

# **This Is a Man's World: Crime and Women's Bargaining Power\***

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**ABSTRACT:** Exposure to community violence is a pervasive development challenge that goes beyond armed conflicts. Millions of people live in high-crime areas exposed to numerous and gender-differentiated negative impacts. This paper studies the effects of violent crime on intra-household resource allocation and bargaining power. I exploit an unexpected, plausibly exogenous, and geographically heterogeneous increase in local violence in Mexico and a longitudinal survey of households formed prior to the crime increase. I first estimate a system of demand equations and find the escalation in violence reallocated household expenditures toward male goods, at the expense of food and other household necessities. These findings would typically be interpreted as a deterioration in women's bargaining power. But changes in local violence may have also affected consumption preferences. To provide further evidence, I complement the analysis with reduced-form estimates of changes in intra-household decision-making, structural estimation of the determinants of women's control over household resources, and the analysis of single households' consumption allocations. Finally, I discuss the evidence on the role played by fear of victimization. **JEL Codes:** D10, D13, J16, O10.

**Keywords:** violence, crime, Mexico, intra-household resource allocation, Engel curves, women's bargaining power, resource shares, decision-making.

**Acknowledgments:** I am extremely grateful to Garance Genicot for her invaluable guidance and support. I am also very thankful to Martin Ravallion, Andrew Zeitlin, Becka Brolinson, Carolina Concha-Arriagada, David Frisof, Jorge Garcia-Hombrados, Pamela Jakiela, Pedro Juarros, Juan Margitic, Umberto Muraatori, Owen Ozier, Franco Peracchi, Daniel Valderrama-Gonzalez, Caitlin Kieran, and Arthur Lewbel. Participants to the ASSA, NEUDC, EALE, GCER, DSW, SDC, IPWSD, BCDE, Econ PhD Warwick, SEA, Ridge Crime Workshop, and SAEe conferences, and seminars at Georgetown University, University of Exeter, WZB, University of Surrey, University of Alicante, University of Vienna, University of Montreal, Universidad del Rosario, Pontificia Universidad Javeriana, CUNEF, Center for Global Development, and Abt Associates have provided lively debates and useful feedback. All errors are my own and the usual caveats apply.

\* Previously distributed as "The Effects of Violent Crime on Intra-household Resource Allocation and Bargaining Power."

# 1 Introduction

Exposure to community violence is a pervasive development challenge. In 2017, over 200 million people lived in close proximity to conflict areas (Corral et al. 2020), and the threat goes beyond armed conflicts. Homicide, rape, or kidnapping represent “everyday” crimes for millions of people not living in war-torn countries. In 2017, estimates suggest 464,000 people were victims of homicide worldwide,<sup>1</sup> a far larger number than the 115,000 fatal victims of terrorism and armed conflicts (UNODC 2019). Global threats such as economic recessions, climate change, and rising income inequality can all trigger new surges in violence in the near future (Miguel and Satyanath 2011; Enamorado et al. 2016; Levy, Sidel, and Patz 2017).

The effects of violence are numerous and complex, and we should not expect them to be gender neutral (Buvinic et al. 2012; Klugman and Mukhtarova 2020). Exposure to violent conflict and crime often have gender-differentiated impacts on labor supply, marital outcomes, and human capital (Dustmann and Fasani 2016; La Mattina 2017; Chakraborty et al. 2018; Velasquez 2019; Borker 2020; Mishra, Mishra, and Parasnis 2021). Extensive research has shown how shocks that worsen an individual’s relative capacity to contribute to the household, as well as their options outside of marriage, affect their intra-household bargaining power (Chiappori and Mazzocco 2017). Therefore, increased risk of victimization may further exacerbate gender inequalities inside the household, with potential welfare impacts. Women’s intra-household bargaining power, defined as their capacity to negotiate or determine the allocation of a household’s resources, commonly affects consumption allocations, and it is positively associated with women’s and children’s well-being (Anderson and Baland 2002; Duflo 2003; Qian 2008; Attanasio and Lechene 2010; Reggio 2011; Doss 2013; Tommasi 2019; Armand et al. 2020; Sanin 2021).

In the late 2000s, Mexico experienced an unprecedented and unanticipated surge

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<sup>1</sup>The International Classification of Crime for Statistical Purposes, developed by the United Nations Office on Drugs and Crimes (UNODC), defines intentional homicide as “unlawful death inflicted upon a person with the intent to cause death or serious injury.” The complete liability of the perpetrator separates it from killings during armed conflicts, terrorist attacks, self-defense, suicide, or due to negligent actions (UNODC 2019).

in violent crime. I exploit this plausibly exogenous, geographical, and temporal variation to study the impacts of exposure to community violence on intra-household resource allocation and bargaining power. A large consensus suggests the increase in violent crime was mostly an unintended consequence of the new war on drugs initiated by the Mexican government in 2007 ([Calderon et al. 2015](#); [Dell 2015](#); [Lessing 2015](#); [Osorio 2015](#); [Lindo and Padilla-Romo 2018](#)). Using panel data, the sudden increase in homicides and other crimes has been treated as plausibly exogenous to study causal impacts on several outcomes including labor, human capital, and risk preferences ([Brown and Velasquez 2017](#); [Brown 2018](#); [Brown et al. 2018](#)). In particular, research shows the drug war discouraged women's labor force participation more than men's ([Dell 2015](#); [Velasquez 2019](#); [Utar 2021](#)).

I use data from a nationally representative longitudinal survey that follows the same households before and after the crime increase. Its timing and structure allow us to control for unobserved time-invariant household heterogeneity and to account for behavioral responses such as non-random migration and marital formation.

To study the impacts on intra-household resource allocations, I estimate a system of household demand equations specified linearly on the logarithm of total household expenditure and local violence, captured by a function of the homicide rate at the municipality level, other time-varying characteristics, and household and time fixed effects. The outcome variables are expenditure shares by good category. Although the coefficient of interest in each of the equations is the local crime rate, I address the potential endogeneity of total expenditure to accurately classify household goods as luxuries or necessities given their estimated expenditure elasticities ([Blundell and Robin 1999](#); [Dunbar, Lewbel, and Pendakur 2013](#); [Attanasio and Lechene 2014](#)). In addition, I first show the increase in violence did not affect total household expenditure, at least within this paper's analytical sample, which alleviates concerns of misspecification bias.

The results suggest increases in homicides decreased the share of household expenditures allocated to food and other household necessities while increasing the expenditure shares of male clothing, transportation, and gambling. A household

living in a non-violent municipality prior to the escalation in homicides, who then experienced the average increase in crime during the period, decreased the share of total expenditure allocated to food by about two percentage points, and to hygiene and other care necessities by 0.8 percentage points. Relative to the baseline average expenditure shares, the increase in crime led to a decrease of 4% in food and 12% in other household necessities. By contrast, the same empirical exercise leads to 0.5-percentage-points (34% increase off baseline) increase in the budget shares of adult male clothing.

The main threat to identification would be that the heterogeneous geographic and sharp temporal variation in homicides reported in Mexico was actually anticipated or was correlated with other underlying trends related to households' consumption patterns. The results are consistent throughout multiple robustness checks that include, but are not restricted to, implementing double lasso, the inclusion of a large set of potential municipality-level confounders, and a placebo exercise to test for unobserved municipality trends using a prior survey wave. I also explore and rule out a series of mechanisms that we could expect, either from theory or prior research, to have a relationship with expenditure allocations and that may also be affected by changes in local crime. In particular, I find no evidence that the crime increase significantly affected household composition, prices, male time allocations, households' living standards, home production and gifts received, or the survey interview process.

The reported impacts on consumption allocations are consistent with a deterioration in women's bargaining power. Previous research in Mexico and elsewhere has shown improvements in women's control over the budget increases households' expenditure on food and women's private goods, such as clothing ([Bobonis 2009](#); [Attanasio and Lechene 2010](#); [Tommasi 2019](#); [Armand et al. 2020](#)). The estimated increases in the budget share of male goods, at the expense of food and other necessities, are therefore consistent with a decrease in women's relative bargaining power inside the household. A potential concern with this interpretation would be that the increased exposure to violence affected individual consumption preferences

in such a way that even without a shift in bargaining power parameters, we could, for instance, observe households spending more in private male goods than household necessities. Despite the improbability of such a mechanism operating solely, in the next part of the paper, I provide further empirical evidence of the Mexican drug war affecting women's control of household resources.

First, using a standard decision-making module and individual fixed-effects regressions, I show increases in crime lowered the probability that a woman would self-report as a decision-maker regarding household purchases. Men are also more likely to claim decision-making power from their wives regarding large household expenditures and their own clothing. These findings are consistent with [Tsaneva, Rockmore, and Albohmood \(2018\)](#), who also find drug-related violence in Mexico reduced women's participation in household decision-making.

Then, within a model of intra-household resource allocation, I structurally estimate men's and women's resource shares, defined as the fraction of the total household budget individuals privately consume, and study how they vary with household's characteristics, including exposure to violent crime. The results suggest that in households who experienced the average increase in crime over the period, women's resource shares (a proxy for their bargaining power) decreased by about five to ten percentage points. The structural setting allows the crime rate to affect both bargaining power and individual preference parameters. I assume a collective model of the household ([Chiappori and Mazzocco 2017](#)) and apply the methodology developed by [Browning, Chiappori, and Lewbel \(2013\)](#) and [Dunbar, Lewbel, and Pendakur \(2013\)](#). Recent work has used this approach to explain the phenomenon of elderly missing women in India ([Calvi 2020](#)), the effect of a cash-conditional-transfer program in Mexico ([Tommasi 2019](#); [Sokullu and Valente 2021](#)), and relevant patterns of intra-household consumption inequality ([Penglase 2020](#); [Brown, Calvi, and Penglase 2021](#); [Calvi and Keskar 2021](#)).

Third, I also show the effects of crime on male goods and household necessities are not observed when analyzing the demand equations of male single households. These results suggest that if the Mexican drug war increased the taste toward male

adult clothing, the taste shock did not affect unmarried men, which also makes the shift in the individual-preferences mechanism less credible. Analyzing the Engel curves of female-headed households who married in between survey waves provides further complementary evidence.

Heterogeneity analysis of the effects of crime on household expenditures highlights the role of fear of victimization. The reported effects of homicides on food and male clothing are stronger in those households whose wives report being more scared of victimization than before. And, interestingly, evidence shows an increase in the budget share of alcohol and tobacco in such households as well, a good previously found to be negatively correlated with women's bargaining power in Mexico ([Angelucci 2008](#); [Bobonis 2009](#)). The effects of fear of victimization on intra-household dynamics may operate through multiple channels, including labor markets and other time spent outside the household, as well as psychological effects ([Dustmann and Fasani 2016](#); [Velasquez 2019](#); [Baranov et al. 2020](#)). In the last section of the paper, I discuss these channels' potential roles.

This paper contributes to the understanding of the hidden costs of exposure to violent crime on households' behavior and well-being. The causal effects of violence on intra-household dynamics remain largely understudied because exposure to violence is usually endogenous, households' self-select their place of residence, and panel surveys, especially including consumption surveys, have been largely unavailable in such settings ([Buvinic et al. 2012](#); [Verwimp, Justino, and Brück 2019](#)). This paper directly addresses these challenges.

Specifically, I add to the understanding of gender-differentiated effects of exposure to community violence, which is key for effective policy design. The reported results, finding opposite effects of what occurred when married women received cash transfers in Mexico and other countries, suggest treatment effects of many policy interventions may be heterogeneous by exposure to violence. A recent paper by [Buehren et al. \(2017\)](#) find that a randomized vocational and life-skills training in South Sudan was only effective for girls not previously exposed to violent conflict. But, to my knowledge, this paper is the first to document how changes in violent

crime can shift consumption allocations consistent with changes in intra-household dynamics. In fact, the majority of research has focused on the consequences of armed conflicts, such as international or civil wars, distorting marriage markets through increased male scarcity ([Abramitzky, Delavande, and Vasconcelos 2011](#); [Brainerd 2017](#); [La Mattina 2017](#)). A recent and growing literature documents the effects of fear of crime on female educational outcomes ([Muralidharan and Prakash 2017](#); [Borker 2020](#); [Fiala et al. 2020](#)) and women's willingness to pay to ride in women-only public transportation to avoid sexual harassment ([Kondylis et al. 2020](#); [Aguilar, Gutiérrez, and Villagrán 2021](#))

More generally, the results also contribute to the literature on the determinants of intra-household allocation of resources and bargaining power ([Doss 2013](#); [Baland and Ziparo 2018](#)), the growing literature on the structural estimation of intra-household bargaining power within a collective model of the household ([Chiappori 1992](#); [Bourguignon et al. 1993](#); [Udry 1996](#); [Chiappori and Mazzocco 2017](#)), and the estimation of resource shares as a proxy of control over household resources and empowerment ([Browning, Chiappori, and Lewbel 2013](#); [Dunbar, Lewbel, and Pendakur 2013](#); [Tommasi 2019](#); [Calvi 2020](#); [Penglase 2020](#); [Brown, Calvi, and Penglase 2021](#); [Calvi and Keskar 2021](#); [Sokullu and Valente 2021](#); [Calvi, Penglasi, and Tommasi 2022](#)).

The next section describes the background of the increase in drug-related crime in Mexico and its gender-differentiated impacts. Section 3 discusses the theoretical framework. Section 4 details the data and empirical strategy and discusses the results on household expenditures. In section 5, I provide evidence of the intra-household bargaining-power mechanism, and section 6 discusses potential channels. Finally, section 7 concludes.

## 2 Background

### 2.1 The Mexican Drug War

Mexico experienced a sudden, unanticipated, and large increase in violent crime starting in 2007. The homicide rate in the country almost tripled within five years (Figure 1). The increase in homicides per capita was so drastic it surpassed countries in the midst of armed conflicts at the time, such as Iraq and Afghanistan (GPI 2016). In 2019, the homicide rate reached a new record of 35 per 100,000 people. The amount of lives lost was so drastic that life expectancy stagnated for young men at the national level and even decreased in some parts of the country (Aburto and Beltrán-Sánchez 2019).

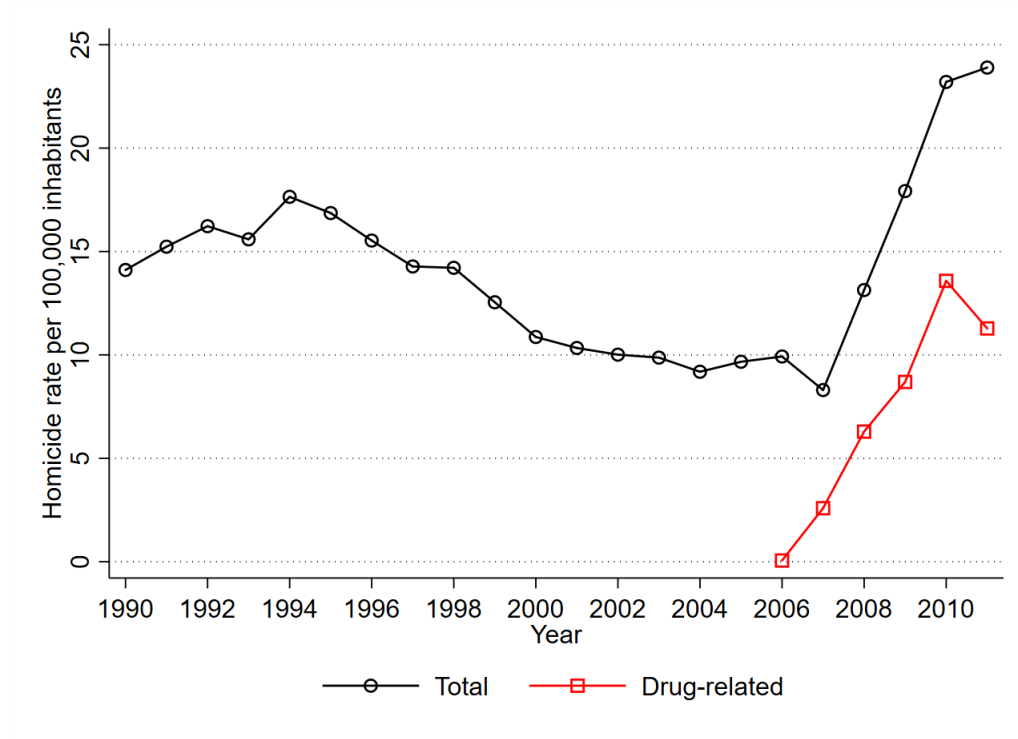
Extensive research has studied the drivers of this rapid and unanticipated spike in violence. A large consensus suggests the surge in violence was mostly an unintended consequence of the new war on drugs initiated by the Mexican government in 2007 (Calderon et al. 2015; Dell 2015; Lessing 2015; Osorio 2015; Lindo and Padilla-Romo 2018).

Within weeks of President Felipe Calderon's election in December 2006, the federal government deployed thousands of troops to fight drug-trafficking organizations (DTOs). The new government combined this militarized approach with a "kingpin strategy" consisting of arresting the leaders of the main drug cartels. As a consequence, the number of DTOs skyrocketed, and violence both escalated and spread geographically as drug leaders fought to gain control of the cartels and territory (Coscia and Ríos 2012; Sobrino 2020). Dell (2015) uses a regression discontinuity design to show how a subsequent and larger increase occurred in the homicide rate in the municipalities where Calderon's political party won mayoral elections. Calderon et al. (2015) and Lindo and Padilla-Romo (2018) both show how the captures or killings of drug kingpins and lieutenants brought destabilizing effects through the cartels and were accompanied by escalations in homicides. Beyond President Calderon's war on drugs, previous research has identified other risk factors for the increase in homicides, including scarcity in cocaine markets (Castillo,

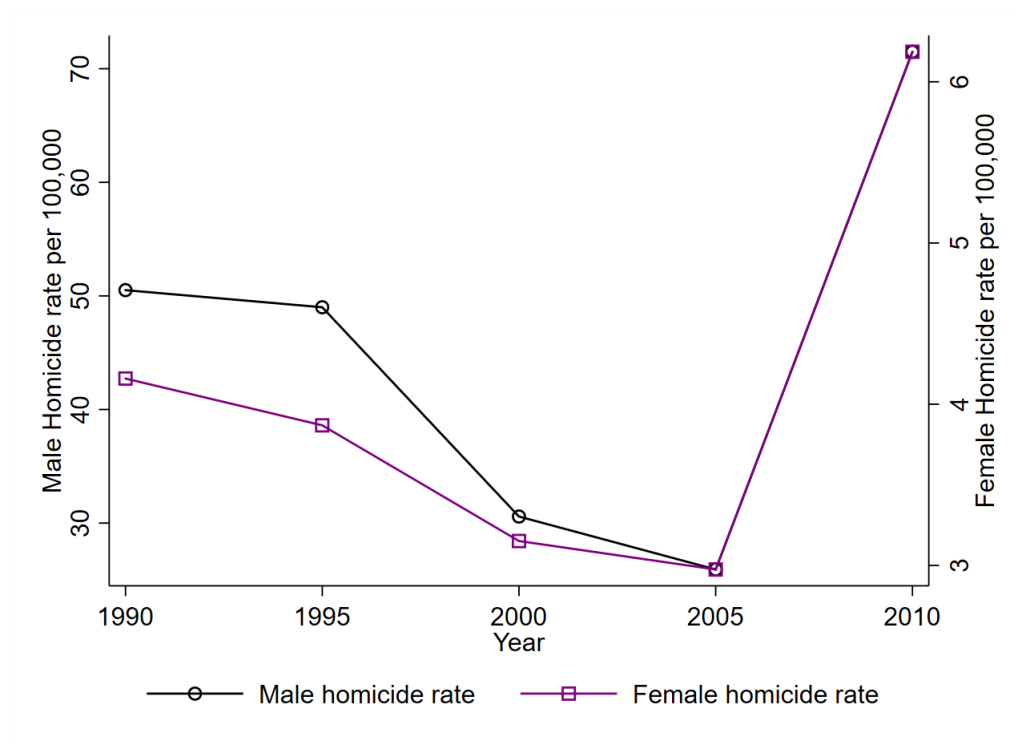


Figure 1: Annual Homicide Rate per 100,000 People

(a) Homicide Rate and Drug-Related Homicide Rate



(b) 15-39 Male and Female Homicide Rate per 100,000 People



Sources: INEGI, Office of the Mexican Attorney General, CONAPO.

Notes: Figure 1a plots the Mexican annual homicide rate over time (black line), and a “drug-related” homicide rate based on data compiled by the government, which counts deaths that can be directly linked to cartel members killing each other or resulting from confrontation with military and police forces (red line). Figure 1b plots the homicide rate of 15- to 39-year-old men (black line) and women (purple line).

Mejía, and Restrepo 2018), manufacturing job loss (Dell, Feigenberg, and Teshima 2019), agricultural price shocks (Dube, Garcia-Ponce, and Thom 2016), and income inequality (Enamorado et al. 2016).

In addition to the temporal variation in violence, the increase in drug-related violence was also geographically heterogeneous. Whereas in some municipalities, the homicide rate was multiplied by 30, others continued to witness a decline in crime rates (Figure A1). In 2007, violence was concentrated in a few municipalities along the border with the US and the states of Sinaloa and Michoacan, the two main drug-producing states and home to the powerful Sinaloa and Michoacan Family cartels.<sup>2</sup> By 2012, violence had spread to many new municipalities with low levels of crime and narco presence before, as they had become newly attractive routes of drug trafficking (Calderon et al. 2015; Dell 2015).

The large increments in drug-related violence go beyond homicides. Mexican civilians have been exposed to a much higher prevalence of other types of crimes as well, including extortion, kidnapping, rape, theft, and human trafficking (Calderon et al. 2015; Magaloni et al. 2020). Recent literature has already documented negative impacts on several outcomes, including young male educational investment (Brown and Velasquez 2017), individual risk aversion (Brown et al. 2018), newborns' birth weight (Brown 2018), migration displacement effects (Basu and Pearlman 2017; Orozco-Aleman and Gonzalez-Lozano 2018), and manufacturing output and employment (Utar 2021).

## 2.2 Gender-Differentiated Impacts

During the Mexican drug war, although the majority of the homicides have been perpetrated against adult men, the female homicide rate also doubled from 2007 to 2010 (Figure 1b), and stories of girls and adult women forced, kidnapped, and sold into sex trafficking and slavery have become daily news in many parts of the country. The cartels also actively engage in “narco-propaganda” deliberately displaying

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<sup>2</sup>The Sinaloa cartel has been commonly declared the most powerful cartel in the world and is infamously known for its leader, “El Chapo.”

victims' bodies in public, including abandoning raped or sexually tortured women undressed in public (Risley 2010; Grillo 2013; Campbell 2014).<sup>3</sup>

Research has documented that women tend to report greater fear and perceived risk of victimization than men, even in contexts where men are more frequently victimized (Ferraro 1996; Mesch 2000; Chataway and Hart 2019), and that sexual violence alone can reduce women's labor supply (Sabia, Dills, and DeSimone 2013; Chakraborty et al. 2018). Importantly, previous research has already documented empirically gendered effects of the Mexican drug war. Mexican municipalities exposed to a higher drug-conflict intensity have experienced decreases in female labor supply—both among self-employed women and blue-collar workers (Dell 2015; Velasquez 2019; Utar 2021). Dell (2015) and Velasquez (2019) find no effect on male labor force participation. Utar (2021) uses plant-level data of manufacturing firms and shows that firms with a female-intensive workforce experienced a much larger decline in employment. In addition, Velasquez (2019) shows the effect is stronger among women who become more afraid of being attacked outside the household. Beyond labor supply, Tsaneva, Rockmore, and Albohmoood (2018) document reductions in women's decision-making, and Balmori de la Miyar (2020) finds the increase in drug-related crime had a negative effect on women's mental well-being, but no statistical effects on men. Qualitative evidence on the so-called "narco-culture" also suggests changes in social norms involving stagnation or regression on attitudes toward women's place in the economy and the household (Garcia 2011, Kim 2014).

The direct and indirect effects of the Mexican crime rise can have gendered impacts on intra-household dynamics through multiple channels. The potential effects on individuals' outside options and preferences may influence how the gains from marriage are distributed. Previous research has provided substantial theoretical support and empirical evidence showing how unanticipated shocks that worsen individuals' capacity to earn income affects their intra-household bargaining power

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<sup>3</sup>Excerpt of 2020 song "Cancion sin miedo" from Mexican songwriter Vivir Quintana: "A cada minuto, de cada semana, nos roban amigas, nos matan hermanas. Destrozan sus cuerpos, los desaparecen.", which can be translated as "In every minute, of every week, they steal our female friends, they kill our sisters. They destroy their bodies, they make them disappear".

(Anderson and Eswaran 2009; Majlesi 2016; Chiappori and Mazzocco 2017). Additionally, the strengthening of traditional social norms, the safety perception of having a male partner, psychological effects, or changes in time use could each be sufficient to affect women’s relative position inside the household and their control over households’ resources (Angrist 2002; Qian 2008; Jensen and Oster 2009; Attanasio and Lechene 2014; Baland and Ziparo 2018).

### 3 Theoretical Framework

In this section, I present a general version of the collective model of intrahousehold allocation based on Browning, Chiappori, and Lewbel (2013) and Dunbar, Lewbel, and Pendakur (2013) within a static framework. Assuming limited commitment, where households are assumed to fully cooperate in each period to achieve *within-period* Pareto efficiency, but cannot commit to the allocation of resources for every future period and possible state of nature (Mazzocco 2007; Chiappori and Mazzocco 2017), the distribution of bargaining power can shift over time and marriages can end.<sup>4</sup> Chiappori and Mazzocco (2017) show how the dynamic limited-commitment model can be formulated as a three-stage problem. In the first stage, households decide on the disposition of lifetime resources across time and states of nature. In the second stage, households decide on the optimal allocation of commodities for household production and time allocation in labor, leisure, and household production. This paper focuses on the final stage, the static “intra-household allocation” that corresponds to the stage at which households decide on the optimal allocation of private goods within the household members. The empirical analysis presented

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<sup>4</sup>Participation constraints will depend on each partner’s option outside of the marriage. Marital breakup occurs when no arrangement that makes both partners better off staying together is feasible. But as long room for renegotiation remains, we may expect intra-household allocations to shift over time (Chiappori and Mazzocco 2017). The outside option has also been modeled as the non-cooperative solution instead of divorce (Lundberg and Pollak 1993). The collective model is silent on how the relative Pareto weights are determined in each period. The evolution of the bargaining-power parameters over time can be thought of as the solution to a repeated bargaining model subject to the period’s outside options (divorce, separation, or a non-cooperative arrangement). Or it may be thought of as updated only when one of the individual’s participation constraints binds and renegotiation occurs to achieve a new feasible allocation more favorable to this individual (Mazzocco 2007).

in section 4 shows the increase in crime in Mexico had no impact on households' total expenditures, at least within the analytical sample of interest. I also abstract from modeling marital-formation decisions, because the empirical analysis is restricted to married households that were formed prior to the escalation in violence.

### 3.1 A Collective Model of the Household

Consider a static collective model of the household with two adult decision-makers, a woman  $w$  and a man  $m$ .<sup>5</sup> Households can consume  $K$  different goods with market prices  $p = (p^1, \dots, p^K)'$ . Let  $z = (z^1, \dots, z^K)'$  be the  $K$ -vector of goods consumed by the household, and let  $y$  be the total expenditure incurred by the household. Given a household consumption bundle  $z$ , a private-good equivalent vector  $x_i$  exists for each household member, such that  $z = F(x_w + x_m)$ . In the absence of economies of scale,  $z$  would be equal to the sum of the private equivalent consumptions  $x_w + x_m$ . Consumption sharing and the presence of public goods suggests, however, this assumption is plausibly unrealistic. Instead, I assume à la Barten linear consumption technology  $z = A'(x_w + x_m)$ , a standard approach in the literature (Browning, Chiappori, and Lewbel 2013; Dunbar, Lewbel, and Pendakur 2013; Calvi 2020).<sup>6</sup>

Let  $U_i(x_i)$  be the utility of individual  $i$  over the vector of consumption goods  $x_i$ . Individuals' total utility may also depend on other household members' utilities (caring preferences) or depend on other economic decisions (e.g., leisure, savings). The individual's total utility function would then be assumed to be weakly separable over the subutility functions for the consumption goods  $U_i(x_i)$  in a given period. I assume the  $U_i(x_i)$  are monotonically increasing in consumption, twice continuously differentiable, and strictly quasi-concave. At each period, households solve

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<sup>5</sup>For ease of exposition, I limit the discussion to households with two adult decision-makers. The model can be easily extended to households with a greater number of adult decision-makers and the empirical analysis will account for them.

<sup>6</sup> $A$  is a  $K \times K$  matrix such that  $x_w + x_m = A^{-1}z$ . This technology allows for different levels of jointness of consumption rather than categorizing goods as either private or public. Suppose the two members of the household always watch TV streaming services together. Then, the consumption of streaming services in private good equivalents is two times the purchased quantity at the household level. Assuming the consumption of streaming services does not depend on consumption of other goods,  $z^k = \frac{1}{2}(x_w^k + x_m^k)$ . Off-diagonal elements of  $A$  may be different from zero if the degree to which a good can be shared depends on the consumption of other goods.

the following problem:

$$\max_{\{x_w, x_m, z\}} \mu(p, y) U_w(x_w) + (1 - \mu(p, y)) U_m(x_m), \quad (1)$$

subject to a budget constraint,

$$z' p \leq y, \quad (2)$$

and the consumption technology constraint,

$$z = A(x_w + x_m), \quad (3)$$

where  $\mu(p, y)$  and  $(1 - \mu(p, y))$  are the Pareto weights for the woman and the man, respectively. Both preferences and Pareto weights are allowed to depend on individuals' socio-demographic characteristics (e.g., age, education, community characteristics) but will be suppressed to simplify notation in this section.

The collective model allows each individual to have their own utility function and assumes Pareto efficiency within each period. The collective model has been tested empirically in Mexico, exploiting exogenous variation from the PROGRESA conditional cash transfer and both [Attanasio and Lechene \(2014\)](#) and [Bobonis \(2009\)](#) fail to reject efficiency of household consumption decisions.<sup>78</sup>

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<sup>7</sup>[Angelucci and Garlick \(2016\)](#) study within-sample variation in the efficiency of intra-household resource allocation among low-income Mexican households and observe that consumption patterns are Pareto efficient for households with relatively old heads but not in households with relatively young heads. The average age of the household head in the empirical analysis of this paper is over 45 years old in the first round of the panel data used, which heavily alleviates the concerns posed by [Angelucci and Garlick \(2016\)](#)'s findings. [De Rock, Pottoms, and Tommasi \(2022\)](#) show household decisions are compatible with the testable implications of the collective model at the beginning of the PROGRESA program but later reject them (using post-treatment data), but they provide suggestive evidence that is plausibly driven by the treatment affecting not only bargaining power parameters but also individual preferences.

<sup>8</sup>Research also exists that challenged the Pareto-efficiency assumption in other contexts ([Udry 1996](#); [Vreyer, Lambert, and Ravallion 2020](#)). But most rejections of the efficiency assumption come from production decisions, not consumption allocations ([Rangel and Thomas 2019](#)). [Lewbel and Pendakur \(2021\)](#) develop a collective household model allowing households to behave inefficiently and show this assumption has little effect on their estimation of intra-household bargaining power (through the estimation of resource shares) in Bangladesh.

By the second welfare theorem, any Pareto-efficient allocation can be supported as an equilibrium after transfers within household members. The solution to the maximization problem in (1) is equivalent to an economy in which each individual  $i$  maximizes her private utility  $U^i$  subject to a vector of shadow prices  $A'p$  and a shadow income of  $\eta_i y$ . Let  $\eta$  and  $(1 - \eta)$  be defined as the resource share of the woman and the man, respectively (Browning, Chiappori, and Lewbel 2013; Dunbar, Lewbel, and Pendakur 2013). The resource shares capture the fraction of household expenditure consumed by each household member and they must add up to 1.<sup>9</sup> Under standard utility assumptions, a one-to-one relationship exists between the Pareto weights and the resource shares.<sup>10</sup> Hence, the resource shares are a proxy for an individual's bargaining power in the intra-household allocation stage.

### 3.2 Household Expenditure Shares

The demand function for each good  $k$  derived from the maximization of equation (1) can be expressed as a household budget share  $W^k$ , a function of prices, total expenditure, and household characteristics. Let  $\omega_i^k$  be the hypothetical budget share we would observe if individual  $i$  would independently maximize her own utility with respect to the shadow price vector  $(A'p)$  and shadow income  $(\eta_i y)$ . I parametrize the individual budget shares  $\omega_i^k$  assuming price-independent generalized logarithm

<sup>9</sup>The allocation of shares of household resources among the different household members is also known as the sharing rule in the collective model literature (Chiappori 1992; Vermeulen 2002; Browning, Chiappori, and Lewbel 2013).

<sup>10</sup>Let  $\tilde{p}^k = A^k p^k$ . The first-order conditions of the household maximization problem in (1) imply

$$\frac{\mu}{(1-\mu)} = \left( \frac{\partial U_m / \partial x_m^k}{\partial U_w / \partial x_w^j} \right) \left( \frac{\tilde{p}^j}{\tilde{p}^k} \right), \quad \forall k, j = 1, \dots, K.$$

The first-order conditions from the woman's and the man's individual problems, the envelope theorem, and the previous equation imply

$$\begin{aligned} \frac{\lambda_m}{\lambda_w} &= \left( \frac{\partial U_m / \partial x_m^k}{\partial U_w / \partial x_w^j} \right) \left( \frac{\tilde{p}^j}{\tilde{p}^k} \right) \quad \forall k, j = 1, \dots, K \\ \frac{\mu}{(1-\mu)} &= \frac{\partial V^m(A'p, (1-\eta)y)}{\partial (1-\eta)y} \bigg/ \frac{\partial V^w(A'p, \eta y)}{\partial \eta y}, \end{aligned}$$

where  $\lambda_i$  is the Lagrangian multiplier from individual  $i$ 's maximization problem and  $V_i$  is the indirect utility function of individual  $i$ . The last equality shows a one-to-one relationship between the Pareto weights and the resource shares; see Browning, Chiappori, and Lewbel (2013) for the full proof.

(PIGLOG) preferences,<sup>11</sup> a widely used parametrization in the literature.<sup>12</sup> The Almost Ideal Demand System (AIDS, [Deaton and Muellbauer \(1980\)](#)) is derived from the PIGLOG model. The main advantage is that it allows estimation of the budget shares as a system of Engel curves linear in the log of expenditure:

$$\omega_w^k = \alpha_w^k + \beta_w^k \ln(\eta y) \quad \forall k = 1, \dots, K \quad (4a)$$

$$\omega_m^k = \alpha_m^k + \beta_m^k \ln((1 - \eta)y) \quad \forall k = 1, \dots, K. \quad (4b)$$

Given the linear consumption technology, the household budget shares  $W^k$  can be expressed as a weighted sum of the individual budget shares  $\omega_i^k$ , where the weights are the bargaining power of each individual represented by their resource share  $\eta_i$ :

$$W^k = \eta \omega_w^k + (1 - \eta) \omega_m^k \quad \forall k = 1, \dots, K. \quad (5)$$

Therefore, both the intercept and slope parameters in the standard household Engel-curve equations are a function of both the household members' individual preferences and of the distribution of bargaining power within the household:

$$W^k = \alpha^k + \beta^k \ln(y) \quad (6)$$

$$\alpha^k = \eta(\alpha_w^k + \beta_w^k \ln(\eta)) + (1 - \eta)(\alpha_m^k + \beta_m^k \ln(1 - \eta)) \quad (7)$$

$$\beta^k = \eta \beta_w^k + (1 - \eta) \beta_m^k \quad \forall k = 1, \dots, K. \quad (8)$$

Hence, *ceteris paribus*, for any shock that increases  $\eta$ , that is that improves women's intra-household bargaining power, we may expect a reallocation of house-

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<sup>11</sup>The indirect utility function of individual  $i$  can be expressed as  $V_i(p, y) = \ln\left(\ln\left(\frac{y}{G_i(p)}\right)\right) + F_i(p)$ . The Marshallian individual demands can be derived by applying Roy's identity:  $\alpha_i^k(p) = p^k \left(\frac{\partial F_i(p)}{\partial p^k} \ln(G_i(p)) + \frac{1}{G_i(p)} \frac{\partial G_i(p)}{\partial p^k}\right)$ ;  $\beta_i^k(p) = -p^k \frac{\partial F_i(p)}{\partial p^k}$ .

<sup>12</sup>See, among many others, [Attanasio and Lechene \(2010\)](#), [Dunbar, Lewbel, and Pendakur \(2013\)](#), [Attanasio and Lechene \(2014\)](#), [Sokullu and Valente \(2021\)](#), [Brown, Calvi, and Penglase \(2021\)](#), [Calvi \(2020\)](#), [Penglase \(2020\)](#), and [Hoehn-Velasco and Penglase \(2021\)](#).



hold expenditures toward those goods that women prefer more than men do, and vice versa (Chiappori 1992; Blundell, Chiappori, and Meghir 2005; Bourguignon, Browning, and Chiappori 2009; Bobonis 2009; Browning, Chiappori, and Lewbel 2013).

Finally, a type of goods exists for which the Engel curves are simpler, and these are private assignable goods. A good is private if it cannot be shared with other members of the household, that is, no economies of scale. It is assignable if we can identify which member of the household consumes it, for example, adult women. The household consumption of a private assignable good is equal to the private equivalent consumption of this good. For ease of exposition, assume here the wife and the husband are the only adults in the household. Let  $\Gamma_w$  and  $\Gamma_m$  be the vectors of the private assignable goods of adult women and men, respectively, with  $|\Gamma_w| + |\Gamma_m| \leq K$ . Then, the household's budget shares of these private assignable goods can be expressed as

$$W_w^k = \eta \omega_w^k = \eta [\alpha_w^k + \beta_w^k \ln(\eta y)] \quad \forall k \in \Gamma_w \quad (9a)$$

$$W_m^k = (1 - \eta) \omega_m^k = (1 - \eta) [\alpha_m^k + \beta_m^k \ln((1 - \eta)y)] \quad \forall k \in \Gamma_m. \quad (9b)$$

## 4 Effect of Violence on Household Allocations

In this section, I first describe the crime and household data used in the analysis. I then describe the empirical strategy to study the effects of violent crime on household expenditure allocations and summarize the results, including a discussion of robustness checks and analysis of potential mechanisms.

### 4.1 Data

#### 4.1.1 Homicide Data

The local crime data come from the National Institute of Statistics and Geography (INEGI). I measure exposure to local crime with the homicide rate per 100,000 people at the municipality level. The use of the homicide rate can be considered

as a proxy for the general escalation in insecurity and crime victimization that occurred in Mexico during the relevant time period. Homicides do not capture the whole crime environment civilians are exposed to, but they are much less subject to misreporting bias than other crime data. The trend in homicides also matches the available data on other crime activities, such as extortions and kidnappings (Heinle, Molzahn, and Shirk 2015). In the main empirical analysis, I apply the quartic root transformation to the homicide rate. The quartic-root serves as a proxy for a logarithmic transformation for positive numbers, avoiding either dropping zeroes or adding an arbitrary small amount. It is a common transformation for variables with outliers that could disproportionately influence the estimates, such as crime rates, saving rates, or earnings (Ashraf et al. 2015; Velasquez 2019). It has been used in most papers measuring the impacts of the Mexican drug war, using the MxFLS data described in section 4.1.2. In section 4.4.2, I also show the main results are robust to the logarithmic and inverse hyperbolic sine transformations.

#### **4.1.2 Household Data: Mexican Family Life Survey**

The Mexican Family Life Survey (MxFLS) is a longitudinal survey containing a wide range of information at the community and household level, including a very detailed consumption module. The baseline survey (MxFLS-1) was conducted in 2002 and collected data on 8,442 households and over 35,600 individuals. The second wave was collected in 2005–2006 (MxFLS-2), right before the sharp increase in homicides in Mexico. The third wave was conducted in 2009–2012 (MxFLS-3). The timing of the MxFLS surveys allows the comparison of the same households before and after the escalation in violence across Mexico and has been previously used to estimate causal impacts of the Mexican drug war (Brown and Velasquez 2017; Velasquez 2019; Brown 2018; Brown et al. 2018; Tsaneva, Rockmore, and Albohmood 2018). The survey is representative at the national level of the Mexican population, and for urban and rural areas within regions at baseline. It is also geographically representative of the increase in homicides over the period. Velasquez (2019) documents the lack of statistically significant differences in the change in violence across MxFLS and non-MxFLS municipalities. Table B1 also shows the MxFLS munici-

palties included in this paper’s analytical sample are not statistically different in terms of the rise in the homicide rate from those not included.<sup>13</sup>

### 4.1.3 Sample structure

The main analytical sample includes every household consisting of at least one head, his/her spouse, and one son or daughter who were interviewed both in the 2005–2006 and 2009–2012 MxFLS waves. Hence, the sample includes married couples that were already formed by the time MxFLS-2 was collected in 2005–2006. I further restrict the sample by dropping households with missing age or relationship to the head for any household member, households with missing education information for the household head or the spouse, same-sex couples, households in which the head or the spouse is less than 14 years old, households with missing consumption or assets module, households who reported zero expenditure on food, and households with missing timing or location of the interview. I apply these restrictions to both survey waves. Given the interest in intra-household decision-making, I also present the analysis restricting the sample to nuclear households with sons or daughters in the household; these households contain only the wife, husband, and sons or daughters (e.g., no grandparents or siblings) and represent 73% of the sample. In addition, given potential concerns of sample selection of changes in household composition, I also present the results including all married households formed prior to the 2005-2006 MxFLS wave (regardless of whether they have children in the household).

### 4.1.4 Descriptive statistics

Table 1 presents descriptive statistics of the analytical sample measured at the MxFLS-2 2005–2006 wave. The first column shows the mean and standard deviation of several household characteristics. Overall, 42% of the households live in rural localities, 43% of the wives and 45% of the husbands have achieved secondary

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<sup>13</sup>The dependent variable in Table B1 is the change in the homicide rate between 2005 and 2010. The coefficient of interest is an indicator variable if the municipality is included in this paper’s sample. The point estimate is very small (-0.19 homicides per 100,000 people) and not statistically different from zero at any conventional significance level.

education or higher, and the average household size is five members. Appendix Table B3 reports similar descriptive statistics when restricting the sample to nuclear households with children. The nuclear subsample is a bit more educated and younger (on average, women and men are 39 and 42 years old, respectively, vs. 40 and 44).

Table 1: Descriptive Statistics: Household Characteristics in 2005-2006

	Mean and standard deviation (1)	Violence variables		
		$\sqrt[4]{H_{m2005}}$ (2)	$\Delta H_m$ (3)	$\Delta \sqrt[4]{H_m}$ (4)
Wife's age	40.54 [11.88]	-0.79** (0.37)	-0.02 (0.01)	0.21 (0.33)
Husband's age	43.96 [12.81]	-1.03** (0.42)	-0.01 (0.02)	0.53 (0.43)
Age gap	3.41 [5.34]	-0.24 (0.15)	0.01 (0.01)	0.33 (0.21)
Wife's secondary	0.43 [0.49]	0.07*** (0.02)	0.00 (0.00)	-0.01 (0.02)
Husband's secondary	0.45 [0.50]	0.06*** (0.02)	0.00 (0.00)	-0.02 (0.02)
Number of children	2.61 [1.40]	-0.07 (0.06)	-0.00 (0.00)	-0.02 (0.06)
Average age children	13.88 [9.08]	-0.49* (0.30)	-0.00 (0.01)	0.19 (0.24)
Share of daughters	0.50 [0.35]	0.01 (0.01)	-0.00 (0.00)	-0.00 (0.01)
Rural locality	0.42 [0.49]	-0.15*** (0.05)	0.00 (0.00)	0.09* (0.05)
Household size	5.04 [1.80]	-0.08 (0.07)	-0.00 (0.00)	-0.03 (0.06)
Observations	3,715	3,715	3,715	3,715
Joint equality test (p-value)		0.04	0.22	0.55

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Column (1) presents sample means and standard deviations, in brackets, of the analytical sample in MxFLS-2. Columns (2)-(4) are calculated with OLS and clustering standard errors (in parentheses) at the municipality level. Column (2) reports the OLS coefficient of a regression of the household characteristic on the homicide rate in 2005-2006 MxFLS-2. Column (3) reports an OLS coefficient of a regression of the household characteristic on the increase in the homicide rate between MxFLS-2 and MxFLS-3. Column (4) also reports an OLS coefficient, but of the increase in the quartic root of the homicide rate.

Table 1 also presents statistical differences in household characteristics by different measures of violence in households' municipalities of residence in 2005–2006. Each of the rows in columns (2) to (4) report the OLS coefficient and standard error,

Table 2: Descriptive Statistics: Household Expenditures in 2005-2006

	Mean and standard deviation (1)	Violence variables		
		$\sqrt[4]{H_{m2005}}$ (2)	$\Delta H_m$ (3)	$\Delta \sqrt[4]{H_m}$ (4)
Total expenditure	73,742.71 [464,095.71]	6,000.47 (3,693.89)	-129.63 (203.96)	-6,129.15 (7,168.14)
Ln(total expenditure)	10.79 [0.78]	0.09* (0.05)	0.00* (0.00)	0.02 (0.05)
Food	55.84 [18.73]	-1.56 (0.98)	0.04 (0.03)	1.45 (0.92)
Drinks and Tob.	3.33 [3.97]	-0.09 (0.19)	0.01** (0.01)	0.27 (0.18)
Male adult clothing	1.47 [2.63]	0.08 (0.08)	-0.00** (0.00)	-0.10 (0.07)
Female adult clothing	1.50 [2.62]	-0.02 (0.08)	-0.00 (0.00)	-0.02 (0.07)
Children goods	2.15 [3.56]	-0.07 (0.10)	0.00 (0.00)	0.07 (0.11)
Hygiene and care	6.02 [5.51]	-0.15 (0.18)	0.00 (0.01)	0.07 (0.13)
Other household goods	12.80 [9.68]	0.53 (0.38)	-0.01 (0.01)	-0.40 (0.34)
Transportation	10.17 [12.42]	0.83* (0.44)	-0.01 (0.02)	-0.73 (0.53)
Health	1.63 [5.14]	-0.00 (0.15)	-0.01 (0.00)	-0.07 (0.15)
Education	2.42 [4.25]	0.16 (0.12)	-0.01*** (0.00)	-0.32*** (0.09)
Recreation	2.62 [6.40]	0.28 (0.18)	-0.01 (0.01)	-0.20 (0.19)
Gambling	0.05 [0.45]	0.02* (0.01)	-0.00** (0.00)	-0.02** (0.01)
Observations	3,715	3,715	3,715	3,715
Joint equality test (p-value)		0.38	0.03	0.00

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Column (1) presents sample means and standard deviations, in brackets, of the analytical sample in MxFLS-2. Columns (2) - (4) are calculated with OLS and clustering standard errors (in parentheses) at the municipality level. Column (2) reports the OLS coefficient of the expenditure share on the homicide rate in 2005-2006 MxFLS-2. Column (3) reports an OLS coefficient of a regression of the expenditure share on the increase in the homicide rate between MxFLS-2 and MxFLS-3. Column (4) also reports an OLS coefficient, but of the increase in the quartic root of the homicide rate.

in parentheses, of a regression of the household characteristic on the measure of the municipality's violence, clustering standard errors at the municipality level. In general, households self-select into their place of residence, and the homicide rate in their municipality of residence cannot be treated as randomly assigned. Column (2) documents that households who lived in municipalities with a greater homicide rate in 2005–2006 were more likely to live in urban localities and to be more educated. This observation is consistent with the higher prevalence of homicides in Mexican urban areas ([Dell, Feigenberg, and Teshima 2019](#)).

The sharp and heterogeneous increase in violence, however, was largely unanticipated, as previously discussed. Columns (3) and (4) show the increase in the level and quartic root of the annual homicide rate has no predictive power on household characteristics in 2005–2006. We also fail to reject the null hypotheses of joint tests consisting of linear regressions of the increase in the level and quartic root of the homicide rate on all household characteristics jointly.

#### **4.1.5 Total expenditure and expenditure shares**

The total expenditure data and the corresponding budget shares are estimated using self-reported monetary-value information about household purchases and the home production of non-durable goods; see Table [B2](#) for a detailed description of each of the goods included in the analysis. I first transform all the expenditures on individual items into a comparable annual period. Then, total expenditure on non-durables is calculated by aggregating the annualized recalled household expenditure on food, drinks and tobacco,<sup>14</sup> hygiene and other personal goods, adult male clothing, adult female clothing, other household public goods (e.g., detergent, utilities), health care and health services, transportation, communication, recreation, education (including tuition fees), and gambling. The methodology used to estimate total expenditure is similar to the one used by, among others, [Bobonis \(2009\)](#), [Attanasio and Lechene \(2010\)](#), and [Attanasio and Lechene \(2014\)](#) in their estimation of Engel curves for Mexican households.

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<sup>14</sup>This category includes alcoholic beverages as well as juices, purified water, and powder for preparing water.

Tables 2 reports descriptive statistics of households' expenditure patterns in 2005–2006. The average annual total expenditure is approximately 70,000 MXN (\$10,000 2005 in US PPP<sup>15</sup>). The largest expenditure share is food, accounting for about 56% of total household expenditures in the sample (see Appendix Table B4 for nuclear households). In columns (3) and (4), we see the 2005-2006 expenditure shares on education and gambling have some predictive power on the posterior change in homicide rates. Although these regressions do not control for any household characteristic, they highlight the importance of using a longitudinal survey that provides the ability to control for initial household characteristics.

## 4.2 Empirical Strategy

The sharp and heterogeneous increase in homicides in Mexico was largely unanticipated, as previously discussed. The identification strategy relies on comparing the same households over time with the inclusion of household fixed effects, which allows to control for any time-invariant household characteristics potentially correlated with the trends of violence and of the households' budget shares. The longitudinal nature of the MxFLS data and the restriction to previously married households also enable isolation of the effects that the rise in violence may have had on selection into marriage. But two other sources of sample selection may still raise concerns: non-random attrition and selective migration.

### 4.2.1 Non-random attrition

The MxFLS survey was quite successful in terms of attrition: 89% of the original respondents from the 2002 baseline were interviewed again in both MxFLS-2 and MxFLS-3. The high retention rate, however, does not fully alleviate the concerns of attrition bias if the probability of individuals being reinterviewed in the MxFLS-3 wave is correlated with the exposure to the violence. Appendix B.2 shows the increase in homicide rates at the municipality level does not predict the probability of attrition at the household level, and this null effect does not seem to mask heterogeneity based on household characteristics (Table B5). To alleviate further

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<sup>15</sup>Source: Purchasing Power Parity 2005, World Health Organization.

concerns, I delve into the potential sources of attrition. I find no evidence of the increase in crime affecting the probability of households not responding to the consumption module from which the expenditure data are derived (Table B6). Finally, as appointed by [Berniell, de la Mata, and Machado \(2020\)](#), testing for the assumption of marriage stability is important, especially given this paper’s interest in bargaining power (section 5). Table B7 shows the increase in crime has no effect on the overall probability of being divorced or widowed in MxFLS-3, with the exception of a higher probability of female widows, consistent with the drastic male victimization brought about by the Mexican drug war (see discussion in section 2).

#### 4.2.2 Selective migration

Previous research has found effects of the Mexican drug war on migration behavior ([Basu and Pearlman 2017](#); [Orozco-Aleman and Gonzalez-Lozano 2018](#)). Appendix B.3 shows that although the average effect of violence intensity on the probability of migration is not statistically significantly different from zero, some heterogeneity exists. Households with a highly educated husband, as well as nuclear rural households, were more likely to migrate between survey waves in the face of greater violence. To deal with the potential selective migration threat, I follow the relevant literature and implement an “intention-to-treat” (ITT) approach ([Brown and Velasquez 2017](#); [Brown et al. 2018](#); [Velasquez 2019](#)), which consists of assigning the 2005–2006 households’ municipality of residence to both survey waves MxFLS-2 and MxFLS-3. This methodology might induce some attenuation bias, but it lessens concerns about the results being biased due to migration responses.

### 4.3 Effect of Violence on Total Expenditures

Prior to the estimation of demand equations, I study whether increases in local crime led to changes in total household expenditure, estimating the following specification:

$$\ln(y_{ijt}) = \alpha + \gamma H_{jt} + \Theta D_{ijt} + \lambda_t + \delta_i + \epsilon_{ijt}, \quad (10)$$

where  $\ln(y_{ijt})$  is the logarithm of total household expenditure on non-durable



goods by household  $i$  living in municipality  $j$  and survey  $t$ .  $H_{jt}$  is the measure of violence in municipality  $j$ , defined as the quartic root of the homicide rate per 100,000 people over the last 12 months prior to the interview of household  $i$  in survey  $t$ .  $D_{ijt}$  includes wife's and husband's age and age squared, and the number of household members by gender and age group;  $\delta_i$  are household fixed effects that, given the ITT approach, will control for both time-invariant household and municipality characteristics;  $\lambda_t$  are year- and month-of-interview fixed effects; and  $\epsilon_{ijt}$  are conditionally mean-zero errors clustered by municipality.

Table 3: Effect of Homicide Rates on Total Household Expenditure

	Households:					
	With children (1)	(2)	Nuclear with children (3)	(4)	All (5)	(6)
$\sqrt[4]{}$ Homicide rate last 12 months	0.028 (0.026)	-0.008 (0.027)	0.019 (0.024)	-0.001 (0.028)	0.031 (0.025)	-0.009 (0.025)
Household controls	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓
Household FE		✓		✓		✓
Y mean	10.92	10.92	10.93	10.93	10.87	10.87
Observations	7,430	7,430	5,834	5,834	8,834	8,834
adj. $R^2$	0.25	0.14	0.27	0.15	0.27	0.13

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. The outcome variable is the logarithm of total household expenditure on non-durable goods. Household controls include wife's and husband's age, wife's and husband's age squared, wife's and husband's secondary school dummy, number of household members by gender and age group, and rural locality dummy.

Increases in violent crime did not have a significant effect on total household expenditure (Table 3). I also find no evidence of heterogeneous effects of homicides on total expenditure by household characteristics (Appendix Figure B1). The null results are also robust to controlling for time-varying economic municipality characteristics (Table B9).

#### 4.4 Effect of Violence on Expenditure Shares

This section tests whether the increase in local violence in Mexico had any effects on household decision-making with respect to expenditure allocations, despite having no effect on total household expenditure. I estimate a system of households'

Engel curves parametrizing and adding an error term to each equation of (6):

$$W_{ijt}^k = \alpha^k + \beta^k \ln(y_{ijt}) + \gamma^k H_{jt} + \Theta^k D_{ijt} + \lambda_t^k + \delta_i^k + \epsilon_{ijt}^k, \quad (11)$$

where  $W_{ijt}^k$  is the budget share spent on good  $k$  by household  $i$  living in municipality  $j$  in survey  $t$ . The coefficients of interest are  $\gamma^k$ , and  $H_{jt}$  remains defined as the quartic root of the homicide rate per 100,000 people over the last 12 months prior to the interview.  $\delta_i^k$  are household fixed effects and  $\lambda_t^k$  are survey fixed effects. I estimate the set of Engel curves specified in (11) simultaneously as a system allowing for correlation of the error terms, clustering at the municipality level. The set of time-varying regressors  $D_{ijt}$  in each equation are selected through double-lasso (see further description below).

The coefficients of interest are  $\gamma^k$ , the effects of violent crime on budget shares. However, if we are interested in an unbiased estimation of  $\beta^k$  to classify goods based on their expenditure elasticity, we need to address the potential endogeneity of total expenditure.<sup>16</sup> I use household wealth as an instrumental variable for total household expenditure within a period. This strategy is standard when estimating demand equations (Dunbar, Lewbel, and Pendakur 2013; Armand et al. 2020). The theoretical foundation relies on households' inter-temporal problem of allocating resources over time and across states of nature. Wealth will be uncorrelated with unobserved consumption heterogeneity within the same period if consumption decisions within a period are separable from saving decisions across time.<sup>17</sup> In the estimation, I implement the instrumental-variable strategy, using a control-function approach bootstrapping the standard errors and clustering at the municipality level (Blundell and Robin 1999; Attanasio and Lechene 2010, 2014; Armand et al. 2020).

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<sup>16</sup>Households are assumed to engage in two-step budgeting. They first decide how much to allocate in each period  $t$  and then how the total expenditure is allocated within the current period (Chiappori and Mazzocco 2017). This assumption raises endogeneity concerns if we worry about households' time preferences being potentially correlated with unobserved preference heterogeneity. Additionally, recall bias and other types of non-random measurement error are a common concern when dealing with self-reported expenditure data.

<sup>17</sup>The wealth instrument is constructed by taking the natural logarithm of the monetary value of the assets owned by the household: land, bicycles, automobiles and other vehicles, household appliances, financial assets, and livestock and other agricultural assets. Appendix B.5 provides more detailed discussion.

The first-stage regressions are reported in Tables B10 and B11. The instrument has the expected positive effect on total expenditure and is highly predictive (F statistic of 49 in main sample and 29 in the nuclear subsample).<sup>18</sup> Given the selection of time-varying controls by double-lasso, the actual set of household controls in each first stage will vary by good category.

The list of time-varying controls is selected implementing the post-double-cluster-lasso methodology proposed by Belloni et al. (2016), which allows to control for household fixed effects and a clustered covariance structure. In addition, the double-lasso methodology permits relaxation of the assumption of a linear functional form and allows variable selection from a high dimensional list of controls. I also augment the equations in (11) expanding the list of lasso-selected controls including the original set  $D_{jt}$ , their square, and interactions among all these variables.<sup>19</sup> The main goal of the double-selection methodology is to deal with potential omitted-variable bias.<sup>20</sup>

Finally, I account for price variation estimating the demand equations including state-time fixed effects (see Attanasio and Lechene (2014) or Armand et al. (2020)

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<sup>18</sup>The first stage is also strong when we include the square of the wealth instrument, which I use when testing the validity of the linear specification in section 4.4.2.

<sup>19</sup> $D_{ijt}$  includes wife's and husband's age and age squared, the number of household members by gender and age group, and month- and year-of-interview fixed effects. I remove one control from any pair of covariates that had a bivariate correlation exceeding 0.99 in absolute value. High-dimensional variable-selection methods work best when the set of variables to be selected is not very large (Belloni, Chernozhukov, and Hansen 2014). Note the variables post selected by lasso can vary across the different demand regressions.

<sup>20</sup>The following steps summarize the methodology: (i) select control variables that predict  $H_{jt}$  by cluster-lasso; (ii) select control variables that predict the budget shares  $W_{ijt}^k$  by cluster-lasso, excluding the regressor of interest  $H_{jt}$ ; and (iii) estimate the coefficient of interest  $\gamma^k$  controlling for any variables selected in either of the first two steps, clustering errors at the municipality level. I include total household expenditure in each of the three steps, as well as household and time fixed effects. The cluster-lasso coefficients from step 1 and step 2 are the solution to a penalized minimization problem with the standard lasso  $\lambda$  penalty parameter, and covariate specific penalty loadings to allow for data with potential dependence within municipalities. The last step is a simple linear regression of the lasso-selected variables (post-lasso), because the lasso coefficients will be generally substantially biased toward zero. The first step helps implement robustly the conditional exogeneity assumption, finding variables that are highly correlated with the homicide rate and could be confounding factors. The second step aims to keep the residual variance small by providing a good prediction of the budget shares, and it is an additional opportunity to find confounders (Belloni, Chernozhukov, and Hansen 2013).

for similar methodologies) to the list of controls in  $D_{ijt}$ . This approach requires that prices are constant within a state, though they can vary across time, and I also include a rural locality linear trend to account for urban versus rural differences over time. I also provide evidence suggesting the increase in homicides did not have a meaningful impact on local prices, at least within the MxFLS municipalities. I use market prices collected at the community level by the MxFLS, although, unfortunately, not all goods have price information. I aggregate prices estimating the median price across markets and communities within the municipality. Appendix B.6 presents the results of difference-in-differences estimations of the price indices by good category. The point estimates are insignificant across the board both from a statistical and an economical evaluation for all the goods considered: food, food categories, household goods, and men's, women's, and children's clothing.

#### 4.4.1 Results

Tables 4 and 5 present the results of the household Engel curves specified in (11). Table 4 presents the estimates on the log of total expenditure ( $\beta^k$ ) and Table 5 reports the coefficients of interest  $\gamma^k$ , the effect of an increase in homicide rates on expenditure shares. All regressions implement the instrumental-variable strategy and include lasso-selected household time-varying controls, as well as household and survey fixed effects. In each of the sample specifications presented, the second column selects controls implementing the double-lasso methodology with high-dimensional controls, and the third column also includes state- and rural-time linear trends to control for unobserved prices.

**Expenditure elasticities** The coefficients on total expenditure show food is a necessity, consistent with Engel's law. An increase of 10% in total expenditure is associated with a 1.7-percentage-points decrease in the food budget share. Hygiene and care goods are also necessities; that is, they have expenditure elasticity less than 1. The estimates also suggest the remaining household goods and services are luxury goods; that is, the expenditure share increases with total spending. Table

Table 4: Engel Curves: Coefficients on Log Expenditure

	Households with children			Nuclear with children			All households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Food	-17.37*** (3.78)	-17.49*** (3.78)	-17.49*** (3.79)	-19.62*** (5.56)	-19.62*** (5.56)	-19.62*** (5.56)	-15.30*** (3.25)	-15.30*** (3.25)	-15.30*** (3.25)
Drinks and Tob.	-0.13 (0.86)	-0.13 (0.86)	-0.13 (0.87)	0.59 (1.14)	0.59 (1.14)	0.59 (1.14)	-0.16 (0.84)	-0.16 (0.84)	-0.16 (0.84)
Male adult clothing	1.31*** (0.44)	1.31*** (0.44)	1.31*** (0.44)	0.98* (0.57)	1.08* (0.58)	1.08* (0.58)	1.86*** (0.58)	1.88*** (0.57)	1.88*** (0.57)
Female adult clothing	1.21* (0.67)	1.21* (0.67)	1.18* (0.69)	0.82 (0.97)	0.82 (0.97)	0.82 (0.97)	1.33* (0.72)	1.33* (0.72)	1.33* (0.72)
Children goods	1.00 (0.76)	1.02 (0.77)	1.02 (0.77)	1.42 (1.15)	1.42 (1.14)	1.42 (1.14)	1.02 (0.66)	1.02 (0.67)	1.03 (0.67)
Hygiene and care	-1.17 (1.14)	-1.17 (1.13)	-1.17 (1.14)	-0.71 (1.52)	-0.71 (1.52)	-0.71 (1.52)	-1.70 (1.17)	-1.70 (1.17)	-1.70 (1.17)
Other household goods	3.49 (2.21)	3.49 (2.21)	3.49 (2.21)	4.75 (2.95)	4.75 (2.95)	4.75 (2.95)	1.37 (2.05)	1.36 (2.05)	1.36 (2.05)
Transportation	7.28*** (2.18)	7.33*** (2.15)	7.33*** (2.17)	6.48** (3.14)	6.60** (3.08)	6.60** (3.08)	6.77*** (1.91)	6.77*** (1.91)	6.77*** (1.91)
Health	1.14 (0.80)	1.14 (0.80)	1.14 (0.82)	2.07* (1.08)	2.07* (1.08)	2.07* (1.08)	1.25 (0.85)	1.25 (0.85)	1.25 (0.85)
Education	0.69 (0.67)	0.66 (0.68)	0.66 (0.68)	0.68 (1.07)	0.47 (1.07)	0.47 (1.07)	0.55 (0.59)	0.48 (0.59)	0.56 (0.60)
Recreation	2.27* (1.23)	2.24* (1.21)	2.24* (1.22)	1.97 (1.77)	1.97 (1.77)	1.97 (1.77)	2.67** (1.13)	2.67** (1.13)	2.67** (1.13)
Gambling	0.24 (0.17)	0.24 (0.17)	0.24 (0.17)	0.32 (0.27)	0.32 (0.27)	0.32 (0.27)	0.24* (0.14)	0.24* (0.14)	0.24* (0.14)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,430	7,430	7,430	5,834	5,834	5,834	8,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Table 4 reports coefficient  $\beta^k$  on  $\ln(y)$  of each demand equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table 5: Effect of Homicide Rates on Expenditure Shares

	Households with children			Nuclear with children			All households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Food	-1.08* (0.56)	-1.10* (0.56)	-1.10* (0.56)	-1.30** (0.63)	-1.30** (0.63)	-1.30** (0.63)	-0.97* (0.51)	-0.98* (0.51)	-0.98* (0.51)
Drinks and Tob.	0.02 (0.13)	0.02 (0.13)	0.02 (0.13)	-0.01 (0.13)	-0.01 (0.13)	-0.01 (0.13)	0.05 (0.13)	0.05 (0.13)	0.05 (0.13)
Male adult clothing	0.25*** (0.08)	0.25*** (0.08)	0.25*** (0.08)	0.28*** (0.09)	0.28*** (0.09)	0.28*** (0.09)	0.23*** (0.07)	0.23*** (0.07)	0.23*** (0.07)
Female adult clothing	0.04 (0.07)	0.04 (0.07)	0.04 (0.08)	0.06 (0.09)	0.06 (0.09)	0.06 (0.09)	0.06 (0.07)	0.06 (0.07)	0.06 (0.07)
Children goods	-0.14 (0.15)	-0.15 (0.15)	-0.15 (0.15)	-0.12 (0.18)	-0.11 (0.19)	-0.11 (0.19)	-0.08 (0.14)	-0.07 (0.14)	-0.05 (0.13)
Hygiene and care	-0.38* (0.20)	-0.38* (0.20)	-0.38* (0.20)	-0.37* (0.20)	-0.37* (0.20)	-0.37* (0.20)	-0.46** (0.18)	-0.46** (0.18)	-0.46** (0.18)
Other household goods	0.23 (0.30)	0.23 (0.30)	0.23 (0.30)	0.53* (0.32)	0.53* (0.32)	0.53* (0.32)	0.23 (0.28)	0.25 (0.27)	0.25 (0.27)
Transportation	0.58* (0.34)	0.58* (0.34)	0.58* (0.34)	0.30 (0.37)	0.29 (0.37)	0.29 (0.37)	0.42 (0.29)	0.42 (0.29)	0.42 (0.29)
Health	0.15 (0.18)	0.15 (0.18)	0.15 (0.18)	0.24 (0.21)	0.24 (0.21)	0.24 (0.21)	0.24 (0.16)	0.24 (0.16)	0.24 (0.16)
Education	0.08 (0.12)	0.08 (0.12)	0.08 (0.12)	0.08 (0.13)	0.07 (0.14)	0.07 (0.14)	0.08 (0.09)	0.08 (0.09)	0.08 (0.10)
Recreation	0.16 (0.20)	0.18 (0.20)	0.18 (0.19)	0.20 (0.23)	0.20 (0.23)	0.20 (0.23)	0.08 (0.18)	0.09 (0.18)	0.09 (0.18)
Gambling	0.06 (0.04)	0.06 (0.04)	0.06* (0.04)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.06* (0.03)	0.06* (0.03)	0.06* (0.03)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,430	7,430	7,430	5,834	5,834	5,834	8,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Table 5 reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

B14 presents the elasticities of each good category at the mean sample values.<sup>21</sup>

**Effect of violent crime on food and other necessities** The results present evidence that an increase in the local homicide rate decreased the expenditure shares of food and hygiene and personal care goods (Table 5). Both of these goods are necessities according to their estimated elasticities (Table 4). A household living in a non-violent municipality in 2005–2006, who then experienced the average increase in homicides (15 in 100,000), decreased the share of total expenditure allocated to food by about two percentage points less of food, and to hygiene and other household necessities by 0.8 percentage points ( $\hat{\gamma}^k * \sqrt[4]{15}$ ). Relative to the baseline average expenditure shares (Table 2), the increase in crime led to a decrease of 4% in food and 12% in hygiene and other household necessities. The effects on food are more negative and more precisely estimated when we drop households in the top and bottom expenditure percentiles, a standard restriction in the estimation of Engel curves (Table B22). Appendix Table B16 splits the food expenditure share by food categories (fruits and vegetables, cereals and grains, meats and dairy, and other food) and shows the point estimates are negative across the board although imprecisely estimated. The break-up results of the hygiene and care goods are further discussed below when discussing the effects on male and female goods, but the overall effect is mostly driven by a decrease in the expenditure of gender-neutral household necessities (Table B17).

**Effect of violent crime on male and female goods** The results indicate an increase in the local homicide rate led to an increase in the budget share spent on adult male clothing (Table 5). A household living in a municipality that experienced the average increase in the annual homicide rate consumed about 0.5 percentage points more of adult male clothing, about 34% increase of a 2005–2006 average. By contrast, the effect of homicides on adult female clothing is small in terms of

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<sup>21</sup>Expenditure elasticities are calculated in the standard form for Working-Leser Engel curves (Armand et al. 2020; Vreyer, Lambert, and Ravallion 2020). The elasticities are equal to  $\frac{\partial \ln(W^k y)}{\partial \ln(y)} = \frac{\partial \ln(W^k y)}{\partial y} y = 1 + \frac{\beta^k}{W^k}$ , with  $W^k$  equal to the average budget share for good  $k$  across the two survey waves.

point estimates and not statistically significant across specifications. Neither the male nor female adult clothing expenditure share can be further broken down by category given the format of the MxFLS consumption module.

The hygiene and personal care goods budget share can be split further in household goods, women care goods, and men care goods. Table B17 replicates the results splitting the budget share in the three categories. Reading point estimates, the effect on household personal care goods is the largest, although the point estimates on female and male care goods are also negative. I also re-estimate the Engel-curves analysis merging the clothing and care goods categories creating new “male goods” and “female goods” categories. The combined effect of crime on male goods is still large and positive, whereas the effect on female goods remains null (Table B18).

Finally, the results also provide some evidence that the increase in homicide rates led to a greater expenditure share on gambling, which has been reported to be more common among Mexican men than women (Velazquez et al. 2018). But we cannot conclude firmly that this result only reflects men’s greater consumption of gambling services.

**Effect of violent crime on other luxury goods and services** The results also provide some evidence that the increase in homicide rates led to greater expenditure share on transportation. This finding may reflect the need to invest in safer routes or modes of transportation, due to an increased risk of victimization. However, the MxFLS data do not allow to disentangle to what extent these results reflect households’ adapting behaviors, or if it is driven by modes of transportation raising prices in response to the increase in insecurity. The rest of the coefficients of interest are largely statistically insignificant. Note the relatively large negative coefficient on the children’s goods category: although it is imprecisely estimated, its randomization-based p-value is 0.14 (see sections 4.4.2 and B.7.1 for further discussion).



#### 4.4.2 Threats to identification and other robustness checks

**Unobserved municipality trends and other economic confounders.** The main threat to identification would be that the heterogeneous geographic and sharp temporal variation in homicides reported in Mexico was actually anticipated or was correlated with other underlying trends related to households' consumption patterns. To assess the plausibility of this source of bias, I conduct a placebo test estimating the system of demand equations using data from the 2002 MxFLS-1 and the 2005–2006 MxFLS-2, but assigning to each survey wave the homicide rate of the subsequent wave. In the within-household framework, this test captures whether prior trends of households' budget shares are correlated with posterior changes in homicides at the municipality level. The future homicide rate changes should not predict changes in consumption patterns between 2002 and 2005. Indeed, the results show the effect of violence on the budget shares is never simultaneously statistically significant and of the same sign as in the main results (Tables B19, B20).

These results alleviate concerns with respect to non-random linear unobserved municipal trends. A word of caution remains with respect to sources of bias coming from non-linear omitted trends. However, these unobserved endogenous variables would need to be on a similar temporal path as the increase in homicides rates and to mirror the geographic heterogeneity of the change in violence in Mexico after 2006. Still, one might worry that several local economic conditions could be confounding the results, especially given the occurrence of the Great Recession between the two survey waves, although previous research has failed to provide evidence in support of a significant relationship between the heterogeneity in the exposure to violence and to the economic effects of the Recession (Velasquez 2019). I augment equation (11) with economic controls to alleviate concerns about municipality-level confounders. The results are robust to adding lasso-selected economic municipality controls allowing for a flexible functional form including higher polynomial orders and interactions among household and municipality controls (Table B21).<sup>22</sup>

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<sup>22</sup>The municipality-level controls are the following: share of manufacturing, commerce, and services employment, share of rural population, Gini index, food poverty index, assets poverty index,

**Randomization-based inference.** To analyze the likelihood that the main results could have occurred by chance, I generate randomness in the exposure to increased local violence and calculate randomization-based p-values ([Athey and Imbens 2016](#); [Young 2019](#)). The estimated p-values indicate the sharp null hypothesis—that the increase in homicides had no effect on households’ expenditure shares among these good categories—should be rejected, further confirming the main results; see appendix [B.7.1](#) for a more detailed discussion.

**Multiple hypothesis testing.** Given the joint estimation of a set of demand equations, the probability of type-I error—the probability of one or more false rejections—is greater than the size of the test we choose when deciding whether to reject the null hypothesis of statistical significance in each regression. Appendix Table [B15](#) shows the results are robust to re-estimating the model, controlling for the family-wise error rate.<sup>23</sup>

**Alternative sample restrictions and specifications.** A standard sample restriction aimed at shielding the estimates from the influence of expenditure outliers is to drop the top and bottom percentiles of total annualized expenditures. Appendix Table [B22](#) presents the Engel-curve results, excluding households in the top and bottom 1%. The results are robust, and if anything, the negative effect of homicides on the food budget share is exacerbated and more precisely estimated.

On the right-hand side, the main coefficient of interest is the quartic root of the homicide rate, but, as we can see in Appendix Table [B23](#), the results are robust to instead implementing other standard monotonic transformations such as the

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and capacities poverty index. Sources: Population Census, Federal Electricity Commission, ENIGH, Technical Committee on Poverty Measurement. The three poverty measures are monetary poverty measures. Capacities poverty is defined as the lack of sufficient household resources to maintain expenditures on a minimum diet, education, and health care. Assets poverty expands the notion of capabilities poverty to include households that cannot afford clothing, housing, energy, and transportation expenditures. I am grateful to [Enamorado et al. \(2016\)](#) for making the inequality and poverty data and descriptions publicly available.

<sup>23</sup>Specifically, I implement the procedure for multiple hypothesis testing based on [List, Shaikh, and Xu \(2019\)](#) within a multivariate regression setting. I use the *mhtreg* Stata package developed by [Steinmayr \(2020\)](#). The procedure allows for p-values to be correlated across specifications and to cluster at the municipality level using a bootstrapping approach.

logarithmic and inverse hyperbolic sine functions. With respect to the curvature of the Engel curves, the Engel equations in (11) assume a linear relationship between total expenditure and expenditure shares. Note the null effect of the increase in homicides on total expenditure (Table 3) alleviates concerns about misspecification bias of the estimate of crime on the budget shares. Still, Appendix Table B24 shows the results are robust to introducing a quadratic term for total expenditure (QUAIDS).<sup>24</sup>

#### 4.4.3 Ruling out mechanisms

In this section, I explore and rule out a series of mechanisms that could explain the relationship found between the increase in crime and changes in household expenditures. They are household or individual characteristics that we could expect, either from a theoretical perspective or prior empirical evidence, to have a relationship with expenditure allocations and that may also be affected by changes in local crime.

**Household composition** The main results already include controls for the number of people living in the household by gender and age group (0-6, 7-11, 12-18, 19-55,+55). If the change in local violence has an impact on household composition, the main results would capture the average effect of the increase in homicides on consumption net of the effect on the number and type of household members. In addition, Appendix Table B25 shows the measure of local violence does not predict changes in the number and type of household members, except for a very small negative effect on the number of young boys ages 7 to 11.

**Male time allocations** The main results, and all the aforementioned robustness checks, show an increase in the budget share of adult male clothing. This reallocation of household expenditure can reflect a shift of intra-household bargaining power toward men, which I discuss in section 5. But an alternative explanation

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<sup>24</sup>The addition of the quadratic term is a common parameterization extension to the AIDS model named the Quadratic Almost Ideal Demand System (QUAIDS). QUAIDS introduces a more flexible relationship and allows for the possibility of a good being a luxury at very low levels of expenditure and a necessity afterwards. For example, for households living at the subsistence level, the food expenditure share may increase with total income at first.

could be that households are responding to the increase in homicide rates with an increase in male labor supply, or simply the time men spend outside the household, and they might need to spend more resources on male clothing. Using the MxFLS survey, [Velasquez \(2019\)](#) documents no effects on working hours either among self-employed or wage-employed men. Also, no statistically significant evidence exists that crime affected men's labor supply within this paper's analytical sample (Tables [B26](#), [B27](#), and [B28](#)). In addition, the MxFLS also includes a time-use module that asked how many hours respondents spent in a series of activities during the last week, and no evidence suggests the change in crime affected the hours men spent participating in sports, cultural, or entertainment activities outside the household (Table [B29](#)).

**Households' standards of living** The negative effects on the expenditure shares on food and other necessities along with the positive effect of homicides on the shares spent on luxury goods could also raise concerns about the possibility of homicides reflecting an increase in households' total resources, not fully captured by controlling for total expenditure. The empirical evidence to date has, in fact, documented the opposite ([Velasquez 2019](#)). Still, we may worry that households might be positively benefiting from the increase in illicit activities in their communities. In this case, self-reported income data may suffer from (under)reporting bias. The use of consumption data as opposed to self-reported income already largely alleviates these concerns. In addition, Appendix Table [B30](#) also shows the increase in homicides rates does not predict any changes in these households' measures of wealth, including savings or labor earnings.

**Home production and gifts** The budget shares are calculated including consumption that the household purchased, received as a gift or payment, or obtained from its crops, animals, or businesses. A concern could be that the increase in homicides could have affected informal trading markets, gifts and transfers, or the type of home production households engage in. Appendix Table [B31](#) shows that the household purchases are what drive the reported effects on expenditure shares.

**Survey interview process** We may worry the increase in crime affected which household member completed the survey if men and women have different recall bias for different goods or if they hide expenditures from each other that they are otherwise willing to report to the enumerators.<sup>25</sup> The Engel-curve results are robust to limiting the sample to households in which the person who fills the consumption survey is the same across survey waves, despite a loss in precision given the smaller sample size (Table B32). The results show no evidence of the increase in crime affecting who is present at the time of the interview in case we worry about differential bystander effects (Table B33).

## 5 The Effect on Intra-household Bargaining Power

Given previous research, the main results presented in section 4 are consistent with the increase in violence deteriorating women's relative intra-household bargaining power. For instance, clothing is a private good that has been shown to be correlated with individuals' bargaining power in Mexico and other countries (Bobonis 2009). Attanasio and Lechene (2010) also show the budget share of food is unchanged following the receipt of a large cash-conditional transfer in Mexico, in contrast to what would be predicted by Engel's law. They rule out multiple mechanisms and argue the key is that the transfer is made to women, which changes the control over household resources. Tommasi (2019) studies the same cash-transfer program and shows that mothers with majority control of household resources relative to fathers increase food consumption as a share of the household budget.

This previous empirical evidence linking changes in expenditure shares to intra-household bargaining power mostly relies on observing changes in *distribution factors*. These factors are observables that are assumed to only affect individuals' bargaining power inside the household but not individual preferences as well (e.g., a conditional cash transfer, modifications in family law).

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<sup>25</sup>The consumption module of the MxFLS survey had to be completed by a household member who was above 18 years old and "who knows about the characteristics of all household members." In 95% of the sample, either the head of the household or the spouse completed the section. In 83% of the cases, the female spouse of the head of the household completed it.

A potential concern would be whether this assumption is as likely to hold when we discuss increases in violent crime in households' communities (see Appendix C.1 for a theoretical discussion). In other words, could the results reported in section 4 be entirely driven by changes in individual preferences and not be reflective of changes in the intra-household decision process? In this section, I provide further evidence in favor of declines in women's bargaining power. First, I present reduced-form results of the effect of violence on individuals' responses on who makes decisions regarding household expenditures. Second, I structurally estimate women's resource shares and study how they vary with household characteristics, allowing for homicides to affect both preference and bargaining power parameters. Third, I analyze the Engel curves of single households, providing further suggestive evidence of the bargaining-power mechanism.

### 5.1 Reduced-form: Intra-household Decision-Making

The MxFLS survey includes a standard decision-making module asking the head of the household and the spouse separately who generally makes the decisions regarding different items. Prior papers have used this module to document a positive correlation between female decision-making and higher secondary enrollment for boys (Chakraborty et al. 2018), less female child labor (Reggio 2011), and a negative relationship between an increase in homicide rates and female self-reported decision-making (Tsaneva, Rockmore, and Albohmoood 2018). I estimate the effect of homicide rates on intra-household decision-making power with the following specification:

$$Y_{ijt}^m = \alpha^m + \gamma^m H_{jt} + \Theta^m D_{ijt} + \lambda_t^m + \delta_i^m + \epsilon_{ijt}^m,$$

where the coefficients of interest are again  $\gamma^m$ . The outcome variables are two indicator variables based on the wife's and husband's responses with respect to decision  $m$ :  $i$  says  $i$  decides over  $m$ , and  $i$  says spouse decides over  $m$ . In all cases, they might mention other decision-makers as well. The sample is limited to those households in which both the wife and the husband filled the decision-making module during their individual questionnaires.

Table 6 plots  $\gamma^m$  of equation (5.1) and shows exposure to local violence has a

Table 6: Effects of Homicide Rates on Decision Making

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Households with children				Nuclear with children			
	Wife says		Husband says		Wife says		Husband says	
	She is DM	Husband is DM	He is DM	Wife is DM	She is DM	Husband is DM	He is DM	Wife is DM
Food	-0.002 (0.010)	0.013 (0.025)	0.010 (0.027)	0.004 (0.011)	0.004 (0.010)	0.007 (0.025)	0.012 (0.028)	-0.003 (0.010)
Your clothes	-0.017** (0.008)	0.019 (0.023)	0.036** (0.014)	-0.033 (0.022)	-0.021** (0.010)	0.012 (0.025)	0.032** (0.014)	-0.036 (0.023)
Spouses' clothes	-0.039 (0.025)	0.025* (0.015)	-0.022 (0.027)	0.013 (0.013)	-0.043* (0.026)	0.019 (0.015)	-0.022 (0.028)	0.005 (0.015)
Children's clothes	-0.006 (0.016)	0.021 (0.020)	0.010 (0.018)	-0.009 (0.017)	-0.002 (0.017)	0.021 (0.022)	0.013 (0.019)	-0.007 (0.017)
Children's educ.	0.011 (0.016)	-0.026 (0.024)	-0.008 (0.016)	-0.011 (0.019)	0.020 (0.016)	-0.021 (0.026)	0.001 (0.017)	-0.015 (0.020)
Children's health	-0.003 (0.014)	-0.026 (0.019)	-0.020 (0.019)	-0.022 (0.020)	0.015 (0.013)	-0.018 (0.020)	-0.007 (0.019)	-0.027 (0.021)
Large house exp.	-0.040* (0.022)	0.015 (0.012)	0.008 (0.011)	-0.044 (0.028)	-0.060*** (0.022)	0.024* (0.013)	-0.003 (0.010)	-0.060* (0.032)
Observations	4,794	4,794	4,794	4,794	3,754	3,754	3,754	3,754

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Each number is the coefficient of the quartic root of the homicide rate of a different regression whose outcome variable is described by the column with respect to the decision described in the row. Columns (1) and (5) outcome variable is equal to 1 if the wife reports been a decision maker. Columns (2) and (6) outcome variable is equal to 1 if the wife says her husband is a decision-maker. Columns (3) and (7) outcome variable is equal to 1 if the husband reports been a decision maker. Columns (4) and (8) outcome variable is equal to 1 if the husband says his wife is a decision-maker. In all cases, a decision-maker may be reported as deciding solely or jointly with others. All regressions include the time-varying household controls including the log of total household expenditure, as well as household and time fixed effects.

negative effect on the probability of women reporting they are a decision-maker, sole or jointly regarding expenditure on her clothes, her spouse's clothes, and large purchases for the household. The changes in violence also have an effect on men's perceptions, especially regarding their own clothing, and on men being less likely to report their wives as decision-makers regarding large household purchases. These results are also important in quantitative terms. A woman living in a municipality that had no violence exposure in 2005–2006, and then experienced the average annual homicide rate increase between the two survey waves, is about 3-4 percentage points more likely to report having lost her decision-making power regarding her own clothing and her husband's clothing, and about 7-11 percentage points more likely, with respect to large expenditures in the household. Applying the same empirical exercise to men's answers, they are about 6-11 percentage points more likely to report their wives have lost decision-making power to them with respect to his clothing and large expenditures, respectively.

The interpretation of self-reported decision-making as a measurement of intra-

household bargaining power or agency is well extended in the literature, although, of course, it presents several limitations because higher involvement in decision-making does not always necessarily reflect greater agency (Seymour and Peterman 2018; Donald et al. 2020; Peterman et al. 2021; World Bank 2021). However, taken together with the previous set of results, they provide further evidence of the hypothesis that exposure to local violence led to reductions in married women's control over their household's resources.

## 5.2 Structural Analysis of Intra-household Inequality

In this section, I set up a model of intra-household resource allocation identifying women's resource shares and study how they vary with household's characteristics, including the exposure to violent crime. As explained in section 3, resource shares are a proxy for individuals' intra-household bargaining power under standard utility assumptions. Identification of the resource shares—the fraction of household expenditure consumed by each household member—rely on the presence of private assignable goods. In particular, male and female goods will comprise adult clothing and personal care goods.<sup>26</sup>

The computation of resource shares will derive from the slope of the Engel curve specified in equations (9a) and (9b). Note that in the absence of further preference assumptions, the system of Engel curves specified in equations (9a) and (9b) would consist of two Engel-curve equations and three unknown parameters:  $\{\eta, \beta_w, \beta_m\}$ . Therefore, identification would not be possible without additional constraints. I impose a semiparametric restriction following Dunbar, Lewbel, and Pendakur (2013) and assume similar preferences across members of the household restricting  $\beta_w = \beta_m = \beta$ . This methodology, known in the literature as the DLP system with preference SAP (Similarity Across People), has been increasingly used to mea-

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<sup>26</sup>Adult male clothing is defined as “Clothes and shoes for male adults such as: pants, shirts, sweaters, suits, underwear, etc.” Male care goods are defined as “Men's personal effects such as: lotion, deodorant, razors, shaving foams, haircuts, etc.” Adult female clothing is defined as “Clothes and shoes for female adults such as: blouses, sweaters, skirts, underwear, pants, dresses, shoes, etc.” Female care goods are defined as “Women's personal effects as: perfume, deodorant, cosmetics, feminine hygiene, face lotion, haircut, dyes, manicure, waxing, etc.”



sure the levels and determinants of intra-household inequality.<sup>27</sup> In addition, I control for unobserved time-invariant heterogeneity, exploiting the use of panel data. Given that, within a non-linear model with unobserved effects, the direct inclusion of household fixed effects is not computationally feasible (Wooldridge 2001), I instead include Mundlak effects: average time-varying characteristics across survey waves.<sup>28</sup> This approach follows the one in Wooldridge (2019) exploiting the equivalence between the one-way fixed-effects estimator and the Mundlak regression in the small T case (two survey waves in this paper’s context), and let the time dummy be included among the time-varying covariates, as opposed to the additional inclusion of cross-sectional averages for each time period (Wooldridge 2021).

The empirical implementation is the following:

$$W_{it}^w = \eta(x_{it})[\alpha^w(x_{it}) + \beta(x_{it})[\ln(\eta(x_{it})) + \ln(y_{it}/n_{it}^w)] + \theta^w \bar{x}_i] \quad (12a)$$

$$W_{it}^m = (1 - \eta(x_{it}))[\alpha^m(x_{it}) + \beta(x_{it})[\ln(1 - \eta(x_{it})) + \ln(y_{it}/n_{it}^m)] + \theta^m \bar{x}_i], \quad (12b)$$

where  $W_{it}^w$  and  $W_{it}^m$  are the household budget shares spent on women’s and male’s private goods,  $y_{it}$  is total household expenditure, and  $n^w$  and  $n^m$  are the number of adult women and men in the household, respectively.  $\eta$  denotes the share of total household expenditure consumed by all adult women and provides a measure of their overall bargaining power (Calvi 2020; Calvi et al. 2021). Note the budget shares of the private assignable goods are not the same as the resource shares  $\eta$ . Importantly, although imposing the same  $\beta$  restricts preference heterogeneity, it does not impose identical preferences across household members. If it did,  $W_w^k > W_m^k$  would imply  $\eta$  must be greater than 0.5. But this conclusion is not necessarily true

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<sup>27</sup>For instance, Calvi (2020) applies the methodology to estimate the age profile of women’s resource shares in India to shed light on the phenomenon of elderly missing women. Brown, Calvi, and Penglase (2021) use the structural estimates of resource shares to measure intra-household consumption inequality in Bangladesh. Hoehn-Velasco and Penglase (2021) estimate resource shares to study the impact of unilateral divorce in women’s bargaining power in Mexico. Tommasi (2019) estimates the impact of the Mexican Progresa cash-conditional transfer on intra-household resource shares.

<sup>28</sup>This methodology is used to replace household fixed effects when the model uses time-invariant regressors of interest. For instance, Vreyer, Lambert, and Ravallion (2020) include Mundlak effects in the estimation of household Engel curves in Senegal. This approach can also be crucial for analyzing non-linear models with unobserved heterogeneity.

when we just restrict the slope  $\beta$ .<sup>29</sup>

### 5.2.1 Estimation strategy and results

The model is implemented by adding an error term to equations (12a) and (12b) and estimated by the non-linear seemingly unrelated regression (SUR) method. The preference parameters  $(\alpha^w, \alpha^m, \beta)$  are parametrized linear on a set of household time-varying controls, including the municipality-level homicide rate, and on Mundlak effects,  $\bar{x}_i$  averages across panels of all the included household characteristics. I also include survey, region, and rural locality fixed effects to account for price variation.<sup>30</sup> As in the Engel-curve analysis, the sample is restricted to those households with at least one son or daughter in the household for representativeness reasons of Mexican households, as well as comparability with other papers estimating resource shares in the Mexican context. In addition, a few observations (37) are dropped given to the lack of presence of adult men or women in the household (above 18 years old).

Table 7 reports the coefficients on the resource shares of the covariates ( $x_{it}$ ). The coefficient on the homicide rate on women's resource shares is negative across the board. Columns (1), (2), and (5) keep  $\beta$  constant across households and survey waves, whereas columns (3) and (4) parametrize it linearly on household time-varying controls, including the homicide rate, and a time fixed effect. Columns (2), (4), and (5) include Mundlak effects to account for unobserved heterogeneity. According to these estimates, in households that experienced the average increase in crime during the period, women's resource shares are estimated to decrease by

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<sup>29</sup>In Figure C1, for a hypothetical household with one adult woman and one adult man, I plot the hypothetical budget shares of two different goods against the resource share of the woman. The woman has a stronger preference for good 1 than the man ( $\alpha_w^1 > \alpha_m^1, \beta_w^1 = \beta_m^1$ ), and vice versa for good 2. We can see a range of  $\eta$  exists for which  $\eta < 0.5$  and  $W_w^1 > W_m^1$ , and another for which  $\eta > 0.5$  and  $W_w^2 < W_m^2$ . Therefore, using  $\frac{W_w^k}{W_m^k} \geq 1$  to determine  $\eta \geq 0.5$  would not be correct unless we assume identical preferences, which highlights the need to estimate the resource shares within a structural setting; see Calvi (2020) for another example.

<sup>30</sup>The set of controls include the average age and average squared age of all adult women and of all adult men in the household, the proportion of adult women and of adult men in the household with at least a secondary education, the number of adult members below 18 years old, the quartic root of the municipality-level homicide rate, and survey, rural locality, and regional fixed effects.

about 5-9 percentage points, consistent with the hypothesis that increases in local crime negatively affect women's intra-household bargaining power.

Figure C2 plots the distribution of the average predicted resource shares and the resource shares against household characteristics. Reassuringly, they are all within 0 and 1, even though they were not forced in the estimation. In addition, consistent with previous research, women's resource shares are positively correlated with the levels of education, are lower in rural areas, and their relationship with age is U-shaped and significantly decreasing in post-reproductive ages (Calvi 2020; Tommasi 2019). The DLP system is a complex model to estimate, and different specifications may lead to unstable results. Column (5) of Table 7 tests a common source of instability in the methodology, the inclusion of dummies rather than a linear index on the number of kids in the household, which is a powerful robustness check (Tommasi and Wolf 2018; Tommasi 2019).

### 5.3 Single Households

In this section, I restrict the MxFLS-2 sample to those families whose household head was neither married nor in a domestic partnership at the time of the interview, and they were re-interviewed during MxFLS-3. Table C1 shows 337 male- and 994 female-headed households met these criteria. These individuals were mostly separated, divorced, or widowed. Of these, 13% of the women (127) and 15% of the men (51) got into a marriage or a domestic partnership between the survey waves.

Table 8 shows the positive effects of crime on male goods are not observed when we analyze the Engel curves of households whose head was male and single before the Mexican drug war started (MxFLS-2). They are also not observed if we drop those individuals who got married in between (columns (3) and (4)); if anything, the point estimates are negative. I do not report the Engel curves for those who married in between, given they are only 51 individuals. These results suggest that if the change in crime increased the taste toward male adult clothing, the taste shock did not affect unmarried individuals, which makes the change in the individual-preference mechanism even less credible. In addition, Table 8 also

Table 7: Determinants of Women's Resource Shares

	(1)	(2)	(3)	(4)	(5)
Avg. secondary adult women	0.05 (0.04)	0.03 (0.03)	0.05* (0.03)	0.03 (0.03)	0.06** (0.03)
Avg. secondary adult men	0.04 (0.04)	0.03 (0.03)	0.03 (0.03)	0.02 (0.03)	0.02 (0.03)
Avg. age adult women	0.01 (0.01)	0.01 (0.01)	0.00 (0.00)	0.01 (0.00)	0.00 (0.01)
Avg. age all women <sup>2</sup>	-0.00 (0.00)	-0.00* (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00* (0.00)
Avg. age adult men	0.00 (0.01)	0.01 (0.01)	0.01** (0.01)	0.01*** (0.01)	0.01 (0.01)
Avg. age adult men <sup>2</sup>	-0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)
# hh members <=18	0.01* (0.01)	0.01* (0.01)	0.01 (0.01)	0.01 (0.01)	
$\sqrt[4]{}$ Homicide rate last 12 months	-0.02 (0.02)	-0.03** (0.02)	-0.05*** (0.01)	-0.05*** (0.01)	-0.04*** (0.01)
Rural locality	-0.11*** (0.03)	-0.12*** (0.02)	-0.11*** (0.02)	-0.12*** (0.02)	-0.13*** (0.02)
Central region	0.07 (0.05)	0.05 (0.04)	0.01 (0.04)	-0.00 (0.04)	0.02 (0.04)
North region	-0.08* (0.05)	-0.11*** (0.03)	-0.12*** (0.03)	-0.14*** (0.03)	-0.11*** (0.03)
West region	0.03 (0.06)	0.02 (0.04)	-0.01 (0.04)	-0.02 (0.04)	0.01 (0.04)
MxFLS-3	-0.06** (0.03)	-0.05** (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.03 (0.02)
Dummy: 1 kid <= 18					0.04 (0.03)
Dummy: > 1 kids <= 18					0.08*** (0.03)
Intercept	0.36** (0.18)	0.32** (0.14)	0.32** (0.13)	0.31** (0.14)	0.39*** (0.14)
Observations	7,393	7,393	7,393	7,393	7,393
Average $\eta$	0.50	0.50	0.51	0.51	0.50
Mundlak effects		✓		✓	✓
$\beta(.)$	Constant	Constant	$x_{it}$	$x_{it}$	Constant

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Table 7 reports the nonlinear seemingly unrelated regression estimates of the determinants of  $\eta(x_{ijt})$  based on equations 12a and 12b. Standard errors, in parentheses, clustered at the municipality level.

Table 8: Effect of Homicide Rates on Expenditure Shares: Single-Households

	Male-headed households				Female-headed households					
	All (1)	(2)	Remain single (3)	(4)	All (5)	(6)	Remain single (7)	(8)	Married in Between (9)	(10)
Food	0.53 (1.84)	0.53 (1.94)	1.61 (1.98)	1.61 (16.58)	-0.24 (0.97)	-0.24 (1.27)	0.52 (1.04)	0.52 (1.32)	-4.99** (2.27)	-4.99* (2.77)
Drinks and Tob.	0.29 (0.77)	0.29 (0.76)	0.63 (0.77)	0.63 (13.50)	0.15 (0.28)	0.15 (0.35)	-0.03 (0.31)	-0.03 (0.41)	0.90* (0.52)	0.90 (0.75)
Male adult clothing	-0.58** (0.27)	-0.58 (0.37)	-0.71*** (0.26)	-0.71 (3.39)	0.21* (0.11)	0.21* (0.12)	0.12 (0.11)	0.12 (0.13)	0.69** (0.35)	0.69* (0.39)
Female adult clothing	-0.15 (0.18)	-0.15 (0.20)	-0.28 (0.18)	-0.28 (1.12)	-0.23 (0.24)	-0.23 (0.27)	-0.20 (0.25)	-0.20 (0.28)	-0.24 (0.68)	-0.24 (0.79)
Children goods	0.02 (0.16)	0.02 (0.18)	-0.08 (0.15)	-0.08 (1.05)	-0.01 (0.13)	-0.01 (0.16)	-0.03 (0.15)	-0.03 (0.18)	0.37 (0.27)	0.37 (0.65)
Hygiene and care	-0.57 (0.52)	-0.57 (0.74)	-0.67 (0.56)	-0.67 (17.23)	0.18 (0.30)	0.18 (0.44)	0.01 (0.33)	0.01 (0.49)	0.92 (0.59)	0.92 (1.09)
Other household goods	1.18 (1.00)	1.18 (1.30)	1.22 (1.00)	1.22 (6.01)	-0.12 (0.66)	-0.12 (0.79)	-0.06 (0.66)	-0.06 (0.77)	-0.42 (2.10)	-0.42 (2.50)
Transportation	1.12 (0.96)	1.12 (1.22)	0.71 (0.93)	0.71 (12.07)	0.67 (0.60)	0.67 (0.62)	0.49 (0.67)	0.49 (0.70)	2.20** (1.07)	2.20 (1.43)
Health	-0.07 (0.72)	-0.07 (0.82)	-0.21 (0.81)	-0.21 (4.84)	-0.31 (0.49)	-0.31 (0.47)	-0.42 (0.55)	-0.42 (0.51)	0.41 (1.05)	0.41 (1.39)
Education	0.41* (0.23)	0.41 (0.25)	0.33* (0.18)	0.33 (1.23)	0.03 (0.22)	0.03 (0.23)	-0.04 (0.25)	-0.04 (0.28)	0.67 (0.44)	0.67 (0.54)
Recreation	-2.16* (1.16)	-2.16* (1.30)	-2.54* (1.30)	-2.54 (6.72)	-0.35 (0.33)	-0.35 (0.36)	-0.32 (0.33)	-0.32 (0.40)	-0.86 (1.14)	-0.86 (1.51)
Gambling	-0.02 (0.03)	-0.02 (0.03)	-0.03 (0.03)	-0.03 (0.30)	-0.03 (0.02)	-0.03 (0.02)	-0.04 (0.03)	-0.04 (0.03)	-0.04 (0.03)	-0.04 (0.04)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure		✓		✓		✓		✓		✓
Observations	674	674	572	572	1,988	1,988	1,734	1,734	254	254

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Table 8 reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11) of single households. Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

shows the positive effect of crime on male clothing is present among female-headed households and seems driven by those who married in between. Given the potential sources of sample selection and small sample sizes, these results have limitations for causal interpretation, but they provide further and complementary evidence of the bargaining-power mechanism.

## 6 Discussion

To recap, this paper provides robust evidence that exposure to community violence can affect households' consumption allocations through changes in the distribution of intra-household control of resources. In this section, I discuss different channels that could be at play, highlighting the overall role played by fear of victimization.

The direct and short-term effects of violent crime on households are evident: direct victimization can result in the loss of life, physical and mental health, and overall living standards ([Sabia, Dills, and DeSimone 2013](#); [Bindler, Ketel, and Hjalmarsson 2020](#)). Most importantly, exposure to crime can indirectly affect households through fear of victimization, without necessarily ever been victimized themselves. Within this paper's analytical sample, the increase in crime had a greater effect on women's fear of victimization than men's (Table [D1](#)). The rise in homicides increases the probability that women are afraid to be attacked at night, lowers the probability of feeling safer than five years ago, and increases the probability of expecting an attack within the next year. The increase in homicides also makes men feel less safe but leads to no statistically significant effect on how scared they are of being attacked, and the point estimates are statistically insignificant and smaller than women's across the board. These results are consistent with a broader literature documenting that women tend to report more fear and a perceived risk of victimization than men, even in contexts where men are more likely to be the target victims ([Ferraro 1996](#); [Mesch 2000](#); [Chataway and Hart 2019](#)).<sup>31</sup>

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<sup>31</sup>Several theories exist for why women's fear of crime is greater than men's, even in contexts where men suffer greater rates of victimization. One common hypothesis is that fear of crime reflects fear of sexual assault ([Ferraro 1996](#)). Another hypothesis is that women are more likely to express

Heterogeneity analysis suggests women's fear of victimization plays a role in the decline of their bargaining power presented in this paper (Figures [D1](#), [D2](#), [D3](#)).<sup>32</sup> The reported effects of homicides on food and male clothing are stronger in those households whose wives report being more scared of victimization than before. And, interestingly, some evidence suggests an increase in the budget share of alcohol and tobacco in such households as well, a good previously found to be negatively correlated with women's bargaining power in Mexico ([Angelucci 2008](#); [Bobonis 2009](#)).

The relationship between women's fear of victimization and bargaining power may operate through multiple channels. Women's earnings capacity through labor markets is of course an important candidate, especially given previous findings ([Dell 2015](#); [Velasquez 2019](#)). [Velasquez \(2019\)](#) finds the negative effects of the Mexican drug war on hours worked are much stronger for women who report fear of being assaulted, whereas these effects are not present in men. In this paper's sample, in which three fourths of the married women were already not working prior to the escalation in crime, the direct effect is bound to be limited. But lower female labor participation may lower women's bargaining power indirectly even for those who were not working before, by limiting their outside options ([Majlesi 2016](#); [Sanin 2021](#)).

Beyond labor markets, women's increased fear of crime may also operate by limiting the time spent outside the household in non-working activities. As opposed to the men in the sample, the increase in homicides negatively affected the number of hours women spend outside the household in sports, cultural, or entertainment activities (Table [B29](#)). This decrease in socialization might shrink women's capacity to join, or interact with existing, empowering social networks ([Oster and Thornton 2012](#); [Kandpal and Baylis 2019](#); [Andrew et al. 2020](#); [Olivetti, Patacchini, and Zenou 2020](#)). A reduction in the time spent outside the household may also decrease the

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fear not only for themselves but also for what happens to their children ([Mesch 2000](#)).

<sup>32</sup>The heterogeneity analysis is performed estimating equations (11) for each subsample of interest. Given the smaller sample sizes and numerical equivalence of the point estimates of the homicide rate, I do not instrument expenditure with wealth given the difficulty to implement the bootstrap approach.

frequency of women commuting to markets to purchase households' goods, potentially allowing men to reallocate the budget toward their preferred commodities (Afzal et al. 2022). Given their policy implications, the potential social networks and the market buyer channels should be subjects of future research.

Psychological impacts might be at play as well. The fear and anxiety of living in highly violent environments can be detrimental to psychological well-being (Jackson and Stafford 2009; Cornaglia, Feldman, and Leigh 2014; Flores Martínez and Atuesta 2018; Alloush and Bloem 2022), especially for women (Dustmann and Fasani 2016; Balmori de la Miyar 2020). An extensive research stream documents that women and men can have different reactions to acute stress (Taylor and Updegraff 2000; Tamres, Janicki, and Helgeson 2002; Wang and Detre 2007). Angelucci and Cordova (2018), in a lab experiment in the US, find acute stress reduces women's productivity and changes their decisions leading to income losses not found in men. Although a growing body of research links mental health and labor market outcomes (Peng, Meyerhoefer, and Zuvekas 2013; Böckerman et al. 2017), little is known about how it may affect individuals' willingness and capacity to participate in their household's decision-making process. Baranov et al. (2020) provides the first causal evidence that treating depression can improve women's empowerment and economic decision-making.

## 7 Conclusion

This paper presents evidence that changes in violent crime can significantly affect households' behavior, and the effects are not gender neutral. I do so in the context of an unprecedented and unanticipated surge in violent crime in Mexico in the late 2000s. I estimate causal estimates using a rich longitudinal survey that follows the same households before and after the escalation in violence. The increase in violence had an effect on the composition of household expenditures. The results suggest increases in homicides shifted the household Engel curves of food and other necessities (hygiene and personal care items) downward while increasing the share of household expenditures allocated to male goods. These results are consistent



with a deterioration in women's bargaining power. But previous research in Mexico and other countries has mostly relied on distribution factors. To alleviate concerns about the results being actually driven by changes in consumption preferences, I further complement the findings analyzing intra-household decision-making measures, computing the effect of violence on women's bargaining power through the structural estimation of intra-household resource shares, and analyzing the Engel curves of single households.

Understanding gendered effects of crime are key for effective policy design. The treatment effects of cash-conditional transfers and other anti-poverty programs may be heterogeneous individuals' exposure to violence. The results of this paper suggest we should not only pay attention to direct victims. Living under the threat of violence can be enough to affect households' behavior with potential welfare impacts, and future research is needed to further pin down the mechanisms.

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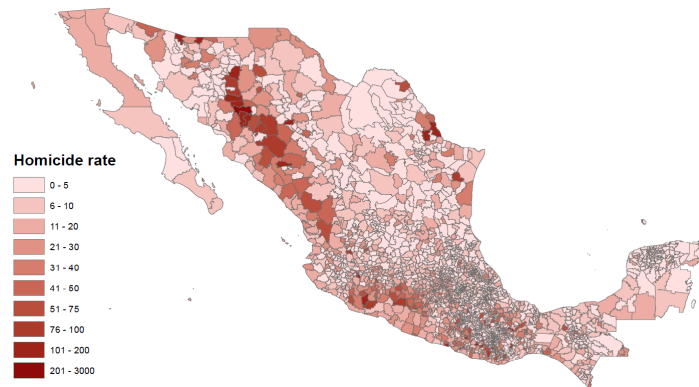
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## APPENDIX

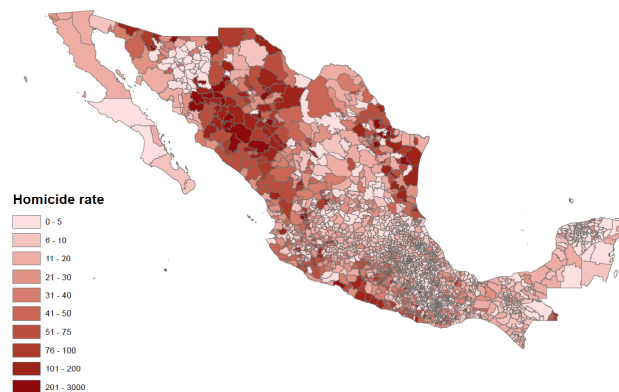
### A Violent Crime in Mexico

Figure A1: Annual Homicide Rates at the Municipality Level (per 100,000 People)

(a) 2005



(b) 2012



Notes: Annual homicide rates at the municipality level (per 100,000) in 2005 and 2012.

## B Additional Analysis

### B.1 Sample Characteristics

Table B1: Comparison of the Change in the Municipal Homicide Rate between Municipalities Included and Excluded in the MxFLS Sample

	Change from 2005 to 2010
	(1)
MxFLS sample	-0.196 (3.416)
Intercept	12.532*** (1.851)
Observations	2,454
adj. $R^2$	-0.00

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, reported in parentheses, are clustered at the municipality level.

Table B2: MxFLS Expenditure Data: Good Categories

Good category	Recall period	Description
Food	7 days	Vegetables and fruits, cereals and grains, meats and other animal originated food, other processed food and drinks.
Drinks & Tobacco	7 days	Juices, purified water, beverages such as beer, tequila, rum, and powder for preparing water, cigarettes and tobacco.
Male adult clothing	3 months	Clothes and shoes for male adults such as: pants, shirts, sweaters, suits, underwear, etc.
Female adult clothing	3 months	Clothes and shoes for female adults such as: blouses, sweaters, skirts, underwear, pants, dresses, shoes, etc.
Children goods	1 month / 3 months	Clothes and shoes for boys and girls (excluding school uniforms). Toys in general, baby clothes and baby items such as: clothes, daycares, baby bottles, carriages, bath tubs, etc.
Hygiene and personal care	1 month	Toothpaste, shampoo, tissues, toilet paper, lotion, deodorant, shaving foam, haircuts, etc.
Other household goods	1 month & 3 months & 1 year	Detergents, cleaners, light bulbs, brooms, candles, bar of soap, bleaches, glass lampshades, domestic service, laundry, dry cleaner's shop, tableware, dishes, glasses, pots, bedspreads, bed sheets, pillows, yarn, needles, any other domestic utensils, etc. Utilities: water, electricity, gas, garbage collection, firewood, coal, petroleum, telephone, telegraph, money orders, postage stamps, internet, etc. Value of gifts given to others. Property or income taxes. Funerals, vacations, parties, insurances, moving costs, other transportation services, and other expenditures.
Transportation	7 days/3 months	Transportation such as: bus, subway, taxi, and/or gasoline. Maintenance services for vehicles such as: fuel, oil, lubricants, pension, parking, car wash, mechanical shops, appliances, auto parts, etc.
Health	3 months	Healthcare and health services such as: medicine, medical and dental visits, hospitalization, etc.
Education	Current school period	Enrollments fees, exam fees, school supplies, uniforms, school transportation.
Recreation	7 days& 1 month	Food and drinks consumed outside the household. Culture and recreation as: books, magazines, newspapers, records, excursions, fairs, etc.
Gambling	1 month	Lottery and other such games of chance.



Table B3: Descriptive Statistics: Household Characteristics in 2005-2006. Nuclear Households with Children

	Mean and standard deviation (1)	Violence variables		
		$\sqrt[4]{H_{m2005}}$ (2)	$\Delta H_m$ (3)	$\Delta \sqrt[4]{H_m}$ (4)
Wife's age	38.52 [11.18]	-0.65* (0.38)	-0.02 (0.01)	0.25 (0.35)
Husband's age	41.75 [12.14]	-0.83* (0.44)	-0.01 (0.02)	0.51 (0.46)
Age gap	3.24 [5.23]	-0.18 (0.19)	0.00 (0.01)	0.25 (0.25)
Wife's secondary	0.48 [0.50]	0.07*** (0.02)	0.00 (0.00)	-0.01 (0.02)
Husband's secondary	0.50 [0.50]	0.06** (0.02)	0.00 (0.00)	-0.01 (0.02)
Number of children	2.56 [1.35]	-0.06 (0.07)	-0.00 (0.00)	-0.03 (0.06)
Average age children	12.13 [8.20]	-0.42 (0.27)	-0.00 (0.01)	0.29 (0.24)
Share of daughters	0.49 [0.36]	0.02* (0.01)	-0.00 (0.00)	-0.01 (0.01)
Rural locality	0.40 [0.49]	-0.14*** (0.05)	-0.00 (0.00)	0.08 (0.05)
Household size	4.56 [1.35]	-0.06 (0.07)	-0.00 (0.00)	-0.03 (0.06)
Observations	2,917	2,917	2,917	2,917
Joint equality test (p-value)		0.03	0.55	0.56

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Column (1) presents sample means and standard deviations, in brackets, of the analytical sample in MxFLS-2. Columns (2)-(4) are calculated with OLS and clustering standard errors (in parentheses) at the municipality level. Column (2) reports the OLS coefficient of a regression of the household characteristic on the homicide rate in 2005-2006 MxFLS-2. Column (3) reports an OLS coefficient of a regression of the household characteristic on the increase in the homicide rate between MxFLS-2 and MxFLS-3. Column (4) also reports an OLS coefficient, but of the increase in the quartic root of the homicide rate.

Table B4: Descriptive Statistics: Household Expenditures in 2005-2006. Nuclear Households with Children

	Mean and standard deviation (1)	Violence variables		
		$\sqrt[4]{H_{m2005}}$ (2)	$\Delta H_m$ (3)	$\Delta \sqrt[4]{H_m}$ (4)
Total expenditure	75,841.57 [522,188.75]	6,515.30 (4,142.28)	-174.03 (242.30)	-7,095.98 (8,693.70)
Ln(total expenditure)	10.79 [0.79]	0.08* (0.05)	0.00* (0.00)	0.02 (0.05)
Food	55.08 [18.68]	-1.60 (0.98)	0.03 (0.03)	1.31 (0.92)
Drinks and Tob.	3.34 [3.99]	-0.02 (0.18)	0.01** (0.00)	0.25 (0.17)
Male adult clothing	1.50 [2.64]	0.09 (0.08)	-0.00* (0.00)	-0.12 (0.08)
Female adult clothing	1.52 [2.66]	-0.01 (0.09)	-0.00 (0.00)	-0.04 (0.07)
Children goods	2.23 [3.62]	-0.05 (0.11)	0.00 (0.00)	0.03 (0.13)
Hygiene and care	6.00 [5.45]	-0.06 (0.19)	0.00 (0.01)	0.04 (0.14)
Other household goods	12.65 [9.52]	0.43 (0.38)	-0.01 (0.01)	-0.37 (0.33)
Transportation	10.56 [12.55]	0.69 (0.46)	-0.01 (0.02)	-0.46 (0.50)
Health	1.67 [5.38]	0.04 (0.18)	-0.01 (0.01)	-0.13 (0.18)
Education	2.54 [4.44]	0.12 (0.12)	-0.01*** (0.00)	-0.33*** (0.10)
Recreation	2.86 [6.69]	0.33 (0.21)	-0.01 (0.01)	-0.15 (0.22)
Gambling	0.05 [0.47]	0.02* (0.01)	-0.00* (0.00)	-0.03** (0.01)
Observations	2,917	2,917	2,917	2,917
Joint equality test (p-value)		0.52	0.06	0.00

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Column (1) presents sample means and standard deviations, in brackets, of the analytical sample in MxFLS-2. Columns (2) - (4) are calculated with OLS and clustering standard errors (in parentheses) at the municipality level. Column (2) reports the OLS coefficient of the expenditure share on the homicide rate in 2005-2006 MxFLS-2. Column (3) reports an OLS coefficient of a regression of the expenditure share on the increase in the homicide rate between MxFLS-2 and MxFLS-3. Column (4) also reports an OLS coefficient, but of the increase in the quartic root of the homicide rate.

## B.2 Attrition Analysis

Table B5 presents an analysis of the probability of attrition based on the following specification:

$$A_{ij} = P(\alpha + \beta H_j + \gamma X_{ij} + \pi_s + \epsilon_{ij}),$$

where  $A_{ij}$  is an indicator variable equal to 1 if household  $i$  living in municipality  $j$  in 2005–2006 was not interviewed or had relevant missing information in 2009–2012 MxFLS-3. The regressor of interest  $H_j$  is the difference between the quartic root of the homicide rate in 2009 and 2005 in municipality  $j$ . The vector of household characteristics  $X_{ij}$  includes wife’s and husband’s age and age squared, wife’s and husband’s secondary-education dummy, log of total household size, rural locality indicator variable, and year- and month-of-interview fixed effects.  $\pi_s$  are state fixed effects. Finally, errors are clustered at the municipality level. Following Velasquez (2019), I also run a specification interacting the measure of violence with  $X_{ij}$ . These interactions aim to capture whether heterogeneity is present in selective attrition based on households’ baseline attributes. The results are qualitatively equivalent using a linear probability model or a probit specification as shown in Table B5.

Tables B6 and B7 delve into potential sources of attrition. Table B6 shows that the probability of a household dropping from the sample in MxFLS-3 due to not completing the consumption module is not differentially affected by the escalation in crime. Table B7 shows the effect of the homicide rate on the household head or the spouse being widow or divorced in MxFLS-3.

Table B5: Prediction of Attrition

	Households with children						Nuclear with children					
	LPM			Probit			LPM			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$\Delta\sqrt{H_{-j}}$	-0.005 (0.008)	0.001 (0.009)	0.122 (0.075)	-0.016 (0.027)	0.001 (0.034)	0.405 (0.250)	0.003 (0.008)	0.004 (0.009)	0.113 (0.087)	0.012 (0.028)	0.014 (0.036)	0.364 (0.301)
$\Delta\sqrt{H_{-j}}$ * Wife's age			0.004 (0.006)			0.016 (0.021)			0.004 (0.008)			0.015 (0.026)
$\Delta\sqrt{H_{-j}}$ * Husband's age			-0.009 (0.006)			-0.031 (0.021)			-0.009 (0.007)			-0.033 (0.025)
$\Delta\sqrt{H_{-j}}$ * Wife's age square			-0.000 (0.000)			-0.000 (0.000)			-0.000 (0.000)			-0.000 (0.000)
$\Delta\sqrt{H_{-j}}$ * Husband's age square			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)
$\Delta\sqrt{H_{-j}}$ * Wife's secondary			-0.021 (0.017)			-0.077 (0.062)			-0.014 (0.019)			-0.053 (0.074)
$\Delta\sqrt{H_{-j}}$ * Husband's secondary			0.022 (0.015)			0.079 (0.059)			0.018 (0.016)			0.064 (0.062)
$\Delta\sqrt{H_{-j}}$ * log (household size)			-0.013 (0.023)			-0.053 (0.090)			0.003 (0.030)			0.012 (0.128)
$\Delta\sqrt{H_{-j}}$ * Rural locality			-0.003 (0.014)			-0.015 (0.055)			-0.006 (0.016)			-0.021 (0.060)
Intercept	0.222*** (0.010)	0.638*** (0.095)	0.595*** (0.098)	-0.765*** (0.033)	0.556* (0.302)	0.421 (0.313)	0.208*** (0.010)	0.557*** (0.098)	0.513*** (0.103)	-0.813*** (0.035)	0.373 (0.342)	0.238 (0.356)
Household controls		✓	✓		✓	✓		✓	✓		✓	✓
State FE		✓	✓		✓	✓		✓	✓		✓	✓
N	4,942	4,942	4,942	4,942	4,942	4,942	3,810	3,810	3,810	3,810	3,810	3,810
Mean dependent variable	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.21	0.21
adj. $R^2$	-0.00	0.05	0.05				-0.00	0.04	0.04			
$\chi^2$ interactions jointly=0 (p-value)			0.05			0.06			0.16			0.24

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. The outcome variable is an indicator variable equal to 1 if the qualifying household in MxFLS-2 was not interviewed in MxFLS-3.

Table B6: Prediction of Consumption Module Missing in MxFLS-3

	LPM			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \sqrt[4]{H\_j}$	-0.005 (0.008)	0.005 (0.006)	0.021 (0.047)	-0.026 (0.043)	0.049 (0.051)	0.223 (0.273)
$\Delta \sqrt[4]{H\_j}$ *Wife's age			-0.001 (0.005)			-0.002 (0.029)
$\Delta \sqrt[4]{H\_j}$ *Husband's age			0.000 (0.004)			-0.000 (0.026)
$\Delta \sqrt[4]{H\_j}$ *Wife's age square			0.000 (0.000)			-0.000 (0.000)
$\Delta \sqrt[4]{H\_j}$ *Husband's age square			-0.000 (0.000)			0.000 (0.000)
$\Delta \sqrt[4]{H\_j}$ *Wife's secondary			-0.014 (0.012)			-0.104 (0.082)
$\Delta \sqrt[4]{H\_j}$ *Husband's secondary			0.015 (0.011)			0.119 (0.080)
$\Delta \sqrt[4]{H\_j}$ *log (household size)			-0.013 (0.011)			-0.143 (0.113)
$\Delta \sqrt[4]{H\_j}$ *Rural locality			0.013 (0.011)			0.079 (0.079)
Intercept	0.110*** (0.009)	0.276*** (0.067)	0.264*** (0.070)	-1.225*** (0.045)	-0.193 (0.324)	-0.285 (0.342)
Household controls		✓	✓		✓	✓
State FE		✓	✓		✓	✓
N	4,942	4,942	4,942	4,942	4,942	4,942
Mean dependent variable	0.11	0.11	0.11	0.11	0.11	0.11
adj. $R^2$	-0.00	0.05	0.05			
$\chi^2$ interactions jointly=0 (p-value)			0.51			0.45

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level The outcome variable is an indicator variable equal to 1 if the qualifying household in MxFLS-2 had consumption module missing in MxFLS-3.

Table B7: Prediction of Not Married in MxFLS-3

	Women				Men			
	LPM		Probit		LPM		Probit	
	Widow (1)	Divorced (2)	Widow (3)	Divorced (4)	Widower (5)	Divorced (6)	Widower (7)	Divorced (8)
$\Delta \sqrt[4]{H_j}$	0.006** (0.003)	-0.000 (0.002)	0.173** (0.077)	-0.026 (0.133)	0.001 (0.003)	-0.003 (0.003)	0.079 (0.092)	-0.073 (0.112)
Intercept	0.089*** (0.029)	0.006 (0.018)	-2.186** (0.899)	-4.416*** (1.324)	0.046** (0.021)	0.050 (0.037)	-8.180*** (1.474)	-2.135** (0.976)
Household controls	✓	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓	✓
N	4,560	4,560	4,134	4,331	4,553	4,553	4,152	4,446
Mean dependent variable	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
adj. $R^2$	0.05	0.00			0.04	0.01		
$\chi^2$ interactions jointly=0 (p-value)								

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level

### B.3 Selective Migration

Table B8 presents an analysis of the probability of migration based on the following regression specification:

$$M_{ij} = P(\alpha + \beta H_j + \gamma X_{ij} + \pi_s + \epsilon_{ij}), \quad (\text{B1})$$

where  $M_{ij}$  is an indicator variable equal to 1 if household  $i$  living in municipality  $j$  in 2005-2006 resided in a different municipality in 2009–2012 MxFLS-3. The regressor of interest  $H_j$  is the difference between the quartic root of the homicide rate in 2009 and 2005 in municipality  $j$ . The vector of household characteristics  $X_{ij}$  includes wife's and husband's age and age squared, wife's and husband's secondary-education dummy, log of total household size, rural locality indicator variable, and year- and month-of-interview fixed effects. Following [Brown and Velasquez \(2017\)](#) and [Velasquez \(2019\)](#), I also run an specification interacting the measure of violence with  $X_{ij}$ . These interactions aim to capture whether heterogeneity is present in selective migration based on households' baseline attributes. The results are

qualitatively equivalent using a linear probability model or a probit specification as shown in Table B8.

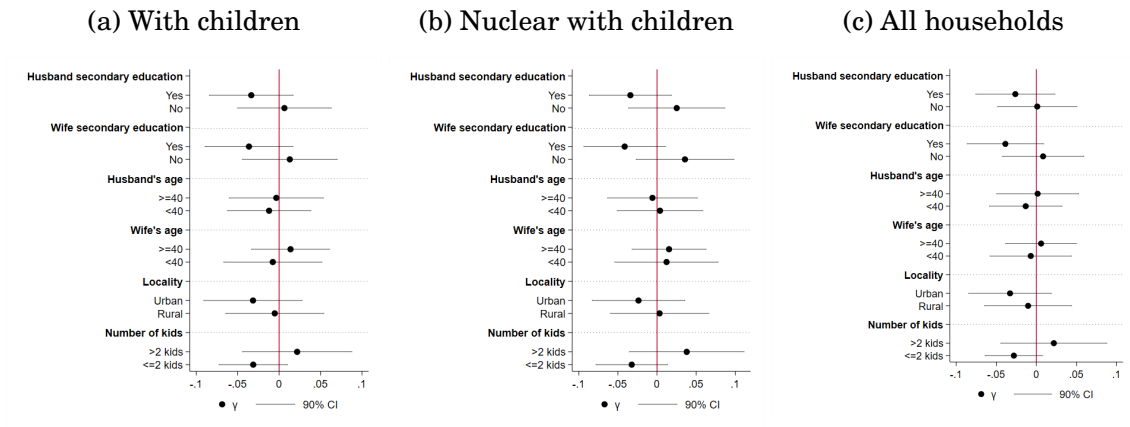
Table B8: Prediction of Migration

	Households with children						Nuclear with children					
	LPM			Probit			LPM			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$\Delta \sqrt{H_{-j}}$	-0.003 (0.007)	0.004 (0.006)	-0.051 (0.066)	-0.043 (0.094)	0.079 (0.085)	-0.505 (0.509)	-0.003 (0.008)	0.004 (0.006)	-0.078 (0.070)	-0.042 (0.095)	0.072 (0.089)	-0.932* (0.565)
$\Delta \sqrt{H_{-j}}$ *Wife's age			0.004 (0.003)			0.056 (0.040)			0.005 (0.004)			0.072* (0.042)
$\Delta \sqrt{H_{-j}}$ *Husband's age			-0.003 (0.003)			-0.029 (0.042)			-0.002 (0.004)			-0.027 (0.041)
$\Delta \sqrt{H_{-j}}$ *Wife's age square			-0.000 (0.000)			-0.001 (0.000)			-0.000 (0.000)			-0.001 (0.001)
$\Delta \sqrt{H_{-j}}$ *Husband's age square			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)
$\Delta \sqrt{H_{-j}}$ *Wife's secondary			-0.001 (0.009)			-0.028 (0.119)			-0.002 (0.011)			-0.020 (0.126)
$\Delta \sqrt{H_{-j}}$ *Husband's secondary			0.018 (0.011)			0.232* (0.130)			0.022* (0.013)			0.261** (0.133)
$\Delta \sqrt{H_{-j}}$ *log (household size)			0.001 (0.008)			-0.052 (0.150)			-0.001 (0.014)			-0.074 (0.212)
$\Delta \sqrt{H_{-j}}$ *Rural locality			0.017 (0.014)			0.211 (0.180)			0.029** (0.014)			0.336** (0.167)
Intercept	0.035*** (0.009)	0.132** (0.065)	0.151** (0.074)	-1.815*** (0.119)	-0.882 (0.702)	-0.785 (0.706)	0.039*** (0.010)	0.075 (0.068)	0.098 (0.078)	-1.762*** (0.115)	-0.442 (0.743)	-0.129 (0.768)
Household controls		✓	✓		✓	✓		✓	✓		✓	✓
State FE		✓	✓		✓	✓		✓	✓		✓	✓
N	3,853	3,853	3,853	3,853	3,648	3,648	2,917	2,917	2,917	2,917	2,617	2,617
Mean dependent variable	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
adj. $R^2$	-0.00	0.05	0.05				-0.00	0.05	0.05			
$\chi^2$ interactions jointly=0 (p-value)			0.54			0.64			0.43			0.27

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. The outcome variable is an indicator variable equal to 1 if the household changes the municipality of residence between MxFLS-2 and MxFLS-3.

## B.4 Effect of Violence on Household Resources

Figure B1: Heterogeneous Effects of Homicide Rates on Total Household Expenditure



Notes: Figure B1 plots marginal effects of increases in homicides on the log of total household expenditure. Each coefficient is estimated in a separate regression in which the sample is restricted to the categories reported in the left columns. Standard errors are clustered at the municipality level. Confidence intervals are constructed with a 90% significance level.



Table B9: Effect of Homicide Rates on Total Household Expenditure Controlling by Municipality Characteristics

	Households:		
	With children (1)	Nuclear with children (2)	All (3)
$\sqrt[4]{}$ Homicide rate last 12 months	-0.032 (0.032)	-0.023 (0.033)	-0.031 (0.028)
% Manufacturing employment	-0.205 (0.779)	-0.164 (0.843)	-0.128 (0.840)
% Commerce employment	-0.617 (1.024)	-0.463 (1.133)	0.043 (1.009)
% Services employment	-0.984 (0.686)	-1.231** (0.616)	-0.944 (0.654)
log(total electricity consumption)	0.097*** (0.029)	0.096*** (0.030)	0.082*** (0.027)
% of rural population	-0.545* (0.303)	-0.284 (0.350)	-0.494* (0.277)
Gini index	-0.400 (0.892)	0.052 (0.904)	-0.585 (0.888)
Food poverty index	-10.484** (4.496)	-11.316** (4.818)	-11.182** (4.638)
Capacities poverty index	13.631** (6.068)	14.326** (6.488)	14.879** (6.326)
Assets poverty index	-3.786* (2.180)	-3.703 (2.293)	-4.423* (2.367)
Household controls	✓	✓	✓
Month and year of interview FE	✓	✓	✓
Household FE	✓	✓	✓
Observations	4,517	3,571	5,413
adj. $R^2$	0.17	0.18	0.14

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. The outcome variable is the logarithm of total household expenditure on non-durable goods. Household controls include wife's and husband's age, wife's and husband's age squared, wife's and husband's secondary school dummy, number of household members by gender and age group, and rural locality dummy.

## **B.5 Wealth Instrument of Total Expenditure**

The MxFLS records households' assets by first asking, "Do/are you or any household member own [...]/owner of [...]?" If yes, it records a monetary value by asking, "What is the value of the [...]?" or "in case you had to sell, how much approximately would you ask for the [...]?" or "in case you had to buy an equivalent [...], approximately how much would it cost?"

The wealth instrument is built by taking the natural logarithm of the monetary value of all the following household assets: dwelling occupied by this household (including the land), other dwelling/building/real state/land/plot/agricultural/cattle or forest land, bicycles, motorcycles/trucks/cars/any other motorized vehicle, electronic devices (radio, TV, VCR, DVD player, computer, etc.), washer and dryer, stove, refrigerator, furniture, appliance (iron, blender, microwave, toaster, etc.), savings, financial assets, stocks, checking accounts, AFORES, coins and others, tractor/other machinery or equipment, livestock (cows, bulls, horses, pigs, chickens, etc.), other assets.

Table B10: First-Stage Regression for Total Household Expenditure

	ln(total expenditure)					
	(1)	(2)	(3)	(4)	(5)	(6)
ln(Wealth instrument)	0.084*** (0.005)	0.060*** (0.004)	0.030*** (0.004)	-0.121*** (0.014)	-0.089*** (0.012)	-0.013 (0.012)
ln(Wealth instrument) <sup>2</sup>				0.013*** (0.001)	0.010*** (0.001)	0.003*** (0.001)
Wife's age		0.003 (0.007)	0.105*** (0.021)		-0.001 (0.007)	0.101*** (0.021)
Husband's age		0.019*** (0.007)			0.014** (0.007)	
Wife's age squared		0.000 (0.000)	-0.000 (0.000)		0.000 (0.000)	-0.000 (0.000)
Husband's age squared		-0.000** (0.000)	-0.000 (0.000)		-0.000** (0.000)	-0.000 (0.000)
Wife's secondary		0.283*** (0.021)			0.245*** (0.020)	
Husband's secondary		0.241*** (0.023)			0.213*** (0.022)	
Rural locality		-0.258*** (0.034)			-0.238*** (0.032)	
# HH members by gender and age group		✓	✓		✓	✓
Household FE			✓			✓
Year FE	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓
F instrument total expenditure	238.91	200.82	48.87	76.72	53.95	37.52
p-value instrument total expenditure	0.00	0.00	0.00	0.00	0.00	0.00
N	7,430	7,430	7,430	7,430	7,430	7,430
adj. $R^2$	0.15	0.30	0.16	0.22	0.33	0.16

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at municipality level.

Table B11: First-Stage Regression for Total Household Expenditure: Nuclear Households with Children

	ln(total expenditure)					
	(1)	(2)	(3)	(4)	(5)	(6)
ln(Wealth instrument)	0.089*** (0.006)	0.060*** (0.005)	0.026*** (0.005)	-0.121*** (0.016)	-0.085*** (0.015)	-0.017 (0.014)
ln(Wealth instrument) <sup>2</sup>				0.013*** (0.001)	0.010*** (0.001)	0.003*** (0.001)
Wife's age		0.007 (0.009)	0.081*** (0.031)		0.002 (0.009)	0.078*** (0.030)
Husband's age		0.023*** (0.008)			0.018** (0.007)	
Wife's age squared		-0.000 (0.000)	-0.000 (0.000)		-0.000 (0.000)	-0.000 (0.000)
Husband's age squared		-0.000*** (0.000)	-0.000 (0.000)		-0.000*** (0.000)	-0.000 (0.000)
Wife's secondary		0.299*** (0.023)			0.262*** (0.022)	
Husband's secondary		0.249*** (0.025)			0.224*** (0.025)	
Rural locality		-0.250*** (0.033)			-0.227*** (0.032)	
# HH members by gender and age group		✓	✓		✓	✓
Household FE			✓			✓
Year FE	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓
F instrument total expenditure	200.79	156.56	28.77	54.58	33.19	26.94
p-value instrument total expenditure	0.00	0.00	0.00	0.00	0.00	0.00
N	5,834	5,834	5,834	5,834	5,834	5,834
adj. $R^2$	0.16	0.32	0.17	0.23	0.35	0.17

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at municipality level.

## B.6 Municipality Prices

Tables B12 and B13 present the results of the following specification:

$$\ln(p_{jt}^k) = \delta_j^k + \lambda_t^k + \beta^k H_{jt} + \pi_{st}^k + \epsilon_{jt}^k, \quad (\text{B2})$$

where  $\ln(p_{jt}^k)$  is the logarithm of the median price of good  $k$  on municipality  $j$  and survey wave  $t$ . The prices come from a community questionnaire collected by the MxFLS survey that collects market price data from a variety of shops distributed across the municipality.

Table B12: Effects of Homicide Rates on Market Prices

	Food		HH goods		Male clothing		Female clothing		Child clothing	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
✓ Homicide rate last 12 months	-0.033* (0.018)	-0.012 (0.029)	-0.068 (0.048)	-0.028 (0.054)	-0.052 (0.035)	-0.025 (0.034)	-0.070 (0.043)	-0.075 (0.048)	-0.006 (0.041)	0.052 (0.033)
_cons	2.209*** (0.024)	2.152*** (0.046)	2.886*** (0.065)	2.875*** (0.115)	5.149*** (0.049)	5.164*** (0.102)	5.099*** (0.060)	4.986*** (0.088)	4.951*** (0.059)	4.837*** (0.109)
Municipality FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
State-Survey FE		✓		✓		✓		✓		✓
Y mean	2.36	2.36	2.84	2.84	5.13	5.13	5.05	5.05	4.99	4.99
Observations	255	255	255	255	236	236	237	237	234	234
adj. $R^2$	0.87	0.90	0.10	0.35	0.12	0.43	0.11	0.30	0.10	0.45

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. The outcome variable is the logarithm of the median municipality price.

Table B13: Effects of Homicide Rates on Food Market Prices

	Fruit & Veg.		Cereals & Grains		Meat & Dairy		Other food	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
✓ Homicide rate last 12 months	0.001 (0.019)	0.006 (0.031)	-0.014 (0.021)	-0.025 (0.031)	-0.060 (0.039)	-0.022 (0.045)	-0.055** (0.024)	-0.053** (0.027)
_cons	1.979*** (0.027)	2.151*** (0.046)	1.880*** (0.029)	1.867*** (0.051)	3.717*** (0.052)	3.588*** (0.078)	2.136*** (0.031)	2.140*** (0.036)
Municipality FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Survey FE		✓		✓		✓		✓
Y mean	2.27	2.27	2.07	2.07	3.71	3.71	2.24	2.24
Observations	254	254	255	255	253	253	255	255
adj. $R^2$	0.88	0.92	0.88	0.90	0.20	0.34	0.90	0.92

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. The outcome variable is the logarithm of the median municipality price.

## B.7 Additional Analysis: Engel Curves

Table B14: Expenditure Elasticities

	Households with children			Nuclear households		
	Elasticity	95% Confidence Interval		Elasticity	95% Confidence Interval	
		Lower bound	Upper bound		Lower bound	Upper bound
Food	0.69	0.56	0.82	0.65	0.45	0.84
Drinks and Tob.	0.96	0.45	1.47	1.18	0.50	1.87
Male adult clothing	1.96	1.33	2.59	1.70	0.91	2.49
Female adult clothing	1.85	0.93	2.76	1.56	0.27	2.84
Children goods	1.51	0.75	2.27	1.69	0.59	2.79
Hygiene and care	0.80	0.43	1.18	0.88	0.38	1.38
Other household goods	1.26	0.94	1.59	1.36	0.92	1.80
Transportation	1.76	1.31	2.20	1.65	1.03	2.27
Health	1.70	0.73	2.66	2.25	0.98	3.52
Education	1.27	0.75	1.79	1.25	0.47	2.04
Recreation	1.96	0.94	2.99	1.77	0.41	3.14
Gambling	4.67	-0.25	9.58	5.62	-1.91	13.15

Notes: The elasticities are calculated as  $1 + \frac{\beta^k}{W^k}$ , with  $W^k$  equal to the average budget share for good  $k$  across the two survey waves. The estimates come from columns (1) and (4) of Table 4.

Table B15: Familywise Error Rate p-values

	(1)	(2)	(3)	(4)	(5)	(6)
	Households with children		Nuclear households with children		All households	
	$\psi$ Homicide rate last 12 months	FWER p-value	$\psi$ Homicide rate last 12 months	FWER p-value	$\psi$ Homicide rate last 12 months	FWER p-value
Food	-1.08**	0.03	-1.30**	0.02	-0.97**	0.04
Drinks and Tob.	0.02	0.89	-0.01	0.92	0.05	0.68
Female adult clothing	0.04	0.55	0.06	0.48	0.06	0.37
Male adult clothing	0.25***	0.00	0.28***	0.00	0.23***	0.00
Children goods	-0.14	0.37	-0.12	0.49	-0.08	0.54
Education	0.08	0.48	0.08	0.52	0.08	0.35
Health	0.15	0.38	0.24	0.24	0.24	0.13
Transportation	0.58*	0.08	0.30	0.44	0.42	0.15
Hygiene and care	-0.38*	0.06	-0.37*	0.07	-0.46**	0.01
Other household goods	0.23	0.42	0.53*	0.06	0.23	0.34
Recreation	0.16	0.43	0.20	0.40	0.08	0.63
Gambling	0.06	0.34	0.08	0.35	0.06	0.31

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . p-values are calculated controlling for the familywise error rate (FWER), this is the probability of making any type I error across the 12 equations. The procedure allows for p-values to be correlated across specifications using a bootstrapping approach (3,000 replications) and clustering errors at the municipality level. Calculations use the *mhtreg* Stata package developed by Andreas Steinmayr, LMU Munich.

Table B16: Effect of Homicide Rates on Food Type Budget Shares

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Households with children			Nuclear with children			All households		
<b>Fruit &amp; Veg.</b>	-0.28 (0.23)	-0.29 (0.23)	-0.29 (0.23)	-0.33 (0.25)	-0.33 (0.25)	-0.33 (0.25)	-0.22 (0.22)	-0.22 (0.22)	-0.22 (0.22)
<b>Cereals &amp; Grains</b>	-0.22 (0.27)	-0.23 (0.27)	-0.23 (0.27)	-0.41 (0.27)	-0.41 (0.27)	-0.41 (0.27)	-0.22 (0.30)	-0.23 (0.31)	-0.23 (0.31)
<b>Meat &amp; Dairy</b>	-0.43 (0.40)	-0.43 (0.40)	-0.43 (0.40)	-0.31 (0.41)	-0.31 (0.41)	-0.31 (0.41)	-0.33 (0.36)	-0.34 (0.36)	-0.34 (0.36)
<b>Other food</b>	-0.16 (0.19)	-0.16 (0.19)	-0.15 (0.19)	-0.26 (0.21)	-0.26 (0.21)	-0.26 (0.21)	-0.22 (0.17)	-0.22 (0.17)	-0.22 (0.17)
Drinks and Tob.	0.02 (0.13)	0.02 (0.13)	0.02 (0.13)	-0.01 (0.13)	-0.01 (0.13)	-0.01 (0.13)	0.05 (0.13)	0.05 (0.13)	0.05 (0.13)
Male adult clothing	0.25*** (0.08)	0.25*** (0.08)	0.25*** (0.08)	0.28*** (0.09)	0.28*** (0.09)	0.28*** (0.09)	0.23*** (0.07)	0.23*** (0.07)	0.23*** (0.07)
Female adult clothing	0.04 (0.07)	0.04 (0.07)	0.04 (0.08)	0.06 (0.09)	0.06 (0.09)	0.06 (0.09)	0.06 (0.07)	0.06 (0.07)	0.06 (0.07)
Children goods	-0.14 (0.15)	-0.15 (0.15)	-0.15 (0.15)	-0.12 (0.18)	-0.11 (0.19)	-0.11 (0.19)	-0.08 (0.14)	-0.07 (0.14)	-0.05 (0.13)
Hygiene and care	-0.38* (0.20)	-0.38* (0.20)	-0.38* (0.20)	-0.37* (0.20)	-0.37* (0.20)	-0.37* (0.20)	-0.46** (0.18)	-0.46** (0.18)	-0.46** (0.18)
Other household goods	0.23 (0.30)	0.23 (0.30)	0.23 (0.30)	0.53* (0.32)	0.53* (0.32)	0.53* (0.32)	0.23 (0.28)	0.25 (0.27)	0.25 (0.27)
Transportation	0.58* (0.34)	0.58* (0.34)	0.58* (0.34)	0.30 (0.37)	0.29 (0.37)	0.29 (0.37)	0.42 (0.29)	0.42 (0.29)	0.42 (0.29)
Health	0.15 (0.18)	0.15 (0.18)	0.15 (0.18)	0.24 (0.21)	0.24 (0.21)	0.24 (0.21)	0.24 (0.16)	0.24 (0.16)	0.24 (0.16)
Education	0.08 (0.12)	0.08 (0.12)	0.08 (0.12)	0.08 (0.13)	0.07 (0.14)	0.07 (0.14)	0.08 (0.09)	0.08 (0.09)	0.08 (0.10)
Recreation	0.16 (0.20)	0.18 (0.20)	0.18 (0.19)	0.20 (0.23)	0.20 (0.23)	0.20 (0.23)	0.08 (0.18)	0.09 (0.18)	0.09 (0.18)
Gambling	0.06 (0.04)	0.06 (0.04)	0.06* (0.04)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.06* (0.03)	0.06* (0.03)	0.06* (0.03)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,430	7,430	7,430	5,834	5,834	5,834	8,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B17: Effect of Homicide Rates on Hygiene Budget Shares

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Households with children			Nuclear with children			All households		
Food	-1.08*	-1.10*	-1.10*	-1.30**	-1.30**	-1.30**	-0.97*	-0.98*	-0.98*
	(0.56)	(0.56)	(0.56)	(0.63)	(0.63)	(0.63)	(0.51)	(0.51)	(0.51)
Drinks and Tob.	0.02	0.02	0.02	-0.01	-0.01	-0.01	0.05	0.05	0.05
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Male adult clothing	0.25***	0.25***	0.25***	0.28***	0.28***	0.28***	0.23***	0.23***	0.23***
	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)	(0.07)	(0.07)	(0.07)
Female adult clothing	0.04	0.04	0.04	0.06	0.06	0.06	0.06	0.06	0.06
	(0.07)	(0.07)	(0.08)	(0.09)	(0.09)	(0.09)	(0.07)	(0.07)	(0.07)
Children goods	-0.14	-0.15	-0.15	-0.12	-0.11	-0.11	-0.08	-0.07	-0.05
	(0.15)	(0.15)	(0.15)	(0.18)	(0.19)	(0.19)	(0.14)	(0.14)	(0.13)
<b>Household hygiene and care</b>	-0.20	-0.20	-0.20	-0.22*	-0.22*	-0.22*	-0.23	-0.23	-0.23
	(0.14)	(0.14)	(0.14)	(0.13)	(0.13)	(0.13)	(0.15)	(0.15)	(0.15)
<b>Male care goods</b>	-0.09	-0.09*	-0.10	-0.07	-0.07	-0.07	-0.10*	-0.10*	-0.11**
	(0.06)	(0.05)	(0.06)	(0.07)	(0.07)	(0.07)	(0.05)	(0.05)	(0.06)
<b>Female care goods</b>	-0.06	-0.06	-0.06	-0.05	-0.05	-0.05	-0.10	-0.10	-0.10
	(0.07)	(0.07)	(0.07)	(0.09)	(0.09)	(0.09)	(0.06)	(0.07)	(0.07)
Other household goods	0.23	0.23	0.23	0.53*	0.53*	0.53*	0.23	0.25	0.25
	(0.30)	(0.30)	(0.30)	(0.32)	(0.32)	(0.32)	(0.28)	(0.27)	(0.27)
Transportation	0.58*	0.58*	0.58*	0.30	0.29	0.29	0.42	0.42	0.42
	(0.34)	(0.34)	(0.34)	(0.37)	(0.37)	(0.37)	(0.29)	(0.29)	(0.29)
Health	0.15	0.15	0.15	0.24	0.24	0.24	0.24	0.24	0.24
	(0.18)	(0.18)	(0.18)	(0.21)	(0.21)	(0.21)	(0.16)	(0.16)	(0.16)
Education	0.08	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08
	(0.12)	(0.12)	(0.12)	(0.13)	(0.14)	(0.14)	(0.09)	(0.09)	(0.10)
Recreation	0.16	0.18	0.18	0.20	0.20	0.20	0.08	0.09	0.09
	(0.20)	(0.20)	(0.19)	(0.23)	(0.23)	(0.23)	(0.18)	(0.18)	(0.18)
Gambling	0.06	0.06	0.06*	0.08	0.08	0.08	0.06*	0.06*	0.06*
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.03)	(0.03)	(0.03)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,430	7,430	7,430	5,834	5,834	5,834	8,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.



Table B18: Effect of Homicide Rates on Expenditure Shares. Female and Male Goods.

	Households with children			Nuclear with children			All households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Food	-1.08* (0.56)	-1.10* (0.56)	-1.10* (0.56)	-1.30** (0.63)	-1.30** (0.63)	-1.30** (0.63)	-0.97* (0.51)	-0.98* (0.51)	-0.98* (0.51)
Drinks and Tob.	0.02 (0.13)	0.02 (0.13)	0.02 (0.13)	-0.01 (0.13)	-0.01 (0.13)	-0.01 (0.13)	0.05 (0.13)	0.05 (0.13)	0.05 (0.13)
Male goods	0.16 (0.11)	0.16 (0.11)	0.16 (0.11)	0.21* (0.12)	0.21* (0.12)	0.21* (0.12)	0.13 (0.10)	0.13 (0.10)	0.13 (0.10)
Female goods	-0.03 (0.11)	-0.03 (0.11)	-0.03 (0.11)	0.00 (0.13)	0.00 (0.13)	0.00 (0.13)	-0.05 (0.11)	-0.05 (0.11)	-0.06 (0.11)
Children goods	-0.14 (0.15)	-0.15 (0.15)	-0.15 (0.15)	-0.12 (0.18)	-0.11 (0.19)	-0.11 (0.19)	-0.08 (0.14)	-0.07 (0.14)	-0.05 (0.13)
Household Hygiene and care	-0.20 (0.14)	-0.20 (0.14)	-0.20 (0.14)	-0.22* (0.13)	-0.22* (0.13)	-0.22* (0.13)	-0.23 (0.15)	-0.23 (0.15)	-0.23 (0.15)
Other household goods	0.23 (0.30)	0.23 (0.30)	0.23 (0.30)	0.53* (0.32)	0.53* (0.32)	0.53* (0.32)	0.23 (0.28)	0.25 (0.27)	0.25 (0.27)
Transportation	0.58* (0.34)	0.58* (0.34)	0.58* (0.34)	0.30 (0.37)	0.29 (0.37)	0.29 (0.37)	0.42 (0.29)	0.42 (0.29)	0.42 (0.29)
Health	0.15 (0.18)	0.15 (0.18)	0.15 (0.18)	0.24 (0.21)	0.24 (0.21)	0.24 (0.21)	0.24 (0.16)	0.24 (0.16)	0.24 (0.16)
Education	0.08 (0.12)	0.08 (0.12)	0.08 (0.12)	0.08 (0.13)	0.07 (0.14)	0.07 (0.14)	0.08 (0.09)	0.08 (0.09)	0.08 (0.10)
Recreation	0.16 (0.20)	0.18 (0.20)	0.18 (0.20)	0.20 (0.23)	0.20 (0.23)	0.20 (0.23)	0.08 (0.18)	0.09 (0.18)	0.09 (0.18)
Gambling	0.06 (0.04)	0.06 (0.04)	0.06 (0.04)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.06* (0.03)	0.06* (0.03)	0.06* (0.03)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,430	7,430	7,430	5,834	5,834	5,834	8,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B19: MxFLS Wave 1 and Wave 2 Placebo Test: Coefficients on Log Expenditure

	Households with children			Nuclear with children			All households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Food	-16.77*** (5.72)	-16.70*** (5.53)	-16.78*** (5.44)	-16.24*** (5.12)	-16.23*** (5.14)	-16.23*** (5.14)	-21.03*** (6.41)	-20.90*** (6.11)	-20.90*** (6.06)
Drinks and Tob.	1.36 (1.14)	1.36 (1.14)	1.36 (1.14)	1.18 (1.22)	1.18 (1.23)	1.18 (1.23)	1.01 (1.28)	1.01 (1.28)	1.06 (1.31)
Male adult clothing	1.97** (0.82)	1.97** (0.82)	1.97** (0.82)	1.35** (0.68)	1.36** (0.69)	1.36** (0.69)	2.50*** (0.84)	2.50*** (0.84)	2.52*** (0.85)
Female adult clothing	0.70 (0.71)	0.69 (0.72)	0.69 (0.72)	0.57 (0.72)	0.57 (0.72)	0.58 (0.72)	0.83 (0.68)	0.83 (0.68)	0.83 (0.68)
Children goods	0.05 (1.05)	0.05 (1.05)	0.05 (1.05)	0.52 (1.04)	0.61 (1.05)	0.61 (1.05)	0.15 (0.94)	0.15 (0.94)	0.12 (0.96)
Hygiene and care	-2.17 (1.72)	-2.17 (1.72)	-2.17 (1.72)	-2.22 (1.48)	-2.22 (1.49)	-2.22 (1.49)	-2.15 (1.62)	-2.15 (1.61)	-2.19 (1.62)
Other household goods	3.47 (2.71)	3.47 (2.71)	3.47 (2.71)	3.96 (2.99)	3.96 (2.98)	3.96 (2.98)	6.37** (3.11)	6.70** (2.95)	6.74** (2.98)
Transportation	9.74*** (3.43)	9.74*** (3.43)	9.74*** (3.41)	9.79*** (3.11)	9.79*** (3.11)	9.79*** (3.11)	9.86*** (3.55)	9.77*** (3.37)	9.69*** (3.40)
Health	-0.65 (1.33)	-0.54 (1.30)	-0.56 (1.30)	-0.54 (1.43)	-0.54 (1.43)	-0.58 (1.42)	-0.45 (1.43)	-0.44 (1.43)	-0.49 (1.44)
Education	0.16 (1.16)	0.16 (1.16)	0.16 (1.16)	-0.32 (1.43)	-0.32 (1.42)	-0.32 (1.42)	0.22 (1.01)	0.22 (1.01)	0.21 (1.02)
Recreation	2.02 (1.63)	2.02 (1.63)	2.21 (1.62)	1.46 (1.85)	1.46 (1.85)	1.68 (1.84)	2.41 (1.50)	2.40 (1.49)	2.42 (1.52)
Gambling	0.23 (0.19)	0.23 (0.19)	0.23 (0.19)	0.39* (0.23)	0.39* (0.23)	0.39* (0.23)	0.19 (0.18)	0.19 (0.18)	0.20 (0.18)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,886	7,886	7,886	5,736	5,736	5,736	9,252	9,252	9,252

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\beta^k$  on  $\ln(y)$  of each demand equation (11) using data from MxFLS-1 and MxFLS-2 and the homicide rate of the subsequent survey wave. Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B20: MxFLS Wave 1 and Wave 2 Placebo Test: Effect of Homicide Rates on Expenditure Shares

	Households with children			Nuclear with children			All households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Food	1.79** (0.84)	1.78** (0.83)	1.66** (0.82)	1.64* (0.92)	1.62* (0.92)	1.62* (0.92)	2.07** (0.85)	2.06** (0.84)	1.96** (0.82)
Drinks and Tob.	-0.35* (0.20)	-0.35* (0.20)	-0.36* (0.20)	-0.42* (0.23)	-0.42* (0.23)	-0.42* (0.23)	-0.30* (0.18)	-0.30* (0.18)	-0.32* (0.19)
Male adult clothing	-0.14 (0.11)	-0.14 (0.11)	-0.14 (0.11)	-0.07 (0.12)	-0.07 (0.12)	-0.07 (0.12)	-0.17 (0.12)	-0.16 (0.12)	-0.17 (0.12)
Female adult clothing	-0.12 (0.11)	-0.11 (0.11)	-0.10 (0.11)	-0.10 (0.11)	-0.09 (0.11)	-0.08 (0.11)	-0.11 (0.11)	-0.11 (0.11)	-0.10 (0.11)
Children goods	-0.29* (0.18)	-0.29* (0.18)	-0.26 (0.18)	-0.35 (0.22)	-0.40* (0.23)	-0.40* (0.23)	-0.27* (0.16)	-0.26* (0.16)	-0.24 (0.16)
Hygiene and care	0.02 (0.22)	0.02 (0.22)	0.02 (0.22)	0.04 (0.26)	0.04 (0.26)	0.04 (0.26)	0.06 (0.21)	0.06 (0.21)	0.07 (0.22)
Other household goods	-0.58 (0.49)	-0.58 (0.49)	-0.54 (0.50)	-0.21 (0.54)	-0.21 (0.54)	-0.21 (0.54)	-0.78 (0.55)	-0.82 (0.55)	-0.82 (0.54)
Transportation	-0.27 (0.55)	-0.27 (0.55)	-0.22 (0.54)	-0.34 (0.62)	-0.34 (0.62)	-0.34 (0.62)	-0.30 (0.46)	-0.29 (0.46)	-0.22 (0.44)
Health	0.21 (0.27)	0.18 (0.27)	0.21 (0.28)	0.29 (0.32)	0.29 (0.32)	0.29 (0.32)	0.08 (0.27)	0.08 (0.27)	0.11 (0.28)
Education	-0.29** (0.12)	-0.29** (0.12)	-0.29** (0.12)	-0.33** (0.14)	-0.33** (0.14)	-0.33** (0.14)	-0.27*** (0.10)	-0.27*** (0.10)	-0.26** (0.11)
Recreation	-0.01 (0.19)	-0.01 (0.19)	-0.07 (0.19)	-0.08 (0.24)	-0.08 (0.24)	-0.16 (0.23)	-0.03 (0.17)	-0.03 (0.17)	-0.03 (0.18)
Gambling	-0.00 (0.02)	-0.00 (0.02)	-0.01 (0.02)	-0.01 (0.03)	-0.01 (0.03)	-0.01 (0.03)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,886	7,886	7,886	5,736	5,736	5,736	9,252	9,252	9,252

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11) using data from MxFLS-1 and MxFLS-2 and the homicide rate of the subsequent survey wave. Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B21: Effects of Homicide Rates on Budget Shares: Municipality Economic Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Households with children			Nuclear with children			All households		
Food	-1.01*	-1.04*	-1.04*	-1.20*	-1.19*	-1.19*	-0.93*	-0.91*	-0.87*
	(0.60)	(0.61)	(0.61)	(0.67)	(0.68)	(0.68)	(0.52)	(0.53)	(0.50)
Drinks and Tob.	0.06	0.06	0.06	0.03	0.03	0.03	0.09	0.09	0.09
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.13)
Male adult clothing	0.24***	0.23***	0.23***	0.27***	0.26***	0.26***	0.22***	0.20***	0.19***
	(0.08)	(0.08)	(0.08)	(0.09)	(0.10)	(0.10)	(0.07)	(0.07)	(0.07)
Female adult clothing	0.04	0.05	0.05	0.07	0.07	0.07	0.06	0.06	0.05
	(0.08)	(0.08)	(0.08)	(0.10)	(0.10)	(0.10)	(0.07)	(0.07)	(0.07)
Children goods	-0.18	-0.16	-0.16	-0.16	-0.17	-0.17	-0.09	-0.10	-0.11
	(0.15)	(0.15)	(0.15)	(0.18)	(0.18)	(0.18)	(0.13)	(0.13)	(0.13)
Hygiene and care	-0.36*	-0.37*	-0.37*	-0.35*	-0.36*	-0.36*	-0.46**	-0.46***	-0.46***
	(0.21)	(0.20)	(0.20)	(0.21)	(0.21)	(0.21)	(0.18)	(0.17)	(0.17)
Other household goods	0.20	0.14	0.14	0.52	0.45	0.45	0.22	0.13	0.12
	(0.33)	(0.31)	(0.31)	(0.36)	(0.35)	(0.35)	(0.27)	(0.29)	(0.27)
Transportation	0.56	0.53	0.53	0.25	0.24	0.24	0.42	0.39	0.45
	(0.36)	(0.37)	(0.37)	(0.41)	(0.41)	(0.41)	(0.30)	(0.30)	(0.31)
Health	0.14	0.15	0.15	0.25	0.27	0.27	0.23	0.25	0.24
	(0.18)	(0.18)	(0.18)	(0.21)	(0.21)	(0.21)	(0.16)	(0.16)	(0.16)
Education	0.06	0.06	0.06	0.06	0.08	0.08	0.08	0.07	0.07
	(0.13)	(0.13)	(0.13)	(0.15)	(0.14)	(0.14)	(0.10)	(0.09)	(0.09)
Recreation	0.17	0.17	0.17	0.20	0.22	0.22	0.10	0.09	0.11
	(0.21)	(0.21)	(0.21)	(0.25)	(0.25)	(0.25)	(0.19)	(0.19)	(0.19)
Gambling	0.07	0.07	0.07	0.08	0.08	0.08	0.06*	0.06*	0.06*
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.03)	(0.04)	(0.04)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,088	7,088	7,088	5,570	5,570	5,570	8,410	8,410	8,410

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100. The municipality-level controls are the following: share of manufacturing, commerce, and services employment, share of rural population, Gini index, food poverty index, assets poverty index, and capacities poverty index. Sources: Population Census, Federal Electricity Commission, ENIGH, Technical Committee on Poverty Measurement. The three poverty measures are monetary poverty measures. Capacities poverty is defined as the lack of sufficient household resources to maintain expenditures on a minimum diet, education, and health care. Assets poverty expands the notion of capabilities poverty to include households that cannot afford clothing, housing, energy, and transportation expenditures.

Table B22: Effect of Homicide Rates on Expenditure Shares, Excluding Top and Bottom Expenditure 1%

	Households with children			Nuclear with children			All households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Food	-1.33** (0.55)	-1.32** (0.55)	-1.32** (0.55)	-1.53** (0.61)	-1.54** (0.61)	-1.54** (0.61)	-1.13** (0.48)	-1.14** (0.48)	-1.10** (0.46)
Drinks and Tob.	0.05 (0.15)	0.05 (0.15)	-0.15 (0.17)	0.01 (0.13)	0.01 (0.13)	0.01 (0.13)	0.02 (0.14)	0.01 (0.14)	0.01 (0.13)
Male adult clothing	0.23*** (0.08)	0.23*** (0.08)	0.23*** (0.08)	0.24*** (0.08)	0.24*** (0.08)	0.24*** (0.08)	0.22*** (0.07)	0.22*** (0.07)	0.21*** (0.07)
Female adult clothing	0.06 (0.08)	0.06 (0.08)	0.06 (0.08)	0.06 (0.09)	0.07 (0.09)	0.07 (0.09)	0.06 (0.07)	0.06 (0.07)	0.06 (0.07)
Children goods	-0.14 (0.15)	-0.16 (0.16)	-0.16 (0.16)	-0.08 (0.18)	-0.09 (0.19)	-0.09 (0.19)	-0.07 (0.14)	-0.04 (0.14)	-0.04 (0.13)
Hygiene and care	-0.36* (0.19)	-0.35* (0.19)	-0.35* (0.19)	-0.41** (0.20)	-0.40** (0.20)	-0.40** (0.20)	-0.46*** (0.18)	-0.47*** (0.18)	-0.46*** (0.17)
Other household goods	0.27 (0.33)	0.29 (0.33)	0.29 (0.33)	0.57* (0.34)	0.58* (0.35)	0.58* (0.35)	0.26 (0.29)	0.28 (0.29)	0.27 (0.28)
Transportation	0.72** (0.36)	0.71** (0.35)	0.71** (0.36)	0.43 (0.38)	0.43 (0.38)	0.43 (0.38)	0.58* (0.31)	0.58* (0.31)	0.56* (0.31)
Health	0.11 (0.18)	0.11 (0.18)	0.11 (0.18)	0.21 (0.21)	0.20 (0.21)	0.20 (0.21)	0.22 (0.16)	0.23 (0.16)	0.22 (0.16)
Education	0.10 (0.12)	0.09 (0.12)	0.09 (0.12)	0.14 (0.14)	0.13 (0.14)	0.13 (0.14)	0.10 (0.10)	0.09 (0.10)	0.08 (0.10)
Recreation	0.25 (0.19)	0.26 (0.19)	0.26 (0.19)	0.34 (0.21)	0.34 (0.21)	0.34 (0.21)	0.13 (0.17)	0.13 (0.17)	0.14 (0.17)
Gambling	0.02* (0.01)	0.02* (0.01)	0.02* (0.01)	0.03* (0.01)	0.02* (0.01)	0.02* (0.01)	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)
Double Lasso	✓	✓	✓	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Lasso High Dimensional		✓	✓		✓	✓		✓	✓
Price proxy			✓			✓			✓
Observations	7,170	7,170	7,170	5,626	5,626	5,626	8,522	8,522	8,522

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B23: Effect of Homicide Rates on Budget Shares: Transformations of Homicide Rates

	Households with children		Nuclear with children		All households	
	(1) log ( Hom. rate )	(2) IHS ( Hom. rate )	(3) log ( Hom. rate )	(4) IHS ( Hom. rate )	(5) log ( Hom. rate )	(6) IHS ( Hom. rate )
Food	-0.68* (0.39)	-0.33* (0.19)	-0.81* (0.44)	-0.40* (0.22)	-0.60* (0.36)	-0.30* (0.18)
Drinks and Tob.	0.03 (0.09)	0.01 (0.04)	-0.01 (0.09)	-0.00 (0.04)	0.05 (0.09)	0.03 (0.04)
Male adult clothing	0.18*** (0.06)	0.09*** (0.03)	0.20*** (0.06)	0.10*** (0.03)	0.16*** (0.05)	0.08*** (0.03)
Female adult clothing	0.04 (0.05)	0.02 (0.03)	0.06 (0.06)	0.03 (0.03)	0.04 (0.05)	0.02 (0.02)
Children goods	-0.11 (0.10)	-0.06 (0.05)	-0.11 (0.12)	-0.05 (0.06)	-0.07 (0.09)	-0.04 (0.05)
Hygiene and care	-0.28** (0.13)	-0.14** (0.06)	-0.26* (0.14)	-0.13* (0.07)	-0.33*** (0.12)	-0.16*** (0.06)
Other household goods	0.16 (0.21)	0.08 (0.10)	0.36 (0.22)	0.18 (0.11)	0.17 (0.20)	0.09 (0.10)
Transportation	0.32 (0.23)	0.16 (0.12)	0.13 (0.25)	0.06 (0.13)	0.23 (0.21)	0.12 (0.10)
Health	0.12 (0.12)	0.06 (0.06)	0.17 (0.14)	0.08 (0.07)	0.16 (0.11)	0.08 (0.05)
Education	0.04 (0.08)	0.02 (0.04)	0.05 (0.09)	0.02 (0.05)	0.06 (0.07)	0.03 (0.03)
Recreation	0.12 (0.13)	0.06 (0.07)	0.15 (0.15)	0.07 (0.07)	0.05 (0.12)	0.02 (0.06)
Gambling	0.04* (0.02)	0.02* (0.01)	0.05* (0.03)	0.03* (0.01)	0.04* (0.02)	0.02* (0.01)
Double Lasso	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓
Observations	7,430	7,430	5,834	5,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table B23 reports the different coefficient  $\gamma^k$  on the several transformations of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B24: Effect of Homicide Rates on Expenditure Shares: QUAIDS

	(1) Households with children	(2) Nuclear with children	(3) All households
Food	-1.07* (0.56)	-1.28** (0.60)	-0.97* (0.50)
Drinks and Tob.	0.02 (0.13)	-0.01 (0.12)	0.05 (0.13)
Male adult clothing	0.25*** (0.08)	0.29*** (0.09)	0.23*** (0.07)
Female adult clothing	0.04 (0.07)	0.06 (0.09)	0.05 (0.07)
Children goods	-0.14 (0.15)	-0.12 (0.18)	-0.08 (0.14)
Hygiene and care	-0.37* (0.19)	-0.37* (0.20)	-0.45** (0.18)
Other household goods	0.23 (0.30)	0.53* (0.31)	0.23 (0.28)
Transportation	0.57 (0.35)	0.29 (0.39)	0.41 (0.29)
Health	0.15 (0.18)	0.24 (0.21)	0.25 (0.16)
Education	0.08 (0.12)	0.08 (0.13)	0.08 (0.09)
Recreation	0.16 (0.20)	0.20 (0.22)	0.09 (0.18)
Gambling	0.06 (0.04)	0.08 (0.05)	0.06* (0.03)
Double Lasso	✓	✓	✓
Survey FE	✓	✓	✓
Household FE	✓	✓	✓
Instrument expenditure	✓	✓	✓
Observations	7,430	5,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11) augmented with  $\ln(y)^2$ . Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

### B.7.1 Randomization-Based Inference

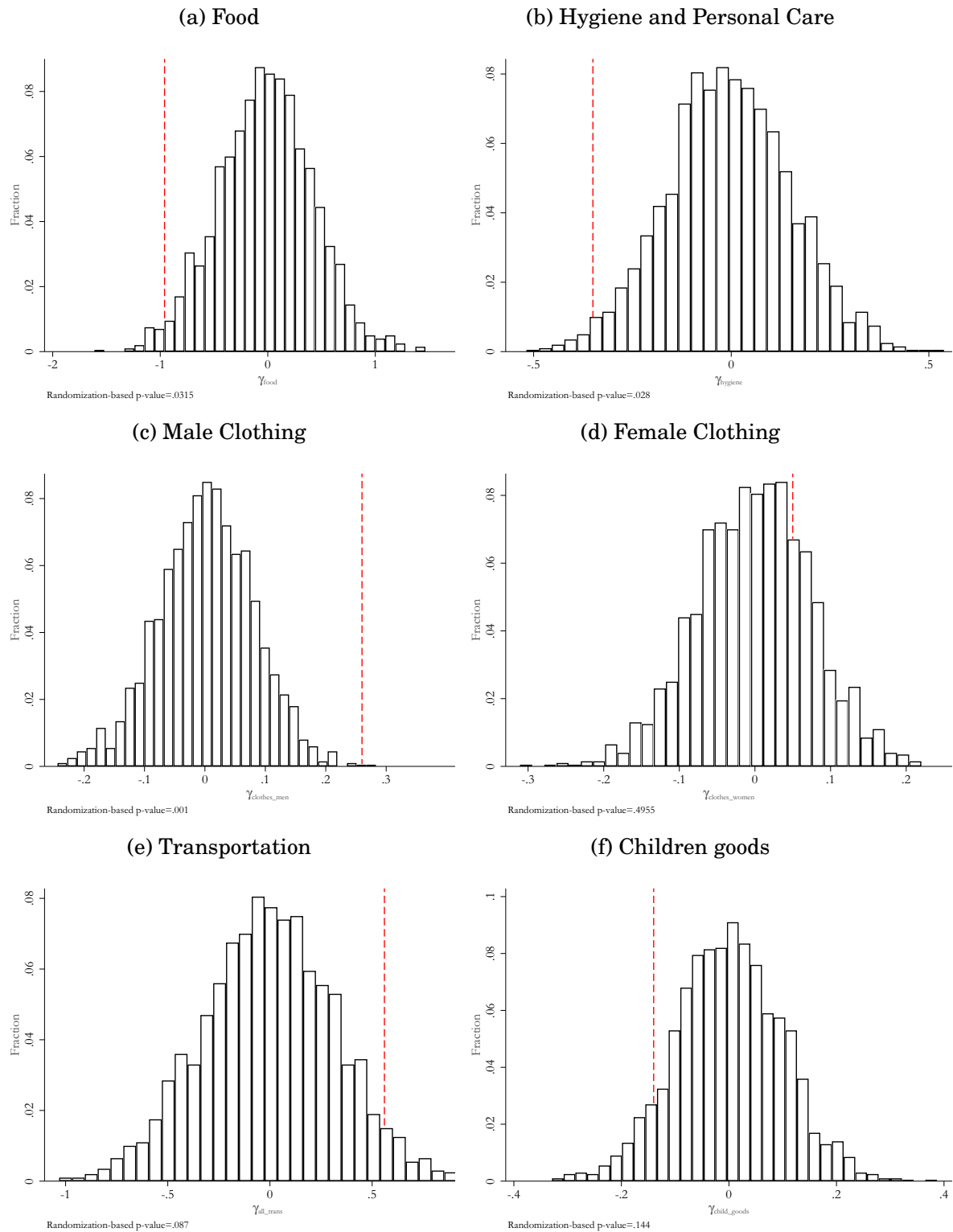
To analyze the likelihood that the main results could have occurred by chance, I generate randomness in the exposure to increased local violence and calculate randomization-based p-values ([Athey and Imbens 2016](#); [Young 2019](#)). It consists on randomly reassigning increases in homicides, drawing values from the original distribution in the sample of interest. I then reestimate the main set of results and calculate what the coefficient of interest would have been under this new distribution of homicide rates. The observed outcome variables do not change for any unit under the null hypothesis, but the estimate of the coefficient on homicides does. I repeat the procedure 2,000 times.<sup>33</sup> The randomization-based p-value is the proportion of reassigned estimates at least as large in absolute value as the actual estimate. I plot the distribution of coefficient estimates in Figure B2. The vertical dashed line in each graph plots the estimated coefficient in the main specification. The p-values associated with these statistics, also reported in Figure B2 footnotes, are approximately 0.03 (food budget share), 0.03 (hygiene/personal care budget share), 0.001 (male adult clothing), 0.50 (female adult clothing), 0.08 (transportation), and 0.14 (children goods). These p-values indicate that the sharp null hypothesis—that the increase in homicides had no effect on households' expenditure shares among these good categories—should be rejected further confirming the main results.

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<sup>33</sup>[Young \(2019\)](#) finds no appreciable changes in rejection rates after 2,000 repetitions.



Figure B2: Randomization Inference of Homicide Rate's Effects on Budget Shares



Notes: These figures show the distribution of the homicides coefficients obtained from column (1) specification of Table 5 while randomly replacing the change in the quartic root of the municipality's homicide rate. The random reassignments come from the original distribution of homicide rates of the analytical sample. The red dashed line represents actual estimates from the main specification.

## B.8 Potential Mechanisms

Table B25: Effect of Homicides on Household Composition

	Number Female					Number Male					HHsize	Log(hhsize)
	0-6	7-11	12-18	18-55	+55	0-6	7-11	12-18	18-55	+55		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
✓ Homicide rate last 12 months	-0.008 (0.010)	0.021 (0.015)	-0.019 (0.013)	-0.007 (0.013)	0.002 (0.006)	0.008 (0.010)	-0.024* (0.013)	0.009 (0.013)	0.002 (0.014)	-0.001 (0.005)	-0.010 (0.022)	-0.002 (0.004)
Intercept	4.458*** (0.768)	-0.208 (0.601)	0.142 (0.770)	-1.263 (0.868)	1.041*** (0.276)	3.882*** (1.253)	1.504* (0.824)	-1.710** (0.782)	-0.139 (1.178)	0.151 (0.408)	4.124** (1.600)	1.103*** (0.273)
Household controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	8,834	8,834	8,834	8,834	8,834	8,834	8,834	8,834	8,834	8,834	8,834	8,834
adj. $R^2$	0.21	0.01	0.02	0.04	0.10	0.20	0.01	0.02	0.02	0.09	0.16	0.17

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Columns (1)-(5) outcome variable is the number of female members in the corresponding age group living in the household. Columns (6)-(10) outcome variable is the number of male members in the corresponding age group living in the household. Columns (11) and (12) outcome variables are the number and logarithm of household size, respectively.

Table B26: Effect of homicides on Male Labor Supply: Households with Children

	Husband Worked Last Week		Husband ✓ Hours Worked Last 12 Months		Household Men ✓ Hours worked last 12 months	
	(1)	(2)	(3)	(4)	(5)	(6)
✓ Homicide rate last 12 months	-0.005 (0.013)	0.001 (0.012)	0.025 (0.087)	0.095 (0.077)	0.013 (0.094)	0.100 (0.075)
Household controls	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Observations	6,364	5,317	6,078	5,123	5,308	4,517
adj. $R^2$	0.05	0.18	0.03	0.12	0.04	0.06

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Column (1)-(2) outcome variable is an indicator variable equal to 1 if the husband worked last week. Columns (3)-(4) outcome variable is the quartic root of the number hours worked by the husband in the last 12 months. Column (5)-(6) outcome variable is the quartic root of the number hours worked by all male members of the household in the last 12 months. Columns (2), (4), and (6) only include households whose husband reported positive hours worked during the MXFLS-2 survey.

**Table B27: Effect of homicides on Male Labor Supply: Nuclear Households with Children**

	Husband Worked Last Week		Husband $\sqrt[4]{}$ Hours Worked Last 12 Months		Household Men $\sqrt[4]{}$ Hours worked last 12 months	
	(1)	(2)	(3)	(4)	(5)	(6)
$\sqrt[4]{}$ Homicide rate last 12 months	-0.006 (0.014)	-0.002 (0.012)	0.048 (0.101)	0.110 (0.086)	0.044 (0.106)	0.119 (0.080)
Household controls	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Observations	4,973	4,238	4,753	4,088	4,309	3,726
adj. $R^2$	0.05	0.17	0.03	0.10	0.03	0.06

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Column (1)-(2) outcome variable is an indicator variable equal to 1 if the husband worked last week. Columns (3)-(4) outcome variable is the quartic root of the number hours worked by the husband in the last 12 months. Column (5)-(6) outcome variable is the quartic root of the number hours worked by all male members of the household in the last 12 months. Columns (2), (4), and (6) only include households whose husband reported positive hours worked during the MXFLS-2 survey.

**Table B28: Effect of homicides on Male Labor Supply: All Households**

	Husband Worked Last Week		Husband $\sqrt[4]{}$ Hours Worked Last 12 Months		Household Men $\sqrt[4]{}$ Hours worked last 12 months	
	(1)	(2)	(3)	(4)	(5)	(6)
$\sqrt[4]{}$ Homicide rate last 12 months	-0.010 (0.013)	-0.002 (0.010)	0.014 (0.085)	0.089 (0.073)	0.023 (0.101)	0.115 (0.076)
Household controls	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Observations	7,640	6,223	7,317	5,998	6,506	5,365
adj. $R^2$	0.06	0.22	0.04	0.15	0.06	0.12

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Column (1)-(2) outcome variable is an indicator variable equal to 1 if the husband worked last week. Columns (3)-(4) outcome variable is the quartic root of the number hours worked by the husband in the last 12 months. Column (5)-(6) outcome variable is the quartic root of the number hours worked by all male members of the household in the last 12 months. Columns (2), (4), and (6) only include households whose husband reported positive hours worked during the MXFLS-2 survey.

Table B29: Effect of Homicides on Time Spent on Social Activities Outside the Household

	Wife			Husband		
	Extensive margin	# Hours	Quartic root hours	Extensive margin	# Hours	Quartic root hours
	(1)	(2)	(3)	(4)	(5)	(6)
✓ Homicide rate last 12 months	-0.017** (0.008)	-0.068 (0.058)	-0.023* (0.012)	-0.004 (0.012)	-0.008 (0.118)	-0.002 (0.018)
Intercept	0.457 (0.535)	3.904 (2.980)	0.760 (0.799)	0.129 (0.837)	-0.005 (7.157)	0.171 (1.405)
Household controls	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Observations	7,021	7,018	7,018	5,457	5,452	5,452
adj. $R^2$	0.00	0.01	0.01	0.01	0.00	0.01

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Column (1) outcome variable is an indicator variable equal to one if the respondent reported any hours participating in sports, cultural, or entertainment activities outside the household during the last week. Columns (2) and (3) outcome variables are the number of hours and the quartic root of the number of hours, respectively, participating in sports, cultural, or entertainment activities outside the household during the last week. The sample includes all households with children.

Table B30: Effect of Homicide Rates on Household Wealth and Earnings

	ln(Wealth)	✓ Total earnings last year	log(Total earnings last year)	Has Savings	✓ Savings	log(Savings)
	(1)	(2)	(3)	(4)	(5)	(6)
✓ Homicide rate last 12 months	-0.105 (0.124)	0.053 (0.292)	0.082 (0.200)	0.016 (0.013)	0.158 (0.111)	0.129 (0.095)
Household controls	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Observations	7,430	7,430	7,430	7,430	7,054	7,054
adj. $R^2$	0.01	0.02	0.02	0.02	0.02	0.02

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Column (1) outcome variable is the natural logarithm of the monetary value of all the following household assets: dwelling occupied by this household (including the land), other dwelling/building/real state/land/plot/agricultural/cattle or forest land, bicycles, motorcycles/trucks/cars/any other motorized vehicle, electronic devices (radio, TV, VCR, DVD player, computer, etc.), washer and dryer, stove, refrigerator, furniture, appliance (iron, blender, microwave, toaster, etc.), savings, financial assets, stocks, checking accounts, AFORES, coins and others, tractor/other machinery or equipment, livestock (cows, bulls, horses, pigs, chickens, etc.), other assets. Columns (2) and (3) outcome variables are the quartic root and logarithm, respectively, of last year labor earnings of all household members above 14 years old. Column (4) outcome variable is an indicator variable equal to one if any household member owns savings, defined as: savings, financial assets, stocks, checking accounts, AFORES, coins and others. Columns (5) and (6) are the quartic root and logarithm, respectively, of the monetary value of the savings asset. The sample includes all households with children.

Table B31: Effect of Homicide Rates on Expenditure Shares: Purchased versus Home Production/Gifts

	(1) Households with children Purchased	(2) HP/Gifts	(3) Nuclear with children Purchased	(4) HP/Gifts	(5) All households Purchased	(6) HP/Gifts
Food	−0.87 (0.59)	−0.02 (0.21)	−0.70 (0.63)	−0.24 (0.19)	−0.69 (0.52)	0.00 (0.24)
Drinks and Tob.	0.04 (0.14)	−0.02* (0.01)	0.00 (0.13)	−0.01 (0.01)	0.05 (0.13)	−0.00 (0.01)
Male adult clothing	0.26*** (0.08)	−0.01 (0.01)	0.29*** (0.09)	−0.01 (0.01)	0.21*** (0.07)	0.02 (0.02)
Female adult clothing	0.05 (0.07)	−0.01 (0.01)	0.07 (0.09)	−0.01 (0.01)	0.04 (0.06)	0.01 (0.03)
Children goods	−0.10 (0.14)	−0.05* (0.03)	−0.05 (0.17)	−0.06* (0.03)	−0.03 (0.13)	−0.04** (0.02)
Hygiene and care	−0.38* (0.20)		−0.37* (0.20)		−0.46** (0.18)	
Other household goods	0.23 (0.30)	−0.01	0.53* (0.32)	−0.00	0.23 (0.28)	0.00
Transportation	0.38 (0.29)	−0.01 (0.01)	0.20 (0.33)	−0.00 (0.01)	0.21 (0.29)	0.00 (0.02)
Health	0.14 (0.18)	0.01 (0.01)	0.24 (0.21)	0.00 (0.01)	0.23 (0.16)	0.01 (0.01)
Education	0.08 (0.12)		0.08 (0.13)		0.08 (0.09)	
Recreation	0.12 (0.16)		0.12 (0.20)		0.04 (0.16)	
Gambling	0.06 (0.04)		0.08 (0.05)		0.06* (0.03)	
Double Lasso	✓	✓	✓	✓	✓	✓
Survey FE	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Instrument expenditure	✓	✓	✓	✓	✓	✓
Observations	7,430	7,430	5,834	5,834	8,834	8,834

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . This Table reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11). Estimates are based on a control-function approach bootstrapping standard errors (500 replications) clustered at the municipality level. The dependent variables are budget shares of household goods, defined as the expenditure on that good divided by total household expenditure multiplied by 100.

Table B32: Effect of Homicide Rates on Expenditure Shares: Households with Same Respondent Across Survey Waves

	(1) Households with children	(2) Nuclear with children	(3) All households
Food	−0.85 (0.66)	−1.11 (0.70)	−0.80 (0.59)
Drinks and Tob.	−0.07 (0.16)	−0.06 (0.14)	0.02 (0.15)
Male adult clothing	0.26*** (0.09)	0.25** (0.10)	0.26*** (0.09)
Female adult clothing	0.07 (0.08)	0.08 (0.10)	0.08 (0.08)
Children goods	−0.09 (0.16)	−0.07 (0.19)	−0.05 (0.14)
Hygiene and care	−0.42 (0.26)	−0.41 (0.26)	−0.45** (0.22)
Other household goods	0.50 (0.33)	0.78** (0.35)	0.49* (0.27)
Transportation	0.36 (0.39)	0.07 (0.42)	0.21 (0.34)
Health	−0.04 (0.14)	0.06 (0.16)	−0.00 (0.15)
Education	−0.00 (0.15)	0.03 (0.17)	−0.00 (0.12)
Recreation	0.23 (0.21)	0.29 (0.25)	0.18 (0.18)
Gambling	0.07 (0.05)	0.09 (0.07)	0.07 (0.04)
Double Lasso	✓	✓	✓
Survey FE	✓	✓	✓
Household FE	✓	✓	✓
Instrument expenditure	✓	✓	✓
Observations	5,670	4,622	6,666

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Table B32 limits the sample to those households who had the same respondent on the consumption module in MxFLS-2 and MxFLS-3. It reports coefficient  $\gamma^k$  on the quartic of the homicide rate in 100,000 of each equation (11)

Table B33: Effect of Homicides on Who Is Present at the Time of the Interview

	Wife responds, nobody present (1)	Wife responds, spouse present (2)	Husband responds, nobody present (3)	Husband responds, spouse present (4)
✓ Homicide rate last 12 months	-0.009 (0.023)	-0.004 (0.012)	0.006 (0.008)	-0.006 (0.004)
Intercept	1.640*** (0.343)	-0.084 (0.200)	0.160 (0.137)	0.048 (0.093)
Household controls	✓	✓	✓	✓
Household FE	✓	✓	✓	✓
Outcome mean	0.52	0.10	0.05	0.02
Observations	7,420	7,420	7,420	7,420
adj. $R^2$	0.04	0.02	0.01	0.00

Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Column (1) outcome variable is an indicator variable equal to one if the wife responds and nobody else is present at the time of the interview. Column (2) outcome variable is an indicator variable equal to 1 if the wife responds and the spouse is present at the time of the interview. Column (3) outcome variable is an indicator variable equal to one if the husband responds and nobody else is present at the time of the interview. Column (4) outcome variable is an indicator variable equal to 1 if the husband responds and the spouse is present at the time of the interview.

## C Intra-Household Bargaining Power

### C.1 Violent Crime: Distribution Factors or Taste Shifter?

This section illustrates theoretically whether changes in violent crime affect preferences of private male goods matters for the conclusions derived from the Engel-curve results with respect to changes in intra-household bargaining power. I present comparative statistics with respect to violence of the Engel curves of male private assignable goods  $W_m^k$  specified in equation (9b).

**Case 1.**  $\frac{\partial \alpha^m}{\partial H_j} = \frac{\partial \beta^m}{\partial H_j} = 0$ . Changes in homicides do not affect preferences; they are *distribution factors*. Then, for any male private assignable luxury good  $m$ ,

$$\frac{\partial W_m^m}{\partial H_j} = -\frac{\partial \eta}{\partial H_j} \left( \frac{W_m^m}{(1-\eta)} + \beta^m \right) \quad (\text{C1})$$

$$\frac{\partial W_m^m}{\partial H_j} \geq 0 \quad \text{if and only if} \quad \frac{\partial \eta}{\partial H_j} \leq 0. \quad (\text{C2})$$

The empirical results provide evidence of  $\frac{\partial W_m^m}{\partial H_j} > 0$  in male clothing. Because the second term of equation (C1) is non-negative (male clothing is a luxury good,  $\beta^m \geq 0$ ), it must be that  $\frac{\partial \eta}{\partial H_j} < 0$ ; that is, the increase in violence decreases women's resource shares in the household (a proxy for bargaining power).

**Case 2.**  $\frac{\partial \alpha^m}{\partial H_j} \leq 0$  and  $\frac{\partial \beta^m}{\partial H_j} \leq 0$ . Changes in violence may shift downward the intercept and slope of the Engel curves of male private goods. Then,

$$\frac{\partial W^m}{\partial H_j} = -\frac{\partial \eta}{\partial H_j} \left( \frac{W^m}{(1-\eta)} + \beta^m \right) + (1-\eta) \left( \frac{\partial \alpha^m}{\partial H_j} + \frac{\partial \beta^m}{\partial H_j} \ln((1-\eta)y) \right) \quad (C3)$$

$$\frac{\partial W^m}{\partial H_j} \geq 0 \quad \text{if and only if} \quad \frac{\partial \eta}{\partial H_j} \leq 0. \quad (C4)$$

Under these assumptions, the empirical results would still be supportive of increases in violent crime leading to increases in male bargaining power.

**Case 3.**  $\frac{\partial \alpha^m}{\partial H_j} \geq 0$  or  $\frac{\partial \beta^m}{\partial H_j} \geq 0$ , with at least one of them with strict inequality. Changes in homicides may shift downward the intercept and slope of the Engel curves of male goods. Then, it may be the case that  $\frac{\partial W^m}{\partial H_j} > 0$  and  $\frac{\partial \eta}{\partial H_j} \geq 0$ .

## C.2 Resource Shares

Figure C1: Budget Shares vs. Resource Shares

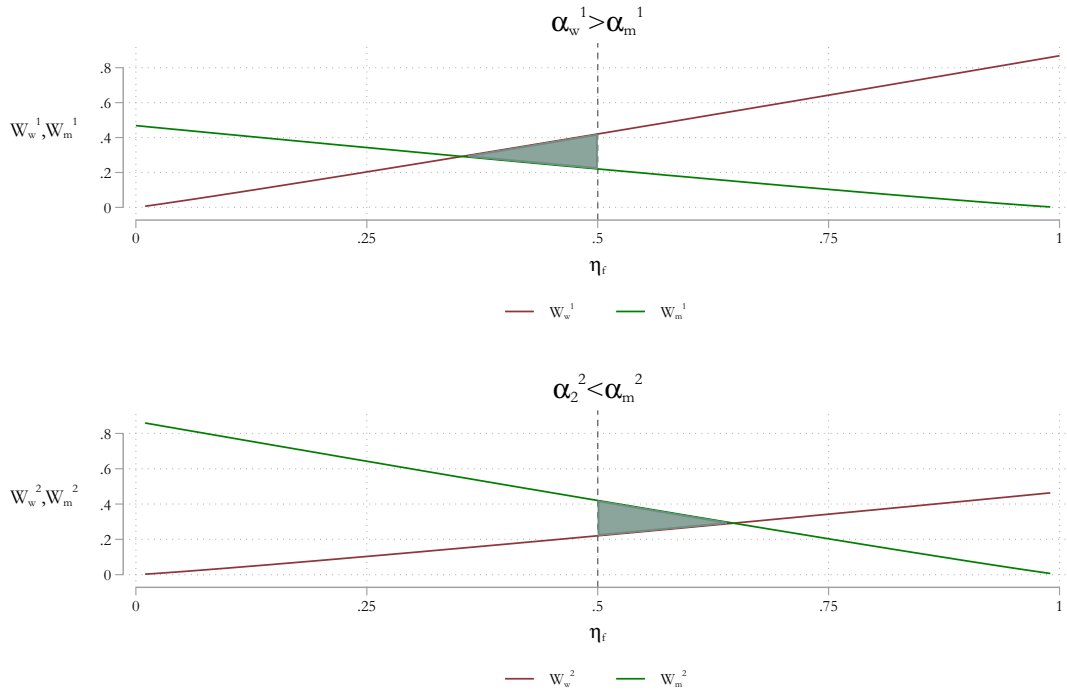
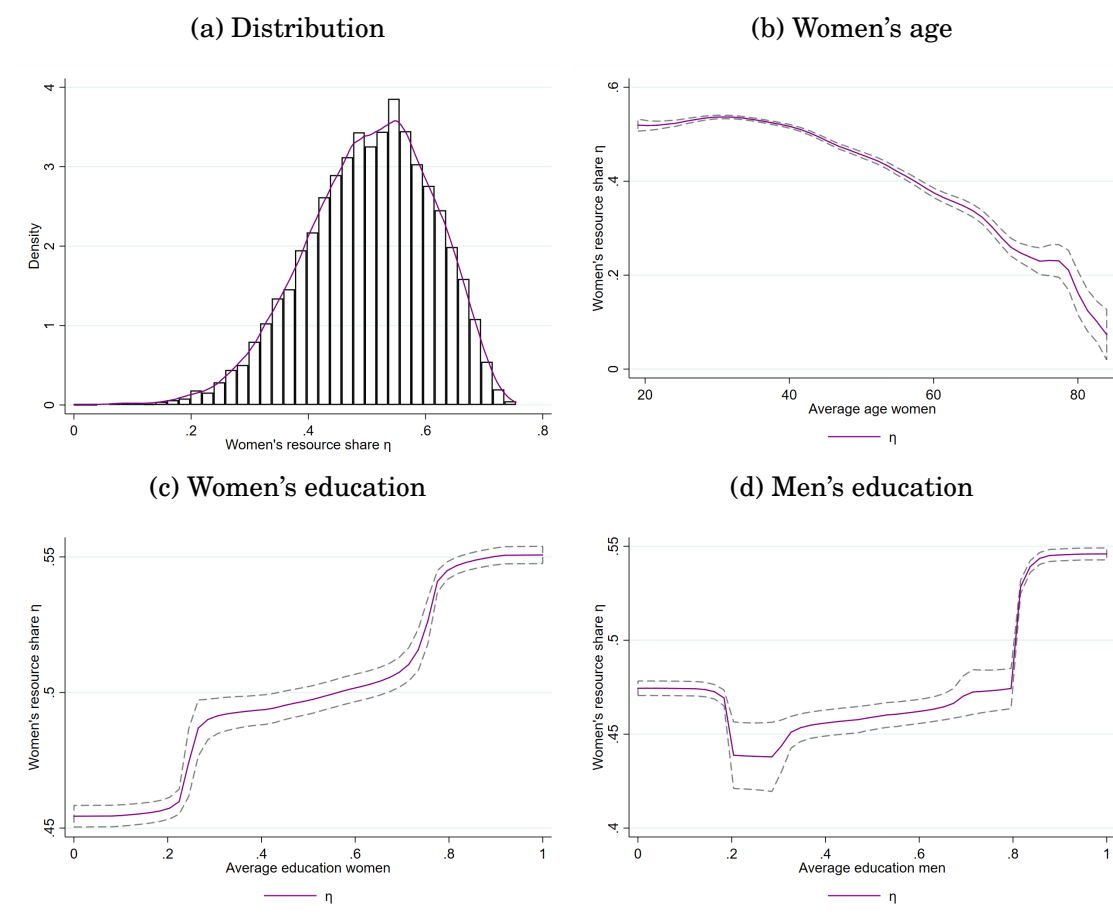




Figure C2: Average Predicted Women's Resource Shares



Notes: The figure plots the average predicted women's resource share. Figure C2a plots the distribution of the average predicted shares. Figures C2b, C2c, and C2d show women's average resource shares against the average age of women in the household, the proportion of female adults with a secondary education, and the proportion of male adults with a secondary education, respectively. The dashed lines are 95% confidence intervals. Estimates come from column (1) of Table 7.

### C.3 Single Households

Table C1: Descriptive Statistics: Single-Household Characteristics in 2005-2006

	(1) Male head	(2) Female head
Age	59.31	57.43
Secondary educ.	0.23	0.23
Never married	0.34	0.19
Separated/Divorced	0.22	0.29
Widowed	0.44	0.53
Household size	2.64	3.27
# hh members $\leq 18$	0.63	1.14
Observations	337	994

Notes: Columns (1) and (2) report the average characteristic described on each row for male- and female-headed single households in MxFLS-2, respectively.

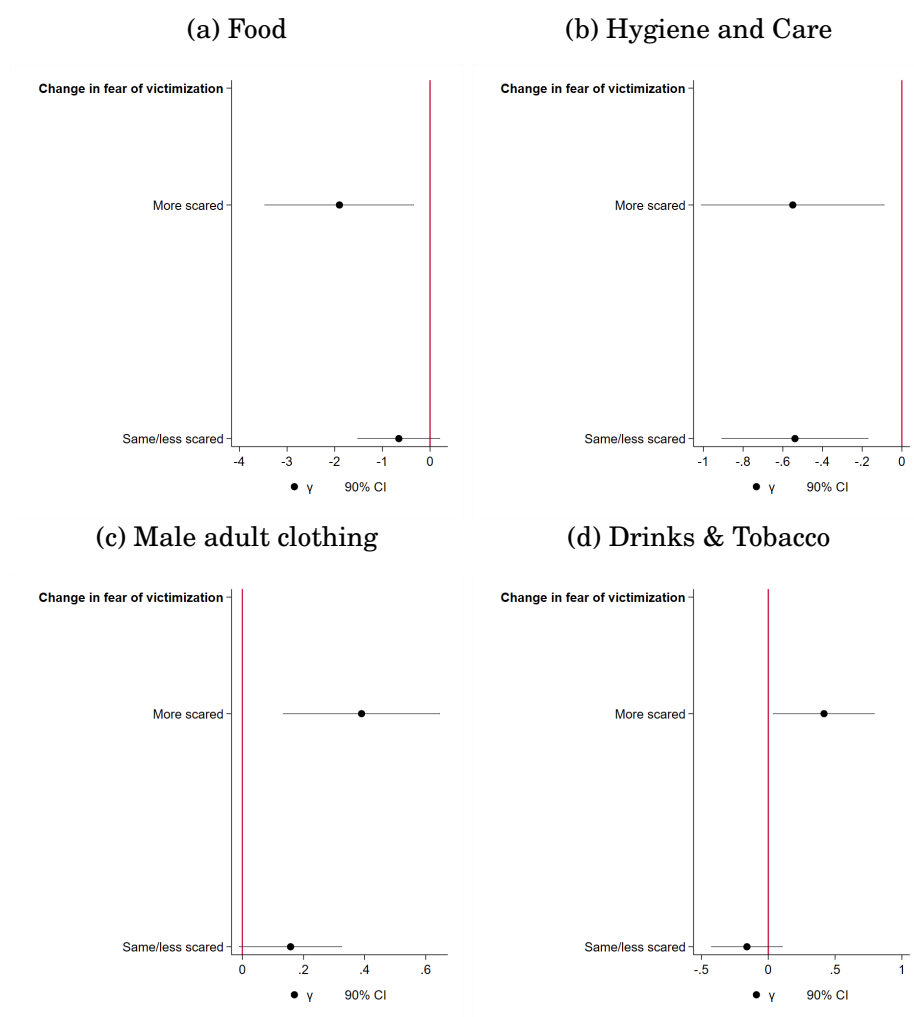
## D Discussion

Table D1: Effect of Homicides on Fear of Victimization

	Wife				Husband			
	Scared attacked day (1)	Scared attacked night (2)	Feels safer than 5 years ago (3)	Expect attack next year (4)	Scared attacked day (5)	Scared attacked night (6)	Feels safer than 5 years ago (7)	Expect attack next year (8)
$\sqrt{\text{Homicide rate last 12 months}}$	0.060 (0.037)	0.087** (0.040)	-0.083*** (0.028)	0.109* (0.056)	0.058 (0.037)	0.039 (0.036)	-0.047* (0.027)	0.078 (0.052)
Intercept	0.055 (1.903)	1.209 (1.796)	0.336 (1.085)	0.008 (2.139)	-1.568 (1.701)	-1.836 (1.734)	0.964 (1.530)	-2.859** (1.260)
Household controls	✓	✓	✓	✓	✓	✓	✓	✓
Month and year of interview FE	✓	✓	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓	✓	✓
Observations	5,313	5,313	5,313	4,713	5,247	5,247	5,247	4,752
adj. $R^2$	0.01	0.01	0.04	0.02	0.03	0.02	0.05	0.02

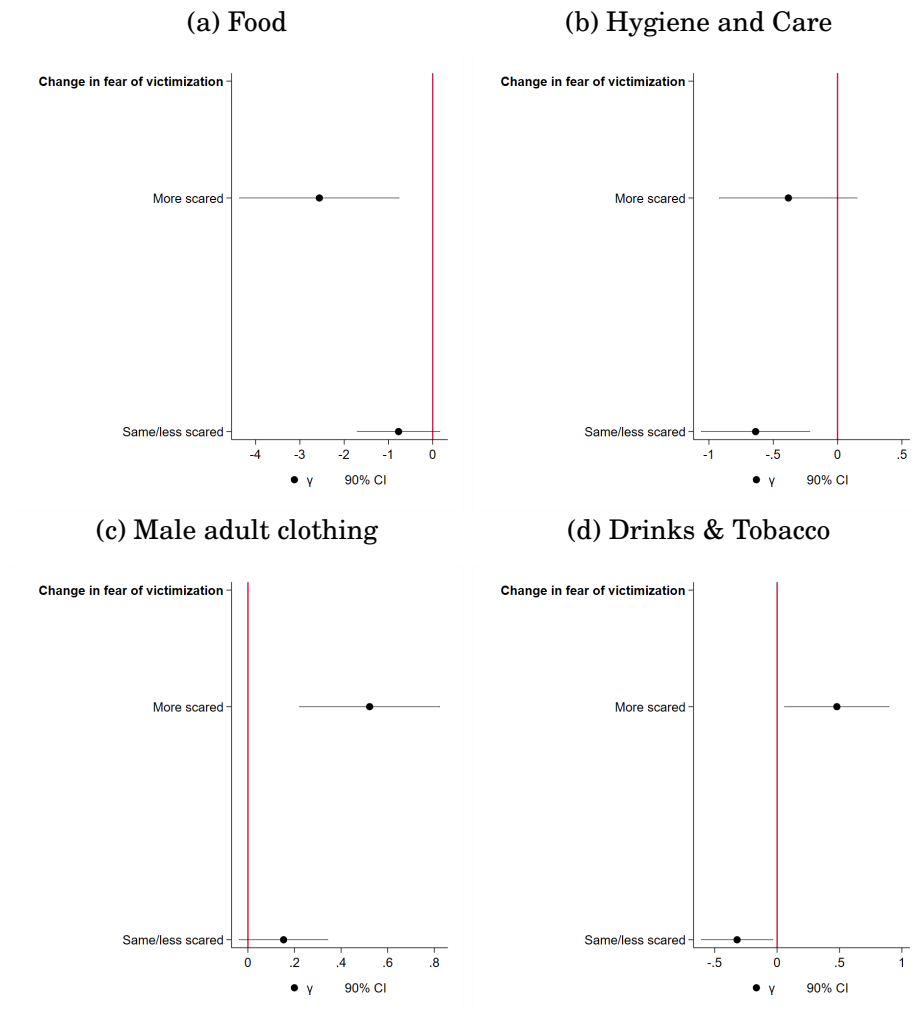
Notes: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors, in parentheses, are clustered at the municipality level. Columns (1) and (5) outcome variables are responses to 4-point Likert scales on how scared individuals feel of being attacked or assaulted during the day. Columns (2) and (6) outcome variables are responses to 4-point Likert scales on how scared individuals feel of being attacked or assaulted during the night. Columns (3) and (7) outcome variables are responses to 3-point Likert scales on how safer individuals feel compared to five years ago. Columns (4) and (8) outcome variables are responses to 4-point Likert scales on the likelihood individuals attach to being assaulted or robbed next year.

Figure D1: Heterogeneous Effects of Homicide Rates on Expenditure Shares: Households with Children



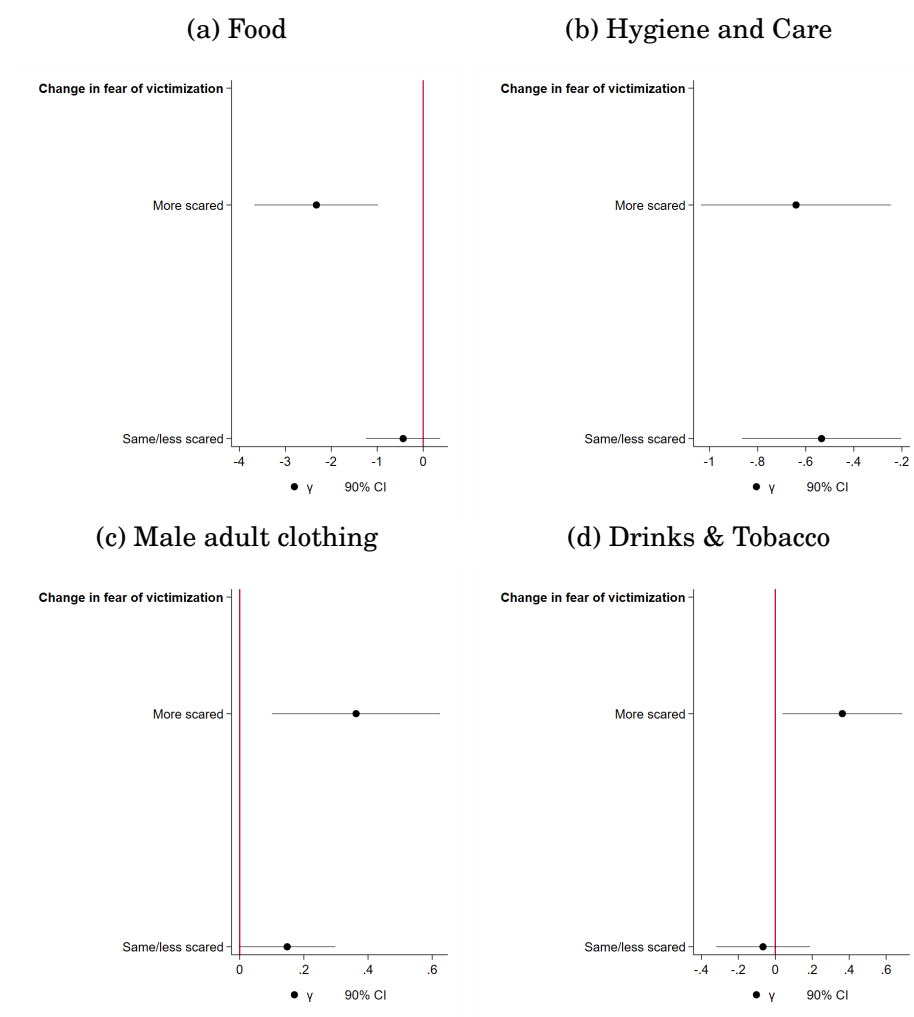
Notes: Figure D1 plots marginal effects of increases in homicide rates on expenditure shares. Each coefficient is estimated in a separate regression in which the sample is restricted to the categories reported in the left columns. Standard errors are clustered at the municipality level. "More scared" means the wife reports a higher fear of being attacked during the day in MxFLS-3 than in MxFLS-2. "Same/less scared" means the wife reports the same or lower fear of being attacked during the day in MxFLS-3 than in MxFLS-2.

Figure D2: Heterogeneous Effects of Homicide Rates on Expenditure Shares: Nuclear Households with Children



Notes: Figure D2 plots marginal effects of increases in homicide rates on expenditure shares. Each coefficient is estimated in a separate regression in which the sample is restricted to the categories reported in the left columns. Standard errors are clustered at the municipality level. “More scared” means the wife reports a higher fear of being attacked during the day in MxFLS-3 than in MxFLS-2. “Same/less scared” means the wife reports the same or lower fear of being attacked during the day in MxFLS-3 than in MxFLS-2.

Figure D3: Heterogeneous Effects of Homicide Rates on Expenditure Shares: All Households



Notes: Figure D3 plots marginal effects of increases in homicide rates on expenditure shares. Each coefficient is estimated in a separate regression in which the sample is restricted to the categories reported in the left columns. Standard errors are clustered at the municipality level. “More scared” means the wife reports a higher fear of being attacked during the day in MxFLS-3 than in MxFLS-2. “Same/less scared” means the wife reports the same or lower fear of being attacked during the day in MxFLS-3 than in MxFLS-2.