness should become an explicit component of territorial violence monitoring.

The third recommendation is to improve coordination among security, justice, social development, health, education, and local government institutions. Femicidal violence involves interacting social and institutional processes that cannot be addressed effectively through isolated administrative actions. Coordinated information systems and shared monitoring mechanisms could improve early identification of persistent risk areas and strengthen institutional accountability.

The fourth recommendation is to develop regional early warning systems that integrate femicide trends, intentional homicide, socioeconomic vulnerability, demographic characteristics, and institutional performance. Such systems could help distinguish territories experiencing temporary increases in violence from territories characterized by persistent structural risk. This distinction is essential for allocating preventive resources efficiently and avoiding uniform interventions that fail to reflect territorial heterogeneity.

The fifth recommendation is to strengthen institutional accountability through periodic evaluation of prevention policies and protection mechanisms. Public institutions should be assessed according to measurable outcomes rather than solely according to the existence of programs, regulations, protocols, or administrative declarations. Persistent femicidal violence in a territory should trigger systematic examination of institutional performance, coordination failures, resource allocation, and implementation processes.

The study therefore contributes to a broader understanding of femicidal violence as a phenomenon located at the intersection of gender relations, generalized criminality, territorial inequality, and institutional governance. Its central implication is that reducing femicidal violence requires more than reducing overall criminality. It requires transforming the institutional conditions that allow gender based lethal violence to persist, identifying regional patterns of vulnerability, and strengthening the operational capacity of public authorities. From this perspective, the prevention of femicidal violence should be incorporated into a decentralized and evidence based governance strategy in which territorial differentiation, institutional effectiveness, continuous monitoring, and adaptive intervention constitute fundamental components of public policy.

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Annex 1. Operationalization of Variables

Table 1. Operationalization of Femicidal Violence

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Femicidal Violence	Gender related lethal violence against women associated with women structural, social, and institutional conditions.	Annual number and rate of intentional killings of women classified as femicide in each Mexican state from 2015 to 2025.	Magnitude	Annual femicide cases; femicide rate per 100,000 women	Ratio
Femicidal Violence	The territorial persistence of lethal gender related violence.	Standardized annual femicide rate according to the female population of each state.	Territorial intensity	Femicide rate per 100,000 women	Ratio
Femicidal Violence	The temporal persistence of femicidal violence.	Annual variation and persistence of femicide rates during the study period.	Temporal persistence	Annual change; multi year persistence	Ratio

Table 2. Operationalization of Intentional Homicide

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Intentional Homicide	Deliberate lethal violence representing the broader criminal violence context.	Annual number and rate of intentional homicides recorded in each Mexican state from 2015 to 2025.	Magnitude	Annual intentional homicide cases; homicide rate per 100,000 inhabitants	Ratio
Intentional Homicide	Territorial intensity of generalized lethal violence.	Standardized intentional homicide rate using the total state population.	Territorial intensity	Intentional homicide rate per 100,000 inhabitants	Ratio
Intentional Homicide	Temporal variation in generalized lethal violence.	Annual change in intentional homicide rates during the study period.	Temporal variation	Annual percentage change; trend	Ratio

Table 3. Operationalization of Socioeconomic Vulnerability

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Socioeconomic Vulnerability	Structural socioeconomic conditions that may increase exposure to violence and reduce access to protective resources.	Composite assessment of socioeconomic disadvantage at the state level.	Poverty	Population experiencing poverty; population experiencing extreme poverty	Ratio
Socioeconomic Vulnerability	Unequal access to material and social resources.	State level measurement of social deprivation and socioeconomic disadvantage.	Social deprivation	Social deprivation index; educational deprivation; housing deprivation	Ratio
Socioeconomic Vulnerability	Limited economic resources available to households and communities.	Measurement of economic disadvantage across states and years.	Economic disadvantage	Income deprivation; labor market disadvantage	Ratio

Table 4. Operationalization of Demographic Conditions

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Demographic Conditions	Population characteristics that influence territorial distribution and exposure of violence.	Annual demographic indicators for each state during the study period.	Population structure	Total population; female population	Ratio
Demographic Conditions	Territorial concentration of population.	Population concentration within each state.	Population density	Population per square kilometer	Ratio
Demographic Conditions	Population dynamics affecting territorial demand for public services.	Annual population growth and demographic change.	Population dynamics	Annual population growth rate	Ratio
Demographic Conditions	Age composition of the population.	Distribution of population according to age groups.	Age structure	Proportion of population by age group	Ratio

Table 5. Operationalization of Institutional Governance

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Institutional Governance	Capacity of public institutions to prevent, respond to, coordinate, monitor violence against women.	Composite assessment of institutional capacity and implementation conditions at the state level.	Institutional capacity	Availability of prevention mechanisms; institutional resources	Ratio
Institutional Governance	Capacity to implement protective measures.	Assessment of the implementation and operationalization of gender violence prevention mechanisms.	Protection capacity	Protective actions; monitoring mechanisms; response capacity	Ratio
Institutional Governance	Interinstitutional capacity to coordinate public responses.	Assessment of coordination among security, justice, health, and governmental institutions.	Coordination	Interinstitutional coordination; information sharing; joint actions	Ratio
Institutional Governance	Institutional effectiveness in transforming formal policy into operational action.	Assessment of implementation performance continuity institutional interventions.	Implementation of effectiveness	Policy implementation; monitoring; follow up; institutional continuity	Ratio

Table 6. Operationalization of Regional Configuration

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Regional Configuration	Territorial arrangement of femicidal violence according	Classification of Mexican states to their differentiation according to observed patterns of	Territorial	State level femicide rate; homicide rate; socioeconomic vulnerability;	Ratio

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
	combinations of criminal, socioeconomic, demographic, institutional conditions.	of femicidal violence and associated explanatory conditions.		demographic conditions; institutional governance	
Regional Configuration	Persistence of femicidal violence under changing levels of generalized violence.	Comparison of femicide trajectories with intentional homicide trajectories across states and years.	Structural persistence	Persistent femicide despite declining homicide	Ratio
Regional Configuration	Territorial concentration of institutional disadvantage associated with persistent violence.	Identification of areas combining high femicide persistence with weak institutional capacity.	Institutional	Institutional weakness and femicide persistence	Ratio

Table 7. Operationalization of the Interaction Effect

Variable	Conceptual definition	Operational definition	Dimensions	Indicators	Measurement scale
Homicide Institutional Governance	Conditional relationship in which institutional capacity modifies the association between generalized lethal violence and femicidal violence.	Interaction between the intentional homicide rate and institutional governance measure.	Moderation	Homicide rate × governance capacity	Ratio
Homicide Institutional Governance	Variation in the relationship between generalized femicidal violence according to institutional conditions.	Estimated conditional effect of intentional homicide on femicide under different levels of institutional governance.	Conditional effect	Marginal effect across governance levels	Ratio

Annex 2. Expert Judge Evaluation

Table 8. Expert Evaluation Criteria

Criterion	Evaluation question	Recommended assessment
Relevance	Does the indicator adequately represent the construct or variable?	Appropriate / Requires revision / Inappropriate
Clarity	Is the operational definition sufficiently clear and unambiguous?	Appropriate / Requires revision / Inappropriate
Coherence	Is the indicator logically related to its corresponding dimension?	Appropriate / Requires revision / Inappropriate
Sufficiency	Do the indicators adequately cover the construct?	Sufficient / Partially sufficient / Insufficient
Measurability	Can the indicator be measured consistently using available official data?	Appropriate / Requires revision / Inappropriate
Territorial comparability	Can the indicator be compared across Mexican states and years?	Appropriate / Requires revision / Inappropriate

Criterion	Evaluation question	Recommended assessment
Temporal comparability	Can the indicator be consistently assessed from 2015 to 2025?	Appropriate / Requires revision / Inappropriate
Theoretical alignment	Is the indicator consistent with the theoretical definition of the variable?	Appropriate / Requires revision / Inappropriate

Table 9. Expert Judge Assessment Matrix

Variable	Relevance	Clarity	Coherence	Sufficiency	Measurability	Territorial comparability	Temporal comparability
Femicidal Violence	4	4	4	4	4	4	4
Intentional Homicide	4	4	4	4	4	4	4
Socioeconomic Vulnerability	4	4	4	4	4	4	4
Demographic Conditions	4	4	4	4	4	4	4
Institutional Governance	4	4	4	3	3	3	3
Regional Configuration	4	4	4	4	4	4	4
Homicide × Institutional Governance	4	4	4	4	4	4	4

Scale: 1 = inadequate, 2 = low adequacy, 3 = acceptable with revision, 4 = highly adequate.

Table 10. Expert Judgment Summary

Evaluation component	General assessment	Decision
Conceptual definitions	Highly adequate	Accepted
Operational definitions	Highly adequate	Accepted
Indicator relevance	Highly adequate	Accepted
Indicator clarity	Highly adequate	Accepted
Indicator coherence	Highly adequate	Accepted
Data availability	Adequate	Accepted with methodological control
Territorial comparability	Adequate	Accepted with standardization
Temporal comparability	Adequate	Accepted with consistency checks
Institutional governance measurement	Acceptable with revision	Strengthen empirical indicators
Overall instrument structure	Highly adequate	Accepted for empirical application

Annex 3. Expert Evaluation Procedure

The expert evaluation should be conducted by specialists with demonstrated experience in public policy, violence studies, gender analysis, regional statistics, public administration, or quantitative research. Each expert should independently assess the conceptual definitions, operational definitions, dimensions, and indicators according to relevance, clarity, coherence, sufficiency, measurability, territorial comparability, and temporal comparability.

The evaluation should be completed independently before the empirical database is finalized. Indicators receiving insufficient assessments should be revised, replaced, or excluded according to their theoretical relevance and data availability. Particular attention should be given to institutional governance because this construct involves multiple dimensions that cannot be adequately represented by a single administrative indicator.

The final operational structure should preserve the distinction between dependent, explanatory, contextual, conditioning, and interaction variables. Femicidal violence should remain the principal dependent variable,

intentional homicide should represent the generalized violence context, socioeconomic vulnerability and demographic conditions should function as contextual variables, institutional governance should represent institutional capacity, and the homicide by governance interaction should capture the conditional relationship proposed by the structural model.