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Labor Market Instability and Household Conflict: A Study of Domestic Violence in Peru's Regions (2009-2023)

Inestabilidad del mercado laboral y conflicto intrafamiliar: un estudio de la violencia doméstica en las regiones del Perú (2009-2023)

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Abstract

Introduction
Domestic violence is a complex social phenomenon closely linked to labor market instability, structural inequality, and housing conditions. In Peru, persistent informality, regional heterogeneity, and the disruptions generated by the COVID-19 pandemic have intensified household stress, making it relevant to examine how employment dynamics shape gender-differentiated patterns of violence.

Objective
This study analyzes the relationship between labor market instability and domestic violence across Peru's 25 regions over the period 2009–2023, using a gender-disaggregated approach. The analysis incorporates unemployment, informal labor, overcrowding, poverty, education, and access to technology, while capturing persistence, regional disparities, and structural vulnerabilities.

Methodology
A balanced panel dataset is examined using a two-step System Generalized Method of Moments (GMM) estimator to address endogeneity and dynamic persistence. The model includes lagged dependent variables and employs internet access and cellphone ownership as instruments for unemployment, strengthening identification under potential reverse causality.

Results
The results reveal strong temporal persistence in domestic violence, particularly among men. Unemployment shows a negative and significant association with violence against women, but a positive effect for men, suggesting asymmetric responses linked to bargaining power, social roles, and reporting behavior. Informal labor and poverty display patterns consistent with institutional constraints, segmentation, and underreporting in more vulnerable regions. Overcrowding operates as a structural stressor amplifying intra-household tensions, while education and technological access reduce violence by enhancing autonomy, information flows, and access to formal support mechanisms.

Conclusions
Overall, the findings highlight the need for integrated, gender-sensitive, and regionally targeted policies addressing labor market instability and housing conditions in post-pandemic Peru.

Keywords:
gender-based violence; violence; unemployment; informal sector; labor market; overcrowding; poverty; information technology; digital divide; education policy; social protection policy; regional statistics.

JEL Classification: J12; J21; J64; C23; O15.

Resumen

Introducción
La violencia doméstica constituye un fenómeno social complejo estrechamente vinculado a la inestabilidad del mercado laboral, la desigualdad estructural y las condiciones habitacionales. En el Perú, la persistente informalidad, la heterogeneidad regional y las disrupciones generadas por la pandemia de la COVID-19 han intensificado las tensiones dentro del hogar, haciendo relevante examinar cómo las dinámicas del empleo configuran patrones diferenciados de violencia por género.

Objetivo
El estudio analiza la relación entre la inestabilidad del mercado laboral y la violencia doméstica en las 25 regiones del Perú durante el período 2009–2023, con un enfoque desagregado por género. Se incorporan variables como desempleo, trabajo informal, hacinamiento, pobreza, educación y acceso a tecnología, considerando persistencia, disparidades regionales y vulnerabilidades estructurales.

Metodología
Se emplea un panel balanceado estimado mediante el Método Generalizado de Momentos (GMM) en dos etapas, lo que permite abordar problemas de endogeneidad y dinámica temporal. El modelo incluye variables rezagadas e instrumentos como acceso a internet y telefonía móvil para el desempleo.

Resultados
Los resultados evidencian una alta persistencia temporal de la violencia doméstica, especialmente en hombres. El desempleo muestra una relación negativa y significativa con la violencia contra las mujeres, pero positiva en el caso de los hombres, lo que sugiere respuestas asimétricas vinculadas al poder de negociación, roles sociales y subregistro. El trabajo informal y la pobreza reflejan restricciones institucionales y patrones de subreporte en regiones vulnerables. El hacinamiento actúa como factor estructural que intensifica tensiones intrafamiliares, mientras que la educación y el acceso tecnológico reducen la violencia al fortalecer la autonomía y el acceso a mecanismos de apoyo.

Conclusiones
En conjunto, los resultados resaltan la necesidad de políticas integrales, sensibles al género y territorialmente diferenciadas que aborden la inestabilidad laboral y las condiciones habitacionales en el Perú postpandemia.

Palabras clave:
violencia basada en el género; violencia; desempleo; sector informal; mercado laboral; hacinamiento; pobreza; tecnologías de la información; brecha digital; política educativa; política de protección social; estadísticas regionales.

Clasificación JEL: J12; J21; J64; C23; O15.

1. Introduction

Domestic violence is a global problem that affects both women and men and has deep social, economic, and cultural consequences. Its short- and long-term impacts extend beyond individual victims and impose substantial costs on communities. In the short term, domestic violence places significant strain on healthcare systems, which must allocate resources to treat physical injuries, mental health conditions such as depression and anxiety, and sexual and reproductive health complications. These demands increase medical expenditures and divert resources from other priority areas (World Bank, 2022).

Domestic violence also disrupts victims' participation in the labor market. Many survivors experience interruptions in their professional activities due to the physical and emotional consequences of abuse, which leads to income losses and reduced productivity. In the long term, domestic violence contributes to cycles of poverty and social exclusion by limiting victims' ability to remain in or re-enter employment and by reducing the economy's available human capital. Children exposed to violent household environments are more likely to drop out of school and to replicate patterns of violence in adulthood, reinforcing intergenerational inequalities and slowing progress toward the Sustainable Development Goals, particularly those related to gender equality (SDG 5), decent work (SDG 8), and peace and justice (SDG 16) (Vaccaro et al., 2022).

The economic implications of domestic violence become particularly evident when examining its reciprocal relationship with labor market instability, especially unemployment. On the one hand, unemployment-related financial insecurity heightens stress and psychological strain, intensifies household tensions, and increases the likelihood of domestic violence (Paul & Moser, 2009). On the other hand, domestic violence undermines victims' capacity to maintain stable employment by impairing productivity and restricting access to professional opportunities because of physical injuries, emotional trauma, and social stigma (World Bank, 2022). This feedback loop between unemployment and domestic violence perpetuates poverty and inequality and further destabilizes families and communities. Breaking this cycle requires policies that simultaneously address domestic violence and labor market instability through employment creation, social protection, and specialized support services (Blundell et al., 2020).

Unemployment has far-reaching consequences for individuals and households, with economic, social, and psychological dimensions. In the short term, income loss reduces household consumption, weakens local economies, and exacerbates poverty, particularly in female-headed households (Güezmes García, 2021). At the individual level, unemployment increases stress, anxiety, and depression, especially among men who often face strong social expectations to act as primary providers (Paul & Moser, 2009). These psychological pressures can fuel domestic conflict and, in many cases, domestic violence.

Over the long term, unemployment erodes human capital and worsens gender inequalities. Women face greater barriers to re-entering the labor market after job loss and are more likely to remain in precarious or informal employment, which contributes to persistent gender pay gaps (Blundell et al., 2020). Children of unemployed parents also tend to have lower academic performance and higher dropout rates, perpetuating economic and social inequalities across generations (INEI, 2021). The notion of "unemployment hysteresis" illustrates how prolonged joblessness can degrade workers' skills and professional experience, further diminishing their employability and reinforcing labor market instability (Blanchard & Summers, 1986).

From a macroeconomic perspective, high unemployment has significant implications for public finances. Countries with elevated unemployment rates face increased fiscal pressures due to rising demand for social assistance programs and unemployment benefits (Currie & Schwandt, 2014). In Peru, social spending and targeted cash transfer programs have expanded in response to poverty and recent economic crises, increasing pressure on public finances

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(OECD, 2025). Evidence from high- and middle-income countries shows that economic hardship and income shocks heighten the risk of intimate partner violence and domestic conflict (Arenas-Arroyo et al., 2021; Cochran et al., 2023).

Economic empowerment is often proposed as a strategy to reduce women's vulnerability to domestic violence (Stern & Heise, 2024). However, higher income can also generate tensions within households, particularly when it challenges traditional gender norms and power relations. For men, unemployment and economic insecurity can increase the risk of domestic conflict and violent behavior (Bhalotra et al., 2025). Beyond individual households, prolonged unemployment weakens social cohesion, undermines sustainable economic development, and reduces the competitiveness of the labor market.

The global prevalence of domestic violence demonstrates the widespread nature of this problem. In North America, 35.6% of women and 28.5% of men have experienced physical violence, harassment, or rape in their lifetimes, including in countries with significant advances in gender equality (National Domestic Violence Hotline, 2023). In the United States alone, approximately 12 million people are affected by domestic violence each year, which corresponds to 24 individuals every minute (Centers for Disease Control and Prevention, 2022). Also in Europe, one in three women has suffered physical or sexual violence, and 43% have experienced psychological abuse. Among men, 20% report having faced psychological violence within the family, although prevalence remains substantially higher among women (European Union Agency for Fundamental Rights, 2014). In Germany, the annual economic cost of domestic violence is estimated at €32.5 billion, including medical care, legal services, and lost productivity (Frauenhauskoordinierung e.V., 2022) and in Asia, 33% of women of reproductive age in Southeast Asia and 70% of married women in India have experienced domestic violence, reflecting persistent structural inequalities (UN Women Asia-Pacific, 2023). In China, more than 200 million women and 18% of men reported having experienced violence in 2021, underscoring that domestic violence also affects men, although their cases are often less visible (All-China Women's Federation, 2021).

Similarly, in Latin America faces similarly critical challenges. In Brazil, 14.3% of domestic violence cases involve male victims, and 18 percent of reported sexual violence affects children and men, highlighting the need for broader visibility and gender-inclusive approaches (Gonçalves et al., 2023). In Chile, around 23.3% of women reported experiencing some form of domestic violence in 2022, which corresponds to nearly one in four women, and 41.4% of women aged 15 to 65 indicated having suffered some type of violence at some point in their lives (Subsecretaría de Prevención del Delito, 2022; Instituto de Políticas Públicas UNAB, 2022).

In Argentina, 45% of women in partnerships reported experiencing domestic violence, with psychological abuse as the most prevalent form, and administrative records documented more than 870,000 cases of gender-based violence between 2013 and 2023 (UNDP, 2023; Ministry of Women, Genders, and Diversity, 2023). In Colombia, domestic violence cases reached 63,528 in the first five months of 2024, and 1,388 individuals were arrested for sexual offenses and domestic violence against men between 2020 and early 2021, revealing the magnitude of underreported male victimization (Fiscalía General de la Nación, 2021; El País, 2024). In Bolivia, official records indicate that about 10% of domestic violence victims are men, and domestic violence accounts for nearly 90% of reported incidents, with psychological and economic abuse as prominent forms (Observatorio Boliviano de Seguridad Ciudadana, 2023).

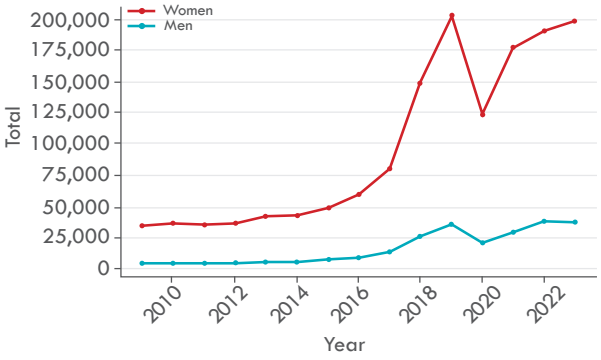
Also in Peru, domestic violence trends reveal a particularly concerning scenario. The Ministry of Women and Vulnerable Populations reported more than 320,867 domestic violence cases attended by the Aurora program in 2023, representing an 18% increase compared to 2022 (Campó, 2024). According to the National Household Survey (ENDES), 35.6% of women and 22.8% of men experienced some form of domestic violence in the previous year (INEI,

2021). Psychological and verbal abuse is the most reported type, affecting 51.9% of women, especially those aged 45 to 49, with the Junín region showing the highest prevalence at 63.6% (INEI, 2023). Between January and September 2023, 175,528 family violence complaints were recorded, with Lima Metropolitana registering the highest number (55,770), followed by Arequipa (10,618) and Piura (10,439). During the same period, there were 7,998 reported cases of sexual violence, most of them occurring in victims' homes (El Peruano, 2023).

Despite the magnitude of the problem, institutional support remains underutilized. Only 29.1 percent of women who suffer physical violence seek help, with the highest proportion in Moquegua (40.4%) and the lowest in Pasco (21.5%). A substantial share of women do not seek assistance, often because they perceive it as unnecessary (44.1%), feel shame (17%), or are unaware of available services (11%) (INEI, 2023). These patterns suggest important regional differences in both the prevalence of domestic violence and access to protection and support mechanisms.

Figure 1 shows the annual number of domestic violence complaints by sex between 2009 and 2023, revealing a sustained upward trend for both men and women, with women consistently representing the largest share of reported cases. The noticeable drop in 2020 coincides with the first months of the COVID-19 lockdown, when strict mobility restrictions sharply limited victims' ability to report violence through formal channels. Evidence from Peru confirms that this decline did not reflect a reduction in violence: during the first three weeks of the national quarantine, calls to Línea 100 fell abruptly because victims were confined with their aggressors and had reduced opportunities to seek help. As confinement intensified household tensions, uncertainty and economic stress, calls not only recovered but exceeded 2019 levels, peaking around week ten. The PNUD analysis also shows that while reports of low- and moderate-risk cases increased, severe-risk cases were effectively "silenced," as women facing the highest danger encountered greater barriers to contacting support services. This non-linear reporting pattern helps explain the temporary decline observed in administrative complaints despite the heightened risk within households. As restrictions eased and service access improved, reported cases resumed their upward trajectory in 2021 and 2022 (Agüero et al., 2022).

Figure 1. Total reports of domestic violence complaints by men and women per year (2009–2023)



Source: own elaboration with data from INEI (2024).

Against this backdrop, the central research question guiding this study is: How does unemployment, as a key dimension of labor market instability, affect the incidence of domestic violence against women and men in Peru between 2009 and 2023? The main objective is to estimate the effect of unemployment on domestic violence while incorporating the heterogeneity of Peru's regions. This approach allows for identifying not only the average effect of unemployment on domestic violence but also the regional patterns through which labor-market stress may exacerbate or attenuate household conflict.

This article makes three main contributions to literature. First, it offers the first country-wide, regionally disaggregated analysis for Peru that jointly examines domestic violence against both women and men, addressing a gap in studies that have focused almost exclusively on female victimization. Second, it builds a long-run panel dataset for 2009–2023 that links administrative records on domestic violence with regional labor-market indicators. Third, it applies an

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instrumental-variables strategy to mitigate endogeneity concerns stemming from the bidirectional relationship between unemployment and domestic violence, producing more reliable estimates for policy design.

The remainder of the article is structured as follows. Section 2 presents a review of the literature on domestic violence, labor market instability, and the links between economic shocks and household conflict. Section 3 describes the data and the variables used in the empirical analysis. Section 4 outlines the econometric strategy and presents the main results. Section 5 discusses the findings in light of the Peruvian context and the existing literature, with particular attention to regional heterogeneity and the COVID-19 period. Section 6 concludes by summarizing the key results, highlighting the study's limitations, and suggesting directions for future research and policy.

2. Theoretical framework

Building on the Family Stress Model (FSM), which links economic strain to psychological distress and conflict escalation, household bargaining theories offer a complementary explanation. A household bargaining perspective further complements the FSM by explaining how economic resources shape partners' relative decision-making power within relationships. In this literature, individuals' ability to negotiate, cooperate or exit harmful relationships depends on their economic autonomy and their "threat point"—the welfare attainable outside the partnership (Manser & Brown, 1980; McElroy & Horney, 1981). Changes in employment or income modify these threat points for *both* partners: reductions in women's economic autonomy weaken their bargaining power, while declines in men's earnings can also generate perceived status loss and conflict within the household. Collective household models (Chiappori, 1992; Lundberg & Pollak, 1993) show that power shifts—regardless of which partner experiences economic deterioration—alter household decision-making and the potential for coercive behavior.

The Resource Theory complements this bargaining view by specifying how economic capacity conditions the exercise of power within intimate relationships. Limited access to income or education constrains autonomy for either partner and increases the likelihood of coercive behavior when the economically dominant partner uses resources to maintain control (Abd et al., 2018). Conversely, greater access to employment and financial resources strengthens individual bargaining positions and reduces vulnerability to violence. However, this relationship is not always linear: in contexts with strong traditional gender norms, improvements in women's economic status may trigger male backlash, while sudden declines in men's employment or earnings can generate status anxiety—both mechanisms capable of heightening household tension and escalating conflict (Dhanaraj & Mahambare, 2021).

In a related manner, Marriage Theory emphasizes how the distribution of labor, power and economic dependency within relationships influences the persistence of domestic violence (Becker, 1981). Unequal access to economic resources creates asymmetries that either partner may use to exert control, while financial dependency reduces the feasibility of exiting harmful relationships. Marital investments—such as children, shared assets or interconnected social networks—raise separation costs for both men and women, reinforcing relationship persistence even under violent conditions. Divorce is therefore interpreted as a cost–benefit decision in which economic barriers, concern for children and fear of retaliation constrain the options of either partner and can delay or prevent exit.

From a behavioral standpoint, Social Learning Theory explains how exposure to violence—through observation or its normalization within the family environment—shapes individuals' expectations, attitudes and responses in intimate relationships. This perspective is consistent with the Theory of Reactive Aggression, which posits that negative emotional states such as stress, frustration or chronic tension increase the likelihood of aggressive behavior in adulthood (Ferreira et al., 2022; Onyeoziri-Iheagwara, 2022). Within this framework, overcrowding operates as a structural stressor: forced cohabitation in confined spaces heightens interperson-

al friction and psychological strain, raising the probability of violent episodes. These effects tend to be more pronounced in low-income households, where persistent material deprivation and limited coping resources compound emotional and social tensions (Evans et al., 1996; Regoeczi, 2003).

Unemployment also disrupts human capital accumulation by interrupting investments in education and professional development, thereby reducing individuals' labor capacities and contributing to emotional distress within households (Becker, 1975). Such disruptions reinforce cycles of economic vulnerability and intensify household stress, increasing the likelihood of conflict. Integrated with the Theory of Employment Barriers, this perspective highlights that the psychological consequences of violence—such as anxiety, depression and diminished self-efficacy—can restrict victims' participation in the labor market, reinforcing economic dependency and limiting opportunities for autonomy (Adams et al., 2013). These mechanisms underscore the reciprocal relationship between labor-market exclusion and domestic violence identified in empirical research (Ouedraogo & Stenzel, 2021).

Building on these insights, Sen's capability framework broadens the analysis by emphasizing that well-being depends not only on material resources but also on the substantive freedoms individuals possess to pursue valued life trajectories. From this standpoint, unemployment diminishes capabilities by constraining opportunities for personal development, reducing social recognition and limiting the scope for participation in economic and social life. Domestic violence further restricts these capabilities by curtailing access to education, employment and supportive social networks, thereby deepening economic and emotional dependency. The interaction between unemployment and violence thus reflects mutually reinforcing constraints that shape individuals' freedom to pursue secure and autonomous lives, linking labor-market disadvantages and household dynamics within a shared analytical structure.

Finally, the Digital Divide Theory incorporates a structural dimension into the relationship between unemployment and domestic violence by emphasizing how unequal access to technologies shapes individuals' opportunities to participate in the labor market. Geographic disparities in digital infrastructure generate asymmetries in access to information, job-search mechanisms and training resources. In rural areas, limited internet connectivity and scarce digital services restrict individuals' ability to identify employment opportunities, acquire skills or enter formal labor markets, reinforcing unemployment and economic vulnerability (Van Dijk, 2020). In contrast, urban settings generally provide stronger connectivity that facilitates virtual training and online job searches. Yet, as Hilbert (2015) notes, traditional tools such as television or basic telephone services offer marginal labor-market benefits when not complemented by reliable internet access, underscoring the cumulative nature of digital inequality.

These structural and informational constraints also shape how unemployment and domestic violence interact. Evidence from low-connectivity settings shows that restricted access to internet, mobile phones or broadcast media heightens informational isolation and economic dependency, increasing women's vulnerability to intimate partner violence (Boyle et al., 2009). Such constraints limit access to job-search mechanisms, training opportunities and social support networks—channels consistent with theoretical arguments linking poverty and overcrowding to elevated household stress and conflict (Evans et al., 1996; Regoeczi, 2003). Complementing this view, Tarzia et al. (2022), in a multi-region systematic review, find that digital interventions can reduce the severity of violence by enhancing access to information, confidential communication and support services, highlighting the broader role of technological infrastructure in shaping economic autonomy and exposure to domestic violence.

Within this broader framework, empirical evidence shows that intimate partner violence and labor-market outcomes are tightly interconnected. Wathen et al. (2015), using a Canadian survey of 8,429 participants, document that domestic violence disrupts employment trajectories through absenteeism, reduced job perfor-

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mance and, in many cases, job loss; more than half of the victims reported that abuse continued in or near their workplace via harassment calls or stalking, and 81.9 percent of women indicated that violence impaired their ability to work due to stress, distraction or physical injuries, generating substantial productivity losses and costs for employers. Complementing this evidence from a bargaining perspective, Alonso-Borrego and Carrasco (2017) analyze a panel of 20,000 couples from the Spanish Active Population Survey (2005–2015) using a fixed-effects specification with controls for age, education and occupation, and find that female employment reduces intimate partner violence only when male partners are also employed, whereas female unemployment increases violence by 3.2 percent in regions with traditional gender norms. Taken together, these studies show, first, that intimate partner violence has direct and measurable labor-market consequences and, second, that employment conditions and gendered patterns of job loss reshape household bargaining power, economic dependence and exit options in ways that influence the risk of abuse.

Showalter et al. (2020) demonstrate that intimate partner violence undermines labor-market participation through psychological and functional disruptions—chronic distress, reduced concentration, absenteeism and fragmented employment histories—confirming that the causal direction runs primarily from violence toward diminished economic autonomy rather than the reverse. This mechanism is consistent with evidence from diverse contexts. Pal (2019), using ethnographic data and an instrumental-variable strategy in tribal communities in India, shows that women's employment reduces physical violence by about 38 percent, but only where female labor-force participation is socially accepted, indicating that economic autonomy translates into protection only when local gender norms permit it. Ranganathan et al. (2021) further document that intimate partner violence constrains victims' labor-market participation through its effects on health, mobility and control over resources, particularly in settings marked by poverty and weak institutional support. Complementing this, Swanberg et al. (2007) find that abusive partners' control tactics—such as transportation interference, workplace harassment and threats—erode job stability, while supportive workplace environments enhance employment continuity. Finally, Eklund (2023), analyzing municipal-level data for Sweden (2008–2021), shows that higher female unemployment is associated with increased violence, whereas rising male unemployment correlates with decreased reports of abuse. These asymmetric effects align with bargaining-power models in which shifts in partners' economic resources alter outside options and reshape the risk of coercive behavior.

Complementing, Tur-Prats (2017) examines unemployment shocks in the United States using micro-data from the National Longitudinal Survey of Youth (1990–2015) and a difference-in-differences strategy, finding that male job loss increases physical and psychological violence by about 5 percent, particularly in households with traditional gender norms, whereas female unemployment shows no significant effect. These results indicate that declines in men's labor-market position weaken their perceived economic authority and heighten the risk of conflict. Comparable asymmetries emerge in Latin America: Bhalotra et al. (2020), analysing DHS data for Colombia, the Dominican Republic, Honduras and Peru, report that a one-percent increase in male unemployment raises physical IPV by approximately 0.50 percentage points ($p < 0.01$), while an equivalent increase in female unemployment reduces IPV by about 0.52 percentage points ($p < 0.05$). Consistent with bargaining models, male job loss intensifies financial strain and challenges traditional provider roles, whereas women's improved employment prospects strengthen outside options but may also generate household frictions where restrictive gender norms persist. Institutional constraints—such as limited access to divorce and weaker enforcement of women's rights—further narrow women's exit options in the region, helping explain why increases in female employment do not consistently yield the protective effects observed in high-income settings with stronger legal and economic autonomy.

In the Peruvian context, empirical work provides additional support for these mechanisms. Ramón Díaz and Juan José Miranda (2010) estimate the economic costs and determinants of domestic violence using ENARES data and a multiple regression framework. Their results show that overcrowding increases the probability of domestic violence by 25%, while higher educational attainment substantially reduces this risk. They also calculate that domestic violence imposes an economic burden equivalent to 3.7% of Peru's annual GDP, highlighting the relevance of policies aimed at structural drivers of violence. More recent evidence by Díaz and Saldarriaga (2020; 2022) examines income shocks in rural areas—particularly unexpected rainfall shocks—and the expansion of the JUNTOS cash-transfer program. Negative income shocks are associated with higher risks of physical IPV, whereas transfers targeted to women reduce abuse when program design strengthens women's control over resources. These findings underscore the role of social protection in mitigating economic stress. Consistent with this, regional reviews show that gender-sensitive cash-transfer schemes tend to reduce women's exposure to intimate partner violence across several Latin American countries (Blofield et al., 2022; Buller et al., 2018).

3. Methodology

The study adopts a quantitative longitudinal design, using a dynamic panel data approach to analyze the socioeconomic and labor-market determinants of domestic violence against women and men across Peru's 25 regions from 2009 to 2023. This framework allows us to control for unobserved heterogeneity and endogeneity, which are central challenges in regional and temporal analyses. Data are drawn from official Peruvian sources, principally the National Household Survey (ENAHO) and regional statistics on education, labor, and socioeconomic conditions (INEI, 2023).

The dependent variables, Violence_Against_Men Violence_Against_Women, are constructed from the annual number of reported complaints in each region during the study period, as recorded by the Observatorio de Criminalística of the Ministry of the Interior (Ministerio del Interior, 2025). This source provides region-specific information on reported incidents of domestic and gender-based violence, which makes it possible to examine trends over time and across regions.

Domestic and gender-based violence can both result from and reinforce labor market instability. Violence deteriorates couples' economic conditions and household relations between men and women. At the same time, unemployment and income loss may increase the risk of domestic violence by intensifying stress and conflict within households (Roza & Martín, 2021; Heise & Kotsadam, 2015). This bidirectional relationship creates a simultaneity problem between unemployment and domestic violence, which is a specific form of endogeneity.

To address these endogeneity concerns, the study employs the System GMM estimator, following the methodology proposed by Arellano and Bond (1991) and extended by Blundell and Bond (1998). System GMM uses lagged levels and lagged differences of the regressors as internal instruments, which helps mitigate bias arising from the correlation between explanatory variables and the error term. In this study, Unemployment and Poverty are treated as endogenous variables because of their dynamic interaction with domestic violence and the possibility of feedback effects. To strengthen identification, Internet and Cellphone access are included as additional instrumental variables for unemployment. These exogenous factors affect labor market outcomes but are assumed not to be directly correlated with domestic violence once other controls are included.

The set of independent variables includes Informality_Labor, Couple_Woman_Eap, and Pca_Education, which capture key dimensions of labor informality, women's economic participation within couple households, and educational attainment. Together, they allow us to assess how structural labor market conditions, household economic participation, and human capital are associated with domestic violence. In addition, Overcrond, which measures overcrowding in housing, is included to capture the

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effect of restricted living space on household conflict and stress.

The model also incorporates a lagged dependent variable, L.Violence_{it}, to capture persistence over time. Domestic violence often displays strong inertia, so past levels of violence are expected to influence current levels. Including the lagged dependent variable within a System GMM framework helps control for this dynamic dependence while addressing the resulting endogeneity. Overall, the dynamic panel design allows for a nuanced assessment of how economic, educational, and labor-market factors interact with the incidence of domestic violence in a context of labor market instability.

The baseline econometric specification that captures both regional and temporal variation is:

$$Violence\_\{it\} = \beta_0 + \beta_1\, L.\, Violence\ \{it\} + \beta_2\, Education\_\{it\} + \beta_3\, SocioeconomicConditions\_\{it\} + \beta_4\, LaborConditions\ \{it\} + \beta_5\, Overcrowding\ \{it\} + \beta 6\, UnemploymentRate + \lambda\_i + \delta\_t + \varepsilon\_\{it\}. \quad [1]$$

Where:

- Violence_{it}: Represents the number of reported cases of violence in region III during year t, disaggregated by gender (women and men), based on data from the Ministry of Interior's Observatory of Criminalistics.

- L. Violence_{it}: Lagged variable of violence (first-order lag) to capture temporal dynamics and address endogeneity issues.

- Education_{it}: Proportion of the population with low educational attainment (incomplete primary and secondary education).

- SocioeconomicConditions_{it}: Socioeconomic factors such as poverty

- LaborConditions_{it}: Refers to whether the Informal Labor or women are part of the economically active population (EAP).

- Overcrowding_{it}: Indicator of overcrowding in housing conditions.

- UnemploymentRate{it}: Unemployment rate as an endogenous variable, instrumented using exogenous variables such as internet access (Internet) and mobile phone ownership (Cellphone).

- λ_i: Region-specific fixed effects.

- δ_t: Time-specific effects to capture period-specific shocks.

- ε_{it}: Stochastic error term

This specification is estimated separately for women and men to compare the dynamics of domestic violence by gender across Peru's regions between 2009 and 2023. To analyze the role of education, an index of low educational attainment (Pca_Education) is constructed using Principal Component Analysis (PCA). The index combines three variables: the share of the population with incomplete primary education (incompletaprim), incomplete secondary education (incompletasec), and no access to higher education (sinesup). PCA reduces dimensionality and limits multicollinearity among these highly correlated indicators, producing a more precise composite measure of educational disadvantage (Wooldridge, 2016; Jolliffe & Cadima, 2016).

The PCA identifies a dominant first component with an eigenvalue of 2.73 that explains 90.9% of the total variance. The loadings for the three variables (0.5947 for incompletasec, 0.5738 for incompletaprim, and 0.5631 for sinesup) are highly similar in magnitude, confirming that they capture a common underlying dimension of low educational attainment.

Given that the remaining components jointly explain less than 10% of the variance, only the first component is retained as the Pca_Education index used in the econometric estimation.

Before estimating the dynamic panel model, a correlation matrix is used to describe the bivariate relationships among domestic violence and the main socioeconomic, educational, and labor variables (Table 1). Violence against women and violence against men are very highly correlated (0.9654), which indicates that regions

with higher reported violence against women also tend to show higher reported violence against men. Unemployment displays a positive correlation with domestic violence against both women (0.7324) and men (0.7588), consistent with the hypothesis that labor market instability is associated with higher levels of household conflict. Poverty is also positively correlated with violence against women (0.6169) and men (0.6713), as well as with unemployment (0.7713), underscoring the central role of economic deprivation.

In contrast, Informality_Labor shows a negative correlation with violence against women (-0.2130) and men (-0.2933). This pattern may reflect underreporting or specific structural features of regions with higher informality, so it should not be interpreted as a protective effect without further analysis. Access to Internet and Cellphone presents weak negative correlations with domestic violence and unemployment, suggesting that greater technological connectivity may contribute to information access, social support, or reporting channels. Women's participation in the economically active population within couple households (Couple_Woman_Eap) presents a mixed pattern: it is moderately and positively correlated with violence against men (0.5281) and weakly negatively correlated with violence against women (-0.4588), pointing to complex gendered dynamics in how economic participation interacts with domestic violence.

The low-education index (Pca_Education) is negatively correlated with violence against women (-0.5107) and men (-0.4677), which suggests that higher educational attainment at the regional level is associated with lower domestic violence. Overcrond (overcrowding) is negatively correlated with violence against women (-0.2849) and men (-0.3478) but positively correlated with poverty (0.4578). This dual pattern indicates that overcrowding is both a marker of socioeconomic vulnerability and a potential source of intrahousehold stress. Together, these correlations provide an initial descriptive overview of how structural, economic, and demographic factors are related to domestic violence in a context of labor market instability, and they motivate the multivariate dynamic panel analysis that follows.

4. Results

Poverty (L1) and unemployment are treated as endogenous variables, and the lag of domestic violence is used as an internal instrument. Additional instruments such as internet access and cellphone ownership help to attenuate reverse causality and omitted-variable bias. The coefficients are therefore interpreted as robust conditional associations rather than strict causal effects.

Table 1. Correlation matrix

	Women_ Violence	Men_ Violence	Unemployment	Informal _Labor	Poverty	Internet	Couple_ Woman_EAP	PCA_ Education	Overcrond	Cellphone
Women_Violence	1									
Men_Violence	0.9654	1								
Unemployement	0.7324	0.7588	1							
Informal_Labor	-0.213	-0.2933	-0.2933	1						
Poverty	0.6169	0.6713	0.7713	0.5226	1					
Internet	-0.1036	-0.1782	-0.1782	0.7077	-0.2818	1				
Couple_Woman_ EAP	-0.4588	0.5281	0.5281	0.6909	-0.4936	0.581	1			
PCA_Education	-0.5107	-0.4677	-0.2677	-0.7116	-0.6531	0.6051	0.6713	1		
Overcrond	-0.2849	0.3478	0.3478	0.4578	0.3476	-0.3805	-0.559	-0.4277	1	
Cellphone	-0.2407	0.0208	-0.3208	-0.4579	-0.3454	0.313	0.6963	0.4815	-0.029	1

Source: own elaboration.

Sociedad y Economía N° 57 (2026) / e-ISSN: 2389-9050 / e10414648
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For reported domestic violence against women, the results in Table 2 indicate strong persistence over time. The lagged dependent variable is positive and highly significant (Coef.: 0.8301, Std. Err.: 0.0589, p-value: 0.000), showing that regions with high levels of violence in one year tend to maintain similar levels in the following year.

Unemployment has a significant negative association with domestic violence against women (Coef.: -0.2995, Std. Err.: 0.0975, p-value: 0.002). While simple correlations suggest that labor market instability should increase violence, the negative coefficient indicates that, once structural controls are included, regions with higher unemployment display lower reported violence. This counterintuitive pattern is consistent with under-reporting and regional differences in access to justice and formal complaint channels, rather than with a protective effect of unemployment.

Informal labor also shows a significant negative coefficient (Coef.: -0.7291, Std. Err.: 0.6126, p-value: 0.005). Regions with a larger informal sector tend to register fewer official complaints, which likely reflect weaker institutions and cultural or practical barriers to reporting, rather than lower prevalence of violence.

Couples in which women belong to the economically active population are associated with lower domestic violence against women (Coef.: -0.2485, Std. Err.: 0.1216, p-value: 0.041). This is consistent with the idea that women's participation in the labor market increases access to income, networks and outside options, reducing dependency on partners. The PCA-based education index, which measures low educational attainment, also has a negative and significant coefficient (Coef.: -0.1068, Std. Err.: 0.0335, p-value: 0.004), implying that higher education levels are associated with lower domestic violence, in line with evidence linking education to empowerment and use of support services.

Overcrowding presents a marginally significant negative coefficient (Coef.: -0.1304, Std. Err.: 0.0739, p-value: 0.078). Although overcrowding is usually seen as a stress factor, this sign is compatible with lower reporting in poorer, denser households where privacy and institutional access are more limited. Access to cellphones (Coef.: -0.1598, Std. Err.: 0.1118, p-value: 0.013) and internet (Coef.: -0.0250, Std. Err.: 0.0245, p-value: 0.007) is also negatively associated with domestic violence against women, suggesting that connectivity may facilitate contact with helplines, information and support services.

The model diagnostics indicate a good fit: the Wald chi-squared statistic is 83,849.01 (p-value: 0.000), and the number of instruments (21) remains below the number of groups (25), which helps to avoid instrument proliferation and supports the validity of the specification.

Table 2. System GMM model analysis for violence against women

Women_Violence	Coef.	Std. Err.	z	P>z
Women_Violence_L1	0.8301285	0.0589381	14.08	0.000
Unemployment	-0.2994849	0.0975458	-3.07	0.002
Informal_Labor	-0.729110	0.6126043	-2.82	0.005
Poverty_L1	-0.0731589	0.0525565	-1.39	0.044
Internet	-0.0249856	0.0244624	-1.82	0.007
Couple_Woman_EAP	-0.2485495	0.1216012	-2.04	0.041
PCA_Education	0.1068251	0.0335272	-3.19	0.004
Overcrond	-0.1303584	0.0738609	-1.76	0.078
Cellphone	-0.1598508	0.1118223	-1.85	0.013
_Cons	-5.520414	2.728953	-2.02	0.043

Note: ** According to each selection criterion, * denotes the optimal lag to be applied in the model.

Source: own elaboration.

Table 3 reports the Arellano-Bond (1991) tests for serial correlation in the first-differenced residuals of the women's model. The AR(1) test shows first-order autocorrelation, with a z-statistic of -3.92 and a p-value of 0.000. This outcome is expected in dynamic panel data models because differencing the data typically induces first-order correlation in the residuals. The crucial diagnostic is the AR(2) test, which examines second-order autocorrelation: the test yields a z-statistic of 1.65 and a p-value of 0.135, indicating that the null hypothesis of no second-order autocorrelation cannot be

rejected. The absence of AR(2) validates the use of lagged variables as instruments and confirms that the conditions underlying the System GMM estimator are appropriate.

Table 3. Arellano-Bond test for autocorrelation in violence against women analysis

Arellano-Bond test for AR(1) in first differences:	**z = -3.92 Pr > z = 0.000**
Arellano-Bond test for AR(2) in first differences:	z = 1.65 Pr > z = 0.135

Source: own elaboration.

Table 4 presents the Sargan and Hansen tests of overidentifying restrictions for the women's model. The Sargan test reports a chi-squared statistic of 4.79 with a p-value of 0.188, providing no evidence against the null hypothesis that the instruments are valid and uncorrelated with the error term. Although the Sargan test is not robust to heteroskedasticity, it is not affected by the number of instruments. The Hansen test, which is robust to heteroskedasticity but can be weakened by instrument proliferation, yields a chi-squared statistic of 4.07 with a p-value of 0.254. This result also fails to reject the null of instrument validity. Taken together, both tests support the adequacy of the instrument set and reinforce the reliability of the estimates obtained for the women's model.

Table 4. Sargan and Hansen tests for overidentifying restrictions in the system GMM model

Sargan test of overid. restrictions: chi2(3) = 4.79 (Not robust, but not weakened by many instruments)	Prob > chi2 = 0.188
Hansen test of overid. restrictions: chi2(3) = 4.07 (Robust, but weakened by many instruments)	Prob > chi2 = 0.254

Source: own elaboration.

Table 5 summarizes the Hansen and Difference-in-Hansen tests for the subsets of instruments used in the System GMM estimation. The Hansen test excluding the instrument group gives χ^2 (1)=2.89 with p=0.089, indicating that the null hypothesis of valid instruments cannot be rejected at conventional significance levels. The Difference-in-Hansen test, which assesses the additional instruments specific to the level equations, yields χ^2 (2) =1.17 with p=0.556, providing no evidence against their exogeneity. These results suggest that the extra instruments introduced in the System GMM framework are valid and do not undermine the specification. Overall, the diagnostic tests confirm that the women's model is not overidentified and that the instrument set performs adequately.

Table 5. Hansen test and difference-in-Hansen test for instrument validity

GMM	Instruments for levels	
Hansen test excluding group:	chi2(1)	= 2.89 Prob > chi2 = 0.089
Difference (null H = exogenous):	chi2(2)	= 1.17 Prob > chi2 = 0.556

Source: own elaboration.

Turning to domestic violence against men, the results in Table 6 also reveal strong persistence over time. The lagged dependent variable is positive and highly significant (Coef.: 0.8570, Std.Err.: 0.0632, p-value: 0.000), indicating that past levels of domestic violence against men are a powerful predictor of current levels. This persistence underscores the importance of long-term policy responses and suggests that short-lived interventions are unlikely to be sufficient to change underlying dynamics.

Table 6. System GMM model analysis for violence against men

Men_Violence	Coef.	Std. Err.	z	P>z
Men_Violence_L1	0.8570234	0.0631877	13.56	0.000
Unemployment	0.2611917	0.113077	2.31	0.051
Informal_Labor	-0.1171346	0.0663075	-1.77	0.124
Poverty_L1	1.280527	0.7607904	1.68	0.094
Internet	-0.0249856	0.0244624	-1.02	0.307
Couple_Woman_EAP	0.3470726	0.0803464	4.32	0.000
PCA_Education	-0.154087	0.0568467	-2.71	0.007
Overcrond	0.1303584	0.0738609	-1.76	0.088
Cellphone	-0.0909276	0.0390617	-2.33	0.020
_Cons	-6.623633	3.365579	-1.97	0.049

Note: ** According to each selection criterion, * denotes the optimal lag to be applied in the model.

Source: own elaboration.

Unemployment exhibits a positive and marginally significant association with domestic violence against men (Coef.: 0.2612, Std.Err.:

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0.1131, p-value: 0.051). This result is consistent with the hypothesis that labor market instability increases stress, economic insecurity, and conflict within households, which can manifest as domestic violence. Informal labor, by contrast, displays a negative but statistically non-significant coefficient (Coef.: −0.1171, Std. Err.: 0.0663, p-value: 0.124), suggesting that the association between informality and domestic violence against men is heterogeneous across regions and not robust once other controls are included.

Poverty (L1) has a positive coefficient (Coef.: 1.2805, Std.Err.: 0.7608, p-value:0.094), which is only marginally significant at the 10 percent level. This pattern indicates that higher poverty may be associated with higher domestic violence against men, but the evidence is weaker than for other covariates and calls for further investigation of the mechanisms involved. Couples with women in the economically active population show a clearly protective association (Coef.: −0.3471, Std.Err.: 0.0803, p-value: 0.000). As in the women's model, this result suggests that women's participation in the labor market can reduce domestic violence, possibly by diversifying household income sources, enhancing women's bargaining power, and easing financial pressures.

The PCA-based education index again shows a significant negative association with domestic violence (Coef.: −0.1541, Std.Err.: 0.0586, p-value: 0.007), reinforcing the idea that regions with higher educational attainment tend to have lower levels of domestic violence against men. Overcrowding presents a marginally significant negative relationship (Coef.: −0.1304, Std.Err.: 0.0739, p-value: 0.088). As with the women's model, the negative sign is not straightforward to interpret: while overcrowding is often viewed as a stress factor, it may be associated with lower complaint rates or with other unobserved characteristics, so this coefficient should be interpreted cautiously.

Cellphone access is statistically significant and negatively associated with domestic violence against men (Coef.: −0.0909, Std.Err.: 0.0391, p-value: 0.022), suggesting that greater connectivity could help potential victims seek information, support, or institutional assistance. Internet access is also negative but not statistically significant (Coef.: −0.0250, Std.Err.: 0.0245, p-value: 0.307). Overall, the model for men performs well, with a Wald chi-squared statistic of 44,543.84 (p−value:0.000), 350 observations, 25 groups (regions), and 21 instruments, indicating a well-specified dynamic panel model.

Turning to domestic violence against men, the results in Table 6 also reveal strong persistence over time. The lagged dependent variable is positive and highly significant (Coef.: 0.8570, Std. Err.: 0.0632, p-value: 0.000), indicating that past levels of domestic violence against men are a powerful predictor of current levels. This persistence suggests that underlying patterns evolve slowly and that sustained, long-term policy efforts are required to alter them.

Unemployment exhibits a positive and marginally significant association with domestic violence against men (Coef.: 0.2612, Std. Err.: 0.1131, p-value: 0.051). This pattern is compatible with the idea that labor-market instability heightens stress, economic insecurity and intra-household tension, increasing the likelihood of conflict. Informal labor, by contrast, displays a negative but statistically non-significant coefficient (Coef.: −0.1171, Std. Err.: 0.0663, p-value: 0.124), suggesting substantial regional heterogeneity and a weak association once structural controls are included.

Overall, the men's model demonstrates strong explanatory power, with a Wald chi-squared statistic of 44,543.84 (p-value: 0.000), 350 observations, 25 regional groups and 21 instruments, indicating a well-specified dynamic panel model with an adequately bounded instrument set.

Table 7 reports the Arellano-Bond tests for autocorrelation in the men's model. The AR(1) test in first differences yields a z-statistic of -4.08 with a p-value of 0.002, rejecting the null hypothesis of no first-order autocorrelation. In the context of dynamic panel estimators, the presence of AR(1) is an expected byproduct of first-differencing and therefore does not compromise the specification. The AR (2) test, by

contrast, produces a z-statistic of -1.15 with a p-value of 0.250, indicating that second-order autocorrelation is absent and that the required moment conditions are satisfied. This result supports the validity of the lagged instruments and confirms that the men's specification meets the identifying assumptions of the System GMM estimator.

Table 7. Results of the Arellano-Bond autocorrelation tests AR(1) and AR(2)

Arellano-Bond test for AR(1) in first differences:	z = -4.08 Pr > z = 0.002
Arellano-Bond test for AR(2) in first differences:	z = -1.15 Pr > z = 0.250

Source: own elaboration.

Table 8 presents the Sargan and Hansen tests for overidentifying restrictions in the men's model. The Sargan test yields a chi-squared statistic of 4.31 with a p-value of 0.268, indicating no evidence that the instruments are correlated with the error term. The Hansen test, which is robust to heteroskedasticity and commonly used to assess overall instrument exogeneity in System GMM, reports a chi-squared statistic of 3.07 with a p-value of 0.354. Both results support the null hypothesis of instrument validity and confirm that the instrument set is appropriately specified for the men's model.

Table 8. Sargan and Hansen tests for overidentifying restrictions in the system GMM model for men

Sargan test of overid. restrictions: chi2(3) = 4.31 (Not robust, but not weakened by many instruments)	Prob > chi2 = 0.268
Hansen test of overid. restrictions: chi2(3) = 3.07 (Robust, but weakened by many instruments)	Prob > chi2 = 0.354

Source: own elaboration.

Finally, Table 9 summarizes the Hansen and Difference-in-Hansen tests for instrument validity in the men's model. The Hansen test excluding the instrument group yields χ^2 (1)=5.20 with p=0.158, meaning that the null hypothesis of valid instruments cannot be rejected. The Difference-in-Hansen test, which evaluates the additional instruments used in the level equations, reports $\chi^2(2)=1.03$ with p=0.596, indicating that these extra instruments are also consistent with exogeneity. Together, these diagnostic results confirm that the model is not overidentified and that the specification satisfies the key requirements for System GMM estimation. When considered alongside the diagnostics for the women's model, the evidence indicates that both dynamic panel estimations are well calibrated and that the reported associations between labor market instability, poverty, education and domestic violence are supported by a coherent identification strategy.

Table 9. Hansen test and Difference-in-Hansen test for instrument validity

	GMM	Instruments for levels	
Hansen test excluding group:	chi2(1)	= 5.20 Prob > chi2 = 0.158	
Difference (null H = exogenous):	chi2(2)	= 1.03 Prob > chi2 = 0.596	

Source: own elaboration.

5. Discussion

The results show the strong persistence of domestic violence against men (Coef.: 0.8570, p = 0.000) reflects high temporal continuity. This is consistent with Bandura's (1977) social learning theory, which argues that violent behaviors are transmitted and reinforced across generations. When compared to the persistence for women (Coef.: 0.8301, p = 0.000), the slightly higher coefficient for men may reflect entrenched social norms around masculinity. In particular, Connell's (2005) concept of hegemonic masculinity helps to explain why violent dynamics involving men can remain embedded in everyday interactions: norms that associate masculinity with toughness and control may discourage help-seeking and external reporting, allowing patterns of aggression and victimization to persist over time even when they are harmful.

Unemployment is positively associated with domestic violence against men (Coef.: 0.2612, p = 0.051), highlighting the destabilizing effects of economic insecurity on household relations. This result is consistent with reactive aggression theory (Ferreira et al., 2022), which posits that economic stress increases emotional volatility and the likelihood of violent behavior. For men, unemployment can be particularly threatening to identity and status when they are socially expected to be primary breadwinners. From a

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bargaining perspective, negative employment shocks weaken men's perceived position within the household, intensifying status anxiety and conflict in line with non-cooperative models of intra-household decision-making (Manser & Brown, 1980; McElroy & Horney, 1981; Chiappori, 1992; Lundberg & Pollak, 1993).

By contrast, unemployment is negatively associated with domestic violence against women (Coef.: –0.2995, p = 0.002). This finding fits with bargaining models of domestic conflict (Cunningham, 2008), in which women's withdrawal from formal employment can reduce open disputes over financial contributions and decision-making. Consistent with this interpretation, increases in male unemployment have been associated with significant rises in intimate partner violence due to deteriorations in men's economic position and weakened provider roles, whereas increases in female unemployment do not generate comparable escalations in conflict and may even reduce violence in some settings. Taken together, these patterns are consistent with asymmetric household bargaining frameworks, in which changes in partners' relative economic standing—not only absolute poverty—modify threat points and the likelihood of coercive behavior (Manser & Brown, 1980; McElroy & Horney, 1981; Chiappori, 1992; Lundberg & Pollak, 1993; Anderberg et al., 2016).

Informal labor shows a negative and statistically insignificant coefficient for men (Coef.: -0.1171, p = 0.124). This suggests that informal work for men does not substantially alter domestic violence risks once other factors are controlled for. In line with Sen's (1999) capability approach, informal employment for men tends to provide unstable income and limited social protection; as a result, it neither expands their set of "real freedoms" nor substantially transforms the structural conditions that generate household conflict. In many cases, men's informal work simply keeps the household functioning without improving security or widening future opportunities. For women, however, informal labor appears to create an avenue for economic participation that is associated with lower domestic violence (Coef.: -0.7291, p = 0.005). Even if informal jobs are precarious, they may increase women's access to income, social networks and information, enhancing their bargaining power and offering exit options from abusive relationships. In this sense, the results support Becker-type models in which women's labor market participation can reduce exposure to abuse by shifting the threat point and altering perceived costs for perpetrators. This interpretation is compatible with both collective household models (Chiappori, 1992; Lundberg & Pollak, 1993), which emphasize the role of income shares in intra-household allocation, and with the empirical literature showing that women's own earnings can reduce victimization risks when they retain meaningful control over resources (Duflo, 2012; Abd et al., 2018).

Poverty is positively associated with domestic violence against men (Coef.: 1.2805, p = 0.094), albeit at a marginal level of statistical significance. This pattern is broadly consistent with Evans et al. (2001), who show that economic deprivation heightens household stress and increases the risk of conflict and violence. Poverty may intensify feelings of frustration, shame, and perceived failure, especially among men, and can interact with labor market instability to produce explosive dynamics. For women, poverty has a small negative coefficient that is statistically significant at conventional levels (Coef.: -0.0732, p = 0.044). This counterintuitive result might reflect measurement and reporting issues rather than a protective effect. Poor women may face more barriers to filing official complaints, including limited access to justice institutions, fear of retaliation, and social norms that discourage disclosure. Machisa and Shamu (2022) emphasize that in contexts with strong informal support networks and weak formal institutions, women may rely on family, neighbors, or community organizations rather than the state. If official complaint data are used, this can generate a negative association between poverty and reported domestic violence, even if underlying victimization is higher.

Internet access is negatively associated with domestic violence against women and statistically significant (Coef.: -0.0250, p = 0.007), while

the coefficient for men, although also negative, is not significant (Coef.: -0.0250, p = 0.307). These patterns are consistent with Van Dijk's (2020) digital divide theory, which highlights how digital technologies can empower individuals by improving access to information, services, and economic opportunities. For women in particular, internet access may facilitate contact with helplines, support networks, and online communities, and may also foster awareness of rights and available protection mechanisms. Hilbert (2015) further notes that connectivity shapes not only information access but also the capacity to mobilize social and institutional support, which helps to explain why the protective effect is stronger and statistically robust for women. The weaker and non-significant effect for men suggests that access to the internet does not transform male behavior or stress in the same way.

The results for couples where women are part of the economically active population show opposite effects by gender. For men, women's economic participation is positively associated with domestic violence (Coef.: 0.3471, p = 0.000), whereas for women it is negatively associated (Coef.: -0.2485, p = 0.041). This combination is consistent with the male backlash hypothesis (Dhanaraj & Mahambare, 2021), which argues that increases in women's economic independence can be perceived by some men as a threat to traditional gender roles, prompting compensatory or "restorative" violence. At the same time, women's own risk of victimization falls as they gain income, autonomy, and access to support, in line with evidence by Abd et al. (2018). Within the bargaining framework, women's participation in the labor market raises their outside options and strengthens their threat point (Manser & Brown, 1980; McElroy & Horney, 1981; Chiappori, 1992), while for some men the same change is interpreted as a relative status loss, which may encourage conflict in settings where hegemonic masculinity and rigid gender norms remain salient (Connell, 2005; Duflo, 2012). Taken together, these results point to the ambivalence of women's economic empowerment in patriarchal settings: it protects women directly but may provoke conflict among men who feel their status is undermined.

Education, captured through the PCA-based index, reduces domestic violence for both men (Coef.: -0.1541, p = 0.007) and women (Coef.: -0.1068, p = 0.004). These findings reinforce Abd et al.'s (2018) argument that education supports self-regulation, non-violent conflict resolution, and awareness of rights. They are also consistent with Becker's (1975) human capital framework and Sen's (1999) capability approach, in which schooling expands individuals' cognitive skills, access to information and range of feasible life choices, thereby weakening the social acceptance of violence and improving the perceived returns to cooperative behavior. The larger magnitude of the coefficient for men suggests that increases in educational attainment may be particularly powerful in challenging norms that sustain male violent behavior, as discussed by Eklund (2023). For women, higher education can also improve employment prospects and information access, reinforcing the protective mechanisms described above.

Overcrowding has a positive association with domestic violence against men (Coef.: 0.1304, p = 0.088) and a negative association with domestic violence against women (Coef.: -0.1304, p = 0.078). For men, the positive coefficient is coherent with Regoeczi's (2003) findings that crowded living conditions increase stress, reduce privacy, and intensify conflict. When several individuals share reduced space, everyday frustrations may escalate more easily into aggression. For women, the negative coefficient may reflect a "surveillance" effect: in highly crowded settings, the presence of other adults or extended family members may constrain opportunities for abuse or make it more visible to third parties, as suggested by Ranganathan et al. (2021). Alternatively, it may again indicate differences in reporting behavior, with some forms of abuse being resolved informally within extended families rather than being reported to authorities.

Finally, cellphone ownership is associated with lower domestic violence for both men (Coef.: -0.0909, p = 0.020) and women (Coef.: -0.1598, p = 0.013). This result is consistent with Hilbert (2015), who emphasizes the empowering role

Sociedad y Economía N° 57 (2026) / e-ISSN: 2389-9050 / e10414648
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of communication technologies. Mobile phones facilitate access to information, emergency services, hotlines, and social networks that can provide emotional or practical support. For women in particular, phones can be an essential tool to seek help discretely, coordinate exit strategies, or maintain contact with support organizations. For men, the negative association suggests that greater connectivity may also reduce isolation and expand access to support or employment-related information, indirectly lowering stress and conflict even if the underlying mechanisms differ from those identified for women.

Beyond these individual coefficients, the results must be interpreted in light of Peru's marked regional heterogeneity. Although fixed effects control for unobserved territorial characteristics, the structural drivers of domestic violence differ significantly across coastal, highland and Amazonian regions. Areas with higher poverty, informality and limited institutional presence may exhibit a stronger link between labor-market instability and household conflict, whereas regions with better access to justice and social programs may translate economic shocks into higher reporting rather than higher victimization. Recent evidence from the Encuesta Demográfica y de Salud Familiar (INEI, 2022) shows that domestic violence rates are consistently higher in highland and Amazonian regions, where structural deprivation, cultural and linguistic barriers and weaker institutional capacity restrict victims' ability to seek help. These regional contrasts help explain the heterogeneous signs found for unemployment and poverty, since the effects of labor-market shocks are filtered through territorial differences in social norms, state presence and access to protection services.

6. Conclusions

This article examined how labor market instability, particularly unemployment, relates to domestic violence against women and men across Peru's 25 regions between 2009 and 2023. Using a dynamic panel framework and the System Generalized Method of Moments (System GMM), the study controlled for unobserved regional heterogeneity, endogeneity and persistence over time, providing regionally disaggregated evidence for a middle-income country characterized by structural labor-market disparities and pronounced regional inequalities.

The findings show a high degree of persistence in domestic violence for both women and men. Lagged domestic violence is a strong and significant predictor of current violence, indicating that once domestic conflict becomes entrenched, it tends to persist over time. This underscores the need for sustained long-term and preventive interventions rather than isolated short-term efforts.

The relationship between unemployment and domestic violence is clearly gender-differentiated. For men, higher unemployment is associated with higher domestic violence, suggesting that economic stress and job loss intensify household conflict and increase the risk of male victimization. For women, unemployment is associated with lower reported domestic violence once regional characteristics are controlled for. This negative association likely reflects bargaining dynamics, variations in women's labor participation and persistent regional differences in reporting rather than a true protective effect. Overall, the results demonstrate that the effects of labor market instability depend strongly on gender roles, social norms and the structure of regional labor markets.

Educational attainment, summarized by the PCA_Education index, is consistently associated with lower domestic violence against both women and men. Regions with higher education levels report fewer cases of violence, pointing to education as a central protective factor. By strengthening access to information, improving non-violent conflict resolution skills and expanding labor opportunities, education weakens structural conditions that sustain domestic violence.

The results for poverty and overcrowding reveal additional layers of vulnerability. Poverty is positively associated with domestic violence against men and only weakly related to women, suggesting that economic deprivation inter-

acts with gendered expectations and household stress in complex and asymmetric ways. Overcrowding shows opposite signs for women and men and should be interpreted with caution: crowded living spaces may heighten conflict, but they can also increase the social visibility of abuse or modify reporting patterns. Both poverty and housing conditions remain markers of structural disadvantage shaping the environment in which domestic violence occurs.

Access to technology also matters. Internet and cellphone ownership are negatively associated with domestic violence, especially for women. Greater connectivity enhances access to information, economic opportunities and support networks, mitigating risks associated with labor market instability and household conflict, particularly in regions with limited institutional presence.

From a policy perspective, the results call for coordinated and regionally tailored interventions that address domestic violence as a problem affecting both women and men. Strengthening education is essential: the Ministry of Education (MINEDU) should expand scholarships and vocational or adult-education programs in regions where low education and high violence coincide, improving skills and non-violent conflict resolution for all household members. Reducing poverty remains a priority. The Ministry of Development and Social Inclusion (MIDIS) can reinforce social protection schemes targeted at households most exposed to labor-market instability and domestic violence, supporting victims of any gender while reducing stressors linked to perpetration.

Expanding access to digital technologies should also be part of prevention strategies. The Ministry of Transport and Communications (MTC) can promote internet and mobile connectivity in underserved regions, facilitating help-seeking and labor-market participation for both women and men. Addressing overcrowding requires housing policies that increase the availability of adequate, affordable housing through targeted programs of the Ministry of Housing, Construction and Sanitation (MVCS), reducing environmental stressors that heighten intra-household conflict.

Finally, specialized services must be strengthened. The Ministry of Women and Vulnerable Populations (MIMP) should expand counseling, shelters and rehabilitation programs for women, male victims and perpetrators, while the Ministry of Labor and Employment Promotion (MTPE) can promote employment policies—such as childcare support and anti-discrimination measures—that reduce economic dependence and mitigate violence risks across genders.

Compared with earlier studies, which often focus on single cities, shorter periods or women only, this article contributes by using a long regional panel for Peru, distinguishing between women and men as victims, and explicitly linking domestic violence to labor market instability and structural conditions. The coexistence of a positive association between unemployment and male victimization and a negative association for women adds nuance to the international literature, which typically treats unemployment as a uniform risk factor. The results on technology access and women's economic participation further highlight the importance of considering empowerment and backlash mechanisms jointly.

The study has limitations. System GMM reduces endogeneity but does not establish causality, and administrative records of domestic violence are affected by underreporting and regional variation in reporting. Regional aggregation also masks intra-regional inequalities and individual-level mechanisms linking labor instability to household conflict.

Future research should incorporate micro-level or district-level data and qualitative evidence to clarify how labor-market instability, social norms and institutional access shape domestic violence across Peru's heterogeneous regions.

Author contributions

Aníbal Erik Romero Bendezú: conceptualization, data curation and cleaning, methodology, full development of the econometric model, formal analysis, investigation, project administration, visualization, original draft preparation, writing, review and editing.

Héctor Javier Bendezú Jiménez: doctoral supervision, conceptualization, formal analysis, supervision, validation, writing, review and editing, preparation and revision of the original draft.

Hernán Ricardo Briceño Avalos: formal analysis, writing, original draft preparation.

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Conflict of interest

The authors declare that they have no conflicts of interest related to the research, authorship, or publication of this manuscript.

Ethical considerations

The study uses only secondary and publicly available anonymized data from official national sources. No human subjects were involved, and no identifiable information was used, therefore ethical approval was not required. The authors complied with all principles of academic integrity, transparency, and responsible data management.

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