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Sleeping with the Enemy: A General Equilibrium Approach

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Abstract

This paper develops a general equilibrium model of domestic violence grounded in household bargaining and economic dependence. Inspired by the dynamics portrayed in the film **Sleeping with the Enemy** (1991), the model incorporates exit constraints, enforcement, and social norms as determinants of women's decisions regarding labor participation and relationship continuity. The analysis shows how insufficient enforcement and limited outside opportunities trap victims in stable but inefficient equilibria characterized by violence and dependency. Comparative statics demonstrate that welfare policies such as shelters, transfers, and employment support shift equilibrium outcomes toward safety and self-sufficiency. The results highlight the role of public intervention in restoring efficiency and individual autonomy when private bargaining fails due to asymmetric power and coercion.

Keywords: Domestic violence, general equilibrium, bargaining, enforcement, welfare policy.
JEL Codes: D13, I38, J12, K42.

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1 Introduction

We study domestic violence as an equilibrium outcome of intra-household bargaining under economic dependence and state enforcement. The central mechanism is that the perpetrator's private benefit from control faces (i) expected legal penalties and (ii) an endogenous loss of household productivity; the victim's threat point depends on exit costs and protection. We derive testable implications and a reduced-form system suitable for estimation.

Domestic violence represents one of the most pervasive forms of social and economic inequality across the globe. According to the World Health Organization (WHO, 2021), approximately one in three women worldwide has experienced physical or sexual violence by an intimate partner at least once in her lifetime. This phenomenon transcends income, culture, and education, revealing its persistence even in advanced economies. In low- and middle-income countries, the prevalence is higher, often aggravated by institutional fragility and limited enforcement capacity. Beyond its immediate human cost, domestic violence imposes long-term economic consequences, reducing labor participation, increasing health expenditures, and perpetuating cycles of dependency that distort the efficient allocation of resources. Understanding its determinants is essential to design effective welfare and enforcement policies.

The economics of domestic violence has evolved from a moral concern to a structured analytical field. Following Becker (1968), who modeled crime as a rational choice under risk and deterrence, later studies such as Tauchen et al. (1991) and Bloch and Rao (2002) extended this reasoning to household conflicts. They argue that violence can emerge as an equilibrium outcome of bargaining when asymmetries of power, income, and outside options exist. Within this framework, the partner with greater economic independence has stronger bargaining leverage, thereby reducing the incidence of violence. Conversely, financial dependence and social stigma can sustain inefficient equilibria, where victims remain trapped due to high exit costs and weak institutional support. This approach has opened a bridge between household economics, behavioral theory, and public policy design.

In Brazil, the problem of domestic violence has reached alarming proportions. Data from the Instituto de Pesquisa Econômica Aplicada (IPEA, 2023) and the Fórum Brasileiro de Segurança Pública indicate that one woman is killed every six hours due to gender-based violence. According to the Atlas da Violência (2023), more than 45,000 cases of rape and 700,000 reports of domestic aggression were registered annually in the last decade, with only a fraction leading to convictions. The National Household Sample Survey (PNAD Contínua, IBGE, 2022) further reveals that violence disproportionately affects younger women and those with low education, reflecting intergenerational poverty and exclusion. These statistics highlight how gender inequality, labor informality, and regional disparities interact to sustain domestic violence as a systemic economic challenge.

The persistence of violence across age groups broadens the scope of analysis beyond gender alone. Studies by Garcia-Moreno et al. (2018) and World Health Organization (2021) show that elder abuse and violence against children often coexist within the same households, suggesting that domestic violence reflects broader failures in family governance and social protection. Among adolescents, early exposure to violence increases the likelihood of reproducing aggressive behavior in adulthood, as emphasized by Heise et al. (2011). Thus, domestic violence is not merely a moral or psychological issue—it is a dynamic equilibrium problem affecting human capital accumulation, labor productivity, and intergenerational welfare. Economically, its persistence acts as a distortion similar to a negative externality that governments must correct through transfers, enforcement, and education policies.

From a macroeconomic perspective, domestic violence generates measurable welfare losses. According to UN Women (2022), the global cost of violence against women is estimated at nearly 2% of world GDP—approximately USD 1.5 trillion per year. These costs arise from productivity losses, medical treatment, judicial processes, and social services. In Brazil, estimates from Cerqueira et al. (2021) suggest that gender-based violence alone reduces GDP by 1.2% annually through absenteeism, turnover, and reduced female participation in the labor market. Such figures place domestic violence at the core of economic policy debates, alongside education, health, and inequality. Effective responses require integrating microeconomic incentives with macroeconomic accountability.

Public policy responses have evolved slowly relative to the magnitude of the problem. The Maria da Penha Law (Lei nº 11.340/2006) introduced judicial protection and stricter penalties in Brazil, representing a major institutional advance. However, Instituto de Pesquisa Econômica Aplicada (2023) note that enforcement remains uneven across states, and many municipalities lack specialized courts or shelters. International comparisons show similar trends: strong legislation is not sufficient without credible enforcement, social awareness, and economic autonomy for victims. Consequently, the challenge lies not only in criminalizing violence but in addressing its economic foundations—dependence, unemployment, and the lack of credible exit options.

The role of information and cultural norms further complicates the equilibrium. Empirical evidence from Bobonis et al. (2013) and Erten and Keskin (2019) shows that social acceptance of violence and underreporting reinforce its persistence. In regions where patriarchal norms remain strong, victims may rationally choose silence to avoid social exclusion. This behavioral constraint interacts with economic incentives, reducing the perceived benefits of exiting abusive relationships even when enforcement improves. Thus, behavioral economics complements classical models by explaining why rational deterrence alone often fails. Policy design must therefore consider not only enforcement intensity but also social beliefs and psychological costs.

Recent advances in quantitative modeling have enabled economists to simulate household bargaining under endogenous enforcement and welfare policies. Structural models such as those developed by Aizer (2010) and Bloch and Rao (2002) show that subsidies, transfers, or improved

policing reduce domestic violence by increasing outside options for potential victims. These interventions alter the Nash bargaining set, shifting equilibria toward non-violent outcomes. When public transfers compensate for income inequality within the household, the equilibrium level of violence falls, improving both welfare and efficiency. Such findings suggest that economic policy can be as effective as criminal justice in preventing domestic violence.

Cross-country comparisons reinforce the importance of institutional quality. According to the OECD (2021), countries with comprehensive welfare systems—such as Sweden, Norway, and Canada—exhibit significantly lower rates of domestic violence. These countries combine universal social assistance with accessible legal and psychological support, reducing dependency and stigma. In contrast, nations with weak enforcement or regressive welfare policies show higher prevalence. Brazil occupies an intermediate position: strong legislation coexists with structural inequality and fiscal constraints, limiting the effectiveness of welfare instruments that could mitigate domestic conflict.

The persistence of domestic violence calls for an integrated economic approach. A general equilibrium model—linking individual behavior, public enforcement, and welfare transfers—can illuminate the complex feedbacks between policy design and private decision-making. By modeling violence as an equilibrium choice influenced by financial dependence, exit costs, and institutional capacity, one can identify optimal interventions that minimize both inefficiency and suffering. The present study aims to formalize such a model, drawing inspiration from *Sleeping with the Enemy* (1991) as an allegory of economic dependence, power, and freedom. The analysis contributes to bridging economics, ethics, and social policy in confronting one of the most persistent failures of human welfare in modern societies.

2 Literature Review

The empirical analysis of domestic violence has increasingly incorporated econometric and statistical modeling to quantify both its determinants and socioeconomic consequences. In early formulations, Tauchen et al. (1991) and Bloch and Rao (2002) used game-theoretic and bargaining models to describe violence as an equilibrium outcome shaped by power asymmetries within households. These frameworks have been extended using microeconomic data, allowing the identification of causal effects between income shocks, labor market participation, and the likelihood of domestic abuse. In particular, Aizer (2010) demonstrated that the reduction in the gender wage gap in the United States significantly decreased domestic violence rates, indicating that female economic empowerment alters the bargaining frontier within families.

Brazilian research has followed similar quantitative approaches, combining household survey data with panel estimations and spatial models. For instance, Cerqueira et al. (2021) employed panel regressions for Brazilian states between 2005 and 2020 to estimate the impact of female labor participation and social transfers on femicide rates. Their results show a negative elasticity

between employment opportunities and homicide of women by intimate partners. Likewise, Instituto de Pesquisa Econômica Aplicada (2023) used hierarchical Bayesian models to evaluate the spatial persistence of domestic violence in metropolitan areas, highlighting the role of urban inequality and police density. Recent contributions by Loureiro et al. (2024) extend this agenda, estimating whether domestic violence contributes to the gender wage gap in Brazil using microdata from national labor surveys and instrumental-variable regressions. The findings indicate that exposure to violence significantly reduces women's earnings, revealing a causal link between abuse, productivity, and income inequality.

Internationally, econometric research has provided robust statistical evidence linking welfare policies to violence reduction. Bobonis et al. (2013) analyzed Mexico's *Oportunidades* program using instrumental variables to isolate the exogenous effect of conditional cash transfers on intra-household conflict. Their model showed that increased female income leads to a statistically significant decline in spousal aggression. Similarly, Erten and Keskin (2019) employed difference-in-differences estimation to assess the effects of education reforms in Turkey, finding that extended female schooling reduced the probability of experiencing domestic violence by 25%. Structural models in Aizer (2010) and Bloch and Rao (2002) show consistent theoretical mechanisms whereby income equality shifts bargaining equilibria toward non-violence.

Recent Brazilian studies have deepened the mathematical modeling of domestic violence through dynamic and spatial econometrics. Sant'Anna and Brito (2020) used a spatial Durbin model to identify neighborhood effects in the propagation of domestic violence across municipalities, suggesting that local interventions produce spillover benefits to adjacent areas. Meanwhile, Cunha and Paixão (2022) combined Poisson regression and difference-in-differences analysis to assess the effectiveness of specialized courts created by the Maria da Penha Law, showing a 12% reduction in reported cases after implementation. Silva and Diniz (2021) applied time-series cointegration models to explore long-run relationships between unemployment, alcohol consumption, and violence against women, identifying cyclical co-movements consistent with economic downturns.

Mathematical approaches have complemented empirical estimations by formalizing the behavioral foundations of violence. Utility-theoretic frameworks such as those in Bloch and Rao (2002) and Tauchen et al. (1991) interpret violence as a strategic decision under asymmetric information and enforcement constraints. In Brazil, Oliveira and Prado (2020) proposed a stochastic dynamic model where female labor participation, enforcement probability, and household utility interact to determine equilibrium violence levels. This type of model allows simulation of public policies—such as transfers or subsidies—under alternative enforcement regimes. Such formulations bridge econometric findings and welfare theory, providing a unified analytical structure for domestic violence as a policy-relevant equilibrium phenomenon.

Overall, econometric, statistical, and mathematical models converge on a central finding: domestic violence is not random but systematic, reflecting predictable responses to economic constraints,

power asymmetries, and policy structures. Empirical evidence from Brazil and abroad demonstrates that increasing female bargaining power through income and education is among the most effective strategies to mitigate violence. The next sections extend this theoretical foundation within a general equilibrium framework, modeling domestic violence as an endogenous outcome of economic dependence and public enforcement.

3 Theoretical Economic Foundations

Our approach builds on household collective models and Nash bargaining with outside options, complemented by the economics of crime for the penalty channel and by GE consistency for markets. Methodologically, we mirror a structured path used to connect incentives, enforcement and welfare in other contexts of coercion and extraction (organization/style as in a companion framework).

(i) Economic Hypotheses

Let $v \geq 0$ denote violence; $h \geq 0$ enforcement; $\kappa > 0$ exit cost; $\eta > 0$ protection efficacy.

H1 (*Productivity loss*). Output falls with violence through absenteeism/health: $Y = A \int (L_F + L_M) d\theta$ with $w_F(v) = w(1 - \delta_F v)$, $w_M(v) = w(1 - \delta_M v)$, $\delta_F, \delta_M \geq 0$.

H2 (*Threat point*). Victim's outside option $\Omega_F(h) = u(\bar{c}) + \phi(\bar{S} + \eta h) - \kappa$ improves with h and worsens with κ .

H3 (*Penalty margin*). Expected marginal penalty $\Pi_v(v; h)$ increases in h .

H4 (*Bargaining*). Higher Ω_F or transfers targeted to F raise her weight and reduce v^* .

4 Model Environment

(i) Households and Technology

There is a unit mass of households indexed by $\theta \in \Theta$, each with a woman F and a man M . A numeraire good is produced competitively with linear technology

$$Y = A \int_{\Theta} [L_F(\theta) + L_M(\theta)] d\theta, \quad p = 1, \quad w = A. \quad (4.1)$$

Each agent has unit time: labor $L_i \in [0, 1]$ and leisure $1 - L_i$. A government chooses enforcement $h \geq 0$ (policing, courts, shelters) financed by a lump-sum tax $\tau \geq 0$ per adult.

(ii) Preferences and Safety

Woman's utility includes consumption, leisure and safety:

$$U_F = u(c_F) + \psi(1 - L_F) + \underbrace{\phi(S)}_{\text{segurança}}, \quad S \equiv \bar{S} - v + \eta h, \quad (4.2)$$

where $v \geq 0$ is domestic violence by M and h reduces effective risk ($\eta > 0$). Assume $u' > 0, u'' < 0, \psi' > 0, \psi'' \leq 0, \phi' > 0, \phi'' \leq 0$.

Man's utility reflects consumption, leisure, and—when applicable—a private benefit of control $g(v)$, offset by enforcement penalties and broader social costs:

$$U_M = u(c_M) + \psi(1 - L_M) + g(v) - \Pi(v; h), \quad (4.3)$$

with $g'(v) \geq 0, g''(v) \leq 0$ (or $g \equiv 0$), and expected penalty $\Pi_v \equiv \partial\Pi/\partial v > 0$, with $\Pi_h \equiv \partial\Pi/\partial h > 0$ (more enforcement increases the marginal cost of violence).

(iii) Productivity and Budget

Effective productivity declines with violence (absenteeism, trauma, health):

$$w_F(v) = w(1 - \delta_F v), \quad w_M(v) = w(1 - \delta_M v), \quad \delta_F, \delta_M \geq 0. \quad (4.4)$$

Intra-household budget (no targeted transfers yet):

$$c_F + c_M = w_F(v)L_F + w_M(v)L_M - 2\tau. \quad (4.5)$$

(iv) Outside Option and Shelters

F may exit and access shelters with acceptance $\pi(h)$, receiving

$$\Omega_F(h) = u(\bar{c}) + \phi(\bar{S} + \eta h) - \kappa, \quad (4.6)$$

where $\kappa > 0$ captures material/social exit costs. Participation requires $U_F \geq \Omega_F(h)$. M faces external sanction cost $\Omega_M(h)$ (prison, restrictions), embedded in Π .

(v) Intra-household Allocation and Bargaining

Use a collective/Nash-bargaining program with weight $\lambda \in (0, 1)$: Intralar allocation resolves:

$$\max_{c_F, c_M, L_F, L_M, v} \lambda [U_F - \Omega_F(h)] + (1 - \lambda) [U_M - \Omega_M(h)] \quad (4.7)$$

$$\text{s.t. } c_F + c_M = w_F(v)L_F + w_M(v)L_M - 2\tau, L_i \in [0, 1], v \geq 0.$$

First-order conditions (illustrative). (i) Consumption sharing:

$$\lambda u'(c_F) = (1 - \lambda)u'(c_M) \quad \Rightarrow \quad \frac{u'(c_F)}{u'(c_M)} = \frac{1 - \lambda}{\lambda}. \quad (4.8)$$

(ii) Labor supply:

$$\lambda \psi'(1 - L_F) = \lambda u'(c_F) w_F(v), \quad (1 - \lambda) \psi'(1 - L_M) = (1 - \lambda) u'(c_M) w_M(v). \quad (4.9)$$

(iii) Violence v (trade-off intralar):

$$\underbrace{(1 - \lambda)g'(v)}_{\text{private benefit to } M} - \underbrace{(1 - \lambda)\Pi_v(v; h)}_{\text{expected penalty}} - \underbrace{\lambda\phi'(S)}_{\text{security loss to } F} - \underbrace{u'(c)w(\delta_F L_F + \delta_M L_M)}_{\text{household income reduction}} = 0. \quad (4.10)$$

This condition yields $\frac{\partial v^*}{\partial h} < 0$ whenever stronger enforcement raises the marginal penalty ($\Pi_{vh} > 0$) or when security concerns (ϕ') are salient, and $\frac{\partial v^*}{\partial \kappa} > 0$ if higher exit costs weaken the bargaining position of F through the outside option Ω_F .

(vi) Government and Budget

The government chooses (h, τ) to satisfy the budget

$$G(h) = 2\tau \quad (\text{per household}) \quad (4.11)$$

and maximize social welfare (e.g., Ramsey), internalizing productivity/health externalities of v .

(vii) Competitive Equilibrium with Intra-household Bargaining

Definição 4.1 (Equilibrium). *Given preferences and technology, a competitive equilibrium with domestic violence is $\{(c_F, c_M, L_F, L_M, v)_\theta\}_{\theta \in \Theta}$, prices $w = p = 1$, and policies (h, τ) such that:*

1. For each θ , (c_F, c_M, L_F, L_M, v) solves the bargaining problem given (w, h, τ) and $\Omega_F(h), \Omega_M(h)$;
2. Markets clear: $\int_{\Theta} (c_F + c_M) d\theta = Y - \int_{\Theta} 2\tau d\theta$, with $Y = A \int_{\Theta} (L_F + L_M) d\theta$;
3. Public budget: $G(h) = \int_{\Theta} 2\tau d\theta$;
4. Participation: $U_F(\theta) \geq \Omega_F(h)$ (otherwise the household does not form).

(viii) Social Planner Optimum and Inefficiencies

The social planner chooses $\{c_F, c_M, L_F, L_M, v\}_\theta$ and h to maximize

$$\max \int_{\Theta} [\lambda U_F + (1 - \lambda)U_M] d\theta \quad \text{subject to resource constraints and } G(h). \quad (4.12)$$

Since v affects aggregate productivity and social costs (such as health and justice), the decentralized choice of v is *not* efficient: v tends to be excessive in competitive equilibrium when $g'(v) > 0$ and the penalties Π fail to fully internalize the damages imposed on F and on production.

(ix) Policy Implications (Planner's First-Order Conditions)

The planner's optimal condition for v internalizes additional terms:

$$(1 - \lambda)g'(v) - (1 - \lambda)\Pi_v(v; h) - \lambda\phi'(S) - u'(\cdot)w(\delta_F L_F + \delta_M L_M) - \Gamma'(v) = 0. \quad (4.13)$$

where $\Gamma'(v)$ captures system-level costs (health, justice, children). Policies that raise Π_v , increase η (effective protection), and reduce κ (exit costs) push v^* toward the social optimum.

(x) Comparative Statics (Key Signs)

Assuming interior solutions and smoothness,

$$\frac{\partial v^*}{\partial h} = -\frac{(1 - \lambda)\Pi_{vh} + \lambda\phi''(S)\eta}{\mathcal{D}} < 0, \quad \mathcal{D} \equiv (1 - \lambda)\Pi_{vv} + \lambda\phi''(S) + u'(\cdot)w(\delta_F L'_F + \delta_M L'_M) > 0. \quad (4.14)$$

$$\frac{\partial v^*}{\partial \kappa} = \frac{\partial v^*}{\partial \Omega_F} \frac{\partial \Omega_F}{\partial \kappa} = -\frac{\partial v^*}{\partial \Omega_F} < 0 \Rightarrow \text{se } \frac{\partial v^*}{\partial \Omega_F} < 0, \text{ então maior } \kappa \Rightarrow v^* \uparrow. \quad (4.15)$$

$$\frac{\partial v^*}{\partial \tau} > 0 \text{ if } \tau \text{ reduces } c_F, c_M \text{ and worsens } F\text{'s bargaining position.} \quad (4.16)$$

(xi) Dynamic Extension (Optional)

Discrete time $t = 0, 1, \dots$ with state z_t (history of violence, health, children):

$$V_F^t = \max\{U_F^t + \beta E[V_F^{t+1}|z_{t+1}], \Omega_F(h_t)\}, \quad V_M^t = U_M^t + \beta E[V_M^{t+1}|z_{t+1}],$$

$z_{t+1} = \Xi(z_t, v_t, h_t)$; policies (h_t, τ_t) may follow rules.

(xii) Calibration/Estimation Roadmap

Choose u, ϕ, ψ (log/CRRA), g (linear/concave), Π (convex in v , increasing in h). Estimate δ_F, δ_M from labor/health microdata; η from enforcement variation; κ from exit costs (shelter distance,

own income). Targets: reports/denunciations, shelter usage, productivity, female participation, wage gap.

(xiii) Testable Predictions and Policies

1. **Enforcement:** Exogenous increases in h (specialized police/courts) $\Rightarrow v^* \downarrow, L_F \uparrow, Y \uparrow$.
2. **Exit cost:** Lower κ (own income, shelters, transport) $\Rightarrow v^* \downarrow$ and higher F 's welfare.
3. **Targeted transfers:** Safety-conditioned transfers to F raise bargaining power $\Rightarrow v^* \downarrow$.

5 Conclusion

This paper developed a general equilibrium model of domestic violence grounded in household bargaining theory, where individual utilities depend not only on consumption and leisure, but also on the strategic use of control and enforcement mechanisms. The model explicitly incorporated the private benefit of violence for the male partner, the disutility and loss of autonomy for the female partner, and the economic externalities that propagate through the labor market and public finances. By formalizing these interactions, the model aimed to provide a unified analytical framework that links violence, financial dependence, and policy instruments such as transfers, enforcement, and social protection. The objective was to endogenize the choice of violence as a behavioral response to economic incentives rather than as an exogenous social pathology.

The results demonstrated that domestic violence arises as an equilibrium outcome under incomplete enforcement and high exit costs. Comparative statics revealed that an increase in enforcement intensity (h) or effective protection (η) reduces equilibrium violence (v^*), while higher exit costs (κ) or regressive fiscal burdens (τ) amplify it. The model further showed that violence imposes a measurable efficiency loss, as it distorts labor allocation and reduces household productivity. Empirically, this prediction aligns with the evidence from Loureiro, Mendonça, and Moreira (2024), who found that exposure to domestic violence significantly depresses women's wages in Brazil, even after controlling for human capital and selection bias. In this sense, the theoretical mechanism proposed here is consistent with econometric findings in both national and international literature.

Overall, the model fulfilled the central purpose of the study: to formally connect the economic dependence of women to the persistence of domestic violence and to demonstrate that policy interventions can restore efficiency. The results suggest that an optimal welfare policy must combine targeted income support, effective enforcement of the Maria da Penha Law, and investments in child protection and legal infrastructure. Reducing violence is not only a moral imperative but also an economic one, as it increases aggregate productivity and social welfare. The conclusion thus reinforces that domestic violence should be analyzed—and mitigated—through an integrated

economic policy lens, bridging micro-level incentives and macro-level outcomes.

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